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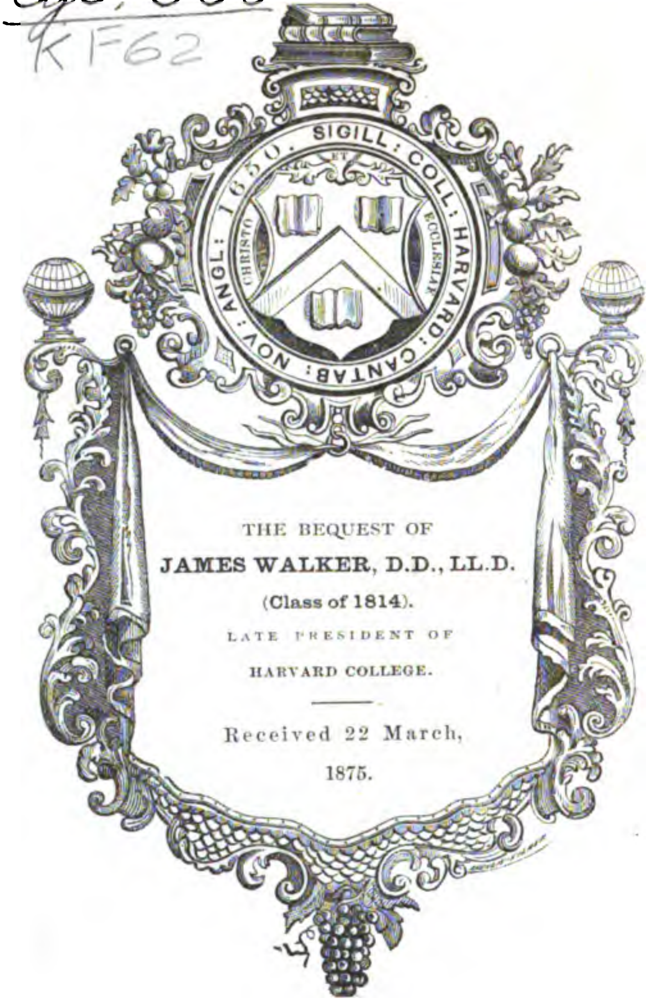

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INTESTINES are that portion of the digestive canal into which the food is received after it has been partially digested in the stomach, and in which its further assimilation, the separation and absorption of the nutritive matter, and the removal of that which is excrementitious, take place. In an adult, the intestines consist of a convoluted tube of from 30 to 40 feet in length, and are, from the difference of their diameters in different parts, divided into small intestines, which comprise about the first four-fifths, and large intestines, which constitute the other fifth of their length. The former again are divided into the duodenum, into which the ducts from the liver and pancreas open, and in which the chyme from the stomach is converted into chyle [Digestion; Chyle]; the jejunum, in which the absorption of the nutritive matter of the food is principally effected; and the ileum. The large intestines are divided into the cœcum, colon, and rectum.

The walls of the intestinal canal are composed of three principal coats or membranes. The exterior, which is smooth and polished, is called the peritoneal, and its principal use is to permit the free motions of the intestines within the abdomen, and of their several convolutions against each other, by rendering the effect of friction as slight as possible. Next to and within the peritoneal coat is the muscular, which is composed of two layers of fibres; an external, in which they are directed longitudinally, and an internal, of which the fibres encircle the intestine. By these the motions of the intestines and the propulsion of their contents are effected; the longitudinal fibres tending to shorten each portion of the canal, while the circular contract its diameter; and the two sets together producing a motion of the tube somewhat like that of a worm, whence it has received the name of vermicular motion. Beneath these layers, and separated from them by a stratum of cellular tissue, which has been sometimes called the fourth or nervous coat, is the mucous membrane, which is the most important part of the intestinal canal. It is everywhere beset by innumerable minute glands, by which the secretion of mucus and the other intestinal juices is carried on. In the small intestines it has a fine velvet-like surface, made up of minute thickly-set hair-like processes, or villi, which are about $\frac{1}{\text{[illegible]}}$th of an inch in length, and stand up so that their tops seem to form a smooth surface like the pile of velvet. These, as well as all the rest of the mucous membrane, are protected from the irritation which the immediate contact of foreign substances would produce, by a covering of an inorganic cuticle of extreme delicacy, called epithelium.

The principal functions performed by the intestines are the conversion of the chyme [Digestion; Gastric Juice] into chyle, the absorption of the latter, and the removal of the innutritious parts of the food and of a considerable quantity of excrementitious matter. In the first process, which constitutes the last stage of digestion, the secretions of the liver and pancreas take an important part; the ducts by which they are conveyed open into the intestinal canal, near the middle of the duodenum, or about six inches from the aperture by which the food passes from the stomach; and immediately beyond the orifices of these ducts the villi are of great size, and thickly set on prominent folds of the mucous membrane, called valvulæ conniventes. These folds, at the same time that they increase the extent of surface for absorption, serve to entangle the semifluid mass of food, now completely digested; they are most numerous and prominent in the jejunum, where absorption is carried on earliest and most rapidly, but are found to a slighter extent throughout the whole of the small intestines. The absorption of the chyle is effected by the villi, each of which is composed of a minute tube, which is the termination of a branch of the lacteal or absorbent system of vessels, and is ensheathed in a delicate tissue containing a net-work of capillary arteries and veins. The form and function of the villi may be best demonstrated in an animal which has died suddenly after a full meal; they then appear turgid, and stand erect, filled with a whitish milky fluid, the chyle, which, as fast as it is absorbed by them, is conveyed by numerous converging streams into the main trunk of the absorbent system, called the thoracic duct, through which it is gradually poured into the blood of the left subclavian vein, at a short distance before it enters the right side of the heart. [Heart.] The whole process of absorption is not unaptly compared to that by which the fluids are conveyed from the earth through the roots into the stem of a plant; the villi of the intestine being represented by the tufts of hair-like spongioles which are placed at the terminations of the fibres of the root.

The portion of the food which is unfit for the nourishment of the body is forced onwards by the vermicular motion of the intestines, and being mixed with the resinous and other excrementitious substances secreted by the liver and other glands, is conveyed through the whole tract of the intestines; and after it has been exposed to the absorbing vessels, which are placed in greater or less abundance in every part of the canal, so that not a particle of nutriment can be lost, the residue is voided.

INTONATION, in vocal music, is the tuning of the voice—the singing true or false—in tune or out of tune. Correct *Intonation* is the first requisite in a singer; this wanting, all his other musical qualities, however good, are unavailing.

INTRA'DOS and **EXTRA'DOS**, the lower and higher curves of an arch. [Arch.]

INTRICA'RIA, a small Polypifer from the oolitic rocks of France, allied to Cellaria. (M. Defrance, *Dic. des Sci. Nat.*)

INTUITION (*intueri*), the most simple act of the reason or intellect, on which, according to Locke, 'depends all the certainty and evidence of all our knowledge; which certainty every one finds to be so great, that he cannot imagine, and therefore cannot require a greater. For a man cannot conceive of a greater certainty than that any idea in his mind is such as he perceives it to be, and that two ideas, wherein he perceives a difference, are different and not precisely the same.' His definition, or rather explanation, of intuition is as follows:—'Sometimes the mind perceives the agreement or disagreement of two ideas immediately by themselves, and this, I think, we may call intuitive knowledge. In this the mind is at no pains of proving or examining, but perceives the truth as the eye does the light, only by being directed to it.' (*Essay on Human Understanding*, b. iv., c. ii., § 1.) Campbell's definition is similar: having defined truth to be the conformity of our conceptions to their antetypes in the nature of things, he declares intuitive truth to be that 'which is perceived immediately on a bare attention to the ideas under review.'

The nature of the relation which subsists between intuition and reasoning has been strongly contested. While Beattie maintains that the connexion between them, how closely soever they are found in general to be connected, is not necessary, but, on the contrary, a being endued with one may be destitute of the other; Dugald Stewart, on the other hand, insists that the two are not radically distinct, although by most writers they are considered to be different faculties. Locke having rightly maintained that every step which the reason makes in demonstrative knowledge has intuitive certainty, and that consequently the power of reasoning presupposes that of intuition, Stewart thinks that the intuition of Locke implies the power of reasoning; or, at least, that intuition combined with memory explains reasoning. Here his usual sagacity appears to have failed Stewart. While the mind itself is perfectly simple, it has been, for the purpose of attaining accuracy of language and distinctness of theory, supposed to be multiple; and distinct faculties have been ascribed to it according as its several operations comprise more or fewer elements. According therefore to his own account, reason, which involves the element of time, must be kept distinct from intuition, which does not involve that element.

The proper objects of intuitive certainty are identical propositions. This of course does not mean propositions verbally identical; such as 'a man is a man.' But while the object of thought is perfectly and always one, it may present itself to the thought under a variety of aspects, either dissolved into its elements or as combined into a whole. It is this identity under an apparent diversity that constitutes that original and primary evidence which makes certain propositions, as soon as the respective terms are understood, to be perceived intuitively. On the other hand, the apparent identity of a real diversity is the ground of all sophistical argument. The ultimate form of legitimate argumentation is, $a = b$, $b = c$, $\therefore a = c$. But every fallacy, when detected, will invariably be found to be $a = b \pm r$, $b = c$, $\therefore a = c$. The sophistry consists in the suppression of the element r, either positive or negative.

In the philosophy of Kant the term intuition (anschauung) is used to denote the single act of the sense upon outward objects according to its own laws. It appears to be employed in a like sense in the following extract from Glanvil—'Some say that the soul is not passive under the material phantasms; but doth only *intuitively* view them by the necessity of its own nature, and so observes other things in these their representatives.' (*Vanity of Dogmatising*, c. iv., p. 29.)

I'NULA, a genus of composite plants, one of whose species, I. Helenium, is used medicinally. This plant is a native of various parts of Europe, in pastures and woods; it has a thick bitter mucilaginous root, a stout stem three feet high, broad ovate serrated leaves, and large yellow flowerheads, which are solitary at the end of the ramifications.

I'NULA HELENIUM (Elecampane), an indigenous perennial herbaceous plant, found in moist meadows, the root of which is used in medicine. This part is thick and branching, brown externally, white internally, with an aromatic odour and a mucilaginous taste, at first bitter, afterwards sharp and camphor-like. In addition to mucilage and a large quantity of a variety of starch termed *inulin*, it contains a crystallized volatile oil (stearopten), a bitter extractive, an acrid resin, and some salts of lime, &c.

These ingredients give it a tonic and stimulating property, and it is employed in debility of the stomach, and other diseases of mucous surfaces unattended with inflammation. It is however not much used.

INULIN, a peculiar vegetable substance which is spontaneously deposited from a decoction of the roots of the *Inula Helenium*. It is a white powder, like starch, is insoluble in cold and soluble in hot water, from which it is deposited on cooling, and this distinguishes it from starch. With iodine it gives a greenish-yellow compound, which is not permanent. Inulin is distinguished from gum by its insolubility in cold water, and by not giving saccholactic acid when digested in nitric acid.

INVARIABLE (Mathematics), the same word in meaning as CONSTANT, which see. There are however two sorts of constants, which it is desirable to treat under different names: the first, which we may call a constant, or a common constant, meaning a quantity which is absolutely invariable; the second meaning a function which may vary, but which does not vary in the processes required by a given equation. This we propose to call the invariable function of that equation, or its invariable.

Thus, in a common differential equation, which is supposed to be true of y and x when x passes through all stages of magnitude whatsoever, the only invariable is an absolute invariable, or a common constant. But in an equation of differences, in which x only passes from one whole number to another, the invariable function is any one which remains unaltered by changing x from one whole number to another. Thus, [INTEGRATION, FINITE] instead of saying that the solution of $\Delta y = x + 1$ is $\frac{1}{2}(x^2 + x) + C$, where C is a constant, we may allow C to be any function of x, which is unaltered by changing x from one whole number to another. Such a function is $\phi(\cos. 2\pi x)$, so that the solution is $\frac{1}{2}(x^2+x) + \phi(\cos. 2\pi x)$, and the last term is the invariable of the equation.

Again, suppose it required to solve the functional equation $\phi(x^2) = 2\,\phi x$. One solution of this is $\phi x = c \log x$, where c is any absolute constant. But the equation is solved if c be a function of x, provided it be one which does not change when x is changed into x^2. Such a function is

$$\cos. \left\{ 2\pi \frac{\log. \log x}{\log 2} \right\} \text{ or any function of it,}$$

$$\text{or } \phi x = \text{any function of } \cos. \left\{ 2\pi \frac{\log. \log x}{\log 2} \right\} \times \log x.$$

General methods of finding invariable functions, as far as they have yet been given, will be found in the 'Encyclopædia Metropolitana,' article 'Calculus of Functions.'

INVENTION. This term, when used in the language of art, has a different signification from what it usually bears in common language. It does not mean *discovery*, but combines *conception*, or the peculiar way in which an artist's mind takes cognizance of a subject to be represented, with the *mode of treatment*, or choice of objects and manner of disposing them best adapted for producing a desired effect. Thus, in painting and sculpture, it is the faculty by which the most perfect mode of illustration, by colour or by form, is suggested to the artist, and by which the mind of the spectator is led to comprehend the truth, the intention, and the whole purpose of the work before him; but so distinct is it at the same time from perfect execution, that it is often found to exist independently of excellence in that particular, some of the finest inventions in art being manifestly defective in technical requirements. It is therefore the highest quality in the constitution of the artist's mind; as Opie says, 'Destitute of invention, a poet is but a plagiary, and a painter a copier of others.' (*Lectures on Painting*.)

It is hardly necessary to enter into the question whether the power of invention be a primary and original law of the mind, or whether the effect of cultivation. Some have believed it may be a result of acquirements begun in youth, and carried on till the power is developed and perfected; others conceive that it is unattainable by any human effort, and is part of the original constitution of the mind.

But even admitting invention to be a gift of nature, and not reducible to rule, nor to be taught by any regular process, it still may be improved by study. Whatever natural disposition or original capacity may exist—and it will not, we suppose, be denied that some minds are more bountifully endowed than others—every power short of *creation* must have groundwork and foundation *on* which and *out of* which to exercise itself; and even the inventive faculty, which seems to approach nearest to creation, depends upon knowledge, by whatever means acquired, for materials with which to develop and declare itself. Sir Joshua Reynolds

(*Discourses*) says, 'He who has the most materials has the greatest means of invention, and if he has not the power of *using* them, it must be from a feebleness of intellect;' and '*it* is in vain to endeavour to invent without materials on which the mind may work,' &c.

Raffaelle, by the wonderful ability and power which he has shown in choosing subjects in which the greatest quantity of matter or incident could be introduced, and then in representing them at the most critical moment for illustration, in combining all the most striking and affecting circumstances, and filling the spectator's mind with the whole story, by bringing before him, as it were, the past, the present, and even suggesting that which is to follow, may justly be considered the greatest master in invention. He was gifted, if any man ever was, with the fullest portion of natural and inherent genius, but he attained his eminence by the most persevering course of exercise and observation, as the necessary and only means through which the inventive faculty could be manifested. He studied nature diligently and profoundly in all her varieties of beauty and expression. Nothing seems to have escaped him; everything that offered itself out of her great storehouse was treasured as serviceable to his art, and he acquired such an accumulation of materials, serving as handmaids to his invention, that whatever subject came before him found him prepared, and was immediately dignified with all the expression, truth, propriety, and completeness, if we may use the word, that it was capable of receiving. Raffaelle never reached the perfect beauty and character almost superhuman which appear in the finest works of the Greeks, nor, in colour, the magic brilliancy and breadth of Titian, another master-spirit; yet, in the largest and most comprehensive sense of the quality we have been describing, he stands (perhaps with one mighty exception) without an equal or a rival.

The examples which may be most satisfactorily adduced in illustration of invention in the fine arts, both for their excellence and for the facility of reference, as we are so fortunate as to possess them in this country, are the Cartoons of Raffaelle preserved at Hampton Court. Of these the 'Paul preaching at Athens,' 'The Sacrifice at Lystra,' and 'The Death of Ananias,' may be selected as the most remarkable for the quality we have been considering.

Equally admirable, though totally in a different style, the frescoes of Michael Angelo, in the Sistine Chapel at Rome, must be quoted as triumphs of invention, a proud achievement of the human mind. The comprehensiveness of his scheme of illustration, with the greatness and energetic character of his design and composition, render this one of the finest monuments that art has to boast. In viewing the magnificent works of these two masters, namely, of M. A. Buonarotti, in this chapel, and of Raffaelle d'Urbino, in the loggie and stanze of the same palace (the Vatican), the spectator has a series of examples of as wonderful efforts of inventive genius in historical design as it seems possible to produce. The works of Rubens offer also fine examples of invention, though the quality of his design, or rather of his forms, was not according to a classical or pure standard.

It should be observed here that invention is quite *independent* of the *class* of design; its force and power may be displayed in every part of the art, and in subjects of inferior grade, or even in the mode of treating colour, light, and shade. Rembrandt, to proceed with further illustration, is one of those who displayed very high powers of invention; 'a genius,' Fuseli says, 'of the first class in whatever relates not to form;' and he justly eulogises his 'powers of nature' and 'the grandeur, pathos, and simplicity of his composition.' Thus also, though the quality of his art was not of the highest or grand class, the merit of invention is eminently due to our own Hogarth. Opie, in speaking of this artist, alludes in terms of high admiration to a fine example of invention in one of his pictures of the series called 'The Rake's Progress.' In the bagnio scene he has introduced in the back-ground one of the dissolute women of the party setting fire to a map of the World.

We have referred only to a very few out of the numerous artists whose works are worthy of attention as examples of invention; and have confined ourselves to some of the leading painters, though we might easily multiply them from productions in the sister art. Enough however has been said to point out the nature and value of that high quality in design, and to enable the intelligent observer to recognise and appreciate it when he meets it in the productions of artists, and discriminate between the efforts of elevated and original minds and the commonplace performances of mere mechanical copiers. Invention is required in every branch of art to raise it above tameness and insipidity: it is indeed the magic power by which works of art first attract and then fix the attention.

It is hardly necessary to observe, that, difficult as it may be to prescribe bounds to the imagination or the power of invention, it has in art certain and defined limits beyond which the painter and sculptor should not attempt to venture. When the artist dashes into extravagance, defies or outrages nature, and, with a view of exciting wonder, steps out of the region of what is, has been, or may be, he only shows that he has been gifted with fancy, but that it is wild and ill-regulated; he may awaken surprise, and may mistake it for admiration, but he will produce no lasting nor beneficial impression, and his undisciplined fantasy will never deserve to be ranked with the genius that has nobly illustrated nature by the only just, safe, and legitimate means, namely, her own beautiful, and expressive, and perfect works.

INVENTORY. [Executor.]

INVERARY, a royal burgh and seaport, capital of the county of Argyle, situated on a small bay at the head of Loch Fyne, where the river Aray falls into that arm of the sea, 75 miles west by north from Edinburgh. The town was erected into a royal burgh by charter granted by Charles I. and dated 28th January, 1648. (*Municipal Corporation Reports.*) The whole territory, with the exception of a small feu, is the property of the Duke of Argyle, of whom the inhabitants hold their houses and grounds either under leases or as tenants at will. It is governed by two baillies and nine common-councillors. The annual income of the burgh is about 180*l.* and the annual expenditure is somewhat less. The town consists chiefly of one row of houses facing the bay, built with great uniformity and covered with slate. The arrangements for watching, cleaning, lighting, and the supplying of water are confided to the town council, and the expenses are defrayed from the proceeds of the burgh manure. The inhabitants are principally engaged in the herring-fishery in Loch Fyne, which is said to have produced in some seasons upwards of 20,000 barrels. (*Beauties of Scotland*, vol. v., p. 437.) The grammar-school is superintended by a teacher, whose salary is 20*l.* The number of scholars during the last 10 years has varied from 25 to 30 annually. The population of the burgh and parish in 1831 was 1117.

Inverary Castle, the principal seat of the Duke of Argyle, is situated near the northern extremity of Loch Fyne. It is a quadrangular building, with a tower at each corner, and a high glazed pavilion rising from the centre of the roof. The stone of which it is constructed, though soft, is very durable, and becomes perfectly black when wetted by a shower. The spacious hall, which is hung with arms and other ornaments, is lighted by a lofty window, and surrounded by a gallery. The other apartments are fitted up in a modern style and with good taste. (*Parliamentary Papers; Beauties of Scotland*, &c.)

INVERNESS, a seaport town and royal burgh of some antiquity, the capital of the county of Inverness, and the principal town of the Highlands. It is situated at the southern extremity of the Moray Frith near the eastern entrance of the Caledonian Canal, 155 miles north by west from Edinburgh. The earliest charters upon record are those of King William the Lion, four in number, conferring several privileges upon the burgesses, which were confirmed and extended by the subsequent charters of Alexander II., III., Robert I., David II., James II., Queen Mary, and James VI. The last constitutes the governing charter of the town, and is dated 1st January, 1591. (*Municipal Corporation Reports.*) The management of the affairs of the burgh is vested in a provost, three baillies, and 15 town councillors. In 1832 the estimated value of the burgh property, consisting principally of lands and other heritable property, was 20,811*l.*; producing an annual revenue of 2236*l.* The annual expenditure at the same period was 2058*l.*, and at Michaelmas 1833 the aggregate debt was 10,614*l.* The town is large and well built; the houses are lofty, and many of them elegant. The streets have, since 1831, been paved with granite and hard sandstone brought from the banks of Loch Ness. Common sewers have been constructed, and the town is well lighted with gas, and supplied with water by means of pipes from the adjacent river. The system of police is also described as most efficient. The public buildings consist of three national churches, an Episcopalian church, a court-house, and Tolbooth. The last is a handsome modern building with a fine tower terminated by a very elegant spire. The central school-house, situated upon the Green of Muirtown, is also a fine building, and comprises a large public hall, with six spacious apartments for the accommodation of the different classes and for the library and philosophical apparatus. Inverness is the centre of the custom-house district, which extends from the mouth of the Spey to Dornoch Frith on the east coast, and from Assynt Point to Ardnamurchan on the west. 'A striking alteration has of late taken place in the trade of grain; within fifteen years about 8000 to 10,000 bolls of oatmeal used to be imported annually into Inverness; while now from 4000 to 5000 bolls of oats are exported from its piers. . . . . The foreign annual imports into Inverness consist of from 400 to 600 tons of hemp, and three or four cargoes of timber or Archangel tar.' (*New Statistical Account of Scotland.*) There is no compulsory assessment for the support of the poor, who are provided for by special quarterly collections, by several charitable mortifications at the disposal of the magistrates, and from other sources. A short account of schools, which are numerous and upon the whole well conducted, is given in the article INVERNESS-SHIRE. The population of the burgh and parish of Inverness in 1831 was 14,324. The people in Inverness speak very good English: the tradition is that they learned it from Cromwell's soldiers. The climate of Inverness is much milder than might be supposed from its northern position in the island. Its mean annual temperature is about 47°, while that of the neighbourhood of London is about 48·5°, and that of London 50·5°. The mean annual quantity of rain which falls at Inverness is about 26·21 inches. This borough unites with Fortrose, Nairn, and Forres in returning one member to parliament.

INVERNESS-SHIRE, a maritime county of Scotland, bounded on the north by Ross-shire, on the south by the shires of Perth and Argyle, on the east by those of Nairn, Elgin, Banff, and Aberdeen, and on the west by the Atlantic Ocean; the mainland is comprised between 56° 40′ and 57° 36′ N. lat., and between 3° 50′ and 5° 50′ W. long. from Greenwich. Its greatest length from north-east to south-west is 88 miles, and its greatest width from north-west to south-east nearly 55 miles. According to Mr. M'Culloch (*Statistical Account of the British Empire*) the entire county contains 4245 square miles, or 2,716,800 acres, of which the mainland occupies 1,943,920, and its islands 773,760; the former having 84,480, and the latter 37,760 acres of water. It comprehends various districts, particularly that of Badenoch on the south-east, where it borders upon Perth and Aberdeenshire; Lochaber on the south adjoining Argyleshire; Glenelg on the north-west bordering upon the ocean; besides many inferior districts, such as Glengary, Glen Morrison, Glenshiel, &c. It also comprehends a considerable portion of the Hebrides, or Western Isles, including the Isles of Skye, Harris, Benbecula, North and South Uist, Barra, &c. [HEBRIDES.] This county, which is extremely mountainous, is intersected by innumerable lakes and rivers, and is divided into two nearly equal parts by the deep valley of Glenmore, which runs in a direction from Fort William on the south-west to the town of Inverness on the north-east. This county forms a large part of the Highlands of Scotland, and the general description of its geographical features cannot well be separated from that of the division of the island to which it belongs. [GREAT BRITAIN, p. 402.] By far the greater part of the surface is covered with heath, but a good deal of the heathy ground is arable, and a considerable extent of it has been brought into cultivation during the present century. The population in 1831, according to the population returns for that year, was 94,797, of which 44,510 were males, and 50,287 females. The valued rent at the same period was 73,188*l.* Scotch, but the annual value of real property in 1815 was 185,565*l.* The county sends one member to parliament. [INVERNESS.]

Geology and Mineralogy.—The prevailing rocks are of the primary class, having a highly crystalline structure, and being entirely destitute of organic remains. Gneiss is perhaps the most abundant, but huge masses of granite and of the oldest trap or porphyritic rocks are met with in the Grampians and the mountains of Glencoe and Ben Nevis. Limestone is found in several districts, and approaches to the nature of marble, particularly near Ballachulish and in the bed of the river three miles south of Fort William. Sandstone is also frequently met with. The beds of the stratified rocks are usually highly inclined to the horizon, approaching almost to the vertical, but the dip varies. Their general direction is from south-west to north-east. The two principal mountains are Ben Nevis and Mealfourvounie. The former, which is separated from the Grampians by the desolate tract called the Moor of Rannoch, is composed of porphyry and granite, and rises 4374 feet above the level of the sea, being the highest mountain in Great Britain. It is easily ascended on the western side; and at about the height of 1500 feet the prospect, till then confined, opens to the south-west and discovers the Paps of Jura and several of the Hebrides. Above the altitude of 2000 feet there is no vegetation, and on the north-east side of the mountain, near its summit, the snow lies throughout the year. Mealfourvounie, which rises 2730 feet above the sea-level, is composed of a conglomerate rock and stratified sandstone, the latter of which is of so hard a texture as to be used for the pavements of the streets of Inverness. Some veins of lead and silver have been discovered in several parts of the county, and also iron ore in small quantities, but we are not aware that mines have hitherto been worked to any extent. The soil is for the most part light and sandy, with a subsoil of gravel or clay; but in the neighbourhood of the town of Inverness it is enriched by a fine loam deposited by the waters of the adjoining frith.

Farms, Estates, and Agriculture.—In 1808 the landed property of this county was divided among 83 proprietors, viz. 7 estates of the valued rents of 3000*l.* per annum (Scotch); 6 from 1000*l.* to 3000*l.*; 23 from 400*l.* to 1000*l.*; 33 from 100*l.* to 400*l.*; and 14 under 100*l.* From that period to the present time we believe the above distribution has not undergone any material alteration. Formerly there were a great number of small arable farms only a few acres in extent, but these have much decreased since the introduction of sheep-farming. What remain of them are usually let from year to year, but the larger farms are let on lease, varying from seven to nineteen years. The farm-houses erected within the last forty years by the wealthier class of store farmers are for the most part well constructed, but the dwellings of the cottagers and poorer tenants are described as being in every respect comfortless and mean. (McCulloch's *British Empire*, vol. i., p. 310.) The attention of the farmers is chiefly directed to the rearing of sheep and cattle. The sheep are mostly of the Cheviot and Linton breeds, and the stock at the present time is estimated at 120,000; the stock of cattle is supposed to amount to 40,000 or 45,000, and is chiefly of the Skye or Kyloe breed. In the month of July a fair for the sale of sheep is held annually at the town of Inverness, where, upon an average, 100,000 sheep and as many stones of wool are bought up for the southern markets. The labourers and farm-servants generally live on potatoes with milk, and oats and barleymeal prepared in various ways, to which the wealthier tradesmen are able to add fish and butcher's meat. The usual rate of ploughmen's and farm-servants' wages is 8*l.* in money and six bolls of meal, with liberty to plant as much ground with potatoes as they can manure, and female labour is commonly reckoned at two-thirds that of men. The fields are frequently enclosed, and within the last twenty years a great deal of waste land has been drained and reclaimed, and much ground planted; but none of any consequence has been irrigated or embanked. The average rent of cultivated ground varies from 1*l.* to 2*l.* 10*s.* the acre, but in the immediate vicinity of the town of Inverness it is as high as 5*l.* to 7*l.* the acre.

Forests.—The fir woods in Glenmore and those of Strathspey in the adjoining county of Elgin are supposed to be more extensive than all the other natural woods in Scotland together. Glen Morrison, which opens into Glenmore, also contains much fine timber. In the parish of Kilmalie alone, near Fort William, it is estimated that there are about 14,000 acres covered with trees. Those which grow naturally are the oak, fir, birch, ash, mountain ash, holly, elm, hazel, and the Scotch poplar. Those which are planted are the larch, spruce, silver fir, beech, plane, and fruit trees. In these forests and the neighbouring mountains the herds of red and roe-deer roam in safety in recesses almost impenetrable to man. The alpine and common hare and other game are also abundant.

Manufactures.—Formerly a good deal of hemp, worsted, and linen yarn was made in this county, but this has greatly declined since the establishment of the large manufactories of the south. At the present time there is a hemp manufactory employing nearly 300 hands, and a woollen factory for the weaving of coarse clothing and Highland plaids and tartan. The produce of the former is principally exported to the London market and to the East and West Indies.

Inland Navigation and Roads.—The Glenmore, or 'Great glen of Albion,' as it is sometimes called, which stretches across the county from Fort William to the town of Inverness, is partially covered by three lakes, Loch Lochy, Loch Oich, and Loch Ness, which lie nearly in a straight line between the above-mentioned limits. Their aggregate length is 37 miles 704 yards, and the entire distance between Fort William and Inverness is 59 miles and 1628 yards. In 1802 Mr. Telford was appointed by the commissioners of the treasury to make a survey of these lakes and of the adjoining country preparatory to the cutting of a canal. His report was made in the following year, and the works were in full operation in 1805, but the whole line of navigation was not opened till the latter end of the year 1822. The expense of constructing the Caledonian Canal, as it is called, was defrayed by government. That part of the navigation which is not upon the lakes is 22 miles and 1628 yards in length: it is 50 feet wide at the bottom and 15 feet deep, though the original plan contemplated a depth of 20 feet. Loch Oich is the summit-level of the canal, and its elevation is 94 feet above the level of the sea on the east coast, at high water and ordinary spring tides. The entire cost was 986,924*l.*, to which must be added a portion of the annual expenditure since the opening of the navigation, which has hitherto exceeded the produce of tonnage dues. The tonnage dues on vessels, whether laden or unladen, is one farthing per ton per mile, and produced in 1829 a revenue of 2575*l.*; but the expenditure during the same year amounted to 4573*l.*, so that this canal promises to be but an unprofitable speculation. 'Its chief effect, as regards the town of Inverness, has hitherto been the commencement and gradual formation of a direct intercourse with the great western marts of Glasgow and Liverpool, and, through them, with the manufacturing districts with which these cities are so closely connected.' (*New Statis. Acct.*) The roads are under the management of the Parliamentary Commissioners for Highland Roads—a body appointed for opening the communication by land about the same time that the Caledonian Canal was projected. They are said to be maintained in a state of most efficient repair, the expense being defrayed partly by government and partly by contributions from the county proprietors. The principal rivers are the Spey, Ness, and Beauly; in all of which there are valuable salmon fisheries, more particularly upon the Spey and Ness.

Education, Schools, &c.—Upon the formation, in the year 1818, of the 'Society for Educating the Poor in the Highlands,' a central or model school was erected on a large scale in the town of Inverness. This establishment, as might be expected, has already proved highly beneficial to the poor of the town and suburbs, and is upon an average attended by about 300 scholars. The same society supports twelve other similar institutions of less extent in the more remote and thinly peopled part of the Highlands, and from its first establishment in 1818 to the 30th of September, 1834, its total expenditure amounted to 8023*l.* The Raining School, founded in 1747 by Mr. John Raining of Norwich, and endowed by that gentleman with the sum of 1000*l.*, is superintended by two well qualified teachers, having salaries of 48*l.* and 40*l.* per year, together with a house and garden. The number of pupils is usually about 250. In addition to these, there are several private elementary schools, besides Sabbath evening-schools for religious instruction, which are attended by a very considerable number of children. 'Inverness, thus already more amply provided than many other towns with the means of education and improvement, has been further enriched by a munificent bequest of 10,000*l.* 3 per cent consols, left by the late Rev. Dr. Bell, the ingenious author of the Madras System of Education, and committed by him to the charge of the magistrates of Inverness, who contemplate, we understand, erecting another large charity-school, and relieving the Education Society of the burthen of supporting their central or model school on the Green of Muirtown.' (*New Statistical Account.*)

The parochial schools throughout the county are numerous and increasing, and the reader will find a very satisfactory description of their present state under the head of the several parishes in the above-cited work.

(*New Statistical Account of Scotland*; Playfair's *Description of Scotland*; *Beauties of Scotland*; Society's *Map of Scotland*; *Parliamentary Reports on the Caledonian Canal*, 1803-4-5-6; *Parliamentary Papers*, &c.)

INVERSE, INVERSION. Any two operations of algebra are said to be inverse when one of them undoes, so to speak, the effect of the other; so that if both be successively performed upon the same quantity, the result is that quantity itself. For instance, the operations implied in $1+x^2$ and $\surd(x-1)$ are inverse to one another; for

$$1+\{\surd(x-1\}^2=x, \qquad \sqrt{(1+x^2-1)}=x.$$

We need do no more than name addition and subtraction, multiplication and division, raising of powers and extraction of roots, as pairs of inverse operations.

The operation of inversion is the solution of an equation, and *vice versâ*. Let it be required to find the operation inverse to ϕx. Assume $\phi x=y$, and find x in terms of y; say $x=\psi y$, then $\phi(\psi y)=y$, or ϕ and ψ are inverse operations. Thus if $x^2-2x=y, x=1\pm\sqrt{y+1}$, and either of the two, $1+\sqrt{x+1}$, or $1-\sqrt{x+1}$, is inverse to x^2-2x.

It thus appears that a function may have more than one inverse function, and there are functions which have an infinite number; but there is a distinction by which one may be separated from all the rest. Let the Greek letters in this article be all functional symbols, or marks of operations to be performed, and let them come before the subject of operation, the quantity x, or y, &c., in the order in which they are to be performed. Thus $\alpha\phi x$ denotes the result of performing the operation ϕ upon x, and then the operation α upon ϕx. Now let $\phi x=z$ give $x=\psi z$, where ϕx is an unambiguous operation, and ψz is, generally speaking, ambiguous, or presenting several different forms. Then ϕ and ψ are inverse operations, and $\phi\psi z=z$, and we might suppose at first that $x=\psi\phi x$; that is to say, we might imagine that ψ destroys ϕ as well as that ϕ destroys ψ. But since ψ is ambiguous, it may be that only one or more of the forms of ψ will satisfy $x=\psi\phi x$, and not all: and that this will be the case with one is obvious, while we can show that it cannot happen with more than one. For though the same operation, performed on different functions, may produce the same function, yet different operations, performed on the same function, must produce different functions. If then α and β be different forms of ψ, we have $\phi\alpha x=x$ and $\phi\beta x=x$; but we cannot have both $\alpha\phi x=x$ and $\beta\phi x=x$, where α and β are different, ϕx having absolutely the same form and value in both equations.

From all the inverses of a function ϕx, then, we separate that one, αx, which gives both $\phi\alpha x=x$ and $\alpha\phi x=x$, and call it the *convertible* inverse. Its symbol is ϕ^{-1}, so that $\phi^{-1}x$ means that operation which satisfies both the equations $\phi\phi^{-1}x=x$ and $\phi^{-1}\phi x=x$. [EXPONENT.] In the preceding example $1+\surd(x+1)$ is the convertible inverse of x^2-2x: for $1+\surd(x^2-2x+1)=1+x-1=x$. But $1-\sqrt{x^2-2x+1}$ gives $1-(x-1)$ or $2-x$; and we call this an inconvertible inverse.

Every function which has more than one inverse is not only a function of x, but the same function of other functions of x. Let αx be an inconvertible inverse of x; then $\alpha\phi x$ is not x, let it be ϖx. Then $\phi\alpha x$ being x, $\phi\alpha\phi x$ is ϕx, or $\phi\varpi x$ is ϕx, so that ϕx is the same function of ϖx which it is of x. Thus in the preceding example x^2-2x is the same function of $2-x$ which it is of x; or

$$x^2-2x=(2-x)^2-2(2-x).$$

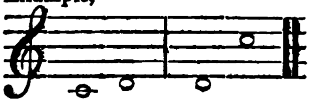
We have then this theorem: every function has as many different forms as inverses, and all these forms can be made by writing different functions of x instead of x in the original function; and each inverse of the function is the convertible inverse to one of its forms, and an inconvertible inverse to all the rest. Thus $1-\surd(x+1)$, which is an inconvertible inverse to x^2-2x, is the convertible inverse of $(2-x)^2-2(2-x)$: for

$$1-\surd\Big((2-x)^2-2(2-x)+1\Big)=1-(2-x-1)=x.$$

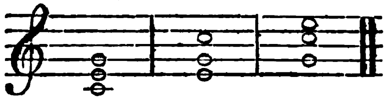
The way to make the convertible inverse of a given function find all the rest is as follows. Find the solutions of the equation $\phi \varpi x = \phi x$, and let them be $\varpi_1 x$, $\varpi_2 x$, &c. Then $\phi^{-1} x$ being the convertible inverse of ϕx, the remaining inverses are $\varpi_1 \phi^{-1} x$, $\varpi_2 \phi^{-1} x$, &c. Thus in the preceding example $\phi^{-1} x$ being the convertible inverse, the other is $2 - \phi^{-1} x$. [PERIODIC FUNCTIONS.] There is a remarkable class of functions, each of which is its own inverse, such as $1-x$, $\frac{1}{x}$, $\surd(1-x^2)$, &c. Now if $\phi x = \phi^{-1} x$ we have $\phi \phi x = x$, and these functions will be considered, in the article just cited, as periodic functions of the second order.

The equation $\phi \phi^{-1} x = x$ being understood, suppose that between the first and second operations we interpose the operation α, so that we have $\phi \alpha \phi^{-1} x$. This is no longer equal to x, but it is a function, the properties of which are closely connected with those of αx. For instance, if αx and βx be inverse to each other, then $\phi \alpha \phi^{-1} x$ and $\phi \beta \phi^{-1} x$ are also inverse to each other: for $\alpha \beta x = x$ and $\phi \alpha \phi^{-1} \left(\phi \beta \phi^{-1}\right) x$ is $\phi \alpha . \phi^{-1} \phi \beta \phi^{-} \; x$, or $\phi \alpha \beta \phi^{-1} x$, or $\phi \phi^{-1} x$, or x. Thus knowing $x + 1$ and $x - 1$ to be inverse functions, we know immediately that $\log(\varepsilon^x + 1)$ and $\log(\varepsilon^x - 1)$ are inverse functions; and also $\surd(x^2 + 1)$ and $\surd(x^2 - 1)$. For more detail on this subject see the article 'Calculus of Functions,' in the 'Encyclopædia Metropolitana.'

INVERSION, in Music, is a change in the relative position of two sounds, or of the several notes of a chord. Thus C D, an interval of a 2nd, becomes by inversion (D C) a 7th. Example,—



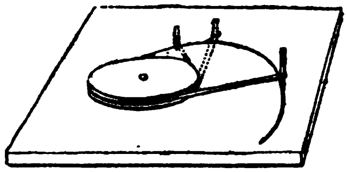
And C E G, the notes of the triad, or perfect chord, by inversion become the chord of the 6th (E G C), or of the $\frac{6}{4}$th (G C E). Example,—



For other musical Inversions, see CANON and FUGUE.

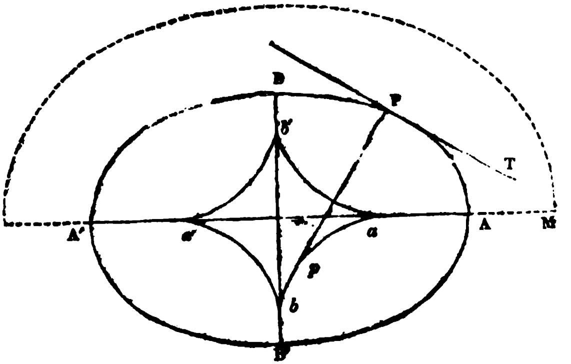
INVOLU'CRUM, in botany, is any collection of bracts round a cluster of flowers. In umbelliferous plants it consists of separate narrow bracts placed in a single whorl; in many composite plants these organs are imbricated in several rows. If the bracts belong to a secondary series of the inflorescence, as in the partial umbels of an apiaceous plant, or in the solitary florets of Echinops, they form an involucel. The most singular state of the involucrum is that which is found in the genera Castanea, Fagus, Quercus, &c., where it forms a cup, or closed cover, remarkable in the European species of those genera, but much more so in the species of India.

INVOLUTE AND EVOLUTE (the curve unrolled and the curve from which it is unrolled), a name given to two curves so formed and placed, that supposing the second to be cut out from solid matter, the first can be formed by fastening one end of a thread upon a point in the second, attaching a pencil to the other end, and moving the pencil so that the thread may either gradually enwrap or be unwrapped from the curve to which it is fastened. Thus the pencil in the diagram is describing the involute of a circle, or the curve of which the circle is the evolute. But the evolute of a circle is evidently a point.



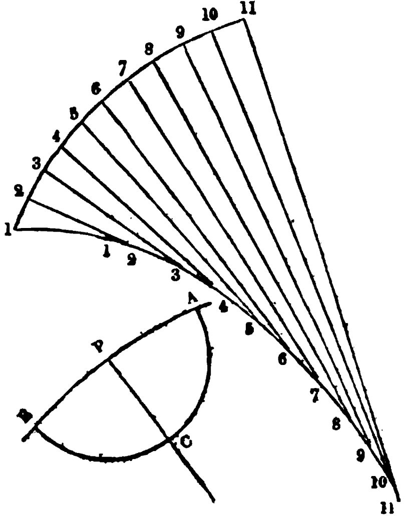
The following figure represents an ellipse with its evolute.

If the thread be fastened at b, wrapped over $b a$, and continued to A, it will, as it unwraps from $a b$, describe the arc A B; and B A′ while it wraps over $b a'$. If fastened in a similar manner at b', it will by the same process describe A B′ A′.



If the line p P be drawn tangent to the evolute at p, it is one of the positions of the thread, and P T, the tangent of the involute at P, is perpendicular to p P. Also p P is the radius of curvature of the involute at P; this is to say, no circle can pass so near the curve at P, as the one which has p for its centre and p P for its radius. [CURVATURE.] Also, any arc of the evolute is the difference of two radii of curvature of the involute: thus the arc ap is the difference between a A and p P. Such are the principal geometrical connexions of the two curves.

Every curve has one evolute, and an infinite number of involutes. For instance, fastening the thread at b, and continuing it to M instead of A, we may with the cheeks $a b$ and $b a'$ produce another involute from them (represented by a dotted line); and any number, however great, by varying the position of M. But none of these involutes will be ellipses, except the one from which the evolute was made; though they will all be ovals having remarkable analogies with the ellipse. The proper name for curves described from the same evolute is *parallel curves*, since they have the fundamental property of parallel lines: for they never meet, though (if they admit of it) ever so far produced; a straight line perpendicular to one is always perpendicular to the other; and the part of the perpendicular intercepted is always of the same length. When arcs of parallel curves are required to be laid down, the most commodious method of proceeding is to construct the evolute of one of the arcs approximately, as follows. On the arc draw tangents at moderately small distances, and draw perpendiculars to those tangents. The parts of the tangents cut off from each by its neighbours will together give the arc of the evolute near enough for all purposes. And it may be well to notice that it will be a sufficiently accurate method of drawing the perpendicular to the tangent at a point P, if we take a small circle whose centre is P, bisect the arc A C B in C, and join and produce P C.



The angular error thus committed is only a small portion of the angle made by the tangents at P and A.

Whenever the two arcs adjacent to a normal (or perpendicular to the tangent) of the involute are equal and similar, there is a cusp in the evolute; and the evolute generally recedes without limit as we approach a point of contrary flexure in the involute.

The mathematical method of finding the evolute is as follows. Let $y=\phi x$ be the equation of the involute, and let X and Y be the co-ordinates of the point on the evolute corresponding to that on the involute whose co-ordinates are x and y. Form the three equations—

$$y=\phi x;$$
$$\mathrm{X}-x+\frac{dy}{dx}(\mathrm{Y}-y)=0;$$
$$1+\left(\frac{dy}{dx}\right)^2-\frac{d^2y}{dx^2}(\mathrm{Y}-y)=0;$$

and from them eliminate x and y. The resulting equation between X and Y is that of the evolute. But if the evolute be given, and the involute is to be determined, let $\mathrm{Y}=f\mathrm{X}$ be the equation of the former, and from this and the latter two of the preceding three equations eliminate X and Y. There will result a differential equation of the second order between y and x, the primitive of which is the equation of the involute, the two arbitrary constants being determined by the point at which the thread is supposed to be fixed and the length of the thread.

Thus if the curve be a parabola having the equation $y=cx^2$, the equations for determining the evolute are—

$$y=cx^2;$$
$$\mathrm{X}-x+2cx(\mathrm{Y}-y)=0;$$
$$1+4c^2x^2-2c(\mathrm{Y}-y)=0;$$

from which we find—

$$\mathrm{X}=-4c^2x^3, \qquad \mathrm{Y}=\frac{1}{2c}+3cx^2;$$

which give $\mathrm{Y}=\dfrac{1}{2c}+\dfrac{3}{2}\left(\dfrac{\mathrm{X}^2}{2c}\right)^{\frac{1}{3}}$,

the equation of the evolute of the parabola, which evolute therefore appears to be what is called a *semi-cubical* parabola.

For considerations similar to those which precede see CAUSTICS.

INVOLUTION and EVOLUTION. (Arithmetic.) Taking these words in their etymological sense, they might stand for the greater part of mathematical analysis. In their technical algebraical sense, they mean only the raising of powers, and the inverse operation, the extraction of roots. The revival however of a general process, accompanied by an improvement which makes it comparatively easy, renders it necessary to make a more extensive definition of the terms. We shall not relinquish any characteristic of the old meanings, and shall bring all corresponding processes together, by laying down the following definition:—Involution is the performance of any number of successive multiplications with the same multiplier, interrupted or not by additions or subtractions; and evolution is any method of finding out, from the result of an involution, what multiplier was employed, provided that the said method proceeds by involutions. Thus to determine $2x^3+4x^2-3x+10$ by involution, we multiply 2 by x, and add 4; then multiply by x and subtract 3, then multiply by x and add 10. If this give 1000, then any method of determining x which proceeds by successive involutions is evolution.

A few years ago our only instances of evolution would have been common division, and the extraction of the square and cube roots, with references to Vieta, Harriot, Oughtred, and the older algebraists in general, for evolutionary methods of solving equations, bearing a strong likeness to such extractions. But since the publication of Mr. Horner's 'New Method of solving Equations of all orders,' *Phil. Trans.*, 1819, the process which has rendered it worth while to propose the preceding extension of terms has been in the hands of mathematicians. For a more detailed account than we can here give, the reader is referred to the paper just cited, which is reprinted in the 'Ladies' Diary' for 1838, or to 'The Theory and Solution of Algebraical Equations,' by Professor Young of Belfast (London, J. Souter, 1835).

We should begin with simple division, and the extraction of the square and cube roots, if we were writing an elementary treatise. But taking it for granted that the reader is familiar with the first two, at least, we shall proceed to describe the general process. This consists of three distinct parts, the first two of which have been long known, while the third, which contains the peculiar distinction of this method, is due to Mr. Horner.*

1. In the article APPROXIMATION it is shown that if a be a value of x which makes ϕx very small, then $a-(\phi a \div \phi' a)$ is a value of x which makes ϕx much smaller; so that a continued succession of approximations may be made to a value of x which makes ϕx absolutely $=0$. Here ϕx means the differential coefficient or derived function: and if

$$\phi x = \mathrm{A}x^n + \mathrm{B}x^{n-1} + \mathrm{C}x^{n-2} + \ldots\ldots \quad ; \text{ then}$$
$$\phi' x = n\mathrm{A}x^{n-1} + (n-1)\mathrm{B}x^{n-2} + (n-2)\mathrm{C}x^{n-3} + \ldots.$$

2. Meaning by a root of ϕx, any value of x which makes $\phi x=0$, it is obvious that $\phi(x+a)$ is a function which has for its roots the roots of ϕx, each diminished by a. And the substitution of $x+a$ instead of x in the preceding value of ϕx gives a well known development, of which an instance will be more to our present purpose. Let the function be

$$\mathrm{A}x^5+\mathrm{B}x^4+\mathrm{C}x^3+\mathrm{D}x^2+\mathrm{E}x+\mathrm{F}\ldots.\ (1).$$

Write $x+a$ for x, and this becomes

$$\begin{array}{l}
\mathrm{A}x^5+(5\mathrm{A}a+\mathrm{B})x^4+(10\mathrm{A}a^2+4\mathrm{B}a+\mathrm{C})x^3\\
+(10\mathrm{A}a^3+6\mathrm{B}a^2+3\mathrm{C}a+\mathrm{D})x^2\\
\quad+(5\mathrm{A}a^4+4\mathrm{B}a^3+3\mathrm{C}a^2+2\mathrm{D}a+\mathrm{E})x\\
+\mathrm{A}a^5+\mathrm{B}a^4+\mathrm{C}a^3+\mathrm{D}a^2+\mathrm{E}a+\mathrm{F};
\end{array}$$

which we may represent by

$$\mathrm{A}x^5+\phi_4 a\,x^4+\phi_3 a\,x^3+\phi_2 a\,x^2+\phi' a\,x+\phi a.$$

3. The quantities ϕa, $\phi' a$, $\phi_2 a$, &c. may be determined by a succession of involutions, each one making use of the results of the preceding. Find ϕa by involution, of which the following are the steps:—

$$\begin{array}{l}
\mathrm{A}\\
\mathrm{A}a+\mathrm{B}\\
\mathrm{A}a^2+\mathrm{B}a+\mathrm{C}\\
\mathrm{A}a^3+\mathrm{B}a^2+\mathrm{C}a+\mathrm{D}\\
\mathrm{A}a^4+\mathrm{B}a^3+\mathrm{C}a^2+\mathrm{D}a+\mathrm{E}\\
\mathrm{A}a^5+\mathrm{B}a^4+\mathrm{C}a^3+\mathrm{D}a^2+\mathrm{E}a+\mathrm{F}=\phi a
\end{array}$$

Repeat the process, using the preceding quantities, except the last, and we have $\phi' a$ by the following steps:—

$$\begin{array}{l}
\mathrm{A}\\
2\mathrm{A}a+\mathrm{B}\\
3\mathrm{A}a^2+2\mathrm{B}a+\mathrm{C}\\
4\mathrm{A}a^3+3\mathrm{B}a^2+2\mathrm{C}a+\mathrm{D}\\
5\mathrm{A}a^4+4\mathrm{B}a^3+3\mathrm{C}a^2+2\mathrm{D}a+\mathrm{E}=\phi' a.
\end{array}$$

A repetition of the process, leaving out the last, gives $\phi_2 a$, as follows:—

$$\begin{array}{l}
\mathrm{A}\\
3\mathrm{A}a+\mathrm{B}\\
6\mathrm{A}a^2+3\mathrm{B}a+\mathrm{C}\\
10\mathrm{A}a^3+6\mathrm{B}a^2+3\mathrm{C}a+\mathrm{D}=\phi_2 a.
\end{array}$$

Repetition gives $\phi_3 a$, and finally $\phi_4 a$, as follows:—

$$\begin{array}{l}
\mathrm{A}\\
4\mathrm{A}a+\mathrm{B}\\
10\mathrm{A}a^2+4\mathrm{B}a+\mathrm{C}=\phi_3 a
\end{array}
\qquad
\begin{array}{l}
\mathrm{A}\\
5\mathrm{A}a+\mathrm{B}=\phi_4 a
\end{array}$$

In numerical application the operations may be made to stand thus, where a new letter below a line stands for the sum of the two preceding; and ϕa, $\phi' a$, &c. are introduced when found.

$$\begin{array}{llllll}
\mathrm{A} & \mathrm{B} & \mathrm{C} & \mathrm{D} & \mathrm{E} & \mathrm{F}\\
 & \mathrm{A}a & \mathrm{P}a & \mathrm{Q}a & \mathrm{R}a & \mathrm{S}a\\
\cline{2-6}
 & \mathrm{P} & \mathrm{Q} & \mathrm{R} & \mathrm{S} & \phi a\\
 & \mathrm{A}a & \mathrm{T}a & \mathrm{U}a & \mathrm{V}a & \\
\cline{2-5}
 & \mathrm{T} & \mathrm{U} & \mathrm{V} & \phi' a & \\
 & \mathrm{A}a & \mathrm{W}a & \mathrm{X}a & & \\
\cline{2-4}
 & \mathrm{W} & \mathrm{X} & \phi_2 a & & \\
 & \mathrm{A}a & \mathrm{Y}a & & & \\
\cline{2-3}
 & \mathrm{Y} & \phi_3 a & & & \\
 & \mathrm{A}a & & & & \\
\cline{2-2}
\mathrm{A} & \phi_4 a & \phi_3 a & \phi_2 a & \phi' a & \phi a
\end{array}$$

If a be of only one significant figure (as 200, 6, ·03), all the operations necessary to fill up this process can be performed in the head, and we have thus (for the method is general, though our example be only of the fifth degree) a working method of answering the following question:—Given a certain equation $\phi x = 0$; required the equation $\psi x = 0$, the roots of which are each less by a than those of $\phi x = 0$.

---

* Mr. W. G. Horner was a schoolmaster and mathematical teacher residing at Bath, and died September 29, 1837. His works are announced as in preparation for the press, under the superintendence of Professor Davies, of the Royal Military Academy.

There has been some dispute about the right to the invention, of which we do not here speak in detail, as we have no doubt it will be extremely evident to all who examine the question that Mr. Horner is the first author and publisher (and, we believe, the only one) of that particular part of the method which goes beyond Vieta and his successors. (See 'Companion to the Almanac' for 1839.)

If ϕa came out $=0$, we should then know that a is a root of the equation: and the method of approximating to a root is as follows:—Suppose we have an equation of which the root (unknown to us) is 26·73. By trial, or otherwise, suppose we find that 20 is the highest denomination of the root, and we thereupon find another equation, each of whose roots is less by 20 than a root of the given equation: this is done by the preceding process, and one of the new roots (but unknown) is 6·73. If we can find that the highest denomination of this root is 6, we make another reduction of all the roots, and find a new equation, one of whose roots is ·73. If we can then find ·7 to be the highest denomination, we repeat the process and find an equation one of whose roots is ·03. In finding the highest denomination of this root we find the root itself, evidenced by the ϕa of this final process being = 0.

The first denomination of the root must be found by trial, or by some of the methods referred to in THEORY OF EQUATIONS. But the second and the remaining ones are found by comparing the results ϕa and $\phi' a$. If a be nearly a root,

$$a - \frac{\phi a}{\phi' a} \text{ or } a + \frac{-\phi a}{\phi' a}$$

is still nearer. Consequently, by dividing $-\phi a$ by $\phi' a$, we may, after the second process, be sure of finding one figure of the remaining root correct. But after the first process we may be liable to an error of a unit (to be corrected by a new trial), as in extraction of the square root.

In order to obtain $-\phi a$ and not ϕa, let the last coefficient, F, have its sign changed, and let the process in the column which contains it always be subtraction, and not addition. In the preceding type of calculation, we should then have

$$\begin{array}{rcl} -\mathrm{F} & & \mathrm{F} \\ \underline{\mathrm{S}a} & \text{instead of} & \underline{\cdot\mathrm{S}a} \\ \text{Subtr. } -\phi a & & \phi a \text{ Add.} \end{array}$$

In carrying on the process, the results ϕa, $\phi' a$, &c. come in a diagonal line; before taking the next step, the beginner should bring them down into one line, as in the type preceding. In our examples, asterisks or other symbols will mark results of a process.

We now apply this method to the solution of the equation—

$$x^4 + 2x^3 - x^2 - x - 631064798 = 0.$$

It will be found that a root lies between 100 and 200.

1	2	−1	−1	631064798(158
...	100	10200	1019900	101989900
	102	10199	1019899	529074898:
	100	20200	3039900	410987450
	202	30399	4059799:	118087448;
	100	30200	4159950	118087448
	302	60599:	8219749	0
	100	22600	5414950	
	402:	83199	13634699;	
...	50	25100	1126232	
	452	108299	14760931	
	50	27600		
	502	135899;		
	50	4880		
	552	140779		
	50			
	602;			
...	8			
	610			

Assuming 100 as a first approximation, we find that $x^4 + 402x^3 + 60599x^2 + 4059799x - 529074898 = 0$ is an equation having roots less by 100 than those of the given equation. And 529074898 contains 4059799 upwards of 130 times; but if any number of tens greater than 50 be taken, the accumulations of the next involution will give more than 5290, &c., as must be found by trial. Repeating the process, we find that $x^4 + 602x^3 + 135899x^2 + 13634699x - 118087448 = 0$ is an equation all whose roots are less by 50 than those of the last. We can now depend upon 118087448 divided by 13634699 giving one figure of the root, and the quotient is between 8 and 9. Assuming 8, the first step of the third process shows that 8 is a root of the last equation, and 58 of the preceding, and 158 of the given equation.

We now give an example in which approximation is carried on. Let the equation be $x^3 - 6x^2 + 7x + 4 = 0$, of which one root lies between 2 and 3. The first working column is abbreviated.

1	−6	7	−4(2·414213562
2	2	−8	−2
	−4	−1	−2:
	2	−4	−1·936
	−2	−5:	−0·064;
	2	0·16	−0·045079
	0:	−4·84	−0·018921†
·4	0·4	0·32	−0·017963056
	0·8	−4·52;	−0·000957944‡
	1·2;	0·0121	−0·000897113
·01	1·21	−4·5079	−0·000060831‖
	1·22	0·0122	44853
	1·23†	−4·4957†	15978
·004	1·234	0·004936	13456
	1·238	−4·490764	2522
	1·242‡	0·004952	2243
·0002	1·2422	−4·485812‡	279
	1·2424	0·000248	269
	1·2426‖	−4·485564	10
		0·000248	8
		−4·485316‖	2

The root of this equation is found to be 2·414213562, as follows. Beginning with the multiplier 2, one set of involutions brings us to the figures followed by colons, and $x^3 + 0x^2 - 5x + 2 = 0$ is an equation on which the process is to be repeated. Dividing −2 by −5 we find that ·4 is most probably the next figure, which is verified in the next trial, since the result of involution, 1·936, is less than 2. We proceed in this way until 2·4142, containing half the number of figures wanted, is found, and this being a, we have found −0·000060831 for $-\phi a$, and −4·485316 for $\phi' a$. The first divided by the second may be depended upon for doubling the number of figures, as commonly practised in the extraction of the square root. [APPROXIMATION.] The figures 13562 are found by a contracted division shown in the example.

But it is more convenient to avoid decimals in the process, which may be done as follows 1. If there be decimals in the coefficients of the equation, annex ciphers to every place in such manner that the number of decimals in the several places may be in increasing arithmetical progression. Then strike out the decimal points entirely, and proceed as with whole numbers, remembering that the root thus obtained will be 10 times too great if the progression increase by units, 100 times too great if it increase by twos, and so on. Thus $1{\cdot}81x^3 - {\cdot}6x^2 + 33x + 18{\cdot}4$ should be changed into $1{\cdot}81x^3 - {\cdot}600x^2 + 33{\cdot}0000x + 18{\cdot}40000$, and $181x^3 - 600x^2 + 330000x + 1840000$ will give ten times the required root. 2. When all the whole figures of the root have been obtained, and the decimal part is about to enter the calculation, before attempting to obtain the first decimal figure annex a cipher to the first working column on the left, two ciphers to the second, and so on to the end. Then proceed with the new figure as if it were a whole number, and make a new involution. When this is finished annex ciphers again as before. One additional advantage will be that the ciphers will serve to mark the places of completion of the individual involutions. If in any case ϕa should not contain $\phi' a$, place a cipher in the root, annex ciphers again, and then proceed. In some of the older algebraists, Oughtred for instance, the several vertical lines of figures are kept in their places by a set of ruled columns, the use of which is difficult. Mr. Horner has a similar contrivance; but the employment of ciphers removes all the difficulty, as in common division and the extraction of the square root. See the last example in this article. The method might easily be extended to the whole part of the root.

The following is an instance of the method:—

$$x^4 + x^3 - x^2 - 2x - 2 = 0.$$

```
1 :    -1        -2             2(1·414,2136
2       2         1           -1
3       1        -1             30000
4       3         4             28256
50      -        ----
54      4         3000           17440000
58      4         4064           12206261
62      800       7064            52337390000
660     216       4992            49671698816
661    1016      12056000          2665691184
662     232        150261          2495754355
663    1248      12206261           169936829
6640    248        150923           124787718
6644
6648   149600    12357184000         45149111
6652      661       60740704         37436315
6656   150261    12417924704          7712796
          662       60847072          7487263
       150923    12478771776
          663
       15158600
          26576
       15185176
          26592
       15211768
          26608
       15238376
```

Many of the preceding figures are useless, but we have judged it best to present the whole process. The best method of abbreviation is to fix a point of the process from and after which the number of figures in the last column is not to increase, striking off at every step one figure from the last column but one, two from the last but two, and so on. The consequence will be that the several columns on the right will disappear one after the other; the process will be legitimately reduced to termination with a contracted division, independently of the theorem cited; and the result will be true to the last place. The effect of this will be, that as soon as the remaining part of the root is too small for its highest power to show itself in the process, an equation of the $(n-1)$th degree takes the place of the nth, and so on, until there remains only an equation of the first degree, and the approximation then proceeds by the Newtonian method. All this was pointed out by Mr. Horner, whose view of his own method was very complete, in everything but historical information. Had he given in his paper an example from Oughtred, also worked by his own method, pointing out the difference of the two, we feel sure that the question about the right to the invention never would have been discussed.

Taking up the preceding example at the point with which we left off (neglecting the division), and following the process, we have

(Root obtained 1·414) 213562373

```
  6 | 656       15   23   83 | 76       124787  7  1  7  7 | 6        2665691184
Disappears                13                30  4  7  9  4           2496363944
     at         15   23   97           124818  1  9  7  2             169327240
    next                  13                30  4  8  2  0            124850203
    step        15   24   10           124848  6  7  9 | 2             44477037
                          13                 1  5  2  4               37455657
                15   24 | 23           124850  2  0  3                  7021380
                                             1  5  2  4                 6242640
                15 | 24                124851  7  2 | 7        Dividend  778740
                                                4  6                     749117
                                       124852  1 | 9                      29623
                                                4  6                      24970
                15 |                   124852  6 | 5                       4653
                                                1                          3746
            Disappears, leaving        124852  8                            907
              1 for carriage.                   1                           874
                         Divisor       124852 | 9                            33
                                                                             37
```

The answer 1·414213562373 is correct to the last place inclusive. (The contracted division follows the thick line.) The rule by which to judge of the extent to which the full process should be continued is as follows: Carry it on until the last column but one has at least two more *figures than the* number of root figures *remaining* to be *found*.

Such is the method which must place its author among those valuable inventors who find out simple adaptations which have been overlooked by their predecessors. It is not a little remarkable that this, the most important facilitation which the solution of numerical equations has received since the time of Vieta, and which is, *when known*, a very obvious extension of the extraction of roots, should have only preceded by a few years the most important addition to the method of ascertaining the number of roots which has been made since Des Cartes, and which is also, when known, an equally simple result of the process of finding the highest common factor of two algebraical expressions. [STURM'S THEOREM.]

Two of the most remarkable applications of this method are, the solution of equations of the second degree, which is made as simple as the extraction of the square root, and the extraction of the cube root, which is reduced from an impracticably complicated process to one of perfectly easy performance.

As an example of the first, required the solution of

$$2x^2 + x = 2.$$

Since the root is less than unity, the preparation for decimals is made at the outset.

```
2   10        200(·78077643
    14        168
    24         3200
    14         3168
    380          320000
     16          288498
    396           31502
     16           28854
    41200          2648
       14          2473
    41214           175
        1           165
    4122             10
                     12
```

or $x = {}^{\cdot}78077643$, which is correct with the exception of the last place. The extraction of the square root, say of 10, is done by solving the equation $x^2 + 0x = 10$; but it will be found that the solution of any equation of the form $x^2 + ax = b$ may be performed by the same rule as the extraction of the square root. We shall show this, beginning with Horner's rule, and changing to the other after a few steps. Let the equation be $x^2 + 2x = 10$.

```
1  2          10(2·31662479
   4           8
   60          200
   63          189
   660          1100
   661          661
   662      6626)43900
                  39756
            66326)414400
                   397956
             66332)16444
                    13266
                     3178
                     2653
                      525
                      464
                       61
                       59
                        2
```

In the extraction of roots the method of pointing and bringing down the periods as they are wanted may be followed. The following is the process for the extraction of the cube root of 205692449327; it being remembered that the question is the solution of an equation of the form $x^3 + 0x^2 + 0x = a$.

```
                                 ·  ·  ·  ·
1  0        0            205692449327(5903
   5        25           125
   10       7500          80692
   150      1431          80379
   159      8931            313449327
   168      1512            313449327
   17700   104430000            0
   17703       53109
           104483109
```

The opposite process is the extraction of the cube root of 1·808, and will serve as an example of the complete process, omitting only the first column, which, with the exception of the unit at the head, is blank. And this is also the type of the solution of any cubic equation whatsoever; the only difference being that the heads of the first and second working columns are ciphers in the extraction of the simple root, and significant in all other cases.

```
  00          009             1808(12·18 2398 69 783957002
a 10          100 a                  ad·gjmpsvwxyz abcdef g
b 20          100 aa          1000 aaa
c 30          200 b            808
d 32          300 b            728 ddd
e 34           64 d             80000
f 360         364 dd            43561 ggg
g 361          68 e             36439000
h 362         43200 e           35371232 jjj
i 3630          361 g            1067768000
j 3638        43561 gg            890260568 mmm
k 3646          362 h             177507432000
l 36540       4392300 h           133564300767 ppp
m 36542         29104 j            43943131233000
n 36544       4421404 jj           40070573018919 sss
o 365460        29168 k             3872558214081|
p 365463      445057200 k           3561857365704| vvv
q 365466          73084 m            310700848377|
r 3654690     445130284 mm           267139491006| www
s 3654699         73088 n             43561357371|
t 3654708     44520337200 n           40070925909| xxx
u 3654717         1096389 p            3490431462|
  x w v       44521433589 pp           3116627593| yyy
                  1096398 q             373803869|
              4452252998700 q           356186010| zzz
                   32892291 s            17617859|
              4452285890991 ss           13356975| aaa
                   32892372 t             4260884|
             |4452318783363 t             4007093| bbb
             |       292377 v              253791|
             |445232170713 vv              222616| ccc
             |      292377 v                31175|
             |445232463090 v                31166| ddd
             |        2192 w                    9|
             |44523248501 ww                    9| ggg
             |       2192 w                     0
             |44523250693 w
             |          32 x
             |4452325101 xx
             |         32 x
             |4452325133
             | gfedcbazy
```

The preparation for decimals makes the answer ten times too great; so that the cube root of 1·808 is 1·218...002, of which only the last figure 2 cannot be depended upon. The preceding contains every figure which need be written down, all the connecting operations being those which are usually performed mentally, and one only is required for each figure. We do not think that any attempt to shorten the work, by leaving out the recurring figures, or employing double mental operations, would save time; and it would certainly very much augment the liability to error. The vertical lines in the example show that part of the operation in which the contraction takes place, and the point at which the contraction becomes simple contracted division is marked by a thick horizontal line. To enable the beginner to examine the process we have placed a letter in every line of the first working column, by which the parts of the second column which are connected with it may be traced; while a letter doubled in the second column shows a multiplicand, the product of which by the root figure is found as marked in the third column. The letters under the last line of the first column mark the figures cut off in the several contractions, and their results in the other columns are traced in the same way: the same for the letters under the second column.

One simplification might be made after the learner has practised a number of examples conducted as above. In the second working column certain lines, namely, the second *b*, the second *e*, the second *h*, &c., are not used except to be added to the next line. Hence each of the lines on which a letter is doubled might be formed by adding the first, third, and fourth preceding lines, and the effect would be to omit some of the lines and some of the most simple additions. The second column, beginning from *pp* inclusive, as a specimen, and changing the line in which ciphers are annexed (and the ciphers should always be annexed to mark the step) would be

```
44521433589   pp
    109639800 q
     32892291 s
4452285890991 ss
     32892372 t
       292377 v
445232170713  vv
       292377 v
         2192 w
44523248501   ww
```

But considering that the process is one which no person will very often perform, we doubt whether to recommend even this abridgment. All such simplifications tend to make the computer lose sight of the uniformity of method which runs through the whole; and we have always found them, in rules which only occur now and then, afford greater assistance in forgetting the method than in abbreviating it.

On evolution of algebraical quantities we do not think it necessary to speak, since either the binomial theorem [BINOMIAL THEOREM], or some other method of development, is employed with more advantage than the usual modification of the arithmetical process. We have also omitted the process of division, the most simple of all evolutions, since its connection with the preceding is sufficiently obvious.

There is however a process of an evolutionary character which we take this opportunity of suggesting, and of which any one moderately conversant with algebra will easily arrive at the demonstration. In finding the highest common divisor of two algebraical integral expressions, and also in the process of Sturm's Theorem, it is required to divide one expression, P, by another, Q, not for the sake of finding the quotient, but the remainder; and this remainder, cleared of all numerical factors and of fractions, is preferable. The following rule will render the application of Sturm's Theorem much more easy.

Question:—Two expressions, P and Q, being given, of which P is lower than Q, required the remainder of Q divided by P, cleared of fractions and of positive numerical factors. To take an example with us, let

$$P = 2x^3 - x - 4$$
$$Q = 4x^5 - 3x^4 + 2x^2 - x + 1.$$

1. Add 1 to the difference of the degrees ($5 - 3 = 2$, $2 + 1 = 3$): this is the number of operations to be expected. In this case it is three.

2. Write down in two lines the coefficients of the divisor and dividend, including the coefficient 0 for every missing term, but change the sign of every coefficient in the divisor, *except the first.* Clear both expressions of all whole factors; and if the two leading coefficients (2 and 4) have a common factor, divide by this factor before writing them down. Write ciphers in all blank places.

(P)	1	0	1	4	0	0
(Q)	2	−3	0	2	−1	1

2. Take the first vertical pair, and every other in succession, and make cross multiplication and addition: thus $\begin{matrix} a & \cdot & \cdot & \cdot & c \\ b & \cdot & \cdot & \cdot & d \end{matrix}$ gives $ad + bc$. Put the first result in the first column, the second in the second, and so on.

(1)	−3	2	10	−1	1

3. Repeat this process with the first line, and the result just obtained, and again with the result, making each new result out of the first line and the last result, and so on till the number of operations ascertained in the first clause of the rule has been performed. But if the leading term of the first line have been divided, multiply it again after the result, unless the first term of the result be also divisible by the same factor.

4. But if ever the first column of a result should turn out a cipher, throw it away, and bring forward the next column, and so on; making every step stand in the next higher place: and if the two first columns of any result should be ciphers, throw them away, and bring forward the third, and so on. And for every cipher thus thrown away diminish by one the number of operations required in the first clause.

5. If any horizontal line thus obtained have a factor in all its terms, divide by that factor before proceeding further: and if the leading term of any new result have a factor in common with the leading term of the first line, divide both before proceeding.

The table of results now is as follows, in which the various changes of the leading terms are shown by putting them down as they occur, and putting a bar over them as they disappear and are replaced by others. In practice the pen may be drawn through the figure which is dismissed.

(P)	$\bar{2}$, $\bar{1}$, $\bar{2}$, 1	0	1	4	0	0
(Q)	$\bar{4}$, 2	− 3	0	2	−1	1
(1)	−3	2	10	−1	1	
(2)	$\bar{4}$, 2	17	−14	2		
(3)	17	− 12	10			

$17x^2 - 12x + 10$ Answer

6. When the last result has been obtained make an algebraical expression one degree lower than the divisor, the coefficients of which are the numbers in the last result, with their signs.

The real remainder in the preceding example is $8\frac{1}{2}x^2 - 6x + 5$.

Let the next example be

$$P = 4x^3 - 6x^2 + x + 1$$
$$Q = 2x^6 - 3x^5 + 2x^4 + x^3 - 3x^2 - 3x + 4.$$

Here the number of operations should be four; but it is reduced by the circumstance mentioned in the fourth clause of the rule.

(P)	$\bar{4}$, $\bar{2}$, $\bar{4}$, 2	6	− 1	− 1	0	0	0
(Q)	$\bar{2}$, 1	− 3	2	1	−3	−3	4
(1)	$\bar{0}$,* 3	1	− 6	− 6	8		
(2)	$\overline{22}$, 11	− 27	−27	32			
(3)	12	− 65	53				

$12x^2 - 65x + 53$ Answer.

* Then bring forward the next column.

The method of proof of the several processes, as their results arise, is as follows: Make an additional proof column, in which place the sums of the numbers in each line, taken with their signs; making these sums vary with the variation of the leading factors: thus

			Proof.
a	b	c	A
p	q	r	P
$aq + bp$	$ar + cp$	. . . . . .	Z

Here A is $a + b + c + \dots$; B is $p + q + r + \dots$; and Z is $aq + bp + ar + cp + \dots$. If then the process be correctly done, an extension of it to the proof column gives aP + Ap, which ought to exceed Z by $2\,ap$.

We shall conclude this article with the process which will be applied hereafter. [STURM'S THEOREM.] The object is to proceed as in finding the greatest common divisor of P and Q, changing the sign of every remainder before using it.

$$P = 4x^3 - 9x^2 - 4x + 1$$
$$Q = x^4 - 3x^3 - 2x^2 + x - 3.$$

					Proof column.
4	9	4	− 1	0	16
1	− 3	− 2	1	−3	− 6
− 3	− 4	3	−12		−16
− 43	0	−45			−88
43	0	−45	0		− 2
4	− 9	− 4	1		− 8
− 387	− 352	43			− 696
− 15136	19264				4128
15136	19264				34400
43	0	45			

The remainders therefore, with the signs changed as directed, are $43x^2 + 45$, $15136x - 19264$, and the last is a negative whole number. The following is the first instance of the use of the proof column:—

$$1 \times 16 + 4 \times (-6) - (-16) = 8 = 2(4 \times 1)$$

IODINE, a non-metallic elementary or simple solid body, which was discovered by M. Courtois, of Paris, in 1812. Its peculiar properties were however first ascertained by Gay-Lussac and Davy. Iodine exists in the water of the ocean and mineral springs, probably combined with sodium, in marine molluscous animals and sea-weeds; it has also been met with in combination with silver. Iodine is principally obtained from *kelp*, or sea-weed which has been burnt for the purpose of obtaining alkali from it. When the alkaline and other salts have been separated, the residual solution is treated with sulphuric acid and binoxide of manganese, by which the iodine is set free, the decomposition being analogous to that by which chlorine is obtained by the same agency from common salt.

Iodine is a soft opaque solid, of a bluish-black colour and metallic lustre. The primary form of the crystal is a right rhombic prism, and the crystals are usually flat. According to Gay-Lussac, its specific gravity is 4·948. When moderately heated, it rises in vapour of a violet colour, and hence its name from the Greek. On cooling, it again crystallizes unchanged, nor is it decomposed or altered by being subjected to very high temperatures, and it has resisted all attempts to decompose it. Iodine has a strong disagreeable odour and taste resembling those of bromine and chlorine; it stains the skin of a brownish colour, but not permanently. It is readily dissolved by alcohol; the solution is of a reddish-brown colour, but so little is taken up by water that a pound of water will not dissolve more than a grain of it. It is very poisonous. Its characteristic property is that of giving an intense blue colour when added to a solution of starch. It unites with metals to form compounds, which are termed *iodides*, and, like chorine and bromine, it forms acids both with hydrogen and oxygen.

Oxygen and Iodine combine to form probably four compounds; the first is *oxide of iodine*. When the vapour of iodine and oxygen gas are mixed at rather a high temperature, the violet tint of the iodine disappears, and a yellow soft substance is formed, which is regarded by Sementini as oxide of iodine; if this be subjected to the action of more oxygen gas, it is converted into a yellow liquid, which the same chemist supposes to be iodous acid; but the composition and properties of these compounds have not been accurately determined.

Iodic Acid.—This compound was first obtained by Davy by the action of iodine upon what he called euchlorine gas. A better process has however been proposed by Mr. Connell, which consists in heating the iodine in the strongest nitric acid. For this purpose the acid should be introduced with about a fifth of its weight of iodine into a tube about an inch wide and 15 inches long, and sealed at one end, and these materials are to be kept boiling for 12 hours; the iodine which rises and condenses on the sides of the tube is to be returned to the acid either by a glass tube or by agitation; when the iodine disappears, the excess of nitric acid is to be got rid of by evaporation. Iodic acid is a white semitransparent solid substance, which is inodorous, but has an astringent sour taste. It is so dense as to sink in sulphuric acid, and it deliquesces in a moist atmosphere. It is very soluble in water; the solution reddens vegetable blue colours; it detonates when mixed and heated with charcoal, sugar, and sulphur. It combines with metallic oxides to form salts, which are termed *iodates*, and these, like the chlorates, yield oxygen when heated; and an iodide remains.

Iodic acid is composed of

Five equivalents of oxygen 8 × 5 =	40
One equivalent of iodine	126
Equivalent	166

Oxiodic or Periodic Acid.—When chlorine is added to saturation to a solution of iodate of soda with excess of the alkali and concentrated by evaporation, a sparingly soluble white salt is obtained, which is *oxiodate of soda;* when this is dissolved in dilute nitric acid and mixed with nitrate of silver, a yellow precipitate falls, which, dissolved in hot nitric acid and evaporated, yields orange-coloured crystals of oxiodate of silver; these are decomposed by cold water, and an aqueous solution of pure oxiodic acid is formed; this by cautious evaporation yields hydrated crystals, and these, when heated to 212°, are resolved into oxygen and iodic acid. It consists of

Seven equivalents of oxygen 8 × 7 =	56
One equivalent of iodine	126
Equivalent	182

Azote and Iodine form iodide of azote. This compound cannot be obtained by direct action, on account of the weakness of the affinity existing between its elements. It is prepared by putting iodine into an aqueous solution of ammonia, which being decomposed, its hydrogen forms hydriodic acid with one portion of the iodine, whilst the azote combining with another portion of it, the result is iodide, or, correctly speaking, teriodide of azote, which remains insoluble in the state of a dark brown powder. This compound is very explosive, especially when dry: the best method of exhibiting its power is that of allowing it to dry in small portions on bibulous paper, and then simply letting it fall on the ground or merely touching it, it detonates with a sharp noise, heat and light being emitted, and the vapour of iodine and azotic gas are evolved. It is not dangerously explosive. It is composed of

One equivalent of azote . .	14
Three equivalents of iodine 126 × 3 =	378
Equivalent	392

Hydrogen and Iodine form hydriodic acid, which may be prepared by the direct combination of its elements. When a mixture of iodine in vapour and hydrogen gas is passed through a red-hot porcelain tube, they combine to form this acid. It is however much more conveniently formed by heating in a retort one part of phosphorus and about 12 parts of iodine moistened with water; by the mutual action of these substances the water is decomposed, its oxygen combines with the phosphorus, forming phosphoric acid, while the hydrogen unites with the iodine to form hydriodic acid, which passes over in the state of a colourless gas. This acid has a sour taste, reddens vegetable blues, and when mixed with atmospheric air forms dense white fumes with its moisture: its odour resembles that of hydrochloric acid gas. It is soluble in water. The salts which it forms are termed hydriodates; but when it is acted upon by metals, hydrogen is evolved, and when by metallic oxides, water is formed, and in both cases iodides are the result.

It is decomposed by oxygen when they are heated together; water is formed, and iodine evolved. It is also immediately decomposed by chlorine, which unites with its hydrogen to form hydrochloric acid, and iodine is set free. It is composed of

One equivalent of hydrogen	1
One equivalent of iodine	126
Equivalent	127

One volume of it consists of half a volume of hydrogen gas and half a volume of the vapour of iodine.

Chlorine and Iodine appear to form three chlorides. The protochloride may be obtained by passing a current of chlorine gas into water in which chlorine is suspended; a deep reddish solution is formed, which yields irritating fumes possessing the smell of both the elements; it first reddens and then bleaches litmus paper. The terchloride may be formed by repeatedly distilling the protochloride. The perchloride when decomposed by water gives rise to hydrochloric and iodic acids. The opinions of chemists with respect to these compounds are yet somewhat at variance.

Sulphur and Iodine is formed by heating gently a mixture of 1 part of sulphur and 4 parts of iodine. The product is of a dark colour, and has a radiated structure; it is easily decomposed by heat.

Iodine and Phosphorus combine readily without the application of heat; and so much heat is evolved by their action that the phosphorus takes fire if the experiment be made in the open air; but in close vessels no light appears. The composition of iodides of phosphorus is rather uncertain; that which is probably a protiodide is formed with one part of phosphorus and seven or eight parts of iodine; it has an orange colour, fuses at 212°, and when heated sublimes without changing; it is decomposed by and decomposes water, forming with its elements hydriodic and phosphorous acids, while phosphorus is set free. It is probably composed of

One equivalent of iodine	126
One equivalent of phosphorus	16
Equivalent	142

The sesquiodide is formed by the action of 1 part of phosphorus and 12 parts of iodine. It is a dark grey crystalline mass, which fuses at 84°, and with water yields hydriodic and phosphorous acids. It is composed of

One and a half equivalent of iodine	189
One equivalent of phosphorus	16
Equivalent	205

The periodide is prepared with 1 part of phosphorus and 20 of iodine; it is a black compound, fusible at 114°. By the action of water it yields hydriodic and phosphoric acids, and hence it is inferred to consist of

Two and a half equivalents of iodine	315
One equivalent of phosphorus	16
Equivalent	331

Iodine and Carbon unite to form two compounds, but not by direct action. They are not important, and their composition has not been ascertained.

The compounds of iodine and metals are mentioned under each metal.

IODINE, *Medicinal Properties of.* Iodine, though only obtained in an isolated state of late years, has been long employed as the efficient principle of other preparations and therapeutic agents, namely, burnt sponge and certain mineral waters. It is only since it has been procured as a distinct principle that its action has been ascertained with precision. In the present day it is administered rather in some artificial compound than as pure iodine, owing to its very sparing solubility in water. Iodine in substance, however, when applied to the skin, stains it brown, and even the very small quantity which can be dissolved in water is sufficient to cause rubefaction, and in the form of baths produces decided action both on the surface of the body and the general system. When applied to ulcers or any breach of the skin, it occasions heat and a sense of pricking and tingling; it is also absorbed, and may be discovered in the blood and the secretions of the patient. Taken internally, even in small doses, it causes a sense of heat in the mouth and throat; if much diluted by the vehicle in which it is given, and the stomach be healthy, it appears to do little more than increase the digestive powers; but in larger and stronger doses it creates great heat in the region of the stomach, which becomes sensible to pressure, with a feeling of weight, heartburn, and often nausea and vomiting. In very large doses it acts as an irritant poison. It is not merely an irritant poison when taken in a large dose, but is a slow or accumulative poison, even when taken in medicinal doses for a length of time. It has been generally represented as causing emaciation even to a frightful extent; but though this has occurred in some instances, it does not seem to be frequent, if we except the absorption of certain glands, especially the mammæ of females.

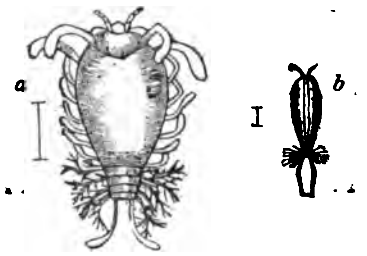
The diseases in which it has been found useful are glandular swellings, especially bronchocele or goître, which rarely resists its action; in some strumous diseases, in chronic rheumatism, and also as an antidote against poisoning with strychnia, brucia, and verataria: but its claims to confidence are not clear in case of such formidable poisons. It is often of use in lessening the injurious effects of mercury and in the treatment of the sequelæ of syphilis. (See Lugol, *On Scrofula.*)

IONA, also known by the names of I-Colm-Kill and Hii or I, is one of the Hebrides, in the district of Mull, and belonging to the shire of Argyle. It is situated on the western side of the Isle of Mull, from which it is separated by a narrow channel called the 'Sound of I.' Its length is three miles, and at its widest part it is about one mile in breadth. The general aspect of the country is rugged and mountainous, and the surface for the most part consists of moor and bog occasionally varied by a patch of green pasture. The village is a miserable collection of huts inhabited by a population of about 450 people. There seems to be no doubt that the island was antiently inhabited by Druids, who were expelled by the Christians about the time that St. Columba came to Britain (A.D. 565), and the inhabitants still point out the spot where this holy man is traditionally said to have been interred. The religious institutions established by the Christians remained unmolested for nearly 200 years; but about the beginning of the ninth century the Danes made a descent upon the island, and, with their accustomed barbarity, put to death the greater part of the monks, forcing the remainder to seek safety in flight. At the dissolution of the monastic institutions the revenues were united to the see of Argyle, and upon the abolition of episcopacy they became the property of the duke. At the present time the island is chiefly interesting on account of its numerous architectural and other antiquities, for a full account of which we must refer the reader to Dr. Macculloch's 'Highlands and Western Isles of Scotland.' The cathedral or abbey church is surmounted by a lofty tower, which is supported by four arches adorned with figures *in basso rilievo*. The choir is handsome, and the large eastern window is a beautiful specimen of the Gothic style, although its light and elegant workmanship has been much injured by time. In the fore court are two finely cut crosses; one called St. Martin's is formed of a single piece of red granite, 14 feet in length. The cathedral itself is dedicated to St. Mary, and, according to Boethius, was built by Malduinus in the seventh century, but Dr. Macculloch thinks this at least seven centuries too soon.

(*Beauties of Scotland;* Macculloch's *Highlands*, &c.)

IONE, or as it is sometimes written, JONE, a parasitic genus of crustaceans, placed by Desmarest under the *Isopoda*, but by Latreille, who established the subgenus, under the *Amphipoda*. The latter founded his separation on the figure given by Montagu under the denomination of *Oniscus thoracicus* (*Linn. Trans.*, ix. iii., 3, 4); and observes that it presents particular characters which place it at a distance from all the other forms of the order. The body is composed of about fifteen joints, which are only to be distinguished by lateral incisions in the form of teeth. The four antennæ are very short: the external ones, longer than the two others, are only visible when the animal is seen on the back. The two first segments of the body in the female are each provided with two elongated, fleshy, flattened, oar-like cirrhi. The feet are short, hidden under the body, and hooked. The six last segments are furnished with lateral, fleshy, elongated, fasciculated appendages, which are simple in the males, but in the form of oars in the other sex. At the posterior extremity of the body are six other appendages, which are simple and curved, two of them being longer than the others. The abdominal valves are very large, cover all the lower part of the body, and form a species of receptacle for the eggs.

Habits.—This parasite hides itself under the shell of *Callianassa subterranea* [CALLIANASSA], and there forms a tumor on one of its sides. Montagu extracted it, and kept it alive for some days. The females are always accompanied by their males, which are very inferior in size, and fix themselves firmly upon the abdominal appendages of the former by means of their claws. Latreille, whose account we have given, speaks of it as rare, and remarks that in its habits it approaches to *Bopyrus*. [ISOPODA.]



Ione thoracica. *a*, Female; *b*, Male. (Montagu, *Linn. Trans.*)

N.B.—M. Milne Edwards (ed. Lamarck, 1838) remarks, that all the figures referred to are copied from those of Montagu, and are very bad. Montagu states that the crustacean on which these parasites are found is rare, but that, in the few that he had obtained, two or three pairs of the parasites had occurred.

IO'NIA and IONIANS. Ionians is the name of one of the various peoples included in antient history under the general name of Hellenes or Greeks. [ACHÆI; ÆOLIANS; DORIANS.] The origin of the Ionians is involved in great obscurity. The name only occurs in the Iliad once, and in the form 'Iaones' (N. 685); but not many years after the war of Troy, the Ionians appear as settled in Attica, and also in the northern part of the Peloponnesus, along the coast of the Corinthian Gulf. Herodotus (viii. 44) says that the Athenians were originally Pelasgi, but that after Ion, the son of Xuthus, became the leader of the forces of the Athenians, the people got the name of Ionians. It appears probable that the Ionians, like the Æolians, were a conquering tribe from the mountains of Thessaly, and that at an unknown period they migrated southwards and settled in Attica and part of the Peloponnesus, probably mixing with the native Pelasgi. The genealogy of Ion, the reputed son of Xuthus, seems to be a legend under which is veiled the early history of the Ionian occupation of Attica. Euripides, in order to flatter the Athenians, makes Ion the son of Apollo. Whatever may be the historical origin of the Ionian name, Athenians and Ionians came to be considered as one and the same people. [ATHENS.] In the Peloponnesus the Ionians occupied the northern coast of the peninsula, which was then called Ionia, and also Ægialæan Ionia; and the sea which separates Peloponnesus from Southern Italy assumed the name of Ionian Sea, a circumstance which would seem to indicate the extent and prevalence of the Ionian name. This appellation of Ionian Sea was retained among the later Greeks and the Romans, and it is perpetuated to the present day among the Italians. When the Dorians invaded the Peloponnesus, about 1100 years B.C., the Achæi being driven from thence gathered towards the north, and occupied Ionia, which after that time took the name of Achæa. The Ionians of the Peloponnesus emigrated to Attica, whence, being straightened for want of space, and perhaps also harassed by the Dorians, they resolved to seek their fortune beyond the sea, under the guidance of the sons of Codrus, the last king of Athens. This was the great Ionian migration, as it is called. The emigrants consisted of natives of Attica, as well as of Ionian refugees from the Peloponnesus, and a motley band from other parts of Greece (Herod. i. 146). But this migration can perhaps hardly be considered as one single event: there seem to have been many and various migrations of Ionians, some of which were probably anterior to the Dorian conquest. Thus the Ionians established colonies in most of the Cyclades, such as Naxos, Andros, Paros, and Delos, and also in Eubœa. The emigrants who proceeded to the coast of Asia, under their leader Neleus, took Miletus, which was then inhabited by the Carians. Miletus seems to have fallen to the share of the Athenian Ionians, who, according to the frequent custom of those times, massacred all the men, and kept the women for themselves. They also colonized Myus and Priene, near the banks of the Mæander. Another party of Ionians under Androclus took possession of Ephesus, and drove away the Leleges and

Carian inhabitants. [Ephesus.] They likewise occupied Lebedos and Colophon, the latter of which towns was inhabited by Cretans, who appear to have amalgamated with the Ionian colonists. Further north Teos, which had been built by the Æolians, received also an Ionian colony, as well as Erythræ on the coast facing the island of Chios. On the north coast of the same peninsula Clazomenæ was founded afterwards by a colony from Colophon, and later still Phocæa was colonized by adventurers from Phocis and Ionians from Attica on a territory north of the Hermus, which belonged originally to the Cumæans of Æolia. The above towns, with the two islands of Chios and Samos, which the Ionians likewise colonized, formed the confederation of the twelve cities of Ionia. Smyrna being seized by Colophonian exiles (according to Herodotus), was in course of time added to the confederation. Other colonies from the twelve cities were built along the coast, such as Geræ, Myonnesus, Claros, &c.

This confederation appears to have been mainly united by a common religious worship and the celebration of a periodical festival; and it seems that the deputies of the several states only met in times of great difficulty. The place of assembly was the Panionium, at the foot of Mount Mycale, where a temple, built on neutral ground, was dedicated to Poseidon. In the old Ionia (afterwards called Achæa), Poseidon was also the national deity, and his temple continued at Helice till that city was destroyed by the great earthquake. That the settlers in Asia should retain their national worship is a circumstance perfectly in accordance with the history of colonization, and confirmatory, if confirmation were wanted, of the European origin of the Ionians of Asia. We have no materials for a history of these cities of Ionia as a political community, and no reason for supposing that their political union came near the exact notion of a federation, as some have conjectured.

Asiatic Ionia extended from the Cumæan gulf on the north to Mount Grius and the gulf Basilicus south of Miletus, a length of not more than 100 miles in a straight line, but with a coast three times that length, owing to the many sinuosities and the form of the large Chersonesus opposite Chios. The Ionian territory did not extend inland above 40 miles from the coast as far as Mounts Sipylus and Tmolus. It bordered on the north upon the territory of Pergamus, Cumæ, and other Æolian cities which had been colonized several generations before the Ionian immigration, and on the south upon Caria, where the Dorian colonies formed, some time later, a small confederation. The principal rivers of Ionia were the Hermus, the Caystrus, and the Mæander, all three flowing from the interior with a western course into the Ægean. [Anatolia.]

The Asiatic Ionians early attained a high degree of commercial and maritime prosperity. Miletus alone is said to have founded 75 towns or colonies. They became wealthy, refined, and luxurious. The remains of their monuments prove their taste for the arts, and their temples and public buildings rivalled those of European Greece. The literature of Greece may be said to have originated on the coast of Asia Minor. The historian Hecatæus was a native of Miletus; Thales, one of the earliest philosophers, was from the same country. Anacreon was a native of Teos; and Herodotus, though a Dorian, adopted, in his History, the language of his Ionian neighbours.

The Lydian kings, whose capital was at Sardis, made war against the Ionian states, who only obtained peace and preserved a kind of independence by paying tribute, but they were finally subdued by Crœsus. They remained faithful to the Lydians, when attacked by Cyrus (B.C. 546), in consequence of which, that monarch having subdued the Lydians, sent his general Harpagus to reduce Ionia. Harpagus took and destroyed Phocæa, and the surviving inhabitants fled by sea, and founded Massilia (Marseille) on the coast of Gaul. About the same time many of the Teians left their country and founded Abdera in Thrace. Priene was taken by Harpagus, and the inhabitants were sold as slaves. Miletus and the other cities obtained peace on the same conditions as they had accepted under the kings of Lydia. In almost every town there were two parties, aristocratic and democratic, and the Persian kings or their satraps generally favoured the former, and thus it happened that most of the Greek cities in Asia came to be ruled by tyrants, or individuals who possessed the sovereign power. Aristagoras, who was deputy tyrant of Miletus in the time of the first Darius, having quarrelled with the Persian satrap, urged his fellow-countrymen the Ionians to revolt, to expel their tyrants, and to establish democracy. He set the example by resigning his power. Hecatæus, who saw the danger of rousing the formidable power of Persia, in vain opposed this rash measure. Aristagoras proceeded to Athens, and obtained the assistance of a fleet. The Athenians and Ionians united marched to Sardis, and plundered and burnt the city, but the Persians coming in great force, the confederates were defeated, and the Athenians withdrew from the contest. The Ionian fleet was strong at sea, but could not prevent the satrap Artaphernes from attacking and taking their cities by land. Clazomenæ was taken and destroyed, but the inhabitants some time after built a new town upon an island near the coast. Miletus was captured after a gallant defence, most of the inhabitants were killed, and the rest were transplanted into Persia, where Darius gave them lands and a settlement. The territory of Miletus was given up to Persian or Lydian colonists. Thus ended, about 494 B.C., the Ionian revolt, which lasted six years. Miletus however seems to have recovered from its ruin after a time, and the victories of the Greeks over Xerxes had the effect of restoring the fugitives to their respective cities.

After the battle of Mycale (B.C. 479), and the victories of Cimon, the Greeks became absolute masters of the sea, and the Persians did not venture near the coast. The Athenians, who had taken the lead in the close of the Persian war, now obtained a kind of supremacy on the eastern coast of the Ægean, and the Ionian cities acknowledged Athens as their leader and the arbiter of their disputes. At the close and after the conclusion (B.C. 404) of the Peloponnesian war, the Lacedæmonians gained the ascendency, and the towns of Asia changed protectors. Accordingly we find Agesilaus reconciling their intestine feuds, and professing, as the object of his expedition into Asia, to secure their independence. But by the peace of Antalcidas, 387 B.C., the towns on the continent of Asia were given up to the king of Persia, who however does not appear to have treated them harshly, for many of them were in a prosperous state at the time of Alexander's expedition. After the battle of the Granicus the democratic party at Ephesus and other towns resumed the upper hand, and Alexander gave them his countenance, at the same time forbidding them strictly from offering any further violence to the vanquished aristocracy. Miletus alone did not submit; it sent proposals however to Alexander, offering to remain neutral, but the conqueror sternly repulsed the proposal: the town was taken by storm, and most of the inhabitants put to the sword. It does not seem to have ever after completely recovered from that blow; and the gradual deposits of the Mæander, which have totally changed the appearance of the coast, contributed to its depression. Miletus, once a seaport town, is now eight miles from the sea, and the island of Lade, which stood at the entrance of its harbour, is become part of the mainland. Miletus however was still a town of some consequence under the Romans, and under the Byzantine emperors, till the twelfth century, when it was ravaged by the Turks. There are now only a few huts amidst its ruins inhabited by some Turkish families, but the place retains the pompous name of Palatska, or 'the palaces.' Chandler found remains of a vast theatre, and also of the famous temple of Apollo Didymæus in its neighbourhood, with several of the columns still standing. Under the Roman empire several of the other cities of Ionia still maintained the rank of wealthy cities, such as Smyrna and Ephesus. The best account of the actual state of the remains of the Ionian cities is in Chandler's *Travels in Asia Minor*, and the *Ionian Antiquities*, published by the Dilettanti Society, 2 vols. fol., with handsome plates. (See also Leake's *Map of Asia Minor*; Macfarlane's *Constantinople in* 1828; and Chishull's *Asiatic Antiquities*; Herodotus, i. 141-151; Strabo, lib. xiv.; Pausanias, vii. 1-5.)

Coin of Clazomenæ.

British Museum. Actual Size. Gold. Weight, 88 grains.

IONIAN ISLANDS is the name given to the Seven islands of Corfu, Cephalonia, Zante, Santa Maura, Ithaca, Paxo, and Cerigo, which are scattered along the coast of Epirus and of the Peloponnesus. The name is probably derived from their being situated in that part of the Mediterranean which stretches between Greece and Calabria, and which from antient times has received the name of the Ionian Sea. [IONIA.] These islands are described under the several heads of CEPHALONIA, CORFU, ITHACA, ZANTE, &c. Under the head CORFU an account is given of the present constitution and administration of the republic of the United Ionian Islands under the protection of Great Britain. The following is a general view of the population, extent, produce, trade, and education of these islands.

Population.—A statement of the area, population, &c. of each island in 1834:—

ISLANDS.	Area in Square Miles.	Total Population.		Aliens and Resident Strangers (included in the Total Population).	Population to the Square Mile.	Persons employed in			Births.	Marriages.	Deaths.
		Males.	Females.			Agriculture.	Manufactures.	Commerce.			
Corfu	227	32,909	27,981	9,040	264	15,077	1621	1443	2507	597	1672
Cephalonia	348	30,875	25,951	348	163	12,689	1471	835	1567	286	799
Zante	156	18,991	16,632	1,217	228	7,672	1947	421	974	284	1181
Santa Maura	180	9,592	8,258	195	100	2,458	132	470	525	110	811
Ithaca	44	4,902	4,664	108	217	1,407	196	931	246	52	128
Cerigo	116	4,091	4,488	37	74	1,522	264	198	248	61	118
Paxo	26	2,560	2,501	223	195	217	198	65	175	34	109
Total	1097	103,920	90,475	11,168	177	41,042	5829	4363	6242	1424	4818

Produce, Exports, Imports, &c.—The principal articles of export from the islands are olive oil and currants. Oil is chiefly the produce of Corfu, but in all the islands the olive-tree is more or less cultivated. Cephalonia and Zante are the only islands in which currants are grown, with the exception of Ithaca and Santa Maura, in which a few acres are employed in that cultivation.

ISLANDS.	CROPS.—Number of Acres of Land under each Kind of Crop.											
	Wheat.	Indian Corn, Calambocchio, Barley, and Wheat.	Oats.	Currants.	Olives.	Vines.	Cotton.	Flax.	Pulse.	Pasture.	Total in Crop.	Total Uncultivated.
Corfu	4,005	13,508	2,963	..	75,700	13,900	69	843	1,020	17,422	112,008	33,272
Cephalonia	682	6,963	635	6,242	4,323	12,232	473	351	1,033	640	32,934	189,786
Zante	7,182	966	492	6,440	16,766	13,600	327	134	64	1,474	45,971	53,869
Santa Maura	1,234	3,249	380	8	8,143	4,127	111	75	212	5,494	17,539	97,661
Ithaca	49	263	5	190	212	756	1	97	38	1,626	1,611	3,286
Cerigo	453	8,466	..	..	513	1,365	54	109	1,595	5,285	12,555	61,685
Paxo	..	..	..	..	11,000	406	..	..	..	..	11,406	5,234
Total	13,605	33,415	4,475	12,880	116,657	46,386	1,035	1,609	3,962	31,941	234,024	444,793

Total Produce.—Wheat, 234,727 bushels; Indian corn, &c., 177,065 bushels; oats, 23,944 bushels; currants, 15,071,400 lbs.; oil, 253,923 barrels; wine, 306,822 barrels; cotton, 45,145 lbs.; flax, 94,522 lbs.; pulse, 19,826 bushels; salt, 114,193 lbs.

The exports from the Ionian Islands in 1833 amounted to 250,669*l.*, and consisted principally of olive oil, currants, wine and spirits, soap, and some other articles of less importance.

The imports into the Ionian Islands in 1834 amounted to 563,611*l.*, and consisted of sugar, coffee, cotton and woollen goods, earthenware, hardware, timber, wheat, rice, cheese, cattle, sheep, and a variety of other articles.

Education.—The following is the number of schools, &c., as they existed in 1834:—

ISLANDS.	Public or Free Schools.							Private Schools.			
	Number.	Number of Scholars.			Mode of Instruction.	Mode of Support.	Total Expenses.	Number.	Number of Scholars.		
		Males.	Females.	Total.					Males.	Females.	Total.
Corfu	4	294	..	294	Classical and Lancasterian.	Wholly by the Government.	£3,261	67	1,955	353	2,308
Cephalonia	12	445	59	504			867	73	1,207	..	1,207
Zante	2	150	..	150			623	38	666	325	991
Santa Maura	2	126	..	126			537	17	426	71	497
Ithaca	2	258	..	258			331	9	312	22	334
Cerigo	9	394	9	403			295	2	17	55	72
Paxo	5	122	49	171			258	..	..	..	..
Total	36	1789	117	1906			6,172	206	4,583	826	5,409

At Corfu there is a university, and also an ecclesiastical seminary for the education of young men intended for the priesthood of the Greek church. Each of the islands also has a school, entitled 'Secondary,' in which the scholars are instructed in the Greek and Latin classics, in the modern Greek, English, and Italian languages, and in arithmetic and elementary mathematics. In the chief town of each island there is a central school, on the mutual instruction plan, for teaching reading, writing, and arithmetic.

Besides these schools, conducted entirely at the public expense, there are in each island district schools on the same plan as the central schools, where similar instruction is given, and the expense is defrayed by the parents of the children. The terms per scholar vary greatly, and the payment is frequently made in kind. Government also contributes to the establishment of these schools by furnishing books, slates, benches, &c., and, where no suitable church exists for the purpose, by providing a school-house.

The district and village schools are under the immediate superintendence of the head master of the central school in each island, and there is an inspector-general of all these schools. The whole of the establishment for education is under the general direction of the commission for public instruction.

The only coinage of the states is a copper currency of farthings to the amount of 10,000*l.* The general circulating medium consists of Spanish dollars. Some British silver coin has also been put into circulation, but the greater part has been withdrawn for remittances to Malta and to England.

The Troy pound of 5760 grains is the standard weight: 24 of these grains make 1 calco; 20 calchi 1 ounce; and 12 ounces 1 libbra sottile, or pound light weight, equal to 1 lb. Troy. The libbra grossa, or great pound, contains 7000 grains, and is therefore equivalent to the pound avoirdupois; 100 lbs. (libbra grossa) are called a talento. The English imperial standard yard is the standard linear measure, with the divisions into 3 feet and 36 inches: 5½ yards are 1 camaco; 220 yards 1 stadio; and 1760 yards 1 mile. The imperial gallon is the measure of capacity: 1 gallon is equal to 8 dicotoli. An Ionian barrel contains 16 gallons, or 128 dicotoli.

IONIAN SCHOOL comprises several of the earliest philosophers of Greece, whose speculations were predominantly of a physiological character, and who, with one or two exceptions, were natives of the Ionian colonies in Asia Minor. From this purely external circumstance the school has derived its name, and its members have been brought into an unbroken connexion of masters and disciples by the learned labours of the later Greeks, who strove to give to the first development of philosophy the same orderly transmission of doctrine which prevailed in the later schools. Accordingly Anaximander is made the scholar of Thales and the teacher of Anaximenes, who had two disciples, Diogenes of Apollonia in Crete, and Anaxagoras, whose disciple was Archelaus of Athens, or Miletus, in whom the school closes. Now, not to mention that this purely artificial arrangement omits Heraclitus, the chief of the Ionians, it is also open to great difficulties both of doctrine and chronology. As regards the latter however, we shall only advert to the general difficulty, that between six and seven generations (212 years) are occupied by the lives of Thales, Anaximander, Anaximenes, and Anaxagoras. The incongruity of the received arrangements appears at once on the slightest consideration of the doctrinal systems of the philosophers of this school. Agreeing in the hypothesis of a primeval state of things, they differed widely in the mode in which they accounted for the deduction of existing phenomena out of the primal substance. One theory endued the universe with life, and considered the orderly procession of all things to be a spontaneous development of a preexistent germ of life. A second accounted for all apparent alteration in the form and qualities of natural bodies by certain changes in the outward relations of space, and proceeded on the supposition of certain permanent material elements which change place in obedience to motion, either originally inherent in or extrinsically impressed on the mass. The latter is the mechanical, the former the dynamical theory of nature. Of the dynamical theorists, Thales first of all taught that all things are pregnant with life; that the seed or germ of vitality, which is in all things, is water, because all seed is moist and humid. Of this potentially living entity Anaximenes advanced a still worthier representation, and taught that the primal substance is infinite and sensuously imperceptible. This principle is analogous to the animal soul, and as the animal soul governs the body, so the universal soul rules and embraces all things. Diogenes made a still farther advance, and maintained that the harmony and design of the mundane fabric suggest the unity and intelligence of its first principle. This principle however he considered as simply physical, and only distinguished from natural phenomena in this, that while it is infinite, as the principle of all, they are finite. Still bolder was the flight of Heraclitus, who taught that the world is an everliving being, a rational fire, whose vitality involves a tendency to contraries, and is ever passing from want to satiety.

The mechanical theory is first opened by Anaximander, who flourished not long after Thales, who conceived the ground both of production and motion to be an eternal substance, which he called the infinite, and wherein the immutable elements were indistinguishably combined. Out of this chaos certain primary contraries, as he conceived them, cold and warm, earth and heaven, were first evolved, and in the course of certain separations and combinations alternately proceeding, more perfect forms are spontaneously developed, to be ultimately resolved into the homogeneous primary. After a long interval of a century Anaxagoras revived the mechanical physiology, and distinctly advanced the principle on which it rests, that nothing is changeable, but that the nature of every thing is permanent. Seizing the contrariety of the moving and the moved, which the mechanical theory is so well calculated to exhibit, he defined the latter to be extended antitypous bulk, inert body, infinitely multiple both in qualities and parts. The moving principle, on the contrary, is perfect, simple, and homogeneous—soul or spirit, which, as moving the elements into combinations of order and beauty, is endued with the faculty of knowing and surveying whatever was, and is, and shall be. Archelaus rather abandoned than advanced the views of his master Anaxagoras, and in him, as the teacher of Socrates, the Ionian school became extinct before the more extensive development of the Socratic philosophy. (Ritter, *Geschichte d. Ionischen Philosophie;* and Brandes, *Geschichte d. Griech.-Röm. Philos.*)

IONIAN SEA. [Ionia.]

IONIC DIALECT, the softest of the four written varieties of the Greek language, was spoken in the Ionian colonies of Asia Minor, and in several of the islands of the Ægean Sea. As the new Ionic, it is distinguished from an older, which was the common origin of itself and the Attic. The old Ionic was widely diffused, and its use was co-extensive with the Ionian settlements in the Peloponnesus and Northern Greece. (Thirlwall, *History of Greece*, i., 123.) The language of epic poetry arose out of this original tongue, which after the Dorian conquest passed, on the one hand, with the fugitives into Asia Minor, while, on the other, it continued to be spoken, for awhile at least, by the conquered peasantry who remained in Greece Proper. This tradition, which however, like most of the earlier traditions of Greece, is involved in great obscurity, may perhaps serve to explain (what in the common legends of Homer is otherwise inexplicable) the similarity of the language employed by Homer and Hesiod, who, though near to each other in time, were widely separated in the supposed scenes of their poetical labours. (*Ibid.*, ii. 120.) This first matured form of the Ionic has been called the epic, and was faithfully adhered to as the standard of Greek epic and elegiac composition by all subsequent writers of epos or elegy, which also owed its birth to Ionians.

On the formation of the new Ionic, or simply the Ionic, great influence was exercised by the commerce of the Ionians, and especially by their intercourse with the soft and effeminate Asiatics. Neglecting the combination of strength with softness which gave to the epic dialect its characteristic fulness of tone, the Ionians attended only to mellowness and euphony, to attain which it softened the aspirates, accumulated vowels, and laid aside every broader and harsher sound. Herodotus (i. 142) distinguishes four varieties (χαρακτῆρες γλώσσης) of the new Ionic, in one of which he wrote, and, though a Dorian, has left us the best and most complete specimen of it. [Herodotus; Hippocrates.]

IONIC ORDER. [Civil Architecture; Column.]

IONI'DIUM, a genus of violaceous plants, inhabiting the tropical parts of America. It resembles Viola itself in most respects, but its sepals are not prolonged at the base into appendages, and the lower petal is not spurred. Several species are used medicinally. I. Ipecacuanha and some others have emetic roots.

IÖRA, or **JORA**, a genus of birds established by Dr. Horsfield, and placed by Mr. Swainson among his *Brachypodinæ*, or short-legged thrushes. [Merulidæ.]

IOS. [Archipelago, Grecian.]

IPECACUANHA is an emetic substance, the root of several plants growing in South America. All the kinds have nearly the same ingredients, but differ in the amount of the active principle which they respectively contain, termed emeta. The best is the annulated, yielded by the Cephaëlis Ipecacuanha, a small shrubby plant, native of Brazil and of New Granada. Of this sort there are three varieties, namely, the brown, red, and grey, or grey-white, called also greater annulated ipecacuan. As this is the only sort sent from Rio Janeiro, it is sometimes called Brazilian or Lisbon ipecacuan. It is sent in bales and barrels

The root is in pieces from two to six inches long, and about the thickness of a straw, much bent or twisted, either simple or branched, with a remarkably knotty character, owing to numerous circular depressions or clefts, which give the whole an appearance of a number of rings; and hence the term annulated. It consists of a central axis called *meditullium*, and an external portion, called the *cortical* part. Each contains emeta; but by far the greater portion exists in the cortical. Of the three varieties of annulated ipecacuan the brown contains 16 per cent. of emeta, while the red contains only 14 per cent.: the grey has not been analyzed.

Another sort of ipecacuan is obtained from the Psychotria emetica: this kind contains only 9 per cent of emeta, and the undulated or amylaceous ipecacuan, the produce of the Richardsonia scabra, holds only 6 per cent. of emeta, with 92 per cent. of starch. Besides these, the roots of numerous other plants are used in tropical countries as emetics, and often termed ipecacuan.

The dust or powder of ipecacuan applied to any mucous surface causes irritation and increased secretion from the part. It is chiefly employed to excite the stomach either to augmented secretion, or to invert its action, and effect vomiting. It is also capable, by being combined with other substances, of being directed to the skin, and producing increased perspiration. When given in very small doses, it improves the appetite and digestive powers; in a somewhat larger dose, it acts on the intestines; but in a still larger, it inverts the action of the stomach, and occasions vomiting. It may therefore be used in a great many diseases, such as indigestion, dysentery, rheumatism, common colds, croup, &c. [EMETA; EMETICS; DIAPHORETICS; ANTIDOTES.]

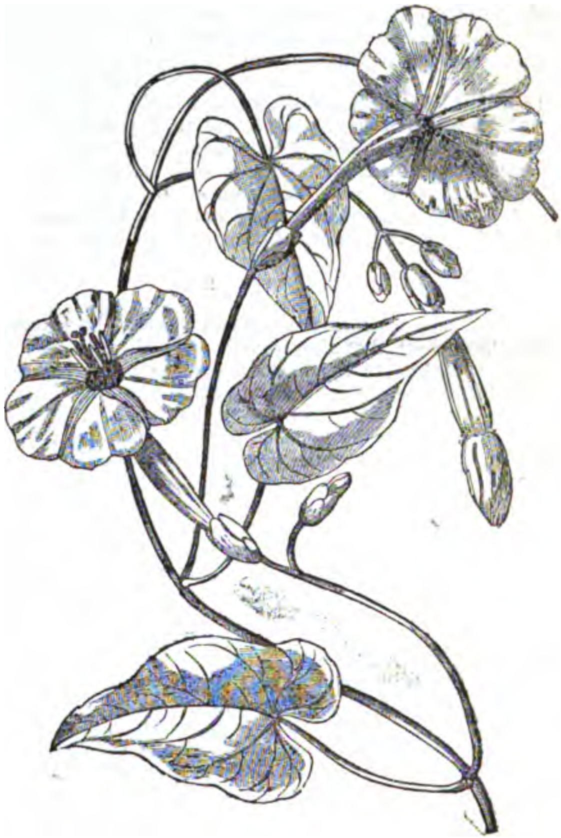
IPHI'CRATES, an Athenian general, most remarkable for a happy innovation upon the antient routine of Greek tactics, which he introduced in the course of that general war which was ended B.C. 387 by the peace of Antalcidas. This, like most improvements upon the earlier methods of warfare, consisted in looking, for each individual soldier, rather to the means of offence than of protection. Iphicrates laid aside the weighty panoply, which the regular infantry, composed of Greek citizens, had always worn, and substituted a light target for the large buckler, and a quilted jacket for the coat of mail; at the same time he doubled the length of the sword, usually worn thick and short, and increased in the same, or, by some accounts, in a greater proportion, the length of the spear. It appears that the troops whom he thus armed and disciplined (not Athenian citizens, who would hardly have submitted to the necessary discipline, but mercenaries following his standard, like the Free Companions of the middle ages), also carried missile javelins; and that their favourite mode of attack was to venture within throw of the heavy column, the weight of whose charge they could not have resisted, trusting in their individual agility to baffle pursuit. When once the close order of the column was broken, its individual soldiers were overmatched by the longer weapons and unencumbered movements of the lighter infantry. In this way Iphicrates and his targetiers (peltastæ), as they were called, gained so many successes that the Peloponnesian infantry dared not encounter them, except the Lacedæmonians, who said in scoff that their allies feared the targetiers as children fear hobgoblins. They were themselves taught the value of this new force, B.C. 392, when Iphicrates waylaid and cut off nearly the whole of a Lacedæmonian battalion. The loss in men was of no great amount, but that heavy-armed Lacedæmonians should be defeated by light-armed mercenaries was a marvel to Greece, and a severe blow to the national reputation and vanity of Sparta. Accordingly this action raised the credit of Iphicrates extremely high. He commanded afterwards in the Hellespont, B.C. 389; in Egypt, at the request of the Persians, B.C. 374; relieved Corcyra in 373, and served with credit on other less important occasions. (Xen., *Hell.*; Diod.; Corn. Nep.)

IPHIS. [LEUCOSIANS.]

IPOMÆA, a genus of plants of the natural family of Convolvulaceæ, which is very closely allied to Convolvulus, or Bindweed, whence has been derived its name. From the more minute investigations of modern botanists considerable changes have taken place in the nomenclature of the species sometimes referred to this genus and sometimes to other nearly allied genera. M. Choisy, who has most recently examined the Oriental Convolvulaceæ, excludes many species usually referred here, and forms the genus of the species of Ipomæa and Convolvulus of authors. Ipomæa has a 5-sepaled calyx, a campanulate corol, with five stamens included within it. Style single; stigma bilobed; lobes capitate; ovary 2-celled; cells 2-seeded; capsule 2-celled. The species are very numerous, and found in the tropical parts of Asia, Africa, and America. A few ascend the mountains in such latitudes.

Most of the species are ornamental; others have been removed to Quamoclit, Argyreia, Pharbitis, &c., and one of the most useful as an article of diet in tropical countries, to Batatas. B. edulis produces the tubers so well known by the name of *Sweet Potatoes*.

Like the kindred genus Convolvulus, which affords us scammony, many of the species of Ipomæa are useful for their purgative properties: thus the Jalap plant is of this genus; and in India, I. Turpethum and cærulea are useful for similar purposes. Of the last the seeds only are employed, and form the *hub-al-nil* of Arabian authors, which has been usually translated *granum Indicum*. *I. Turpethum*, probably so called from the Arabic *toorbud*, which is itself no doubt derived from the Sanscrit tripoota (from *tri*, three, and *poota*, the coat of a seed), or from *trivrit*, another name, as the plant is an Indian one, and its root has been long employed in India as a common purgative. The bark of the roots is the part employed by the natives, as it contains all the active properties, which they use fresh, rubbed up with milk. About six inches in length of a root as thick as the little finger they reckon a common dose. (Roxb.) It is reckoned an excellent substitute for Jalap, and is free from the nauseous taste and smell of that drug. The plant is a native of all parts of Continental and probably of Insular India also, as it is said to be found in the Society and Friendly Isles and the New Hebrides. (*Fl. Ind.*, ed. Wall. 2, p. 59.)



Ipomæa Jalapa.

I. Jalapa is a species which has only recently been accurately determined, though its root has so long and so extensively been employed as a powerful medicinal agent. The drug being exported from Vera Cruz was supposed to be produced in the hot country in its immediate neighbourhood, or in that of Xalapa, and *I. macrorhiza* of Michaux was supposed to be the plant, though this grows also in Georgia and Florida, where no jalap has ever been produced, and its root weighs from 50 to 60 lbs. This was sufficient to prove that it could not be the source of the officinal drug, which is seldom larger than the fist. Humboldt was however well aware that 'the true Purga de Xalapa delights only in a temperate climate, or rather an almost cold one, in shaded valleys, and on the slope of mountains' (*New Spain*, vol. iii.); and the fact is important as showing that a temperate and not a hot climate is required for its cultivation elsewhere. Dr. Coxe, of Pennsylvania, received in 1827 directly from Xalapa several small Jalap plants, one of which he succeeded in growing to maturity, and which was ascertained by Dr. Nuttal to be an Ipomæa, and named by him *I. Jalapa*. Specimens and seeds, of which the latter have produced plants, were subsequently procured by Dr. Schiede from Chiconquiera, on the eastern declivity of the Mexican Andes, at an elevation of 6000 feet. This plant, it is now ascertained, was also known to Miller from seeds sent by Dr. Houston from Mexico, as in the 'Gardener's Dictionary' a plant agreeing in description with the true Jalap plant, and with smooth leaves, is described. The root of this plant is a roundish somewhat pear-shaped tuber, externally blackish, internally white, with long fibres proceeding from its lower parts. The stem is much disposed to twist, and rises to a considerable height upon surrounding objects. The leaves are heart-shaped and pointed, deeply sinuated at the base, entire, smooth, prominently veined upon their under surface, and supported upon long footstalks. The flowers are of a lively purple colour, and stand upon peduncles as long as the petioles. [Convolvulus Jalapa.]

IPSAMBUL. [Abousambul.]

IPSUS, BATTLE OF. [Antigonus, p. 103.]

IPSWICH, a parliamentary borough and corporate town, capital of the county of Suffolk, and distant 69 miles north-east from London, is agreeably situated on the side of a hill near the junction of the rivers Orwell and Gipping. According to Camden, this town was antiently called Gippeswich, which name was derived from that of the neighbouring river Gippen, or Gipping, and thence gradually became changed into Yppyswyche and Ipswich. The town does not appear to be mentioned before the invasion of the Danes in 991, by whom it was pillaged, and the fortifications destroyed. In the Confessor's time, according to Domesday Book, 'Queen Ediva had two parts here, and earl Gwert a third, and there were 800 burgesses paying custom to the king.' The earliest charter conferred upon the town was granted by king John in the first year of his reign, and by it numerous privileges were acquired by the burgesses, of which privileges the chief were, that they should have a merchant's guild, with their own hanse; that no person should be lodged within the borough without the consent of the burgesses; that they should hold their lands and tenures according to the customs of free boroughs, &c. Henry III. increased the privileges of the burgesses, but in the reign of Edward I. the borough was seized by that monarch, on account of certain offences committed by the inhabitants, though it was afterwards restored to them with all its liberties. In the reign of Edward III. the municipal government appears to have been again taken away from the corporation, and committed to the sheriff of the county, by whom a keeper of the town was appointed, but the corporate government was soon restored, and the burghal privileges confirmed and extended by the subsequent charters of Richard II., Henry VI., Edward IV., Richard III., Henry VII. and VIII., Edward VI., Elizabeth, James I., and Charles I. In the reign of Charles II. this corporation, like many others, surrendered its charters and franchises to the king, but in the 36th year of his reign the borough was re-incorporated, with a new constitution, and by a charter of James II. the corporate officers were released from the oaths. The charters of John, Edward IV., Henry VIII., and 17 Charles II., as restored by the proclamation of James, are all considered as governing charters. By the 5 and 6 William IV., cap. 76, the council of the borough consists of a mayor, 10 aldermen, and 30 councillors. Ipswich has returned two members to parliament since the 25th year of Henry VI.

The revenue of the corporation, consisting of water rental, rents of lands, houses, mills, and other tenements, exceeds 2000*l.* per annum. The expenditure in 1828 amounted to 1529*l.* 19*s.* 1*d.*, and the corporation property is charged with a debt of 14,300*l.*

The streets of Ipswich, though well paved, and lighted with gas, are narrow and irregular, which is attributable to the remarkable circumstance that the town is not known ever to have suffered from fire, or even from the civil commotions which convulsed so many parts of the kingdom about the middle of the seventeenth century. There are many good buildings, and many extremely old, decorated with a profusion of curiously carved images. Most of the houses, even in the heart of the city, have convenient gardens adjoining them, which render it at once agreeable, airy, and salubrious. The water for the supply of the town rises from springs in certain lands which the corporation hold under long leases, and it is conveyed into the town by pipes laid down at their expense. The water rental, which forms a considerable part of the revenue of the corporation, has been the source of much discontent among the inhabitants, as the former claim a monopoly of the supply, and the latter complain that they are ill supplied. In the Report of the Commissioners on Municipal Corporations, 1835, the police of the town is described as being particularly inefficient.

The manufactures of the town consist chiefly in the spinning of woollen yarn, ship-building, sail-making, &c. Its commerce arises from the exportation of corn, malt, and other produce of the surrounding country. There is a harbour for light vessels formed by the æstuary of the Orwell, which is navigable at high water up to the bridge, except for vessels of large burthen, which lie at Downham Reach.

The principal public buildings are the churches of Saints Clement, Helen, Laurence, Margaret, Mary at Elms, Mary at Kay, Mary at Stoke, Mary at Tower, Matthew, Nicholas, Peter, and Stephen. To the northward of the church of St. Mary at Kay was formerly a house of Black Friars, called the Priory of St. Peter's. The extensive site of this convent was purchased by the corporation, and confirmed to them in 1572 by the appellation of Christ's Hospital. Part of this edifice is now occupied as an hospital for poor boys, in which they are maintained, clothed, and educated, but the number during the five years preceding 1835 had never exceeded sixteen. The revenue of the hospital is estimated at 400*l.* a year. In another part of the monastery is a spacious room wherein is deposited the town library, the keys of which are kept by the master of the grammar-school, and out of which every freeman is privileged to take away any book upon giving a proper receipt. In the spacious refectory of the same building, and on the south side, is now held the Free Grammar-school, the date of the first establishment of which is not known, though it was certainly prior to the year 1477. But in 1524 Cardinal Wolsey having intimated to the university of Oxford his design of founding a college (now Christ Church), the priory of St. Peter's was surrendered to him in 1527, whereon he founded a school as a nursery for his intended college at Oxford, and this school is said for a time to have rivalled those of Eton and Winchester. Queen Elizabeth, in the second and third years of her reign, granted two charters for the regulation of the Grammar-school and of Christ's Hospital. At the present time the master has a salary of 150*l.* a year; he is provided with a dwelling-house, and the appointment is for life. Since the Report of the Commissioners on Charities a committee has been appointed to investigate the endowments of the Grammar-school. They state that the original endowment under the charter of Queen Elizabeth was 38*l.* 13*s.* 4*d.* per annum, which with some subsequent bequests makes an aggregate annual income of 66*l.* 6*s.* 8*d.*; but it does not appear from what source the additional funds are derived in order to liquidate the master's salary of 150*l.* and to defray the other expenses of the establishment. Ipswich is in the diocese of Norwich. The livings are three rectories, of the respective annual net values o. 326*l.*, 337*l.*, and 82*l.*, and seven paid curacies of the net value of 175*l.*, 115*l.*, 80*l.*, 103*l.*, 150*l.*, 138*l.*, and 103*l.* The borough is divided into fourteen parishes, the aggregate population of which in 1831 was 20,201 persons. (Gough's *Camden's Britannia*; Carlisle's *Endowed Schools*; *Beauties of England and Wales*; *Parliamentary Papers*, &c.)

IRAK AJEMI. [Persia.]

IRAK ARABI. [Bagdad.]

IRAPUATO. [Mexico.]

IRELAND, the second in size of the British islands, and the second largest island of Europe, lies west of Great Britain, in the Atlantic Ocean. The general maps of Ireland at present published are too imperfect to give the means of stating its position more accurately than that it lies between 51° 25′ and 55° 22′ N. lat. and 5° 27′ and 10° 35′ W. long. The arm of the Atlantic which separates Ireland from Great Britain, and bounds it on the north-east, east, and south-east, is narrowest at its northern extremity, where it is called the North Channel, and the opposite coasts approach within 14 miles, between the Mull of Cantyre in Scotland and Fair Head in the county of Antrim. Southward from this, that part of the channel which contains the *Isle of Man* expands to a breadth of 120 miles, between the coasts of Louth and Lancashire, and bears the name of the Irish Sea. Being again contracted by the projecting coast of Wales to a breadth of about 65 miles, it assumes the name of St. George's Channel, which it bears until it expands into the Atlantic at its southern extremity. The remainder of the coast-line on the north-west, west, and south-west is formed by the Atlantic Ocean. The chief lines of communication between Ireland and Great Britain are from Londonderry to Glasgow, 138 miles; from Belfast to Glasgow, 107 miles, and to Liverpool, 156 miles; from Donaghadee to Portpatrick, 21 miles; from Dublin to Liverpool, 130 miles, to Holyhead, 63 miles, to Port-Dinnlleyn, 70 miles; from Waterford to Bristol, 222 miles; from Cork to Bristol, 268 miles—sailing distances.

According to the Map published by the Society for the Diffusion of Useful Knowledge, the greatest length of Ireland, in a line nearly from north to south, is from Bloody Farland Point in the county of Donegal to the Old Head of Kinsale in Cork, 245 miles; and the greatest breadth, from Achill Head in the county of Mayo, on the west, to the mouth of Loch Strangford in the county of Down, a little to the north of east, 200 miles. In an oblique direction the greatest length is, from Fairhead in the county of Antrim to *Mizen Head* in the county of Cork, 306 miles, in a line bearing north-north-east by south-south-west. Pending the completion of the Ordnance Survey of Ireland, nothing can be stated with certainty regarding the area of Ireland. It is however estimated in the Map published by the Society for the Diffusion of Useful Knowledge, at 18,484,343 statute acres, or 28,881 statute square miles, of which 215,252 statute acres are under water. Another estimate made in 1831 is as follows:—

	Statute Acres.
Dry land	14,603,473
Unprofitable, mountain and bog	5,340,736
Lakes	455,399
Total .	20,399,608;

but this is probably above the true amount.

General Features.—The general form of the island is that of an oblique parallelogram, the longer diagonal lying between *Mizen* Head on the south-west and Fair Head on the north-east, and the shorter between Erris Head on the north-west and Carnsore Point on the south-east. The south-westerly portion of the island, which is most exposed to the Atlantic, is deeply indented with arms of the sea penetrating between rocky and mountainous promontories: the western shore in general is lofty and precipitous, and the eastern flat and little indented.

The most remarkable feature in the distribution of high and low land over the surface is the great limestone plain which occupies, with little interruption, almost the whole of the central district extending from the sea at Dublin on the east to the bay of Galway on the west, and from the counties of Sligo and Fermanagh on the north to the confines of Cork and Waterford on the south. The chief mountain-groups are either external to this plain, or rise in insulated ridges near its borders. Commencing from Dublin, where it touches the sea, the first interval between the limestone country and the Channel is occupied by the granite range of the Wicklow and Mount Leinster Mountains, which extends southward from the confines of Dublin and Wicklow into Carlow, and terminates near the confluence of the Barrow and Nore. From the flanks of this chain a clay-slate formation extends on the one hand into the eastern portion of Kildare, and on the other to the sea, forming the more cultivable portions of Wicklow, and almost the entire of Wexford; this latter district is interspersed with protruded masses of quartz and greenstone. Abutting on the southern extremity of this granite range commences a series of mountain-groups skirting the limestone plain on the south. The main constituent of these elevations is clay-slate and old conglomerate supporting flanks of yellow sandstone. One group, that of the Gaultees in Tipperary, is entirely insulated by the limestone, which also occupies several longitudinal valleys of the external district and in some places penetrates to the sea. This is the most extensive mountain district of Ireland. Commencing from the east the Slievenaman, Knockmildown, and Gaultee ranges extend in successive elevations of from 2000 to 3000 feet across the south of Kilkenny, Tipperary, and Limerick; after subsiding under the coal district which spreads from Limerick over the north-east of Kerry, they rise again towards the Atlantic, where Mount Brandon terminates the series in a lofty promontory which separates the bay of Dingle from the mouth of the Shannon. Southward from these groups the same formation occupies the entire counties of Cork and Kerry; the elevations here towards the east are moderate and the country fertile, but they spread over a wider surface and attain a greater altitude as they trend towards the sea, occupying the whole western part of Cork and the southern portion of Kerry with precipitous and sterile ridges, among which MacGillicuddy's Reeks in Kerry rise to the height of 3404 feet, being the highest ground in Ireland. Northward from Dingle Bay the limestone district again touches the sea, but throughout the western parts of Limerick and Clare it is overlaid by the great Munster coal-tract, from under which it again emerges on the south side of the bay of Galway. North and west of Galway the space between the limestone plain and the sea is again occupied by mountains. An extensive tract of granite with peaks of quartz and greenstone rising to the height of 2400 feet forms the northern boundary of the bay of Galway, and from this point northward to Killalla Bay a series of primitive rocks consisting chiefly of mica-slate and protruded masses of quartz is interposed between the Atlantic and the inland plain, except in one instance where the limestone reaches to the sea through the low country connecting the plains of Mayo with the head of Clew Bay. A primitive ridge of mica-slate and granite, nearly surrounded by the limestone which intervenes between it and the coast, prolongs this district northward and westward through Sligo to within a short distance of the borders of Donegal, where it subsides to rise again in that extended primitive formation which occupies almost all the county of Donegal and a great part of the counties of Derry and Tyrone. The north-western portion of this district consists of granite and quartz with numerous veins of primitive limestone, which is also of frequent occurrence throughout the great field of mica-slate that constitutes the remainder and rises in mountains from 1500 to 2500 feet high. This district is succeeded on the east by the great trap-field of Antrim, which overlies it through an extent of nearly 800 square miles: the cap of trap is supported throughout by a bed of chalky white limestone reposing on lias, the denuded edges of which give an extraordinary variety of colouring and structure to the cliffs of that coast: the substratum of mica-slate protrudes from below the superincumbent masses at the north-eastern extremity of the field, and crossing the Channel re-appears in Scotland. The clay-slate tract which succeeds the trap-field on the south and west, extending over Down and Armagh into Monaghan, Louth, and parts of Cavan, Meath, Longford, and Roscommon, also re-appears on the opposite side of the Channel, forming the grauwacke district which extends from Portpatrick to St. Abb's Head on the Frith of Forth. The granite group of the Mourne Mountains and the granite and greenstone group of Slieve Gallion occupy a considerable portion of this clay-slate tract, protruding in conspicuous masses in the southern parts of Down and Armagh to a height of 2500 feet and upwards. This completes the circuit of the interior plain which extends between the last-mentioned district and Dublin to the sea.

The principal detached groups which occur within the limestone plain are the Slieve Bloom and Slieve Baughts ranges, consisting of nuclei of clay-slate supporting flanks of red and yellow sandstone, which extend to a considerable distance on each side of the valley of the Shannon in the counties of Tipperary and Queen's County, and Clare and Galway respectively. A tract of old red sandstone rises into a chain of moderate elevation on the borders of Roscommon and Sligo in the north-west part of the plain, and several greenstone elevations diversify its surface in the centre and south-west.

The limestone-plain likewise contains six coal-districts. the Leinster, or Castlecomer district, on the south-east; the Slieve Arda, or Tipperary district, on the south; the Munster district, extending through parts of the counties of Cork, Kerry, Limerick, and Clare, on the south-west; the Loch Allen district, round the source of the Shannon, on the north-west; and the Monaghan and Tyrone districts, on the north: there is also a coal district of small extent in the north-eastern extremity of the county of Antrim. The coal raised in the southern districts is anthracite, or blind-coal; that raised in the districts north of Dublin is bituminous.

In addition to these the central district of Ireland contains upwards of one million of acres of bog, comprehended for the most part within that portion which would be embraced by lines drawn from Wicklow to Galway, and from Howth-head to Sligo. The greater portion of these bogs lies west of the Shannon in the counties of Galway, Roscommon, and Mayo; the remainder, extending in various tracts through King's County, Longford, Westmeath, and Kildare, is known collectively as the Bog of Allen. Numerous ridges of limestone-gravel, called Eskers, surrounding these several divisions, offer an unlimited supply of the material best adapted for their improvement. It is calculated that an expense of 1*l.* 5*s.* per acre would be sufficient for the drainage of these bogs, which are at present inaccessible and useless for the purposes of turbary.

Besides these encumbrances the lower carboniferous limestone, which constitutes the central plain, is overlaid in many tracts towards the borders of the district by the upper or splintery limestone, and this is generally accompanied by a craggy and rough surface: such is the case in the vicinity of each of the coal districts and throughout the counties of Sligo, Fermanagh, Cavan, and Leitrim. These districts contain numerous caverns, and streams sinking into subterranean channels are here of frequent occurrence.

By much the greater part of the central plain however is unincumbered, and has the pure carboniferous limestone for its substratum. Throughout these districts the soil is rich and sweet, and the surface gently undulating. The mountain groups and waste lands on the whole occupy a comparatively small portion of the entire island, and many of the districts lying without the central plain rival the richest limestone lands in easiness of access and fertility.

Rivers and Lakes.—From the arrangement of the mountain groups round the borders of the central plain the courses of the greater number of the rivers of Ireland are necessarily short. Of those which drain the external districts the chief are the Blackwater and Lee in Cork, the Foyle in Donegal and Derry, the Bann and Lagan in Antrim and Down, and the Slaney in Wexford. The rivers of the central district have longer courses and a much greater body of water. The chain of Slieve Bloom and the low range of the Eskers divide the central plain longitudinally into two unequal portions, of which the western division is by much the greater. The eastern or smaller division is again subdivided by the summit-level of the bog of Allen into a northern district, the waters of which discharge themselves into the Irish Sea by the Boyne, and a southern district, which sends its drainage in an opposite direction into the Atlantic by the united streams of the Barrow, Nore, and Suir, all navigable rivers. The western division, which much exceeds the united basins of these several rivers, is drained solely by the Shannon, which, from its great body of water and course through a flat country, possesses the extraordinary advantage of being navigable from its source to its mouth, a distance of nearly 240 miles. Those portions of the central plain which lie beyond the basins of the Shannon and Boyne discharge their chief drainage into a series of lakes which skirt the limits of the limestone country on the west and north. The lakes of Galway and Mayo form such a series, separating the primitive district of Connaught from the plain on the west; the extended line of Loch Erne in like manner drains that portion of the central plain which stretches towards the primitive district of Donegal and the high lands of Tyrone on the north; and Loch Neagh collects the waters of the remainder by the Blackwater River on the north-east. The other principal lakes of Ireland lie within the basin of the Shannon, those of most consequence being merely expansions of that river. The water-power afforded by the different rivers and natural dams of Ireland is greater than in any equal extent of accessible country in Europe. The surface of all the lakes in Ireland is estimated at 215,252 statute acres, or 336 square miles.

Climate.—There is but a small portion of Ireland which is more than fifty miles distant from the sea-coast, and on three sides of the island the Atlantic Ocean extends uninterrupted: hence the climate is more moist and less liable to severe cold than in any of the neighbouring countries. On an average of five years ending with 1829 the annual quantity of rain which fell at Cork in the southern extremity of the island was 35 inches, and in a like calculation for Derry, at its northern extremity, the average annual quantity was 31 inches; being in both cases considerably above the average quantity for most parts of Great Britain, though much below the average at Kendal, Keswick, and a few other places. Frosts are rarely severe in Ireland, and snow does not lie so long as in England; neither are thunder-storms of so frequent occurrence or of so formidable a character. The extension of tillage has contributed in a considerable degree to lessen the extreme moisture complained of by early historians; and to the quantity of dark-coloured earth now annually turned up intelligent writers attribute a fact often remarked by old persons, that the winters have latterly become much milder. The prevalent winds are from the west and south, and these are usually accompanied by a mild state of the atmosphere. Easterly winds are keen, and much dreaded by invalids. Instances of longevity are numerous, and the population generally healthy.

The chief characteristics of the scenery of Ireland are freshness and verdure · the surface is less rugged than that of Scotland, and more varied and undulating than that of England; it is however generally deficient in timber. The works of various tourists have latterly attracted much attention to the natural beauties of the southern and western districts.

HISTORY AND ANTIQUITIES.—In the various names of Ireland, as known to the classic writers, Iris, Iernis, Iuvernis, Hibernia, &c., the radical *Ir* or *Eri*, by which it is still known to its own natives, is plainly traceable. It is customary among the Irish to indicate a country by the affix *Hy* or *Hua*, sometimes written *O*, as in the case of proper names, signifying literally 'the (dwelling of the) sons or family of,' such as Hy-Mania, Hy-Tuirtre, Hy-Brazil, &c. In adding this affix to names beginning with a vowel it is optional to insert a consonant to prevent the concurrence of open sounds, thus *Hy-v-Each*, meaning the country of the descendants of Each or Æacus. Again, this affix requires the genitive, which in *Eri* is *Erin*, and thus all variations of the name, from the *Iris* of Diodorus Siculus, and the *Ir-land* and *Ireland* of modern times, to the *Iernis* (*Hy-Ernis*) of the Orphic poems, and the *Hibernia* (*Hy-b-Ernia*) of Latin writers, would seem to be accounted for.

The name *Scotia* does not appear to have been applied to Ireland till about the end of the third century, from which time to the beginning of the eleventh it continued to indicate that country exclusively.

The Scoti, who were in possession of the island at the time of the introduction of Christianity, appear to have been to a great extent the successors of a people whose name and monuments indicate a close affinity with the Belgæ of Southern Britain. A people also called Cruithne by the Irish annalists, who are identifiable with the Picts of Northern Britain, continued to inhabit a portion of the island distinct from the Scoti until after the Christian mission; and it is observable that the names of mountains and remarkable places in that district still strikingly resemble the topographical nomenclature of those parts of North Britain which have not been affected by the Scotic conquest. The monuments and relics which attest the presence of a people considerably advanced in civilization at some period in Ireland, such as Cyclopean buildings, sepulchral mounds containing stone chambers, mines, bronze instruments and weapons of classic form and elegant workmanship, would appear to be referrible to some of the predecessors of the Scoti, and indicate a close affinity between the earliest inhabitants of Ireland and that antient people, by some referred to a Phœnician origin, whose vestiges of a similar kind abound throughout the south and south-west of Europe.

The Scoti were not builders in stone, at least in their civil edifices, nor did they use bronze implements. Their own tradition is that they came originally from Scythia, by which is meant the north-eastern part of central Europe, which appears to be confirmed by the fact that the antient topography of the country, in districts where the Scotic invasion has not wholly obliterated it, points at the Welsh language as the nearest representative of that spoken by the predecessors of the Scoti, and that the chief distinctions which at present exist between the Irish and Welsh languages are referrible to a Gothic or Northern European source.

The general conversion of the Irish Scots to Christianity took place in the earlier and middle portion of the fifth century. The principal instrument in effecting the change was Patrick, who landed in Ireland on this mission in the year 432. Before this time Christianity had made some progress, but the mass of the people were heathens. The form of church government introduced by Patrick was episcopal: in his doctrine and that of his successors for many centuries it is affirmed that there are no traces of those peculiar tenets which the Reformed churches rejected in the sixteenth century.

A considerable advance in civilization followed the introduction of the new religion. Greek and Roman literature got some footing among the clergy, and an improved system of architecture became requisite for religious edifices. The Irish round towers are now generally ascribed to an ecclesiastical origin, and are supposed to have been erected during the sixth, seventh, and eight centuries, which form perhaps the most prosperous epoch in the history of the country. From the end of the eighth century till the coming of the English, in A.D. 1170, the disputes of the petty princes of the country, and the frequent depredations of the Danes and other northern pirates, render the annals of Ireland a melancholy series of feuds and disasters.

Up to this time the government of the island had usually been vested in one monarch, who was entitled to certain subsidies and services from the petty kings of the provinces, and they in like manner levied contributions from the minor chiefs of territories. Dermod Mac Murrough, king of Leinster, having seduced the wife of one of these petty princes, and otherwise grown oppressive to his subjects, was expelled from his dominions in 1168, and fled for succour to Henry II. king of England, who, having already obtained a grant of Ireland from pope Adrian IV., readily gave his countenance to the restoration of Mac Murrough on receiving his oath of allegiance; but, being at that time engaged in a war with the French, he was unable personally to undertake the expedition. Several Welsh adventurers however, having obtained his licence to embark in the undertaking, fitted out a small armament, with which they landed in the county of Wexford, in the month of May, A.D. 1170. The conquest of the entire island was soon effected. In 1174, the king, coming over in person, received the submission of the Irish monarch, and of almost all the provincial and petty kings, and in the same year had his title confirmed, and the discipline of the Irish and English churches assimilated at a general synod of the Irish clergy held at Cashel.

The country was now portioned out among the Anglo-Norman conquerors, and with the introduction of English modes of tenure the erection of courts of law and appointment of executive authorities had their commencement. The twelfth year of the reign of king John, who succeeded his father as lord of Ireland, is the epoch to which the final division into counties is generally referred. This division appears to have embraced almost the entire of Ireland, although through subsequent reverses most of the counties in Ulster and Connaught ceased to be considered shire ground. These disasters were chiefly owing to the exorbitant powers enjoyed within their several territories by the great lords of the country, who finding the Irish customs more congenial to arbitrary authority, by degrees fell away from the exercise of the English law, and assumed the characters of despotic chieftains. In particular, the family of the De Burgho's in Ulster and Connaught, being released, by the murder of William earl of Ulster, in A.D. 1333, from the restraint which he had for some time exercised over them, seized the better part of the latter province and assumed Irish names; while the northern native Irish recrossing the river Bann, beyond which they had hitherto been confined, drove the English out of the north-eastern parts of Ulster, and narrowed the pale in that direction to the county of Louth. In like manner the families of Desmond and Kildare, having possessed themselves of a great part of Munster and Leinster, introduced the Irish customs on that side, so that on the accession of king Henry VIII. there was but an inconsiderable tract along the eastern coast in which the English law was fully recognised.

In this and the succeeding reigns of Elizabeth and James I., the English government having now the double motive of effecting a religious as well as a civil reformation in Ireland, applied themselves with great energy to the recovery of their authority, and, after a tedious series of rebellions and confiscations, succeeded at length, in the beginning of the seventeenth century, in making the entire island shire-ground, and planting a numerous Protestant proprietary in Ulster. The Reformed church had already been established in A.D. 1535; but the great body of the native Irish still continued attached to the Roman Catholic faith.

In October, 1641, a rebellion, having for its object the overthrow of the new establishment and the restoration of the old proprietors to their estates, broke out among the native Irish, and was afterwards joined by the chief Roman Catholic nobility and gentry: the result of the civil wars which ensued was the suppression of the Irish and Roman Catholic party, and a general confiscation of their lands.

On the accession of James II., and the prospect of a re-establishment of the Roman Catholic church, the same party again rose to considerable power, and on king James retiring to Ireland after the revolution of 1688, they supported his cause through an arduous war of three years' continuance, until after the defeats of the Boyne and Aughrim, when they finally capitulated at Limerick, on the 3rd October, 1692. Extensive confiscations followed this civil war also. The military men and other more active members of the Roman Catholic party left the country, and entered into the service of different states on the Continent, where they very generally distinguished themselves by their fidelity and bravery. Those who remained, still constituting the bulk of the population of the island, were henceforth treated with extreme severity; yet, notwithstanding the harshness of the penal laws from time to time enacted against Roman Catholics, the country generally prospered during the century of uninterrupted tranquillity that ensued. The example of the American and French revolutions however having created a democratic spirit among many of the northern Protestants, and some of them having taken up arms in the year 1798, led to another rising among the Roman Catholic peasantry of much the same character with those insurrections in which their ancestors had unfortunately been so often engaged. This rebellion, being likewise suppressed, led the way to the Act of Union, by which the parliament of Ireland, which had of late years enjoyed an absolute independence of all power but the crown, was merged in that of the United Kingdom, A.D. 1800.

The Irish Roman Catholics, who had greatly increased in wealth and numbers since the time of the Union, were in the year 1829 admitted generally to the political privileges enjoyed by Protestant dissenters. The Reform Act considerably added to their political influence, and various changes are now in progress and operation, the general tendency of which is to give them a large share of political power in the state.

Population.—Notwithstanding the numerous colonies of British who have from time to time settled in Ireland, the great bulk of the population is still of the native Irish race. The native Irish are of a warm and imaginative disposition, with much natural eloquence and a strong perception of humour; they are very hospitable, and individually brave; the prevailing vices of the national character are improvidence and a disposition to riotous excitement. During the wars in the reign of Elizabeth they were reduced to considerably less than a million in number, but in the subsequent progress of the population they have increased in a much more rapid ratio than either their English or Scottish fellow-countrymen. The following table exhibits the numbers of the entire population at the several dates below:—

Date.	How ascertained.	
1672	By Sir William Petty . .	1,320,000
1695	By Captain South . . .	1,034,102
1712	By Mr. Dobbs. (See *Essay on Trade and Improvement of Ireland*, by him, published 1721; numbers taken from hearth-money returns.	2,099,094
1718		2,169,048
1725		2,317,374
1726		2,309,106
1731	By the Established Clergy, by order of the House of Lords of Ireland.	2,010,221
1754	From the returns of the hearth-money collectors . . .	2,372,634
1767	On an average of 6 per house .	2,544,276
1777	Ditto	2,690,556
1785	Ditto	2,845,932
1788	Mr. Bushe	4,040,000

Date.	How ascertained.	
1791	Hearth-money collectors . .	4,206,612
1792	Estimated by Dr. Beaufort . .	4,088,226
1805	Mr. Newenham's estimate . .	5,395,456
1821	Under Act 55 Geo. III., c. 120 .	6,801,827
1831	Under Act 1 Will. IV., c. 19 .	7,767,401
1834	Estimated by the Commissioners on Public Instruction . . .	7,954,100
1837	Estimated by Irish Railway Commissioners	8,523,750

The distribution of this very large population is chiefly towards the eastern side of the island; the west and north-west are comparatively thinly inhabited. The general condition of the people is considerably improved of late years, but still there is a very numerous class of peasantry in the west and north-west whose state is extremely wretched. The average rate of wages for agricultural labourers throughout the entire country is about 8½*d.* per day, and the average employment about twenty-two weeks of six working days each in the year. The classes into which the population was divided in 1831 appear in the census of that year as follows:—Families chiefly employed in agriculture, 884,339; ditto chiefly employed in trade, manufactures, and handicraft, 249,369; ditto not comprised in the preceding classes, 251,368; males 3,794,880; females 3,972,521; total 7,767,401 persons, forming 1,385,066 families, inhabiting 1,249,816 houses.

In the same year the number of agricultural occupiers employing labourers was 95,339; of occupiers not employing labourers, 564,274; of male labourers employed in agriculture, 567,441; of males, 20 years of age, employed in manufactures, 25,746; employed in retail trade or in handicraft as masters or workmen, 298,838; of capitalists, bankers, professional and other educated men, 61,514; of labourers employed in labour not agricultural, 89,876; of other males 20 years of age, except servants, 110,595; of male servants 20 years of age, 54,142; of ditto under 20 years, 44,600; of female servants, 253,155.

Religion.—In 1834, according to the returns of the Commissioners of Public Instruction, there were in Ireland 6,431,008 Roman Catholics; 852,676 members of the Established church; 642,356 Presbyterians; 21,808 other Protestant dissenters: and 6254 whose religion could not be ascertained; being in the proportion of 4¼ Roman Catholics nearly to one Protestant of whatever denomination.

Education.—In 1834 there were in Ireland 9657 daily schools, being in the proportion of one school to each 824 of the entire population, educating 633,946 young persons, being in the proportion of 7·97 per cent. of the entire population under daily instruction. Of these schools 5653 were supported wholly by payments from the children, and 4004 were supported wholly or in part by endowment or subscription: of the latter class there were in the above year 892 in connection with the National Board of Education; 203 in connection with the Society for Discountenancing Vice; 115 in connection with Erasmus Smith's fund; 235 in connection with the Kildare-street Society, and 618 in connection with the London Hibernian Society. There is a University at Dublin, a Roman Catholic College at Maynooth, and various superior establishments for education in other towns. [BELFAST; DUBLIN; &c.]

Crime.—During the year 1836 there were 23,891 persons committed for trial or bailed, of whom 7769 were charged with offences against the person; 671 with offences against property committed with violence; 6593 with offences against property committed without violence; 500 with malicious offences against property; 214 with forgery and offences against the currency; and 8144 with other offences not included in the above classes. The proportion of the offenders to the entire population was 1 in 325, and the male offenders were to the female as 0·82 to 0·18. Of the total number of offenders 6744 males and 490 females could read and write; 3898 males and 912 females could read only; 7435 males and 2595 females could neither read nor write; and of 1542 males and 275 females the instruction could not be ascertained. The total number of convictions in that year was 18,110.

PRODUCTIVE ECONOMY.—*Agriculture.*—The agricultural produce of Ireland was estimated, in the year 1832, at 36,000,000*l.* per annum, raised off 14,603,473 acres. This falls short, by nearly one half, of the amount of produce yielded by an equal area in Great Britain; and yet in the latter country there are only *two* agricultural labourers for every *five* for the same quantity of land in Ireland. Hence it appears that the productive powers of the soil of Ireland, as compared with those of the soil of Great Britain, are little more than half developed. The causes of this deficiency are to be sought in a bad system of agriculture, small farms, and want of capital. A marked improvement is however observable both in the quantity and quality of Irish agricultural produce within the last ten years. The increase in quantity will be apparent from the following table of the comparative exports of some of the principal articles of such produce in the years 1825 and 1835:—

Exports of Irish Produce in 1825 *and* 1835.

Commodities.	Quantity.		Increase between these Periods.	Estimated Value for 1835.	
	1825	1835.		£	s.
Cows and Oxen, number	63,524	98,150	34,626	793,837	0
Horses . . . do. .	3,140	4,655	1,515	65,453	0
Sheep . . . do. .	72,191	125,452	53,261	199,986	0
Swine . . . do. .	65,919	376,191	310,272	893,839	0
Grain, viz.: Wheat, qrs. .	283,340	420,522	137,182	812,441	0
" Barley, do. .	154,822	168,946	14,124	210,756	0
" Oats, do. .	1,503,204	1,575,984	72,780	1,661,953	3
" Other Grain .	23,832	39,637	15,805	75,149	6
Wheatmeal, Flour, and Oatmeal . . cwts. .	594,124	1,984,480	1,390,356	1,441,966	0
Potatoes . . . do. .	..	233,298	..	17,537	0
Provisions: Bacon and Hams do. .	362,278	379,111	16,833	828,158	0
" Beef and Pork do. .	604,253	370,172	..	723,935	0
" Butter do. .	474,161	827,009	352,848	3,316,306	0
" Lard . do. .	35,261	70,267	35,006	182,018	0
Eggs { number . . .	..	52,244,800	..	87,352	0
Eggs { crates	..	2,275	..	37,660	0
Eggs { boxes	..	10,695	..	31,027	0
Feathers . . . cwts. .	..	6,432	..	82,636	0
Hides and Calf Skins, number .	..	57,657	..	45,831	0
Wool, Sheep and Lambs' { bales .	..	33	..	1,940	0
Wool, Sheep and Lambs' { lbs. .	..	764,184	..	17,322	16
Flax and Tow . cwts. .	54,898	163,949	109,051	402,773	10
Spirits . . . gallons .	629,529	459,473	decrease.	75,505	0
Beer . . . do. .	..	2,696,689	..	188,981	0

The earnings of the agricultural labouring classes, including occupiers labouring on their own land, in 1836, are estimated at 6,844,500*l.*

The value of the peat annually raised from the bogs for fuel is very considerable. At 35 kishes or loads per family, which is the estimate of Mr. Wakefield, averaging 9*d.* per kish, the value of the quantity required for fuel in 1831, calculating only on the families employed in agriculture, would be 1,160,694*l.*; but this is probably too low an estimate, as it only exceeds by about 200,000*l.* the value of the imported and native coal consumed in the same time.

Mining.—The annual average produce of the mines worked by the Mining Company of Ireland in 1836 was about 150,000*l.*, and of the mines worked by other parties about 220,000*l.* The export of lead and copper ore in 1835 amounted to 477,660 cwts., of an estimated value of 179,388*l.* The mines and quarries at present open are not however worked to their full extent; this branch of industry is indeed still in its infancy in Ireland.

Fisheries.—In the general coast fishery in the year 1836 there were employed—decked vessels 215, tonnage 7099 tons; half-decked ditto 870, tonnage 10,292 tons; open sail-boats 1812, tonnage 9178 tons; and row-boats 7864: total number of fishermen 54,119; showing a considerable decrease since 1830, when the number of fishermen employed was 64,771. The earnings of each fisherman having a share in the produce being estimated at from 3*s.* 6*d.* to 4*s.* per week on an average through the year would give the nett profits of the produce for 1836 at 527,650*l.* The gross annual produce of the coast and river salmon fisheries does not amount in all to 10,000*l.*

Manufactures.—The value of the unbleached linens sold in the several counties of Ulster in the year 1824 was 2,109,305*l.*, and in all Ireland for the same year 2,580,697*l.* Since that time there is no authentic return; but the introduction of linen-yarn spinning-machinery has latterly given the linen trade an extraordinary impetus in the northern counties of Ulster. The exports of linen in the year 1835 amounted to 70,209,572 yards, of an estimated value of 3,725,054*l.*, being an increase on the linen export of 1825 of 15,095,057 yards.

The cotton trade is carried on to a considerable extent in

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the same district, and in one large establishment in the county of Waterford; but it has latterly declined, and many of the mills originally designed for the spinning of cotton are now turned to the manufacture of linen yarn, the demand for which is much greater than the present means of production can meet. The export of cotton fabrics, which in 1825 amounted to 10,567,458 yards, in 1835 was only 1,039,088 yards, estimated at a value of 15,253*l.* In the latter year there was however an export of cotton in other forms of manufacture to the amount of 132,880*l.*

Since the year 1822 the woollen trade has declined considerably. In that year there were in and about Dublin forty-five establishments, the annual value of the goods produced in which, if estimated at present prices, would be about 200,000*l.* The total value of the woollens now manufactured in the same district is about 90,000*l.* In the districts of Cork, Kilkenny, Moate, and Carrick-on-Suir, where the woollen trade formerly flourished, the present value of the woollens annually manufactured does not exceed 20,000*l.*; and the flannel trade of Wicklow and Wexford, which in 1822 was estimated at 56,000*l.* for the annual value of its produce, may now be considered as extinct. The manufacture of worsted and stuff articles is the only branch of this trade which has increased within the last sixteen years: it is now carried on to a considerable extent at Mount Mellick and Abbeyleix in the Queen's County. Such of the general trade as remains is however considered to be at present in a healthy state, and reasonable hopes are entertained of a progressive improvement. The value of the different woollen manufactures exported in 1835 was 40,128*l.*: a considerable portion of this export was to the south of England, which is now more accessible to the Irish than to the northern English manufacturer. The silk manufacture is also much decayed: the export of silk fabrics in 1835 amounted to 21,740*l.*

In grinding, malting, brewing, and distilling, a great advance has been made in Ireland within the last fifteen years. The number of corn-mills in Ireland in 1835 was 1882; of corn-kilns, 2296; of distilleries, 95; of rectifying distilleries, 19; of breweries, 236; of paper manufactories, 57; of glass-works, 6; and of tobacco factories, 291. The export of oatmeal, flour, and wheatmeal, which now amounts to nearly one million and a half sterling annually, has grown up almost wholly of late years; so also the valuable export trade in porter.

Steam Power.—There were, in 1835, 151 steam-engines of from 1 to 100 horse-power each, employed in various manufacturing operations in the towns and neighbourhoods of Belfast, Clonmel, Cork, Dublin, Galway, Kilkenny, Limerick, Londonderry, Waterford, and Portlaw. Of these the first was erected in Belfast in the year 1806.

In addition to these there are upwards of 90 steam-vessels with engines of from 20 to 300 horse-power engaged in the British coast and canal traffic. Cork is now a station for steamers sailing to North America, and a steam communication is kept up during the summer months between Bordeaux and Dublin, and Hâvre and Belfast.

COMMERCE.—*Inland Traffic.*—The inland traffic of Ireland is almost wholly carried on either by high road or canal, there being but one railway of five miles in length at present in operation in the country. Another line of seven miles in length is however now in process of completion between Belfast and Lisburn. The extent of the various lines of inland navigation is as follows:—

	Miles.
Grand canal from Dublin to Ballinasloe, with its branches	164
Royal canal from Dublin to Tarmonbarry, with its branches	99
Lower Shannon navigation	44
Limerick navigation, river and canal . .	15
Middle Shannon, navigation . . .	39
Upper Shannon navigation . . .	59
Lagan navigation, river and canal . .	28¼
Newry navigation, river and canal . .	16½
Tyrone navigation, river and canal . .	11¾
Lower Boyne navigation, river and canal .	19
Slaney navigation, river and canal . . .	16
Barrow navigation, river and canal . .	78
	589½
In addition there is now in progress the Ulster canal, joining the waters of Lough Neagh and and Lough Erne, of which there are completed	24
	613½

Being in all about one-fourth of the similar means of internal traffic existing in 1835 in an equal area in Great Britain.

The general direction of the traffic of Ireland is eastward, of the external traffic almost wholly so. With the exception of the transverse lines of the Royal and Grand Canal, the great bulk of the inland traffic lies towards and along the eastern coast from Londonderry to Cork inclusive.

Carrying Traffic.—The means of external traffic possessed by Ireland amount to less than one-fourteenth of those of England, and to rather more than a third of those of Scotland. The following table exhibits the number of vessels, with the amount of their tonnage, and the number of men and boys usually employed in navigating the same that belonged to the several ports of Ireland in the years below:—

		Vessels.	Tonnage.	Men.
On the 31st December,	1834	1536	119,398	8731
„ „	1835	1627	131,735	9282
„ „	1836	1635	128,469	9189

Here the proportion of seamen to tonnage is about 1 to 14; in the merchant-service of England the proportion is as 1 to 18 nearly This difference is to be accounted for by the superior size and better management of the English vessels, which require less manual labour. The general navigation of Ireland and its progress appear from the subjoined table, showing the number of vessels, with the amount of their tonnage and men (including their repeated voyages), that entered inwards and cleared outwards at the several ports of Ireland, from and to all parts of the world, during each of the years below:—

Shipping entered inwards in Ireland, from all parts of the World.

Year ending 5th January.	British and Irish Vessels.			Foreign Vessels.			Total.		
	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.
1835 .	15,691	1,621,410	94,706	139	22,188	1192	15,830	1,643,598	95,898
1836 .	15,418	1,621,603	97,164	163	26,274	1366	15,581	1,647,877	98,530
1837 .	15,565	1,662,264	102,324	149	21,714	1228	15,714	1,683,978	103,552

Shipping cleared outwards from Ireland, to all parts of the World.

Years ending 5th January.	British and Irish Vessels.			Foreign Vessels.			Total.		
	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.	Vessels.	Tons.	Men.
1835 .	10,354	1,180,135	71,900	100	16,386	881	10,454	1,196,521	72,781
1836 .	10,254	1,210,327	76,842	131	21,748	1120	10,385	1,232,075	77,962
1837 .	10,148	1,251,835	80,289	128	19,029	1052	10,276	1,270,864	81,341

Imports and Exports.—Summary of the Imports and Exports of Ireland for the year 1835, *including the coasting trade.*

Names of Ports.	Counties.	Exports, 1835. Value. £	s.	d.	Imports, 1835. Value. £	s.	d.
Ardglass and Killough	Down	35,161	0	0	2,970	0	0
Arklow	Wicklow	3,677	0	0	6,762	10	0
Balbriggan	Dublin	5,417	10	0	11,391	19	2
Ballina	Sligo and Mayo	70,568	0	0	13,532	0	0
Ballyrane Creek	Donegal	20,834	0	0	5,770	0	0
Ballycastle Creek	Antrim	1,791	0	0	2,030	13	3
Ballyshannon	Donegal	11,130	0	0	9,524	0	0
Baltimore, &c.	Cork	37,144	0	0	17,767	0	0
Bantry Creek	Do.	6,212	0	0	17,293	8	0
Berehaven Creek	Do.	77,362	0	0	30,081	0	0
Belmullet Creek	Mayo	2,940	0	0	—		
Belfast	Antrim	4,341,794	3	7	3,695,437	11	10
Clare Creek	Clare	16,617	0	0	1,672	0	0
Coleraine and Portrush	Derry and Antrim	105,685	0	0	65,900	0	0
Cork	Cork	2,909,864	0	0	2,751,684	0	0
Donaghedee Creek	Down	62,484	0	0	7,570	0	0
Donegal Creek	Donegal	11,363	0	0	11,331	0	0
Drogheda	Cy. of town	766,027	0	0	259,854	0	0
Dublin	Dublin	2,528,543	0	0	4,430,321	0	0
Dundalk	Lowth	452,813	0	0	107,953	0	0
Dungarvan	Waterford	69,486	0	0	16,312	15	0
Galway	Galway	251,864	0	0	68,268	12	8
Killalla	Mayo	26,396	0	0	3,188	0	0
Kilrush	Clare	36,158	0	0	2,768	0	0
Kinsale Creek	Cork	13,479	0	0	18,262	0	0
Larne Creek	Antrim	60,309	0	0	7,255	6	7
Limerick	Limerick	726,430	0	0	323,740	0	0
Londonderry	Londonderry	1,040,913	0	0	708,054	0	0
Newcastle Creek	Down	3,681	0	0	3,156	0	0
Newport Creek	Mayo	2,269	0	0	—		
Newry	Down and Armagh	616,836	0	0	568,711	0	0
Ross	Wexford	59,074	0	0	28,007	0	0
Strangford	Down	79,633	6	4	20,498	8	0
Sligo	Sligo	369,490	0	0	124,692	0	0
Tralee	Kerry	42,315	0	0	7,270	0	0
Waterford	Waterford	1,821,245	0	0	1,274,154	0	0
Wexford	Wexford	312,136	0	0	621,417	0	0
Westport	Mayo	87,805	0	0	28,517	0	0
Wicklow	Wicklow	86,565	18	0	15,671	0	0
Youghall	Cork	215,316	0	0	28,310	0	0
Total		17,394,813	7	11	15,337,097	4	6

Exclusive of the coasting trade, so as to exhibit the true excess of exports over imports, these totals for the year 1835 are—

	£	s.	d.
Exports	£16,693,685	6	1
Imports	10,918,459	4	4
Excess of Exports over Imports	5,775,226	1	9

The increase exhibited by the returns of this year over those of 1825 is very remarkable, showing an increased value on exports of 7,450,475*l.* 6*s.* 1*d.*, and on imports of 2,321,674*l.* 4*s.* 4*d.*

The principal article of import into Ireland is cotton goods, which in 1835 were imported to the amount of 1,419,364*l.*; in the same year, notwithstanding the active manufacture of linen yarn in Ulster, that article was imported to the amount of 1,217,900*l.* The next most important articles of import in that year were—tea, to the amount of 972,554*l.* 11*s.* 8*d.*; coal, 802,749*l.* 5*s.* 2*d.*; sugar, 774,930*l.*; tobacco, 743,115*l.* 7*s.* 10*d.*; woollen goods, 685,423*l.*; haberdashery and apparel, 487,630*l.*; wool, 304,337*l.*; iron, 208,830*l.*; cast-iron, 89,130*l.*; wrought-iron and hardwares, 198,806*l.*; glass and earthenware, 128,709*l.*; wines 160,343*l.* 1*s.* 3*d.*; herrings, 124,084*l.*; hides, 163,221*l.*; tallow, 129,149*l.*; hops, 92,657*l.*; flax-seed, 84,329*l.*; salt, 65,718*l.* 14*s.*; leather, 30,840*l.*, &c.

Currency.—There are in Ireland seventeen banks and banking companies, with numerous branch establishments: the following is an estimate of the proportions in which their notes circulate in each of the four provinces, the total amount of notes being about 5,000,000*l*:—

The province of Leinster	£1,700,000
" Ulster	1,400,000
" Munster	1,300,000
" Connaught	600,000
	£5,000,000

Between the years 1824 and 1831 there appears to have been an amount of government stock of the value of 14,181,100*l.* transferred to the credit of Irish fundholders.

GOVERNMENT.—*Representation.*—Ireland is represented in the imperial parliament by 105 members of the House of Commons, and 28 temporal and 4 spiritual peers in the House of Lords. The temporal peers are elective representatives for life; the spiritual peers take the office in rotation.

Civil Divisions.—Ireland is divided into four provinces and thirty-two counties. *Connaught* contains 5 counties, *Munster* 6 counties, *Ulster* 9 counties, and *Leinster* 12 counties. The counties are divided into baronies, and the baronies into townlands.

The following is a list of the counties of Ireland, with the population according to the last census, and the area in square miles:—

	Population.	Sq. Miles.
Antrim (Ulster)	325,615	1,107
Armagh (Ulster)	220,135	485
Carlow (Leinster)	81,988	330
Cavan (Ulster)	227,933	711
Clare (Munster)	258,320	1,141
Cork (Munster)	810,732	2,659
Donegal (Ulster)	289,150	1,829
Down (Ulster)	352,010	951
Dublin (Leinster)	380,167	294
Fermanagh (Ulster)	149,763	640
Galway (Connaught)	414,684	2,033
Kerry (Munster)	263,126	1,670
Kildare (Leinster)	108,424	597
Kilkenny (Leinster)	193,685	733
King's County (Leinster)	144,225	714
Leitrim (Connaught)	141,524	576
Limerick (Munster)	315,355	750
Londonderry (Ulster)	222,010	794
Longford (Leinster)	112,558	357
Louth (Leinster)	124,846	322
Mayo (Connaught)	366,328	1,599
Meath (Leinster)	176,826	899
Meath, West (Leinster)	142,280	578
Monaghan (Ulster)	195,536	493
Queen's County (Leinster)	145,850	744
Roscommon (Connaught)	244,207	870
Sligo (Connaught)	171,765	638
Tipperary (Munster)	402,564	1,305
Tyrone (Ulster)	304,468	1,210
Waterford (Munster)	177,055	618
Wexford (Leinster)	182,713	627
Wicklow (Leinster)	121,558	607
	7,767,400	28,881

	Sq. Miles.	Population.
Ulster	8,220	2,286,620
Leinster	6,802	1,915,120
Munster	8,143	2,227,152
Connaught	5,716	1,338,508
	28,881	7,767,400

Each of the 32 counties returns 2 members to the House of Commons, and the University of Dublin 2 members.

List of the cities and boroughs which return members to the House of Commons:—

			14		28
Armagh	1	Dublin	2	Londonderry	1
Athlone	1	Dundalk	1	Mallow	1
Bandon	1	Dungannon	1	New Ross	1
Belfast	2	Dungarvan	1	Newry	1
Carlow	1	Ennis	1	Portarlington	1
Carrickfergus	1	Enniskillen	1	Sligo	1
Cashel	1	Galway	2	Tralee	1
Clonmel	1	Kilkenny	1	Waterford	2
Coleraine	1	Kinsale	1	Wexford	1
Cork	2	Limerick	2	Youghall	1
Downpatrick	1	Lisburn	1		
Drogheda	1				
	14		28		39

In the Population Returns the number of parishes in each county is not stated; but it appears from some Diocesan Returns made in 1834 that the total number of parishes in the four provinces is 2348; that is, for the province of Armagh, 658; Dublin, 624; Cashel, 791; and Tuam, 275.

Ecclesiastical Divisions.—Ireland is divided into four ecclesiastical provinces and thirty-two dioceses. These divisions, although equal in number and corresponding in general situation, are in no instance co-extensive with the civil districts. The provinces are Armagh on the north, containing the dioceses of *Clogher, Kilmore, Ardagh, Meath, Armagh, *Dromore, Down, Connor, Derry, *Raphoe; Tuam on the west, containing the dioceses of *Kilmacduagh, *Clonfert, *Elphin, Tuam, *Killalla, *Achonry; Dublin on the east, containing the dioceses of *Kildare, Leighlin, Dublin, Ferns, *Ossory; and Cashel on the south, containing the dioceses of *Waterford, *Lismore, Cashel, Emly, Cloyne, *Cork, *Ross, Ardfert and Aghadoe, Limerick, Killaloe, Kilfenora. The dioceses are divided into parishes, which are for the most part co-extensive with a certain aggregate of townlands. By the 3rd & 4th William IV., c. 37, it is enacted that the dioceses marked above with asterisks, forming in all ten bishoprics, when and as void, shall be united to certain other bishoprics: by the same act the archiepiscopal sees of Tuam and Cashel, on becoming void, are to be united to the archiepiscopal sees of Armagh and Dublin respectively. The present ecclesiastical establishment consists of four archbishops and twelve bishops, six of the bishoprics mentioned in the act having now lapsed.

The Roman Catholic establishment consists of four archbishops and twenty-three bishops, their provinces and dioceses being for the most part co-extensive with those of the Established church.

The Presbyterian body are divided into two sects; one, by much the more numerous, being in connection with the synod of Ulster, which agrees in doctrine and government with the church of Scotland; and the other with the synod of Munster and Remonstrant synod, among whom Unitarian opinions are prevalent. The Seceding body have also their synod.

The clergy of the Established church derive their revenue from church lands and tithes; those of the Presbyterian church from parochial stipends and an annual grant from government, called the *regium donum*; the Roman Catholic church is supported wholly by dues paid by the people.

Justice.—The law courts of Ireland are the Queen's Bench, Common Pleas, Exchequer, and Chancery. There is also, as in England, a bankrupt court, a court for the relief of insolvent debtors, a court of admiralty, with consistorial courts in the several dioceses, and a metropolitan ecclesiastical court. There are four judges in each of the courts of Queen's Bench, Common Pleas, and Exchequer. In the Court of Chancery there are the lord-chancellor and the master of the rolls. The office of vice-chancellor does not exist in Ireland. The courts of law sit during each term in Dublin, and the going judges hold assizes of Oyer and Terminer and gaol delivery twice a year in each county town. Courts of quarter-session are held in the several counties before assistant-barristers, and there are numerous minor courts in most of the towns and counties.

Executive.—The administration of the government is vested in the lord-lieutenant and privy-council, assisted by a chief secretary and an attorney and solicitor-general. The lord-lieutenants and magistrates of the several counties are appointed by the crown and lord-chancellor, and the sheriffs are generally nominated by the going judges and appointed by the lord-lieutenant.

The police, independent of the local police of the towns, in 1836, consisted of 4 inspectors, 1 superintendent, 10 resident magistrates, 155 chief constables of the first and 59 of the second class; 1232 constables; 6233 subconstables, and 277 horse of the constabulary force; and of 10 resident magistrates, 9 chief constables, 109 constables, 492 subconstables, and 10 horse of the peace preservation police: total expense of both forces, 382,460*l.* 12*s.* 11*d.*

In addition to this force there are generally from 15,000 to 20,000 soldiers of the line quartered in Ireland.

Finance.—The revenue of Ireland is derived from four sources; customs, excise, postage, and stamps. The following table exhibits a comparative view of the progress of this branch of the general revenue from the year preceding the Union.—Gross proceeds:

	1799	1810	1820	1837
Customs	832,046 17 7	2,044,430 14 11	1,885,482 17 1½	2,036,738 2 3½
Excise	635,666 4 3	1,824,921 4 7½	2,295,377 19 4½	2,027,949 17 7¾
Post-Office	47,449 19 3	191,279 10 7	201,637 2 6¼	255,070 0 4
Stamps	56,902 17 7½	644,855 2 4½	448,088 14 2½	476,152 18 8¾
Fees and *Imprest* Monies				11,491 2 3
Total (gross)	*£1,572,065 18 8½*	£4,705,486 12 6	£4,830,586 13 2¾	£4,807,402 1 3

The rate per cent. for which these gross receipts have been collected has been greatly diminished of late years. In 1837 it was 11*l.* 13*s.* 4¾*d.*, including the expenses of the post-office department. The net proceeds in that year were 4,165,910*l.* 17*s.* 5¾*d.*

The general contribution of Ireland to the imperial revenue is however considerably greater than the amount appearing on these returns, in consequence of the large importation into that country of taxable commodities which have already paid duty in Great Britain.

County Cess.—The cost of making, repairing, and maintaining highways, bridges, gaols, &c., and keeping up the general machinery for the administration of justice and preservation of the public health, is supported by local assessments levied by the grand juries of the several counties. These annual assessments average about 800,000*l.* for the whole country.

A good account of all the sources from which information in Irish affairs might be drawn up to the year 1724 is given in Nicholson's 'Irish Historical Library,' 8vo., Dublin, 1724. Since that time various general histories have been published by Leland, O'Halloran, MacGeoghegan, Plowden, Moore, and others, with statistical accounts of most of the counties by compilers employed by the Royal Dublin Society. The 'Transactions of the Royal Irish Academy' have latterly thrown much light on the antiquities and natural history of the country, and numerous Parliamentary Reports and Papers have from time to time added to our statistical information. A geological Map and Memoir, recently published by the Commissioners on Railways, have also supplied a desideratum long felt by writers on Irish topography. The more particular authorities are given under the heads of the several counties.

IRELAND, NEW. [New Ireland.]

IRE'NA. [Oriolinæ.]

IRENÆUS, SAINT, bishop of Lyon in Gaul, was a pupil of Polycarp, in Asia Minor (Iren. *adv. Her.* iii. 3, § 4; Eusebius, *Hist. Eccl.* v. 20), and a presbyter of Pothinus, bishop of Lyon. He carried a letter from the church of Lyon to Eleutherus, bishop of Rome, respecting some disputes which existed between them, in which he is honourably mentioned. On the martyrdom of Pothinus, at the age of ninety, in 177 A.D., Irenæus was elected bishop of Lyon. He discharged the duties of his office with exemplary diligence and faithfulness, and is said to have been the means of converting many pagans to the Christian religion. The place of his birth is not known; but it is probable from his name that he was a Greek, and from his early acquaintance with Polycarp that he was a native of Asia Minor. Critics differ considerably respecting the date of his birth: Dodwell places it about A.D. 97, Grabe about A.D. 108, Du Pin about A.D. 140, and Tillemont about A.D. 120. It is commonly supposed that he suffered martyrdom in the beginning of the third century; but it has been argued by many critics, from the silence of Tertullian, Eusebius, and most of the early fathers, that this is probably incorrect.

With respect to the works of Irenæus, we learn from Eusebius (*Hist. Eccl.* v. 20) 'that he wrote several letters against those which at Rome corrupted the true doctrine of the church; one to Blastus, concerning schism; another to Florinus, concerning the monarchy, or that God is not the author of evil; and concerning the number eight.' Eusebius also mentions (v. 26) 'a discourse of Irenæus against the Gentiles, entitled, Concerning Knowledge; another, inscribed to a brother named Marcianus, being a demonstration of the apostolical preaching; and a little book of divers disputations.' Irenæus also wrote a letter to Victor, bishop of Rome, concerning the controversy about the time of holding Easter; and also 'Five Books against Heresies.' The last work is still extant; but all the rest have perished, with the exception of a few fragments. The original Greek of the 'Five Books against Heresies' has also been lost; we possess only a Latin translation of it, written in an uncouth style, which was made, according to Dodwell's computation (*Dissert. Iren.* v. 9, 10), about A.D. 385. This circumstance renders the work of little value in ascertaining the readings of the Greek Testament in the time of Irenæus, since the Latin translator appears to have quoted the text of Scripture according to the Latin version then in use.

It is difficult to determine at what period the 'Five Books against Heresies' were written, but they all appear to have been composed after Irenæus became bishop of Lyon, and to have been published at different times. Irenæus was well acquainted with heathen literature and the doctrines of the heretics of his time. His work is very valuable in an historical point of view, and has been highly commended by most of the fathers; though Photius (*Bibl.* c. 120) gives rather a different opinion of it, thinking 'that the purity of the faith with respect to ecclesiastical doctrines is adulterated by the false and spurious reasonings of Irenæus.'

Irenæus was a most diligent collector of apostolical traditions. He informs us, in many parts of his work, that he was well acquainted with several persons who had been intimate with the apostles. Many of his traditions are of a very curious kind. He affirms that Christ was at least 50 years old at the time of his crucifixion, and he asserts the most extravagant opinions with regard to the Millennium. Middleton, in his 'Free Inquiry' (p. 45-52), has given an interesting account of many of the opinions of this father.

The life of Irenæus has been written by Gervaise, Paris, 1723. His works have been published by Erasmus, 1526; by Feuardent, 1596; by Grabe, 1702; by Massuet, 1710; and by Pfaff, 1734. Some of the fragments published for the first time by Pfaff are supposed by Lardner (*Credibility of the Gospel History*, Works, ii., p. 189-191, ed. of 1831) to be spurious.

IRETON, HENRY, the eldest son of German Ireton, of Attenton, in Nottinghamshire, was born in 1610. He was entered at Trinity College, Oxford, in 1626, and having taken the degree of bachelor of arts, became a student of the Middle Temple. His legal studies were interrupted by the outbreak of the civil war; he entered the parliamentary army, and soon made such a proficiency in the military art, that it has been asserted that Oliver Cromwell learned its rudiments from him. In 1646 he married Bridget, Cromwell's eldest daughter, by which connexion and his own merit he gained a commission, first of captain of horse, and almost immediately afterwards that of colonel. He distinguished himself in the battle of Naseby, was taken prisoner by the royalists, but made his escape. Ireton was perhaps more than any other man the cause of king Charles's death; by intercepting a letter, he is said to have discovered that it was the king's intention to destroy him and Cromwell, and from that time he rejected any accommodation: he attended most of the sittings of the regicide court, and signed the warrant for Charles's execution. On the establishment of the Commonwealth he was appointed to go to Ireland, next in command to Cromwell. He was made president of Munster, and afterwards lord-deputy of Ireland. The greater part of the country submitted to him from fear of his cruelty, without striking a blow. While in the height of his successes he was seized, before Limerick, with the plague, of which he died on the 15th of November, 1651. His body was landed at Bristol, and lay in state at Somerset House. On an atchievement over the gate of Somerset House was the motto, 'Dulce et decorum est pro patria mori,' which was readily translated 'It is good for his country that he is dead.' He was buried in Henry the Seventh's chapel in Westminster Abbey; but the corpse was exhumed after the Restoration, gibbeted, and burnt at Tyburn.

He left one son, Henry, and four daughters. Ireton was revered by the republicans as a soldier, a statesman, and a saint. He was called the 'scribe,' from his skill in drawing up declarations, petitions, and ordinances. His antagonists allowed him to be an able but not a virtuous statesman; indeed, he appears to have been the most artful, designing, and deliberate man of his party. He refused a grant of 2000*l.* a year, which was offered to him out of the confiscated estate of the duke of Buckingham; and after his death the parliament, out of gratitude for his services, settled it upon his widow and children. (Noble's *Memoirs of the Cromwell Family*, vol. ii., No. 27.)

IRIARTE. [YRIARTE.]

IRIDA'CEÆ, a natural order of endogenous plants, usually with equitant leaves, and a rhizoma or cormus for their stem, but more particularly characterized by having three stamens, the anthers of which are turned outwards, and an inferior ovary. The genera are numerous, and some not well defined; they inhabit the temperate parts of the world in preference to the hottest, where they are comparatively rare. The Iris and Crocus are representatives of the predominant northern form of the order, as Gladiolus and Ixia are of the genera prevalent in the southern hemisphere. All the species are sufficiently ornamental to deserve cultivation, and many are of striking beauty.

Leaves and flowers of Sisyrinchium striatum. 1, the stamens; 2, the ripe fruit.

IRIDI'NA. [CONCHACEA, vol. vii., p. 426.]

IRI'DIUM, a metal discovered in 1803 by Mr. Tennant (*Phil. Trans.*, 1804), and also about the same time by Descotils in France. Its name was suggested from *Iris*, the rainbow, on account of the various colours assumed by the solution obtained with hydrochloric acid. When the grains of native platinum are digested in nascent chlorine (aqua regia), a black powder is left after the platinum has been dissolved, which consists chiefly of iridium and another peculiar metal, osmium [OSMIUM]; some ore of titanium and chromate of iron also occur in it. The iridium is obtained by fusing this black residue for at least an hour with twice its weight of hydrate of potash in a silver crucible; the residual matter is to be washed to remove the oxide of osmium, and the insoluble portion remaining is iridium, which has been oxidized during fusion, mixed with any insoluble impurity. This is to be digested in hydrochloric acid, and if free from iron the solution is blue; but it afterwards becomes of an olive green, and eventually it acquires a deep red tint.

When a plate of zinc is immersed in this solution of the chloride of iridium, or when it is decomposed by a very high heat, the metal is obtained of a whitish colour, and its specific gravity, as determined by Mr. Children, who fused it by his large voltaic apparatus, is above 18, while that of the native iridium found in minute grains in the Siberian platinum, according to Breithaupt, is 23·35. It is brittle, and when carefully polished has the appearance of platinum. When heated to redness in the air, if in a state of fine division (which is obtained by precipitation), it is oxidized, but not if in mass.

One of the most remarkable characters of iridium is the difficulty with which it is acted upon by acids. It is even questionable whether they act at all upon the perfectly pure metal; but when alloyed with platinum nascent chlorine dissolves a small portion of it.

Oxygen and Iridium combine and form several oxides: the protoxide, sesquioxide, and teroxide. They are precipitated by the alkalis from the corresponding chlorides, obtained as we shall presently state.

The protoxide of iridium is black, and greenish-grey when combined with water so as to form a hydrate. It is composed nearly of 1 equivalent of oxygen 8, and 1 equivalent of iridium 98, making 106.

The sesquioxide is also black, but its hydrate is deep brown. It is not decomposed by a low red heat, but at the temperature of melting silver it loses all its oxygen. When slightly heated with charcoal, sulphur, or phosphorus, it detonates violently: acids do not act upon it, but, on the contrary, it unites with salifiable bases. It is of course composed of about 1½ equivalent of oxygen 12, and 1 equivalent of iridium 98, making 110.

The teroxide of iridium is yellowish-brown, or greenish in the state of hydrate. The oxide, which gives a blue-coloured solution with hydrochloric acid, is suspected by Berzelius to be a compound of the sesquioxide and peroxide. It is obtained by adding ammonia to a solution of bichloride of iridium, and digesting the mixture with a gentle heat till the greater part of the ammonia is volatilized. It is then precipitated, combined with a little ammonia.

The binoxide has not been hitherto insulated. This great variety of oxides, and the facility with which they appear to pass from one into the other, account for the variety of tints which their solutions exhibit.

Chlorine and Iridium.—The protochloride of iridium is obtained by transmitting chlorine gas over pulverulent iridium heated to incipient redness: at a full red heat the chlorine is expelled. It is insoluble in water, and sparingly dissolved by acids or nascent chlorine; but when the hydrated protoxide is digested in hydrochloric acid a solution is obtained which appears to be the protochloride dissolved in hydrochloric acid.

It is composed of 1 equivalent of chlorine 36, and 1 equivalent of iridium 98, making 134.

Sesquichloride of iridium may be obtained by calcining iridium with nitre, digesting the product in nitric acid, and, after washing, by dissolving it in hydrochloric acid. This chloride has so dark a yellowish-brown tint, that a small quantity renders water opaque. It yields by evaporation a dark-coloured, uncrystallizable, deliquescent mass. It consists of 1½ equivalent of chlorine 54, and 1 equivalent of iridium 98, making 152.

Bichloride of iridium is formed by heating the sesquichloride in nascent chlorine. Like the preceding, it yields by evaporation a dark-coloured deliquescent mass, which at 104° loses chlorine and returns to the state of sesquichloride.

The terchloride of iridium has not been obtained in a separate state. It is of a rose-red tint.

Iridium combines with carbon when a piece of this metal is held in the flame of a spirit lamp. The resulting compound consists of about 19·8 of carbon, and 80·2 of iridium.

No other compounds of iridium are much known: it has however been inferred, from the colour of the precipitates formed by the addition of hydrosulphuric acid to the preceding chlorides, that there are corresponding sulphurets.

IRIS. [Eye; Rainbow.]

IRI'TIS is an inflammation of the iris, the membrane that surrounds the pupil of the eye. [Eye.] It most frequently originates in a disordered state of the system, as in gout or syphilis, but it sometimes follows the exposure of the eye to an intense light, or is produced by external injury, as the wound which is made in the operation for cataract, &c.

Iritis is principally characterized by an effusion of lymph, both into the substance of the membrane, producing a peculiar dullness of its colour, and on its surface in the form of small masses which adhere at the edge of and around the pupil. The eye is at the same time irritable to light, and the pupil is closely contracted; there is redness of the conjunctiva, and a zone of a bright pink colour is usually seen surrounding the margin of the cornea.

Iritis is very likely to end in adhesions of the iris to the adjacent parts, by the lymph which is deposited upon it becoming organized, and having its vessels united with theirs; in which case, irregularity in the form of the pupil, a loss of its power of contracting and dilating, or even its complete closure and obliteration, with corresponding degrees of obscurity of vision or total blindness, may ensue. These results may be produced in a few days; and the treatment must therefore be prompt and vigorous. Blood must be freely and sometimes repeatedly drawn from the arm, or by cupping and leeches from the head or neck; mercury must be administered in frequent and full doses till salivation is produced, and belladonna should be applied to or around the eye, to produce dilatation of the pupil and thus prevent its being closed.

IRKUTSK. [Siberia.]

IRON. Of all the metals iron is the most widely diffused, the most abundant, and the most useful. It is found not only intermixed with soils, and contained in rocks and minerals, but it is even met with in some animal and vegetable bodies, and also in mineral waters.

Iron occurs rarely, if indeed at all, in nature in the metallic state, for almost the whole of it that has been found occurs as meteoric iron containing nickel, or in meteoric stones. It has however been stated that it has been discovered *in situ* near Canaan in the United States; it there occurs in a vein, two inches wide, in chlorite schist, filled with native iron. It appears that this iron is traversed by graphite. Its specific gravity is 5·95 to 6·71. The Uralian Mountains yield a kind of native iron which is accompanied with platinum.

The greatest quantity of iron is found either combined with oxygen, oxygen and carbonic acid, or with sulphur; the last mentioned is not however worked as an ore. The best iron ores are oxides, which occur in primitive countries, where they generally form very large beds; such are those o Sweden: but the greater part of the iron ore of Britain is an impure carbonate.

The properties of iron are, that it is greyish-white with a tint of blue; it is extremely ductile, so that it may be drawn into wire finer than the human hair, but it cannot be beaten into very thin leaves. It is of all metals the most tenacious, for a wire 0·787 of a line in diameter is capable of supporting a weight of about 550 lbs.

Iron is susceptible of a high polish. It is combustible when minutely divided, as in the state of filings, which is shown by sprinkling them in the flame of a spirit lamp. It is very hard at common temperatures, and this property may be increased by its being heated and then suddenly cooled; it then however becomes brittle. It requires a most intense heat to melt it, but when heated to redness it becomes soft and pliable, and possesses the valuable property of *welding*, that is, two pieces of red-hot iron may be made to unite by hammering. Its texture is fibrous. Its specific gravity is about 7·77, but this varies in some degree according to the extent to which it has been drawn, rolled, or hammered, and it is increased by fusion. Iron, or rather steel, is capable of being rendered permanently magnetic, a property which no other metal possesses but nickel: when heated to redness this property is lost, and a loadstone suffers the same loss just below visible ignition; while a steel magnet loses its polarity when subjected to the temperature of boiling almond oil. Iron has great affinity for oxygen and sulphur, and some other elementary bodies, and combines with them in various proportions.

Having now stated the general properties of this metal, we proceed to describe those compounds which occur naturally containing the largest quantity of it, and among these are of course the various ores of this metal: and we shall prefix a short account of the more remarkable masses which have occurred of

Meteoric Iron.—There have been found in different parts of the earth large masses of native or metallic iron, of the history and origin of which nothing very accurate is known; but they are regarded as being of meteoric origin, for it is invariably found that, like the iron which occurs in meteoric stones, this metallic iron contains nickel, and no such compound or mixture is found in the earth in veins or beds: and in point of fact two masses of such iron were seen to fall at Hradschina, near Agram in Croatia, in 1751. It contained 3·5 per cent. of nickel. Similar masses have been found in Africa, America, and Siberia; that in the last-mentioned part of the world was discovered by Professor Pallas: it weighed 1600 lbs., had a cellular structure, and contained crystals and grains of a green substance of a vitreous appearance, which have been stated to be olivine. This iron contains only 1·5 per cent. of nickel. One of the largest masses is that found in Peru by Don Rubin de Celis; it weighed 15 tons, and contained nickel. This was also the case with the knives which Captain Parry obtained from the Esquimaux. The largest quantity of nickel contained in any specimen was about 10 per cent.

Meteoric iron sometimes occurs crystallized; the primary form is the cube, and it is stated to have been found in regular octohedrons. It has no apparent cleavage. Fracture hackly; hardness 4·5; specific gravity 6·48 to 7·768; opaque; lustre metallic; colour pale steel grey.

Oxides of Iron.—The protoxide of iron does not occur in nature, except in combination, and usually with carbonic acid: that which most nearly approaches it is

Magnetic Iron, sometimes called *oxydulous iron* and *octohedral iron.* This ore is found crystalline, massive, and arenaceous. The crystals occur attached and imbedded. The primary form is a cube, but it is generally met with in the form of the regular octohedron. Cleavage parallel to the planes of the octohedron, but not obtainable in some varieties. Fracture uneven or conchoidal; hardness 5·5 to 6·5; scratches fluor-spar, and is scratched by quartz; specific gravity variously stated from 4·4 to 5·094; opaque; lustre metallic, occasionally bright; colour iron or steel grey; streak black; obeys the magnet.

Massive Varieties amorphous; structure granular to compact. It is of this variety of iron ore that native loadstones consist. This ore occurs in various parts of the world, especially in the North of Europe, and it is of it that the best Swedish iron is made, and so also is the iron which yields the wootz steel of the East Indies. It is generally found in primitive countries. This ore frequently contains titanium; but the varieties have not been well distinguished. By the blowpipe it becomes brown, and loses its magnetic property, but does not fuse.

It consists of 28·4 of oxygen and 71·6 of iron, which are equal to

Two equivalents of sesquioxide of iron	80
One equivalent of protoxide of iron	36

There are several ores, which possess very different appearances, that are altogether composed of the sesquioxide or peroxide of iron, and which are principally the *oligiste iron ore* and the *hematite.*

Oligiste Iron; Specular or Micaceous Iron.—This occurs crystallized and massive. The crystals are attached; the primary form is a rhomboid. Cleavage parallel to the primary planes and perpendicular to the axis in some varieties; fracture uneven, conchoidal; hardness 5·5 to 6·5; scratches phosphate of lime; is scratched by quartz; specific gravity 5·0 to 5·25; lustre metallic; colour steel and iron grey; the surface frequently iridescent; obeys the magnet slightly; streak red and reddish-brown.

It is found in the island of Elba and in many other parts of Europe. It also occurs in the lava of Auvergne in France, and in that of Vesuvius.

Goethite, Pyrosiderite.—Occurs in very thin transparent crystalline plates in the cavities of black hematite. Colour brownish red, by reflexion yellowish, in a strong light of a brilliant red; lustre adamantine. It occurs in England and in Germany. The former yielded by analysis

Peroxide of iron	89·2
Water	10·8
	100·

Iron Froth consists of very thin brownish red scaly particles, which have a greasy feel, and stain the fingers. It is found plentifully in Devonshire and Lancashire, and was ascertained by Dr. Henry to be pure peroxide of iron. The massive varieties are amorphous; structure foliated.

Red Hematite occurs in globular and botryoidal masses. Structure fibrous, radiating, opaque. Specific gravity 4·7 to 5. Lustre externally, sometimes metallic, sometimes dull; internally, nearly dull. Colour externally red; greyish red, &c., internally, and streak red. It occurs in large quantity at Ulverstone in Lancashire, and in other parts of Great Britain and Europe. According to D'Aubuisson it consists of

Peroxide of iron	94
Silica	2
Lime	1
Water	3
	100

Brown Hematite; Hydrous Oxide of Iron; Brown Iron Ore.—Occurs in attached crystals and massive prisms. Primary form a right rhombic prism. Cleavage parallel to the short diagonal; fracture uncertain. Hardness 5·0 to 5·5. Specific gravity 3·93; lustre adamantine; nearly opaque; translucent. Colour brown of various shades. Streak yellowish brown. Occurs in Cornwall.

Massive Varieties.—Globular, reniform, and some of the varieties of brown and yellow clay iron-stone. Stalactitic, structure fibrous, or fibro-laminar. Sometimes occurs in pseudomorphous crystals. It occurs in most parts of the world. Analysis by D'Aubuisson:—

	Fibrous.	Compact.
Peroxide of iron	82	84
Water	14	1
Oxide of manganese	2	2
Silica	1	2
	99	89

Carbonate of Iron; Brown Spar; Spathose Iron Ore.—This occurs in attached crystals and massive. Primary form a rhomboid. Cleavage parallel to the primary planes, distinct. Fracture imperfect conchoidal; hardness 3·5, 4·5; specific gravity 3·6 to 3·829; transparent, translucent, opaque; lustre vitreous, inclining to pearly; colour white, yellow, red, and brown of different shades.

Massive Varieties: tabular, structure fibrous; botryoidal and globular (these being called *sphærosiderit*), structure fibrous, diverging; amorphous, structure foliated, granular, compact. Found in Cornwall, Scotland, and Ireland, and in other parts of Europe; and also in America.

Before the blowpipe it blackens and becomes magnetic, but does not fuse; in the reducing flame it colours borax bottle-green, and in the oxidating yellow; dissolves in acids with effervescence. Analysis, by Beudant, of the hexahedral variety:—

Carbonic acid	38·72
Protoxide of iron	59·97
Oxide of manganese	0·39
Lime	0·92
	100·

Clay Iron-Stone, or *Argillaceous Iron Ore*, consists essentially of carbonate of iron mixed with various proportions of earthy matter; on an average carbonate of iron forms about one-third of the abundant clay iron-stone of England, Wales, and Scotland. It occurs in beds and in coal deposits; it is found sometimes in globular masses, and also columnar.

Although various other minerals occur containing large quantities of iron, yet the above-described contain almost all the ores which are extensively used in the manufacture of iron. Other ferruginous compounds have been already described under arbitrary names, and others still remain to be noticed in alphabetical order.

Carburet of Iron; Graphite. [Anthracite.]

Sulphur and Iron exist in combination in enormous quantities; the compounds which it forms are called *magnetic iron pyrites, iron pyrites,* and *white iron pyrites.*

Magnetic Iron Pyrites, Protosulphuret of Iron, occurs in embedded hexagonal crystals and massive; primary form a rhomboid; cleavage parallel to all the planes of a regular hexagonal prism; fracture uneven, sometimes conchoidal; hardness 3·5 to 4·5; scratches calcareous spar, and is scratched by felspar; specific gravity 4·63; opaque; lustre metallic; colour bronze yellow mixed with red; streak greyish black; obeys the magnet but feebly; soluble in dilute sulphuric acid; when exposed to the blowpipe on charcoal is converted into oxide of iron; occurs at Kongsberg in Norway and Andreasberg in the Hartz. Analysis by Hatchett:—

Sulphur	36·5
Iron	63·5
	100·

Massive Varieties amorphous; structure foliated, granular, compact; found in Cornwall, Wales, Germany, North America, &c.

Iron Pyrites; Martial Pyrites; Persulphuret, or bisulphuret, of Iron.—Occurs in attached and imbedded crystals, and massive; primary form a cube; cleavage parallel to the primary planes, distinct; less so parallel to the planes of the octohedron; fracture uneven, sometimes conchoidal; hardness 6·0 to 6·5; scratches felspar, and is scratched by quartz; colour brass-yellow; streak brownish-black; lustre metallic opaque.

Massive Varieties: amorphous, structure granular, compact; globular and stalactitic, structure fibrous or columnar, radiating; surface frequently reddish brown, owing to the loss of sulphur and acquisition of oxygen. It sometimes contains gold; the pyrites of Anglesey, Sweden, and Bohemia contains selenium.

By the blowpipe sulphur is expelled and magnetic oxide of iron remains. It is scarcely acted upon by dilute sulphuric acid, but nitric acid dissolves iron and deposits sulphur. Analysis by Hatchett:—

Sulphur	52·15
Iron	47·85
	100·

Iron pyrites occurs abundantly in every part of the world. It is frequently found in the form of various fruits. The amorphous occurs sometimes to a great extent in coal-beds. Very large crystals occur in Cornwall and South America. The massive varieties in general more readily become oxidized and converted into sulphate of iron than the crystallized, and hence it is largely employed in preparing copperas.

White Iron Pyrites occurs in attached crystals and massive. Primary form a right rhombic prism; cleavage parallel to the planes of the primary form; fracture uneven, granular; hardness 6·0 to 6·5; scratches felspar, is scratched by quartz; colour various shades of yellowish, greenish, and greyish-white; streak greyish-black; opaque; lustre metallic.

Massive Varieties, botryoidal, reniform, stalactitic, and amorphous. Structure diverging, fibrous, or columnar. It is found in Cornwall, Derbyshire, Bohemia, and various other mining districts. According to Berzelius it consists of

Sulphur	53·35
Iron	45·07
Manganese	0·70
Silica	0·80
	99·92

Having now mentioned those ores and compounds which contain most iron, we refer to Assaying for the means by which their value is determined. We now proceed to consider the artificial oxides and other compounds of iron which are procured by chemical agency.

Oxygen and Iron do not combine at common temperatures when both are quite free from moisture, but when filings moistened with a little water are exposed to the air, a black powder is formed by the absorption of oxygen, which is almost entirely protoxide of iron, and was formerly employed in medicine under the name of *martial æthiops.* Protoxide of iron, nearly pure, may also be procured by dissolving iron in dilute sulphuric acid, decomposing the solution by potash and drying the precipitate out of the contact of air.

The properties of this oxide are, that it is black, tasteless, insoluble in water, readily dissolved by most acids, and obeys the magnet. It is precipitated from its saline solutions by potash and ammonia in the state of white hydrate; tincture of galls and hydrosulphuric acid do not produce any alteration in its solutions; by the alcaline carbonates protoxide of iron is thrown down as a white carbonate, and by ferrocyanide of potassium as a colourless compound, which speedily becomes Prussian blue when exposed to the air. It is composed of

One equivalent of oxygen	8
One equivalent of iron	28
Equivalent	36

Magnetic Oxide of Iron.—This is the ore already described as crystallizing in octahedrons; it is obtained artificially by passing water over ignited iron in a porcelain tube; it is also formed when iron is heated in the open air, and the scales which fall from iron when it is rolled hot consist principally of this oxide. It is black, obeys the magnet, brittle, easily reduced to powder, insoluble in water, and by sulphuric acid is dissolved and separated into protoxide and sesquioxide; the solution is in fact a mixture of protosulphate and persulphate of iron. It gives a black precipitate with tincture of galls, and a blue one with ferrocyanide of potassium. It is composed of one equivalent of protoxide 36, and 2 equivalents of peroxide 80; or it may be regarded as constituted of

Four equivalents of oxygen	32
Three equivalents of iron	84
Equivalent	116

It is sometimes described as a $\frac{4}{3}$ oxide of iron.

Peroxide, or Sesquioxide, of Iron.—Various ores, among others hematite, have been described as consisting of this oxide, which is, in fact, common rust of iron, and it is obtained by the action of a plate of iron upon moist atmospheric air. It may be easily procured also by acting upon iron filings with nitric acid; when the acid is moderately strong, but little iron is dissolved, the whole being at once precipitated in the state of red peroxide. When more dilute, a solution of pernitrate is obtained, from which the alkalis precipitate peroxide, and ferrocyanide of potassium Prussian blue. Like hematite, this artificial oxide has a red colour; it is inodorous, insipid, insoluble in water, forms red solutions with acids, but does not readily dissolve in them when it has been heated. It is composed of—

One and a half equivalent of oxygen	12
One equivalent of iron	28
Equivalent	40

Chlorine and Iron combine to form two chlorides, the protochloride and the perchloride. The protochloride may be formed by passing dry hydrochloric acid gas over iron heated to redness in a porcelain tube; hydrogen gas is evolved, and the surface of the iron is covered with a white crystalline protochloride, which, if the temperature be much increased, sublimes. Or it may be prepared by dissolving the metal in hydrochloric acid, and evaporating the solution to dryness out of the contact of air. In this case also the hydrogen of the decomposed hydrochloric acid is evolved; the protochloride thus obtained is grey and crystalline.

This compound is very soluble in water, but insoluble in absolute alcohol; the solution by exposure to the air absorbs oxygen, sesquioxide of iron is precipitated, and sesquichloride of iron of a yellowish colour remains in solution. This salt is also decomposed by oxygen at a high temperature, chlorine being evolved and oxide of iron formed.

When the solution is carefully evaporated, rhombic crystals, which, like it, are of a green colour, are formed; they contain water and deliquesce by exposure to the air. The solution of protochloride of iron (frequently called protomuriate) dissolves nitrous oxide gas, and the solution has been used in eudiometry, for the purpose of absorbing uncombined oxygen gas. [Eudiometer.] It is decomposed by the alkalis, which throw down protohydrate of iron, and by their carbonates, which yield protocarbonates. It gives no precipitate with hydrosulphuric acid or tincture of galls, and a white one with ferrocyanide of potassium, which speedily becomes blue.

It is composed of—

One equivalent of chlorine	36
One equivalent of iron	28
Equivalent	64

Sesquichloride, or Perchloride, of Iron may also be prepared by two processes: first, by heating iron wire in dry chlorine gas; combustion attended with a red light ensues, and a compound is formed, volatile at a heat below redness, and which exists in the form of brownish iridescent scales. This salt is very deliquescent, and dissolves readily in water, alcohol, and æther, and the solutions have a yellow colour.

The second method of obtaining sesquichloride of iron is that of dissolving the sesquioxide in hydrochloric acid; a reddish solution is formed, which, by evaporation till it becomes of the consistence of a syrup, yields reddish-brown crystals, which are very deliquescent and soluble. The aqueous solution of sesquichloride of iron is decomposed by the alkalis, yielding a precipitate of hydrated sesquioxide of iron. The carbonates produce the same effect, for sesquioxide of iron does not unite with carbonic acid. Tincture of galls gives, with the solution of this salt, a deep black precipitate, and ferrocyanide of potassium a deep blue precipitate, which is Prussian blue. It is sometimes called permuriate of iron.

Sesquichloride of iron is composed of—

One and a half equivalent of chlorine	54
One equivalent of iron	28
Equivalent	82

Azote and hydrogen do not form any compound with iron, or at any rate no permanent compound, though it seems probable that nascent hydrogen volatilises, if it does not unite with, a small portion of this metal, when used for preparing the gas by solution in an acid.

Fluorine and Iron.—The protofluoride may be formed by dissolving iron in a solution of hydrofluoric acid; small colourless square crystals are obtained, which are sparingly soluble in water, and become of a pale yellow colour by the action of the air. When heated they lose water, and may then be heated to redness without expelling the fluorine.

It is composed of—

One equivalent of fluorine	18
One equivalent of iron	28
Equivalent	46

The perfluoride, or sesquifluoride, of iron is procured by dissolving recently precipitated sesquioxide in hydrofluoric acid; the solution is colourless. By evaporation a pale flesh-coloured substance is left, which has a somewhat astringent taste and is but sparingly dissolved by water.

It consists of—

One and a half equivalent of fluorine	27
One equivalent of iron	28
Equivalent	55

Bromine and Iron.—When the vapour of bromine is passed over red-hot iron wire, a yellow fusible bromide is formed, which is readily soluble in water. When also bromine mixed with water is made to act upon iron, a solution of the protobromide, of a greenish colour, is obtained.

It consists of—

One equivalent of bromine	78
One equivalent of iron	28
Equivalent	106

A perbromide may also be formed. But these compounds are not important.

Carbon and Iron combine, and the resulting compound is steel, or perhaps it may be stated that steel contains carburet of iron. [STEEL.] By the long fusion of steel with charcoal, Stodart and Faraday obtained a highly crystalline compound, containing from 5 to 6 per cent. of carbon, whereas steel usually contains only from 1·3 to 1·78 per cent. When Prussian blue is decomposed without the access of air at a red heat, a carburet of iron remains, composed of one and a half equivalent of carbon and one of iron; it is a black pulverulent substance, which at a low heat takes fire in the air, when carbonic acid is given out, and sesquioxide of iron left.

The substances called graphite, plumbago, or black-lead, have been regarded as carburets of iron; it is however more than questionable whether the small and uncertain portion of iron which they contain is not in a state of mixture rather than combination.

Sulphur and Iron readily unite, and the native compounds have been already mentioned. Protosulphuret of iron, having much the appearance of the native mineral, may be formed by heating iron to whiteness and rubbing a mass of sulphur upon it. The sulphuret formed readily fuses, and should be dropped into water, removed from it, and dried. It may also be formed by other processes, as by adding a hydrosulphate to protochloride or protosulphate of iron. That made by the first process is of a bronze colour, moderately hard and brittle; that formed by the last is dark and pulverulent. When put into diluted sulphuric or hydrochloric acid, sulphuretted hydrogen gas is evolved, and a protosulphate or protochloride of iron formed. It is a very useful substance for the preparation of hydrosulphuric acid gas, by the action of these acids.

It is composed of—

One equivalent of sulphur	16
One equivalent of iron	28
Equivalent	44

Bisulphuret, or Persulphuret, of Iron has been occasionally formed, both in the moist and dry way, artificially; fine yellow and well defined cubic crystals have been accidentally obtained during the preparation of hydrochlorate of ammonia from ammoniacal gas liquor. According to Berzelius, it may also be formed by cautiously heating the artificial protosulphuret with as much sulphur as it already contains; by this there is formed a bulky powder of a yellow colour and metallic appearance; it is not attracted by the magnet, nor does hydrochloric or sulphuric acid act upon it.

It is composed of—

Two equivalents of sulphur	32
One equivalent of iron	28
Equivalent	60

Some other sulphurets of iron may be also artificially formed, but they are not of any great importance.

Phosphorus and Iron.—Diphosphuret of iron may be formed by several processes; the direct one is that of dropping phosphorus into a crucible containing red-hot iron wire; it is also obtained where the protophosphate of iron is heated with a charcoal-lined crucible; phosphorus and oxygen being expelled. It is a fused granular mass, having the colour and lustre of iron, is very brittle, and not acted upon by hydrochloric acid. It is said that what is called cold-short iron owes its brittle property to the presence of this compound.

It is composed of—

One equivalent of phosphorus	16
Two equivalents of iron	56
Equivalent	72

The perphosphuret of iron is obtained by the action of phosphorus on persulphuret of iron at a moderate heat, it resembles the diphosphuret in its properties.

It consists of—

Four equivalents of phosphorus	64
Three equivalents of iron	84
Equivalent	148

Iodine and Iron.—When iron-filings are digested in a mixture of water and iodine, the metal is dissolved, and a green solution is obtained, which by evaporation yields green tabular crystals of protiodide of iron; these when fused leave an iron-grey coloured opaque mass, which is very deliquescent, and soluble both in water and in alcohol. The solution rapidly absorbs oxygen, and peroxide of iron is precipitated, unless an iron wire be kept in it. It is used in medicine.

It is formed of—

One equivalent of iodine	126
One „ iron	28
Equivalent	154

Periodide, or sesquiodide, of iron is formed by digesting iron with excess of iodine, and subliming the product. It is a red volatile compound deliquescent, and soluble in water and in alcohol.

It is composed of—

One and a half equivalent of iodine	189
One equivalent of iron	28
Equivalent	217

Boron and Iron are made to combine with difficulty in any notable proportion. When hydrogen gas is passed over borate of iron heated to redness in a porcelain tube, there was obtained, according to Lassaigne, a boruret of iron consisting of 22·57 boron and 77·43 iron. It was of a silver-white colour and very brilliant; it was with difficulty acted upon by sulphuric or hydrochloric acid, because the boron set free enveloped the metal and prevented their action.

Selenium and Iron may be made to combine by heating filings of the metal with selenium. The seleniuret has a greyish colour with a tint of yellow; it is hard, brittle, and when heated by the blowpipe loses selenium; it is decomposed by hydrochloric acid when heated, and the results are seleniuretted hydrogen and protochloride of iron.

It is composed of—

One equivalent of selenium . .	40
One „ iron	28
Equivalent	68

Having now described the more important compounds which iron forms with the elementary gases and non-metallic solids, we shall briefly describe some of its alloys, and then mention such salts as its oxides form with acids as are most useful and best known.

The Alloys of Iron are much less useful than might be expected from the extreme utility of the metal itself.

Potassium and iron, and sodium and iron, combine when heat is applied to them: the alloys are more fusible than pure iron, especially when in contact with the air. These alloys are decomposed by air and water. When a mixture of magnesia, iron filings, and charcoal is exposed to the melting heat of iron, the resulting globule contains traces of magnesium. With lime no analogous effect is produced.

Silicium and iron combine readily when silica is fused with iron filings and charcoal in powder. The compound is ductile or brittle according to the quantity of charcoal which it contains. Silicium does not appear to diminish the ductility of iron, nor does the alloy alter by exposure to the air when the silicium does not exceed 5 or 6 per cent. Iron combines also with aluminum and glucinum.

Arsenic combined with iron and with sulphur occurs as a mineral body. This contains nearly one-fifth of its weight of sulphur. In Silesia however an arseniuret of iron occurs, which consists of 65·88 arsenic, 32·25 iron, and 1·77 sulphur. This last may therefore be considered as accidental admixture. It is used for preparing arsenious acid and realgar.

An alloy of one part of arsenic and two parts of iron is obtained by heating in a covered crucible, until fused, a mixture of one part of iron filings and a little more than half a part of arsenic. It has a greyish-white colour, does not obey the magnet, is very brittle, and much more fusible than iron. When heated in the air the arsenic is converted into arsenious acid and volatilized, and oxide of iron is left. An alloy containing only one-fifth of arsenic obeys the magnet.

Chromium and iron may be combined. This alloy is but little known. With columbium iron forms an alloy hard enough to scratch glass. It is not at all ductile, is very difficult to break, and gives a brown powder. Acids dissolve the iron, leaving a pulverulent metallic columbium.

Titanium does not appear to be susceptible of combination with iron. Zinc is with difficulty made to unite with iron, but yet in some operations a compound of these metals has been formed, the zinc constituting however much the larger portion. The alloy is white, has a metallic appearance, and is brittle. It has been proposed to cover iron *with zinc, in the* same way as with tin, to prevent oxidisement. *As yet* however it has not been rendered practically useful.

Tin and iron combine in tin plates, which are plates of iron, both sides of which are alloyed or combined with tin. According also to Bergman, when a mixture of tin and iron is fused, two separate layers are formed, each constituting a peculiar alloy of tin and iron: one of them, consisting of one part of iron and twenty parts of tin, is ductile, of a rather deeper colour than tin, and somewhat harder; whilst the other, composed of two parts of iron and one part of tin, is rather ductile, but so hard that it cannot be cut with the knife.

Antimony and iron unite when heated together in close vessels: the alloy is white, hard, brittle, and its specific gravity is less than that of the mean of the two metals. No metal appears to deprive iron more of its magnetic property than antimony.

No compound of tellurium and iron has yet been examined.

Cobalt and iron combine by fusion: the alloy is hard and magnetic.

Nickel and iron unite easily. It has already been mentioned that meteoric iron contains from about 2 to 10 per cent. of nickel. The artificial alloy is less liable to rust than iron alone; but when the nickel amounts to about 10 per cent. the ductility of the iron begins to diminish.

Bismuth combines with iron, but with difficulty; a very small portion of iron renders the alloy magnetic.

Molybden forms a bluish-grey brittle compound with iron. Equal parts of these metals may be fused by the blowpipe, but one part of iron and two parts of molybden form a bright grey compound, which is infusible by the blowpipe, attracted by the magnet, and of a fine grained fracture.

Copper is with difficulty combined with iron. The alloy is magnetic, even when it contains only one-tenth of iron. It is stated that iron which contains copper is rendered more tenacious, and does not become brittle till near a red heat.

Silver combines readily with iron when they are fused together, but they separate on solidification, and globules of silver appear on the surface of the alloy. When even the quantity of iron does not exceed 1-400th, it may be perceived that it is not combined but intermixed with the iron.

Mercury and iron do not unite directly. The addition of another metal favours the amalgamation. An amalgam may be obtained by digesting tinned plate in boiling mercury. The alloy is silvery-white, tenacious, almost ductile, and obeys the magnet. Other processes have also been proposed.

Lead and iron combine with difficulty. If a mixture of the two metals be fused, there are obtained two layers of alloy; the upper one is iron containing a little lead, and the lower one lead containing a little iron.

Rhodium and iridium may both be combined with iron and also with steel. [Steel.] Iron also unites with tungsten: the alloy is of a bright brown colour, hard, harsh to the touch, and brittle.

Gold and iron combine with facility. A compound of eleven parts of gold and one part of iron is nearly white. It is very ductile, and its specific gravity 16·885. An alloy of three parts of iron and one part of gold is of a silver colour, and is attracted by the magnet. Steel may be soldered with gold.

Iron and platinum, in equal quantities, form an alloy which is susceptible of a fine polish, and does not tarnish in the air. The colour of this compound is such as to render it very useful for reflectors. Its specific gravity is 9·862. Platinum may also be combined with steel. [Steel.]

Having described the more important binary compounds of iron, we shall consider those which its oxides form with some acids, and also notice some combinations which are not included in this class.

The action of acids upon iron is different, being greatly dependent upon their nature and composition. An aqueous solution of sulphurous acid dissolves the metal without the evolution of any gas whatever, and a solution of the protoxide is obtained; concentrated sulphuric acid, when cold, scarcely acts upon iron, but when they are heated the sulphuric acid is decomposed, sulphurous acid is evolved, and oxide of iron is formed; dilute the sulphuric acid, and then the water is decomposed, hydrogen gas is given out, and sulphate of protoxide of iron is formed. When iron is put into liquid hydrochloric acid, hydrogen gas is then also evolved, but this is derived from the decomposition of the acid, and not of the water, and the metal unites with the chlorine to form a protochloride. Nitric acid when concentrated has no action upon iron, whether cold or hot; but when diluted, nitric oxide is evolved, owing to the decomposition of the acid, and protoxide or peroxide of iron is formed, according to the degree to which the acid is diluted.

The first salt which we shall describe is the

Sulphate of Iron, or Sulphate of Protoxide of Iron. It is largely prepared for various purposes, especially for dyeing black, by exposing iron pyrites to the action of air and moisture, in masses which are called *copperas beds.* By absorbing oxygen, the sulphur becomes sulphuric acid, and the iron protoxide, and these combining form protosulphate of iron; as however there is great excess of sulphuric acid, pieces of old iron are added to saturate it, and the copperas, or green vitriol, is obtained in the state of crystals, by evaporating the solution.

For nicer purposes, especially for medicinal use, sulphate of iron is prepared by dissolving iron filings or turnings in dilute sulphuric acid; it may also be obtained by dissolving protoxide or protocarbonate of iron. The solution is of a bluish-green colour, and the salt obtained has the following properties: the primary form of the crystal is an oblique rhombic prism; its colour is bluish-green when recently prepared, but by exposure to the air, and the partial peroxidizement of the iron, it becomes first green and eventually yellowish. Like the other salts of iron, it has a disagreeable styptic taste; two parts of cold water, and three-fourths of a part of boiling water, dissolve one part of this salt; when moderately heated it loses the greater part of its water and becomes white, and when subjected to a red heat it is partly converted into persulphate and partly into peroxide of iron; and when the heat is long continued, totally into peroxide; but when subjected to distillation without the free contact of air, it yields a peculiar kind of sulphuric acid. This salt is insoluble in alcohol; the aqueous solution is decomposed by the alkalis, which precipitate hydrated protoxide of iron; by the alkaline carbonates, which throw down protocarbonate of iron; and by ferrocyanide of potassium, which, when the solution is quite free from peroxide, gives a white precipitate, but if any peroxide be present, which is generally the case, then the colour of the precipitate is more or less blue, dependent upon its quantity; tincture of galls also gives no precipitate in a solution of perfect protosulphate of iron, but, for the reason already stated, it generally gives more or less of a dark-coloured precipitate. The aqueous solution, when exposed to the air, owing to the peroxidizement of the iron, gradually lets fall a precipitate which is a subpersulphate of iron. The solution also absorbs nitric oxide, and hence is used in eudiometrical processes. [EUDIOMETER.]

Sulphate of iron is composed of—

One equivalent of sulphuric acid .	40
One equivalent of protoxide of iron	36
Seven equivalents of water . .	63
Equivalent	139

We have given a rather detailed account of the properties of this salt, because it may be considered as a type of the soluble salts of protoxide of iron, and will save useless repetition.

Sulphate of Peroxide of Iron, or *Sesquipersulphate of Iron*, may be considered as representing the soluble salts of peroxide of this metal. It may be prepared by dissolving the moist peroxide, obtained by decomposing the solution of the perchloride with an alkali, in dilute sulphuric acid; but it is generally formed by heating a solution of the protosulphate with nitric acid, which being decomposed yields oxygen to the protoxide and converts it into peroxide. This solution is of a reddish colour when concentrated, and yellowish when diluted. No crystals are obtained by evaporation, but there remains a brown deliquescent mass; its taste is very astringent, and it is soluble in alcohol; when concentrated sulphuric acid is added to a strong solution of this salt, it is precipitated in the state of a white anhydrous powder. The solution, like that of the other persalts of iron, gives a yellow precipitate of hydrated peroxide with the alkalis, an intense blue one with ferrocyanide of potassium, and a very dark one with tincture of galls. It is decomposed by heat, which expels the sulphuric acid, and leaves peroxide of iron. This salt exists in what are termed the *mother waters* of the copperas-makers, and it is also formed, though very slowly, by the action of the air upon a solution of the protosulphate of iron· a subpersulphate being precipitated.

It is a sesquisalt, composed of—

One equivalent and a half of sulphuric acid .	60
One equivalent of sesquioxide, or peroxide .	40
Equivalent	100

Nitrates of Iron. Of these, as of the sulphates, there are two. When iron is acted upon by very dilute nitric acid, a protonitrate of a pale green colour is obtained; but when the acid is moderately diluted pernitrate of iron is formed: this resembles the persulphate in its more important properties, and is, like it, a sesquisalt.

Carbonate of Iron. It is only the protoxide of iron which combines with carbonic acid to form a solid compound. It has already been mentioned that carbonate of iron exists in nature, and is the basis of what is termed the *argillaceous iron ore;* it sometimes also occurs pure in transparent rhombic crystals, much resembling calcareous spar in appearance. The crystals are however more commonly yellowish-brown, and constituting what is called *spathose iron ore.* Carbonate of iron is precipitated from the solution of the protosulphate by the alkaline carbonates; but on account of the facility with which the protoxide absorbs oxygen, it is almost impossible to obtain it perfect, in a dry state. Carbonate of iron is decomposed by heat and by acids, which expel the carbonic acid. Carbonate of iron, held in solution by excess of carbonic acid, exists in chalybeate waters.

It is composed of—

One equivalent of carbonic acid .	22
One equivalent of protoxide of iron	36
Equivalent	58

Phosphates of Iron. The protophosphate occurs in Cornwall, America, &c. It is sometimes called *Vivianite.* The primary form of the crystal is an oblique rhombic prism. Cleavage parallel to the oblique diagonal; fracture indistinct; hardness 1·5 to 2·0; colour various shades of blue and green; streak lighter than colour; lustre vitreous; translucent; transparent; specific gravity 2·6 to 2·7. Soluble in dilute sulphuric and nitric acids without effervescence. Before the blowpipe on charcoal intumesces, reddens, and melts into a steel-grey globule with metallic lustre. *Massive varieties,* aggregations of crystalline particles, or globular and amorphous earthy masses.

Analysis of the crystallized (No. 1) by Stromeyer, and of the earthy (No. 2) by Klaproth :—

	No. 1.	No. 2.
Phosphoric acid .	31·18	47·5
Protoxide of iron .	41·23	32·
Water . . .	27·49	20·
	99·90	99·5

This compound may be formed artificially by adding a solution of phosphate of soda to one of protosulphate of iron; the precipitate is at first blue, but by attracting oxygen from the air it is converted into perphosphate, and then becomes white. It is soluble in most acids, and may be precipitated from them by ammonia without being decomposed.

Perphosphate of Iron is white; it is obtained by adding phosphate of soda to persulphate of iron. Like the protophosphate, it is insoluble in water, but dissolved by acids, and may be precipitated from them unaltered.

Arseniates of Iron. [ARSENICAL MINERALS.] The protoarseniate of iron is obtained by adding arseniate of potash to a solution of protosulphate of iron; a greyish precipitate of protoarseniate is obtained, which by exposure to the air absorbs oxygen and becomes darker. The perarseniate of iron is obtained by precipitating a solution of the persulphate by arseniate of potash. It is a yellowish-white insoluble powder.

Chromate of Iron. [CHROMIUM.]

Tungstate of Iron. [TUNGSTEN.]

Percyanide of Iron. Prussian Blue. [BLUE.]

We shall conclude this part of the subject with a brief account of the

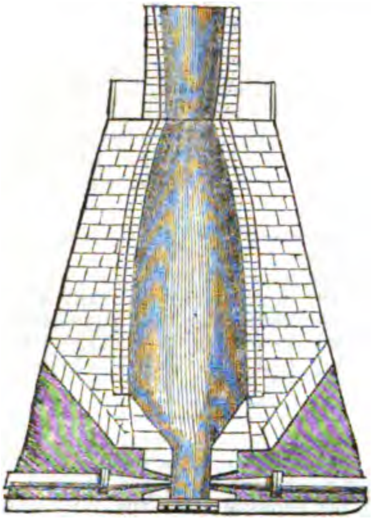
General properties of the Salts of Iron. Those salts which contain or yield the protoxide are distinguished by the following properties:—They give no precipitate with tincture of galls or hydrosulphuric acid; a white one, which becomes speedily blue on exposure to the air, with ferrocyanide of potassium, and a blue one with the sesquiferrocyanide. Solution of chloride of gold, and especially of the sodium chloride, gives a dark-coloured precipitate, and when nitrate of silver is added to protosulphate of iron metallic silver is precipitated. The alkalis throw down a colourless hydrate, and the alkaline carbonates precipitate protocarbonate of iron. The salts of iron which contain the peroxide, or sesquioxide, are distinguished from those of the protoxide by giving a deep blue or black precipitate with tincture of galls; the ferrocyanide of potassium also gives a deep blue, but the sesquiferrocyanide gives none at all. Hydrosulphuric acid reduces them to the state of protoxide, sulphur being precipitated. Ammonia, and the solutions of potash and soda, give a yellowish hydrate.

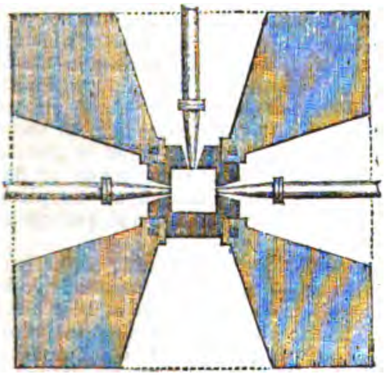
There are however some exceptions to the production of these effects: thus the tartrate of potash and peroxide of iron, the ferri potassio-tartras of the Pharmacopœia, gives no blue precipitate with ferrocyanide of potassium, nor is it precipitated by ammonia or the alkaline carbonates; but potash, when the mixture is heated, throws down hydrated peroxide of iron.

IRON MANUFACTURE AND TRADE.—The art of smelting iron was practised in this country during the time of the Roman occupation and in many antient beds of cinders, the refuse of iron-works, Roman coins have been found. The principal antient seats of the iron manufacture in this country appear to have been Sussex and the Forest of Dean, or Arden, as it was then called. It is known that iron-works existed in that part of Gloucestershire in 1238, because there occurs among the patent rolls of Henry III. of that date, one entitled 'De Forgeis levandis in foresta de Dean.' Remains of antient iron-furnaces have been noticed in Lancashire, Staffordshire, and Yorkshire. The art of working in iron and steel was much practised in this island before the Norman conquest, and we are told that not only was the army of Harold well supplied with weapons of steel and with defensive armour, but that the horses were covered with steel and iron armour, and that every officer of rank maintained a smith, who constantly attended his master to the wars, and took charge of his arms and armour to keep them in proper repair.

There are two distinct qualities into which this metal is commonly divided, viz. pig-iron, and malleable or bar iron, the second being the result of an extension of the processes necessary for the production of the first kind—pig-iron.

The first process is that of reducing the iron-stone or ore, or, as it is technically called, the *mine*, into a metallic state by means of fusion. This operation is conducted in a blast-furnace, the form and construction of which will be understood from the following section. The interior of this furnace in the broadest part, which is called the *boshes*, is usually from 14 to 17 feet in diameter, and this is gradually decreased to about half that diameter at the top. The whole is built of masonry, the lining to the furnace being composed of fire-bricks carefully jointed together with fire-clay: the whole furnace is strongly bound together with iron hoops or stays. The furnace is again contracted below the boshes, and into this lower part the melted iron falls as it is formed. The ground-plan of this lower part of the furnace is constructed according to the following diagram, where the unshaded square in the centre represents the hearth, and is about 3 feet square. The three tubes leading to this hearth (two of which are shown in the section above), and which are called *tuyeres*, are used for introducing the blast of air required to give the degree of intenseness to the heat which is necessary for fusing the ore.





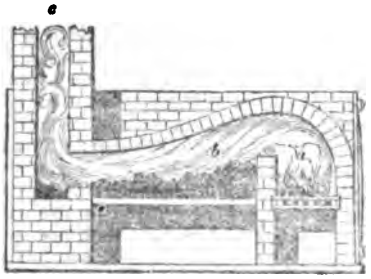
The furnace is charged from the top with certain proportions of iron-ore, of coke, and of limestone. The ore must previously have been roasted or calcined in a kiln, in order to drive off the water, sulphur, and arsenic, with which it is more or less combined in its native state: by this process it loses one-sixth part of its weight. A furnace of the size commonly used in Wales will produce from 5 to 6 tons of pig-iron in twelve hours. For the largest quantity the furnace must be charged progressively with 15 tons of roasted iron-ore, 22½ tons of coke, and about 6 tons of limestone. These ingredients are supplied at 50 charges, and must be intimately mixed together in the furnace. The limestone must be broken into small pieces; its use is to act as a flux to the ore and promote its fusion. The heat that would be produced in any furnace by merely setting fire to the fuel which is contained in it would be altogether insufficient for the fusion of the ore, if its intenseness were not promoted by the forcing in of a current or blast of air. For this purpose it is necessary to use a strong mechanical force, and of late years the agency of steam has been most commonly employed for this purpose. Water-wheels, where they can be had, are of course cheaper agents; but there are not many places where a sufficiently copious and regular supply of water at all seasons can be commanded, and the success of an iron-work would be destroyed by the failure of the blast in any degree for even a short time. Steam-engines are therefore usually preferred. This power is applied to the working of a blowing cylinder, which may be four times the area of the cylinder of the steam-engine. If the blast thus produced were passed immediately from the blowing cylinder through the tuyeres to the furnace, the effect would be intermitting and irregular, ceasing at the end of each stroke of the steam-piston. To remedy this inconvenience the blast is carried into an intermediate chamber of a spherical or cylindrical shape, called a regulator, and as the air is in a state of condensation when admitted, its effort to expand itself again to its natural volume causes the continuous and regular supply to the furnace which is necessary. The air thus forced into the furnace keeps the heat at the degree of intenseness which is indispensable for the smelting of the ore. Until the last few years the air thus supplied was uniformly at the temperature of the atmosphere from which it was immediately taken, and the effect was not only to produce a lower degree of heat, but also to supply a quantity of moisture which is prejudicial to the smelting process. Atmospheric air always contains moisture in some degree or other, but holds a larger proportion in hot than in cold weather, for a very obvious reason, and this causes the furnaces not to work so well in summer as in winter. By the previous drying and heating of the air these inconveniences are remedied, the consumption of fuel is lessened, and the absence of moisture is said to have a beneficial effect upon the quality of the iron produced. This improvement is the invention of Mr. Neilson, of the Clyde Iron-works, and has been made the subject of a patent. It is probable that when, by the expiration of the term of the patent, this invention may be freely used without compensation to the inventor, it will be adopted universally; at present it is used only partially, but still in an increasing degree, and its adoption has very recently made great progress in France, where it has been strongly recommended by the government engineers, after one of them, M. Le Play, had investigated the subject in Scotland in 1836. The air, before it is forced into the furnace, is heated in cast-iron vessels to about 300° Fahr., and is thus more nearly than when at its natural temperature in a condition to support combustion. The saving of fuel in the furnace is found to exceed by ten times its weight the quantity of coal used for the preliminary heating of the air. It is supposed that the improved quality of hot-blast iron is the result of the state of dryness which is thus attained.

The iron is run from the furnace every twelve hours, by tapping it in the front, on a level with the bottom of the hearth, at the side on which, as will be seen from the diagram, there is no tuyere introduced. When the furnace is tapped the metal is allowed to run into channels formed in the sand of the smelting-house floor. The names of *sow-metal* and *pig-metal*, which were originally given by the workmen, signify in one case the blocks of iron which are formed in the large main channels, and in the other case the smaller blocks which are formed in smaller side channels communicating with the larger ones; these names were adopted from the fancied resemblance of the cast metal to a sow and her litter of pigs: this is iron in its crudest state. The weight of materials lost in its production is somewhat greater than that of the fuel used; taking into account the refuse cinder and ashes with the metal, the whole does not weigh quite so much as the ore and lime that have been put into the furnace. Large heaps of cinder are gradually accumulated in the neighbourhood of iron-works, and give a dreary aspect to the country.

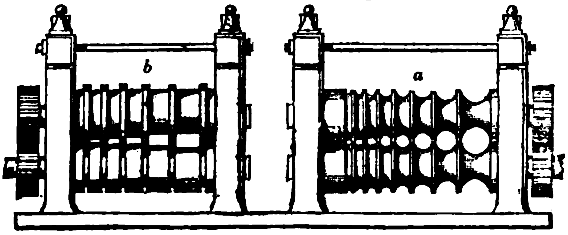
The quality of pig-iron varies according to the purposes for which it is intended, and depends not only upon the quality of the ore, but also upon that of the fuel. The principal division is into foundry-iron and forge-iron, the former being used for castings, the latter for conversion into malleable iron. Foundry-iron is further divided into three qualities, distinguished by the numbers 1, 2, and 3. No. 1 contains a large proportion of carbon, which it has acquired from the coke used in smelting, and the quality of which has been chosen with a view to the production of this kind of iron, which is soft and very fluid when melted, so that it will run into the finest and most delicate forms the moulder can produce. No. 2 contains a smaller proportion of carbon; it is harder than No. 1, closer grained, and of more regular fracture; it is more refractory in the furnace, and does not run so freely when melted as No. 1, but as it is harder and stronger it is preferred for purposes where strength and durability are required in preference to delicacy of form: these two kinds are unfit for conversion into bar-iron. No. 3 varies in the same direction as No. 2, but in a greater degree, from the qualities of No. 1; it is used for many kinds of heavy work where it has to bear great strains and is exposed to constant wear. Forge-iron is divided also into three qualities, and is distinguished as *bright iron*, *mottled iron*, and *white iron*, which names are indicative of the appearance which each quality presents to the eye; they all of them contain some carbon, but less than foundry-iron, and in proportions diminishing in the order in which they are here mentioned, white iron having the smallest proportion of any, and being exceedingly hard; its fluidity too is so small that it runs with difficulty into the channels provided to receive it at the first smelting, and it is altogether incapable of being afterwards used for foundry purposes.

Forge or bar iron is pig-iron freed from carbon and oxygen. The first operation for producing this change is called refining, and is performed in small low furnaces about three feet square at the base, having the bottom, or hearth, of fire-bricks, and the sides of cast-iron, made hollow to allow a stream of water to pass constantly through, which prevents their being quickly burnt away; near the top are holes for the insertion of blast-pipes. These refineries have iron doors at the back, but are open in front; the whole is surmounted by a chimney of brick-work carried to the height of 20 feet from the ground. At the level of the hearth in front is a hole similar to that in the smelting-furnace for running out the melted metal. This communicates with a flat mould of cast-iron 20 feet long and two feet wide, placed over a cistern of water with which its under surface is in contact, and which serves to cast the metal rapidly as it runs into the mould. The iron is kept in a state of fusion in the refinery for some time exposed to an intense heat produced by a strong blast. From the sudden cooling to which it is exposed, the plate when run into the mould is very brittle: when broken the fracture presents a bright silvery appearance. The operation of refining requires about two hours for its performance, and as the weight of each plate when run out is about one ton, each refinery is capable of being made to yield about 70 tons weekly. From 22 to 23 hundred-weight of pig-iron are required to produce one ton of refined iron, and from 10 to 12 cwt. of coke is used for the purpose.

The first process employed for making bars is called puddling, and is performed in a reverberatory furnace, thence called a puddling-furnace: the structure of this furnace will be explained by the following diagram:—In this diagram *a* is the grate, which is supplied with coal through a door in the side. The refined metal broken in small fragments is placed in the body of the furnace *b*, over which the flame is made to play in its passage to the chimney *c*.



The degree of the draft is regulated by a damper on the top of the chimney, which is about 30 feet high. Such is the intenseness of the heat in these furnaces, that when the damper is raised the flame is sometimes carried to the top of the chimney. The quantity of refined metal put into this puddling-furnace at each charge is from 3½ to 4 cwt. In about half an hour from the charging of the furnace the metal begins to melt. The puddler then observes, through a small hole provided for that purpose and for the introduction of his tools, the progress of the work. The business of the puddler is so to dispose of the pieces of metal, moving them by means of his tools, as to ensure an equable application of heat to the mass. When the whole quantity is fully melted, the puddler stirs the metal about briskly, changing his tools continually that they may not be melted. By means of this agitation the metal gives off an elastic fluid, and after a time becomes thick, and grows increasingly so, until it loses all fluidity and forms into lumps. The contents of the furnace are then divided into five or six portions by the puddler, and each is made up by means of his tools into a spherical form. These balls are technically called *blooms*. Being taken from the puddling-furnace they are subjected each to 10 or 20 blows from a heavy hammer (called shingling), which makes them more compact and gives them a shape more convenient for going through the rollers. The form and construction of these rollers are shown in the following diagram. The bloom is passed in succession through the holes in *a*, beginning with the largest and proceeding to the smallest; it is then passed through the grooves in the second roller *b*, and is thus reduced to the requisite width and thickness, having by these several processes been converted from a fusible, hard, and brittle substance, to a tough and elastic bar which is hardly fusible, and which from its property of yielding and altering its form under the hammer has acquired the name of malleable iron.



The quantity of refined metal required to make one ton of these rough bars is about 22 cwt., and the quantity of coal consumed in the process is about 17 cwt. The bars, when they have been passed through these rollers, and while yet hot, are cut into convenient lengths and taken to the balling-furnace, the shape and construction of which resemble those of the puddling-furnace. In this balling-furnace the bars are piled evenly, so that one bar does not project beyond another. Several of these piles, each of which is composed of five or six bars, are placed at once in the furnace, and when sufficiently heated, so that they will weld together, the piles are taken out separately and are passed again through rollers similar in construction to those described above, but differing from each other in the form of their orifices and grooves, so that either round or flat or square rods and bars may be produced at the pleasure of the maker, and these when weighed and put up into bundles are ready for sale.

There are no means of ascertaining correctly the quantity of iron made in this country. Estimates have been formed at different periods, but these are at best but approximations to the truth: these estimates are as under:—

1740	. . . 17,000	Tons.
1788	. . . 68,000	„
1796	. . . 125,000	„
1806	. . . 250,000	„
1820	. . . 400,000	„
1827	. . . 690,000	„

More recently (in 1836) the gentleman who has been already mentioned as an engineer in the employ of the French government, M. Le Play, having visited every ironwork in the United Kingdom, ascertained that the quantity produced was one million of tons, which was probably not beyond the truth at that time. In the following year several furnaces were put out of blast, but it is probable that the quantity in 1838 will again reach, if it do not exceed, the quantity just mentioned. The quantity of iron conveyed upon the Monmouthshire and Glamorganshire canals in 1837 amounted to 256,810 tons, including 20,000 tons of railway iron from the Dowlais works alone.

The manufacture of iron has increased very considerably of late years in France, and since the establishment of mining inspectors in that country we know precisely the quantity produced within the year. Since 1832 the produce has been—

	Pig Iron. Tons.	Malleable Iron. Tons.
1832	221,660	141,336
1833	232,559	149,982
1834	265,028	174,507
1835	290,378	206,396
1836	303,739	201,691

The iron trade of England in all its various branches is of very great importance. Its growth since 1814 has been exceedingly rapid, as will be seen by the following statement of exports in each year:—

Year.	Bar Iron. Tons.	Pig Iron. Tons.	Castings. Tons.	Hardwares & Cutlery. Tons.	Steel unwrought. Tons.	Total declared Value. £.
1814	15,468	307	5,034	6,162	323	
1815	18,223	166	5,320	15,472	1221	
1816	20,870	953	6,368	13,914	917	
1817	34,310	4,057	6,322	8,190	475	
1818	42,095	3,048	6,303	11,057	704	
1819	23,765	906	7,270	8,699	494	
1820	36,348	2,746	5,186	6,697	326	
1821	34,093	4,484	4,506	9,037	515	
1822	33,395	5,095	4,810	10,466	564	
1823	33,138	7,545	5,730	10,375	479	
1824	25,871	2,093	6,717	12,285	570	
1825	25,613	2,815	5,944	10,980	533	
1826	33,253	6,563	5,940	9,627	472	
1827	45,284	7,095	6,292	12,433	535	2,610,442
1828	51,108	7,826	6,205	12,100	917	2,613,821
1829	56,178	8,931	8,219	13,028	714	2,553,482
1830	59,985	12,036	8,854	13,269	832	2,490,630
1831	64,012	12,444	10,361	16,799	1207	2,745,801
1832	74,024	17,566	12,495	15,294	1112	2,625,180
1833	75,388	22,988	14,763	16,497	1587	2,871,397
1834	70,809	21,788	13,870	16,275	1709	2,892,105
1835	94,383	33,073	12,604	20,197	2810	3,477,784
1836	88,536	33,880	19,891	21,072	3014	4,613,987

See *Manufacture of Iron* in the 'Library of Useful Knowledge.'

IRON, *Medicinal Properties.* [Chalybeate Springs.]

IRON BRIDGES. [Bridges.]

IRONY (εἰρωνεία), a refined species of ridicule, which under the guise of earnestness and simplicity exposes all undue pretensions, even while it professes to honour and admit them. It stands intermediate between naïveté, or frank simplicity, on the one hand, and banter and persiflage, on the other. From the former it is distinguished by the consciousness and intention of ridicule, which object again is more covert and less transparent in irony than in the latter. By Aristotle the ironical is opposed to the boastful (τῷ ἀλάζονι), and as a middle term between *the two* he places the truthful (τὸν ἀληθῆ). The Latins translated the word irony by 'dissimulatio,' which however Quintilian (lib. ix., c. 2) disapproves of as very inadequate, and preferred the original, for which we are indebted to the refinement of the Athenians, among whom Socrates, the master in this art, was called emphatically the Ironical (ὁ εἴρων). The strict etymology of the term is very doubtful. One explanation, looking to the so-called Socratic method of question and answer, takes it to mean simply 'the interrogator;' while another would derive it from εἴρειν, to fasten, which may have had reference to the skill wherewith Socrates reduced the sophists to the necessity of adopting some fixed and stable point for discussion, instead of loose and slippery declamation, which, as more favourable to delusion and fallacy, they preferred. Both explanations equally leave out of consideration that element of latent mockery which predominates in the modern acceptation of the word, but which was probably only accessory to the original idea. For while the serious object of the Socratic irony, in which he presented himself as desirous to learn of those whose claim to wisdom he laboured to expose, was to awaken reflection by the development of the consciousness, he nevertheless combined with it all the Attic urbanity and wit. It was consequently of two kinds, a finer and a grosser, according as he had to do with the more presumptuous arrogance of the sophists, whose undue and pernicious reputation he sought to subvert, or with those younger but not less conceited spirits, who yet sought his society for the sake of benefit and improvement, and therefore required a milder and more merciful treatment.

The ironical argument proceeds in simulated ignorance, and by appearing to agree with those whom its purpose is to refute, in holding certain erroneous opinions and maxims, brings out the antagonism of truth to error, and gradually involves them in inextricable difficulties. On this account it has been considered a species of apogogical argument (τῆς εἰς ἀδύνατον ἀπαγωγῆς), or reductio ad absurdum.

As a figure of rhetoric, it is correctly defined to be that mode in which our words convey a sense directly contrary to what we express, but agreeable to what we mean and are understood to mean. (Beattie, *Moral Science*, c. i. § 1, p. 4.) In an opposite and somewhat extended sense those mistakes have been called ironical wherein our intended expressions receive an inverted signification.

Since the essence of irony consists in its serious and seeming simplicity, it is essential to its successful application that it should advance gradually to its ultimate object of exposure, and neither lose its covert character by rising too suddenly to exaggeration and extremes, nor yet so closely veil itself but that the intention of ridicule may appear through the assumed mask of earnestness and simplicity.

Of English writers Swift contains the strongest and the most numerous examples of irony.

IROQUOIS, or MOHAWKS, an Indian tribe in North America, formerly known also under the name of Mengwe, or Six Nations, inhabited the country between the present town of Montreal and Lake Ontario. This once powerful and numerous tribe gradually diminished as the European settlements in their country increased, and at present the number of individuals composing it probably does not exceed 1600. They inhabit two villages not far from the southern banks of the river St. Lawrence. Coghnawaga, opposite the island of Montreal, contains about 900 inhabitants, and St. Regis more than 700. The last-mentioned village is situated where the boundary-line between Canada and the United States strikes the river St. Lawrence, so that one half of the village is within the British territories and the other belongs to the state of New York. The Iroquois have quite changed their manner of life; they derive their subsistence from the produce of their fields, in which they cultivate rye, Indian corn, potatoes, and peas, and from the rearing of some poultry and hogs. They also fish and hunt, but these are no longer considered their principal employment. Their language, which they still speak, differs considerably from that of the Crees, who inhabit the country farther west, but does not seem to differ from that of the Wyandots, Nadowessies, and Asseeneepoytuck, and hence the language of all these tribes is called Iroquois.

(Bouchette, *Topogr. Diction. of Lower Canada*; Carver's *Travels through North America*; Dr. Richardson, in Franklin's *First Journey to the Polar Sea*.)

IRRATIONAL QUANTITY. The distinction between quantity in general and number, or rather between the ratio of quantity to quantity, and that of number to number, has begun to appear in the article Incommensurable, of which the present may be taken as a continuation. It there appears that there are such things as magnitudes which are not in the proportion of any one number to any other; though if we may use numbers as great as we please, we can find a pair which shall be as nearly as we please in the ratio of any two given incommensurable quantities.

According to the modern use of the term irrational, it simply means not expressible by a finite fraction. The word *ratio*, or its equivalent λόγος, does not here mean reason, in the common sense of the word, but mathematical proportion. A quantity whose proportion to the unit of quantity cannot be expressed arithmetically, that is, by a whole number, or a fraction, is 'inexpressible by an arithmetical ratio,' or 'arithmetically irrational,' abbreviated into 'irrational.' This explanation is very important, since the student might otherwise be led to suppose that irrational meant unreasonable, or absurd. Suppose for example that we have a geometrical problem which we solve by the application of arithmetic, taking a certain line to be one, and applying the fundamental principles explained in RECTANGLE. Suppose the problem thus reducible to the solution of $x^2 = 2$, or the quantity sought is such a fraction as multiplied by itself will give 2. The arithmetical answer is very simple; there is no such fraction. But is the problem therefore impossible? By no means; for the line required must be the diagonal of a square whose side is the linear unit. What then is the reason for our not being able to produce an arithmetical solution? Because the ratio of the line sought to the linear unit given is not to be expressed arithmetically, or is in the preceding sense irrational. The student has now arrived at the point where he must be taught (if he have not learnt it before) that arithmetic is not the science of all ratios or relative magnitudes, but only of the ratios or relative magnitudes of those quantities which are made by putting together quantities which are all equal to one another. The senses alone would never make this distinction, and those who desire nothing more than sensible evidence in their mathematical studies need not attend to it: unfortunately the present bent of such pursuits tends to inexactness, not explicitly avowed, but wearing the appearance of absolute rigor.

The student who begins to extract the square root of numbers is allowed to place the symbol of that process over numbers which do not admit of its performance, as $\sqrt{2}$, $\sqrt{3}$, &c. These symbols are reasoned on as if they represented fractions, and arithmetical deductions are drawn; but when it is required to reduce them to practice, then the possibility of determining their arithmetical values is denied, and it is implied that they have an existence which can only be approximately represented. Thus, since 1·4142 multiplied by itself gives 2 very nearly; it is said that 1·4142 is very nearly the square root of 2. This method, which is indispensably necessary in practice, should not be allowed in perfectly strict reasoning. It cannot be just to say that 2 has no square root, but that since fractions very near to 2 have square roots, therefore these square roots are very near to the non-existent square root of 2. It is only in a properly extended arithmetic, which by express agreement admits of extended symbols of ratio, that it can be lawful to speak of the square root of 2. [RATIO.] Waiving this point for the present, we proceed to further considerations, confining ourselves to those irrational quantities which arise from taking the square roots of numbers, but premising that similar remarks might be made on cube, fourth, &c. roots. If we take the series of numbers 1, 2, 3, &c., and extract the square root of each, we thereby obtain (1.) the original series 1, 2, 3, &c., by means of $\sqrt{1}$, $\sqrt{4}$, $\sqrt{9}$, &c.: (2.) a series of multiples of $\sqrt{2}$, namely, $\sqrt{2}$, $\sqrt{8}$, $\sqrt{18}$, &c., which are $\sqrt{2}$, $2\sqrt{2}$, $3\sqrt{2}$, &c.; (3.) a similar series of multiples of $\sqrt{3}$; and so on ad infinitum. The primitive numbers are either prime numbers or products of *different* prime numbers. Thus we have a series of multiples of $\sqrt{(7 \times 5)}$, but not of $\sqrt{(7 \times 7 \times 5)}$, since this last is $7\sqrt{5}$, and, with its multiples, is included in those of $\sqrt{5}$. Any two quantities in the same series are commensurables; thus $7\sqrt{10}$ and $12\sqrt{10}$ are in the proportion of 7 to 10, and have $\sqrt{10}$ for a common measure: but any two which are in different series are incommensurables; thus $\sqrt{10}$ and $\sqrt{11}$ have no common measure whatsoever. And the sum or difference of any two incommensurable quantities is incommensurable with either; thus we can form infinite sets of binomials, such as $\sqrt{2}+\sqrt{3}$, $\sqrt{10}+\sqrt{11}$, $\sqrt{19}-\sqrt{5}$, &c., no one of which shall be commensurable with any other.

The square root of any arithmetical fraction is commensurable with that of the product of its numerator and denominator: thus $\sqrt{(\frac{3}{5})}$ is $\frac{1}{5}\sqrt{15}$. And the reciprocal of any square root is commensurable with that square root: thus $1 \div \sqrt{7}$ is $\frac{1}{7}\sqrt{7}$. Also the fraction made by any two of the binomials just described is commensurable with the product of some similar pair: thus

$$\frac{\sqrt{3}+\sqrt{5}}{\sqrt{10}-2} = \tfrac{1}{6}(\sqrt{3}+\sqrt{5})(\sqrt{10}+2).$$

If we take the square root of one of the preceding binomials, as $\sqrt{(\sqrt{3}+\sqrt{5})}$ we have a new quantity, not commensurable with any of those just mentioned, except only in certain cases pointed out by the following theorem. Let a and b be two numbers, of which a is the greater:

$$\sqrt{(\sqrt{a} \pm \sqrt{b})} = \sqrt{\left(\frac{\sqrt{a}+\sqrt{(a-b)}}{2}\right)} \pm \sqrt{\left(\frac{\sqrt{a}-\sqrt{(a-b)}}{2}\right)}$$

If a and $a-b$ be both square numbers, let $a = p^2$, $a - b = q^2$, and we have

$$\sqrt{(\sqrt{a} \pm \sqrt{b})} = \tfrac{1}{2}\sqrt{(2p+2q)} \pm \tfrac{1}{2}\sqrt{(2p-2q)}.$$

Though Euclid was not acquainted with any direct algebraical process, yet he carried the distinction of incommensurable quantities to the length of a complete subdivision of all the possible cases which can be contained in the formula $\sqrt{(\sqrt{a} \pm \sqrt{b})}$. We are induced to give an account of his tenth book, because there does not, to our knowledge, exist any such thing in a form accessible to the student. Indeed, we do not know where to find a description of its details in any form whatsoever. In old geometrical writings references to the classification of this book are not unfrequently met with. If we take any given line to represent the unit of length, and if a, b, c, &c., represent lines commensurable with this unit, arithmetically expressed, it is well known that the most common geometry shows how to find the lines expressed by $\sqrt{a}$, $\sqrt{b}$, &c. All such lines Euclid terms rational, all others irrational (ῥητός and ἄλογος); and any area which being formed into a square has a rational side, he calls a rational area; that is in fact any area which is commensurable (σύμμετρος) with the square unit, is rational. The term for the square on a line is its *power* (δύναμις) and from this comes the algebraical use of the word power. Thus when he says that two lines are only commensurable in power, he means that the squares on them are commensurable, but not the lines themselves. A mean, or medial line (μέσος), is the mean proportional between two incommensurable rational lines, and is such as can be represented in algebra by $\sqrt[4]{a}$, where a is commensurable with the unit: and a medial area is the mean proportional between two rational areas, and its number of square units may be represented by $\sqrt{a}$.

A line which is made by putting together (σύνθεσις) two incommensurable rational lines is called a line of two names (ἐκ δύο ὀνομάτων), or a binomial line; while one which is made by taking away (ἀφαίρεσις) the lesser of two incommensurable rational lines from the greater, is called an apotomé (ἀποτομή) literally, off-cut. The binomial therefore has one of the forms $a+\sqrt{b}$ and $\sqrt{a}+\sqrt{b}$, while the apotomé has one of the forms $\sqrt{a}-\sqrt{b}$, $a-\sqrt{b}$, $\sqrt{b}-a$. Six distinct species of each sort of line are found, and in connection with each set of six is another similar set, which a modern mathematician would describe as composed of the square roots of the first set. But Euclid describes the square roots, as we should call them, previously to the lines themselves, and in order to render this article more available to those who look through the tenth book, we shall do the same. The whole amounts to this, that taking a given line as the unit and standard, Euclid separates the lines represented by $\sqrt{(\sqrt{a} \pm \sqrt{b})}$, where a and b are commensurable with the standard unit, into twenty-five distinct classes, no one of which contains any lines commensurable with those of any other class. The following enumeration contains the order in which they make their appearance: a, b, &c., representing lines commensurable with the standard unit; A, B, C, D, E, F, the six binomial lines; $\sqrt{A}$, $\sqrt{B}$, &c., those connected with them; U, V, W, X, Y, Z, the six apotomæ; $\sqrt{U}$, $\sqrt{V}$, &c., those connected with them.

It is however to be noticed that Euclid does not use the term unit, but supposes a rational line, to which he makes reference. Thus when he mentions in one place a rational line and a fourth binomial, he means that the fourth binomial shall be related to that rational line in the same manner as our following definition will connect it with the modern phrase, the standard unit.

(1). a, b, &c., lines commensurable with the unit.

(2). $\sqrt{a}$, $\sqrt{b}$, &c., lines commensurable in power with the unit. These two heads include the rational lines.

(3). $\sqrt[4]{a}$, $\sqrt[4]{b}$, &c., medial lines, described by Euclid as lines equal in power to the rectangle of incommensurable rational lines.

( ). $\sqrt{A}$ has the form $\sqrt{a}+\sqrt{b}$. A binomial line generally. This case contains all the six hereafter described and numbered, for which reason the numbering is here left blank. There is a proposition which we should now enunciate by saying that the square root of a binomial of the first species

(A) is one or other, and may be either, of the six binomials.

(4). $\sqrt{B}$ has the form $(\sqrt{a}+\sqrt{b})\sqrt[4]{x}$, where abx is a square number. It is the first species of line composed of two medials, or a first bi-medial, and is compounded of two medials, which make a rational rectangle (εὐθεῖα ἐκ δύο μέσων πρώτη).

(5). $\sqrt{C}$ has the form $(\sqrt{a}+\sqrt{b})\sqrt[4]{x}$, where abx is not a square number. It is the second species of line composed of two medials, or a second bi-medial, and is compounded of two medial lines, which make a medial rectangle (εὐθεῖα ἐκ δύο μέσων δευτέρα).

(6). $\sqrt{D}$ has the form $\sqrt{(a+\sqrt{b})}+\sqrt{(a-\sqrt{b})}$, where a^2-b is not a square. It is described by Euclid as composed of two straight lines, incommensurable in power, whose squares together make a rational space, but whose rectangle is a medial space, and is called by him a greater line (εὐθεῖα μείζων).

(7). $\sqrt{E}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}+\sqrt{(\sqrt{a}-\sqrt{b})}$, where $a-b$ is a square. It is described by Euclid as composed of two straight lines incommensurable in power, whose squares together make a medial space, but whose rectangle is a rational space; and it is called by him 'a line in power making a rational and a medial space' (εὐθεῖα ῥητὸν καὶ μέσον δυναμένη). The nomenclature is not here quite correct, for the preceding line, called a greater line, is also a line in power equal to a rational and medial space.

(8). $\sqrt{F}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}+\sqrt{(\sqrt{a}-\sqrt{b})}$, where $a-b$ is not a square. It is described by Euclid as composed of two lines incommensurable in power, making both the sum of their squares and their rectangle medial spaces incommensurable with one another; and it is called 'a line in power equal to two medial spaces' (εὐθεῖα δύο μέσα δυναμένη).

We now come to the description of the six binomial lines themselves.

(9). A has the form $a+b+2\sqrt{(ab)}$. It is described by Euclid as having the greater term commensurable with the standard unit, and more in power than the less by the square of a line commensurable with itself in length; and it is called the first binomial line (εὐθεῖα ἐκ δύο ὀνομάτων πρώτη).

(10). B has the form $(a+b+2\sqrt{(ab)})\sqrt{x}$, where abx is a square. It is described as differing from the first binomial only in having the lesser term commensurable with the standard unit; and is the second binomial line.

(11). C has the form $(a+b+2\sqrt{(ab)})\sqrt{x}$, where abx is not a square. It differs from the two preceding only in neither term being commensurable with the standard unit.

In the first three binomial lines, reduced to the form $\sqrt{p}+\sqrt{q}$, $\sqrt{(p-q)}$ is commensurable with $\sqrt{p}$, the greater term: in the last three these two are incommensurable.

(12). D has the form $a+\sqrt{b}$, where a is greater than $\sqrt{b}$, and a^2-b is not a square. Euclid describes it as having the greater term more in power than the less by the square of a line incommensurable to itself in length, the same greater term being commensurable with the *standard unit*: it is the fourth binomial line.

(13). E has the form $a+\sqrt{b}$, where $\sqrt{b}$ is greater than a, and $b-a^2$ is not a square. It is described as differing from the preceding by having the less term commensurable with the standard unit: it is the fifth binomial line.

(14). F has the form $\sqrt{a}+\sqrt{b}$ where $a-b$ is not a square. It is described as differing from the two preceding by neither term being commensurable with the standard unit; and is the sixth binomial line.

We now come to the lines derived from the apotomæ, and afterwards to the apotomæ themselves. The descriptions might be shortened by allusion to the corresponding binomial lines, but this would impede the speedy reference to the complete meaning of any one term.

( ). $\sqrt{U}$ has the form $\sqrt{a}-\sqrt{b}$. An apotomé generally. The numbering is left blank, as this class of lines is afterwards subdivided. A proposition is proved, which we should now enunciate by saying that the square root of an apotomé of the first kind is one or other, and may be any of the six apotomæ.

(15). $\sqrt{V}$ has the form $(\sqrt{a}-\sqrt{b})\sqrt[4]{x}$ where abx is a square. Euclid describes it as the difference of two medial lines which are commensurable in power, and whose rectangle is a rational space. He calls it the first kind of apotomé of a medial line (μέσης ἀποτομὴ πρώτη).

(16). $\sqrt{W}$ has the form $(\sqrt{a}-\sqrt{b})\sqrt[4]{x}$, where abx is not a square. It is described as differing from the former only in the medial lines containing a medial space, and is the second apotomé of a medial line.

(17). $\sqrt{X}$ has the form $\sqrt{(a+\sqrt{b})}-\sqrt{(a-\sqrt{b})}$ where a^2-b is not a square. Euclid describes it as the difference of two straight lines incommensurable in power, the sum of whose squares is rational, and their rectangle medial: and he calls it a lesser line (εὐθεῖα ἐλάσσων).

(18). $\sqrt{Y}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}-\sqrt{(\sqrt{a}-\sqrt{b})}$ where $a-b$ is a square. It is described as the preceding, except that the sum of the squares is medial, and the rectangle rational: and Euclid calls it 'a line which with a rational space makes a medial space' (εὐθεῖα μετὰ ῥητοῦ μέσον τὸ ὅλον ποιοῦσα) meaning that a certain rational space added to the square on it makes a whole space, which is medial. There is not here the defect of nomenclature mentioned in (7), for the preceding line here can only be called 'a line which with a medial space makes a rational space.'

(19). $\sqrt{Z}$ has the form $\sqrt{(\sqrt{a}+\sqrt{b})}-\sqrt{(\sqrt{a}-\sqrt{b})}$ where $a-b$ is not a square. It is described by Euclid as the difference of two lines incommensurable in power, having the sum of their squares and their rectangle both medial: and it is called 'a line which with a medial space makes a medial space (εὐθεῖα μετὰ μέσου μέσον τὸ ὅλον ποιοῦσα).

The six apotomæ now follow, all in the form $\sqrt{a}-\sqrt{b}$; in the first three $\sqrt{(a-b)}$ is commensurable with $\sqrt{a}$, in the second three, incommensurable. And $\sqrt{a}$ is called the whole, but $\sqrt{b}$ is called the fitted or adapted line.

(20). U has the form $a+b-2\sqrt{(ab)}$. The whole is commensurable with the standard unit, and exceeds it the adapted line in power by the square of a line commensurable to itself. Euclid calls this a first apotomé.

(21). V has the form $(a+b-2\sqrt{(ab)})\sqrt{x}$ where abx is a square. Described as the preceding, except that only the adapted line is commensurable with the standard unit; and is the second apotomé.

(22). W has the form $(a+b-2\sqrt{(ab)})\sqrt{x}$, where abx is not a square. Here neither the whole nor the adapted line is commensurable with the standard unit; this is the third apotomé.

(23). X has the form $a-\sqrt{b}$ where a^2-b is not a square. Euclid describes it by saying that the whole is commensurable with the standard unit, and exceeds the adapted line in power by the square of a line incommensurable with itself; and calls it the fourth apotomé.

(24). Y has the form $\sqrt{b}-a$ where $b-a^2$ is not a square. Described as the last, excepting that only the adapted line is commensurable with the standard unit: it is the fifth apotomé.

(25). Z has the form $\sqrt{b}-\sqrt{a}$ where $b-a$ is not a square. It differs from the two preceding by neither term being commensurable with the standard unit: and is the sixth apotomé.

Besides obtaining this classification, Euclid proves, firstly, that every one of these species is distinct from every other, and that every line which is commensurable with a line of any one species is itself a line of the same species. He shows also how to find lines of every species, in which he directly applies the theory of numbers obtained in the seventh, eighth, and ninth books. He also demonstrates that no straight line can belong to one species in two different ways: proving, for example, an equivalent to the following, that $\sqrt{a}+\sqrt{b}$, if the terms be incommensurable, cannot be equal to $\sqrt{x}+\sqrt{y}$, where x differs from a, and y from b: which he expresses thus:—'a binomial line is divided into its names (or terms) in one point only.' He then proves that the lines which we have denoted by $\sqrt{A}$, $\sqrt{B}$, &c., are derived from A, B, &c., in the manner which justifies our notation. For instance, 'if a space be contained by a rational and a fourth binomial line, the line equal in power to the space is the irrational line called a greater line.' Now, c representing a rational line, a fourth binomial derived from it has the form $a+\sqrt{b}$ where a is commensurable with c, and greater than $\sqrt{b}$, and $\sqrt{(a^2-b)}$ is not commensurable with c. His proposition then amounts to this, that $\sqrt{(ca+c\sqrt{b})}$ has the form

$$\sqrt{(x+\sqrt{y})}+\sqrt{(x-\sqrt{y})}$$

where $2x$ is a rational space (or the number $2x$ commensurable with c^2), and x^2-y is an irrational space, or that number is incommensurable with c^2. This involves the algebraical proposition, that the square root of $ca+c\sqrt{b}$ is

$$\sqrt{\left\{\tfrac{1}{2}ca+\tfrac{1}{2}c\sqrt{(a^2-b)}\right\}}+\sqrt{\left\{\tfrac{1}{2}ca-\tfrac{1}{2}c\sqrt{(a^2-b)}\right\}};$$

and in showing the identity of the forms, Euclid arrives at the manner of deriving one from the other. He also shows, in two propositions, that the form $\sqrt{(a+\sqrt{b})}$ gives either a binomial line, or (4), (6), or (7) of the preceding enumeration, and that $\sqrt{(\sqrt{a}+\sqrt{b})}$ gives either (5) or (8). In three more he shows that $\sqrt{(a-\sqrt{b})}$ gives either an apotomé or (17) of the enumeration, that $\sqrt{(\sqrt{b}-a)}$ gives either (15) or (18), and that $\sqrt{(\sqrt{a}-\sqrt{b})}$ gives either (16) or (19). He further shows the equivalent of the following algebraical proposition:—

$$\frac{1}{\sqrt{a}-\sqrt{b}}=\frac{\sqrt{a}+\sqrt{b}}{a-b}$$

The preceding enumeration points to one of the most remarkable pages in the history of geometry. The question immediately arises, had Euclid any substitute for algebra? If not, how did he contrive to pick out, from among an infinite number of orders of incommensurable lines, the whole, and no more than the whole, of those which were necessary to a complete discussion of all lines represented by $\sqrt{(\sqrt{a}\pm\sqrt{b})}$, without one omission or one redundancy? He had the power of selection, for he himself has shown how to construct an infinite number of other species, and an algebraist could easily point out many more ways of adding to the subject, which could not have been beyond Euclid. If it be said that a particular class of geometrical questions, involving the preceding formula and that one only, pointed out the various cases, it may be answered that no such completeness appears in the thirteenth book, in which Euclid applies his theory of incommensurables. It is there proved that each of the segments of a line divided in extreme and mean ratio is an apotomé—that the side of an equilateral pentagon inscribed in a circle is, relatively to the radius, the irrational line called a lesser line, as is also the side of an icosahedron inscribed in a sphere—and that the side of a dodecahedron is an apotomé. The apotomé then and the lesser line are the only ones applied.

It seems probable that the distinction of commensurable and incommensurable, and even a notion of different species of incommensurables, was familiar to the geometer before Euclid wrote. Had it been otherwise, we must suppose that the definitions of the fifth book would have been accompanied by some little account of their necessity, and also that the absolute determination of two incommensurable magnitudes would not have been postponed till the last proposition of the tenth book. But it is impossible to draw any very positive conclusion on this subject. Owing to the loss of Euclid's book on Fallacies [Geometry, p. 162], we are probably left without those notions which he intended to be preliminary to the elements.

The most conspicuous propositions of elementary geometry which are applied in the tenth book are the 27th, 28th, and 29th of the sixth book, of which it may be useful to give the algebraical signification. The first of these (the 27th) amounts to showing that $2x-x^2$ has its greatest value when $x=1$, and contains a limitation necessary to the conditions of the two which follow. The 28th proposition is a solution of the equation $ax-x^2=b$, upon a condition derived from the preceding proposition, namely, that $\tfrac{1}{4}a^2$ shall exceed b. It might appear more correct to say that the solution of this equation is one particular case of the proposition, namely, where the given parallelogram is a square; but nevertheless the assertion applies equally to all cases. Euclid however did not detect the *two* solutions of the question; though if the diagonal of a parallelogram in his construction be produced to meet the production of a line which it does not cut, the second solution may be readily obtained. This is a strong presumption against his having anything like algebra; since it is almost impossible to imagine that the propositions of the tenth book, deduced from any algebra, however imperfect, could have been put together without the discovery of the second root. The remaining proposition (the 29th) is equivalent to a solution of $ax+x^2=b$: but the case of $x^2-ax=b$ is wanting, which is another argument against Euclid having known any algebraical reasoning

IRRAWADDI. [Birman Empire.]

IRREDUCIBLE CASE (that is, of cubic equations), the common name of a particular class of cubic equations, to which Cardan did not succeed in applying his celebrated rule. Bombelli however showed that the reason of this was the reality of all the three roots. The following is the sketch both of the method and the difficulty. [Bombelli; Cardan; Tartalea; Theory of Equations; Negative and Impossible Quantities.]

Unity has three cube roots, 1, $-\tfrac{1}{2}(1-\sqrt{-3})$, and $-\tfrac{1}{2}(1+\sqrt{-3})$, of which the product of the second and third is possible and equal to unity. Calling these 1, r, and r', it is next shown that a^3 has three cube roots, namely, a, ra, and $r'a$. Now, let there be a cubic equation (A, B, and C being possible quantities)

$$x^3+Ax^2+Bx+C=0;$$

and, by the method explained in Involution and Evolution, find another equation which has each root greater than a root of the preceding by $\tfrac{1}{3}$A. We have then

$$x\;+Px+Q=0\;.\;.\;.\;(1)$$
$$P=B-\tfrac{1}{3}A^2\qquad\qquad Q=C-\tfrac{1}{3}AB+\tfrac{2}{27}A^3.$$

Let x be $v+w$: then $x^3=v^3+w^3+3vwx$, and (1) becomes

$$v^3+w^3+(3vw+P)\,x+Q=0\;.\;.\quad(2).$$

Determine v and w so that

$$3vw+P=0\qquad\qquad v^3+w^3+Q=0;$$

by which means (2), and therefore (1), is satisfied. This gives

$$v^3\ (\text{or } w^3)=-\tfrac{1}{2}Q+\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)}$$
$$w^3\ (\text{or } v^3)=-\tfrac{1}{2}Q-\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)},$$

from which v and w can be found. But as each of the two, v and w^3, has three cube roots; and as no reason yet appears for choosing one rather than another, it should seem as if the possible combinations by which $v+w$ might be made would be nine in number. But on looking back we find the condition $3vw=-P$; so that the product of v and w must be a possible quantity. If then we signify by v and w the real cube roots of v^3 and w^3, the others are rv and $r'v$, rw and $r'w$; and the only combinations which satisfy the last-mentioned condition are

$$v+w,\quad rv+r'w,\quad r'v+rw,$$

which are the three roots of the equation (1), to the exclusion of $v+rw$, $rv+w$, $v+r'w$, $r'v+w$, $rv+rw$, $r'v+r'w$. So far all is right, and the algebraical solution is complete, and may be represented thus: let ρ stand for any cube root of unity; then the three solutions of (1) are contained in

$$\rho\,\sqrt[3]{(-\tfrac{1}{2}Q+\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)})}$$
$$+\frac{1}{\rho}\sqrt[3]{(-\tfrac{1}{2}Q-\sqrt{(\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3)})},$$

where $\sqrt[3]{}$ signifies the real cube root.

This is perfectly intelligible when $\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3$ is a positive quantity: for if we call the real cube roots above mentioned K and L, we find for the three roots of the equation, first, the possible root, K + L; next, the pair of impossible roots contained in the formula

$$-\tfrac{1}{2}(K+L)\pm\tfrac{1}{2}(K-L)\sqrt{-3}.$$

If we apply this to the equation $x^3-9x-28=0$, where $P=-9$, and $Q=-28$, we shall find $K=3$, $L=1$, and the roots are 4, $-2+\sqrt{-3}$, and $-2-\sqrt{-3}$. But if it should happen that $\tfrac{1}{4}Q^2+\tfrac{1}{27}P^3$ is negative (which requires that P should be negative and $\tfrac{1}{27}P^3$ numerically greater than $\tfrac{1}{4}Q^2$), we return to the original form of the solution, and find that the roots of the equation are contained in the formula

$$\left\{V+W\sqrt{-1}\right\}^{\frac{1}{3}}+\left\{V-W\sqrt{-1}\right\}^{\frac{1}{3}}\;.\;.\;.\;(3)$$

where $\{\quad\}^{\frac{1}{3}}$ means any cube root, there being a tacit condition that the product of the two cube roots must be possible. V stands for $-\tfrac{1}{2}Q$, and W for the possible (though perhaps irrational) quantity $\sqrt{(-\tfrac{1}{4}Q^2-\tfrac{1}{27}P^3)}$. Now, it is shown in books of algebra that every cube root of $V+W\sqrt{-1}$ is of the same form, say $F+G\sqrt{-1}$, and that the corresponding cube root of $V-W\sqrt{-1}$ is $F-G\sqrt{-1}$. If then we assume

$$\left\{V+W\sqrt{-1}\right\}^{\frac{1}{3}}=F+G\sqrt{-1},$$
$$\left\{V-W\sqrt{-1}\right\}^{\frac{1}{3}}=F-G\sqrt{-1},$$

we find by multiplication

$$\left\{V^2+W^2\right\}^{\frac{1}{3}}=F^2+G^2;$$

and by addition of their cubes, and division by 2,

$$V=F^3-3FG^2,$$

between which the elimination of G gives

$$F^3 - \frac{3}{4}\sqrt[3]{V^2+W^2}\,.\,F - \frac{1}{4}V = 0;$$

from which it would seem that we might find F, and then G. But on examining this last equation we find it to be precisely that kind of cubic equation about which the difficulty arose; for the P of this equation is negative, being $-\frac{3}{4}\sqrt[3]{(V^2+W^2)}$, and the Q is $-\frac{1}{4}V$; and $\frac{1}{27}P^3$, being $-\frac{1}{64}(V^2+W^2)$, is numerically greater than $\frac{1}{4}Q^2$, or $\frac{1}{64}V^2$. Whence this case is called irreducible; for though, as will be shown immediately, there are three possible values of the expression (3), yet every direct algebraical attempt to find them leads to the same difficulty in another form.

If F and G could be determined, one value of (3) is 2 F; and taking the other cube roots, selecting only those pairs whose products are possible, we find

$$-\tfrac{1}{2}(1+\sqrt{-3})\ (F+G\sqrt{-1})\ -\tfrac{1}{2}(1-\sqrt{-3})\ (F-G\sqrt{-1})$$
$$-\tfrac{1}{2}(1-\sqrt{-3})\ (F+G\sqrt{-1})\ -\tfrac{1}{2}(1+\sqrt{-3})\ (F-G\sqrt{-1})$$

for the other admissible values. These may be reduced to

$$-F+G\sqrt{3},\ \text{and}\ -F-G\sqrt{3},$$

which are both possible. Consequently, the irreducible case of a cubic equation is that in which the three roots are all possible.

Let us apply the preceding to $x^3-21x+20=0$. Here $P=-21$, $Q=20$, $\frac{1}{4}Q^2+\frac{1}{27}P^3=-243=-81\times 3$. Hence the roots are contained in

$$\left\{-10+9\sqrt{3}\,\sqrt{-1}\right\}^{\frac{1}{3}}+\left\{-10-9\sqrt{3}\,\sqrt{-1}\right\}^{\frac{1}{3}}.$$

By trial (or by semi-tentative methods, described in most books of algebra) it may be found that a cube root of $-10+9\sqrt{3}\ \sqrt{-1}$ is $2+\sqrt{3}\ \sqrt{-1}$; whence $F=2$, $G=\sqrt{3}$. Hence one root (2 F) is 4; the second and third ($-F+G\sqrt{3}$ and $-F-G\sqrt{3}$), are $-2+3$ and $-2-3$, or 1 and -5.

But the best method of obtaining the roots is by having recourse to a registry of the roots of cubic equations, which is in the hands of every tyro, namely, the tables of sines and cosines, by which also the theorem of Bombelli will be established, namely, that the difficulty of the irreducible case answers to that of the trisection of an angle in geometry. It is proposed then, by means of trigonometry, to calculate the values of (3). Assume $V=r\cos.\theta$, $W=r\sin.\theta$, or find r and θ from

$$r=\sqrt{V^2+W^2},\qquad \tan.\theta=\frac{W}{V}$$

in which that sign must be given to r, which gives $r.\cos.\theta$ the *sign of V*. Then, by De Moivre's theorem [NEGATIVE AND IMPOSSIBLE QUANTITIES],

$$(\cos.\theta\pm\sin\theta\sqrt{-1})^{\frac{1}{3}}=\cos.\tfrac{1}{3}\theta\pm\sin.\tfrac{1}{3}\theta\sqrt{-1},$$

in which, by substituting $\theta+360^\circ$ or $\theta+720^\circ$ for θ, the equation $\tan.\theta=V\div W$ is still satisfied, and while the first side of the preceding equation is not altered in appearance, the different values of the cube root appear on the second side. From this we readily find that the expression (3) is no other than $2\sqrt[3]{r}\,.\,\cos.\tfrac{1}{3}\theta$; the three values of which, obtained as just noted, are

$$2\sqrt[3]{r}\,.\,\cos.\tfrac{1}{3}\theta,\ 2\sqrt[3]{r}\cos.(120^\circ+\tfrac{1}{3}\theta),\ 2\sqrt[3]{r}\cos.(240^\circ+\tfrac{1}{3}\theta)$$

which may be thus written:

$$2\sqrt[3]{r}\,.\,\cos.\tfrac{1}{3}\theta,\ -2\sqrt[3]{r}\,.\,\cos.(60^\circ-\tfrac{1}{3}\theta),\ -2\sqrt[3]{r}\,.\,\cos.(60^\circ+\tfrac{1}{3}\theta.)$$

Thus, in the preceding example, which gives $V=-10$, $W=9\sqrt{3}$, we find $r^2=100+243=343=7$; whence $\sqrt[3]{r}=-\sqrt{7}$. And $\tan.\theta=-\frac{9}{10}\sqrt{3}$, whence θ is found to be $-(57^\circ\ 19'\ 16'')$, one-third of which is $-(19^\circ\ 6'\ 25'')$, and this, with $79^\circ\ 6'\ 25''$ and $40^\circ\ 53'\ 35''$, are the angles on which the required values depend. The cosines of these angles, severally multiplied by $-2\sqrt{7}$, $2\sqrt{7}$, and $2\sqrt{7}$, give results as near to -5, 1, and 4 (the values found), as the unavoidable errors in the last places of logarithmic results, and the preceding rejection of fractions of seconds, will permit.

IRRIGATION. Of all the substances which concur in the vegetation and growth of plants water is the most essential: without moisture the seed cannot germinate, nor can the plant receive nourishment. Hence in warm climates, where rains are periodical, and where the soil is dried and parched by a continued evaporation, no verdure exists, except where springs or rivers supply the waste of moisture. The warmer the climate, and the more rapid the evaporation, the more luxuriant is the vegetation, provided there be an abundant supply of water. This circumstance has suggested the plan of diverting streams and conducting them in channels to fertilize as great an extent of land as possible. In China and in India, as well as in Egypt, ingenious modes of watering lands have been adopted from the most remote ages. No expense has been thought too great to secure a supply of water, and to distribute it in the most advantageous manner. It seems that where there is great heat in the air, water alone will supply the necessary food for the growth of plants. It is probable that the component parts of the atmosphere are more easily separated, and made to enter into new combinations with those of water, in a high temperature than in a lower; or that the leaves and green parts of vegetables imbibe water in a state of solution in air, and that in this state it is more easily decomposed. Atmospheric air and water contain all the principal elements of vegetables, viz. oxygen, hydrogen, carbon, and nitrogen; the remainder are either found in the soil or diffused through the water. Manures seem to act principally as stimulants or re-agents, and are themselves composed of the same elements: they are of no use unless diffused or dissolved in water; but when the water is impregnated with animal or vegetable substances, the effect is far greater and more rapid than when the water is pure.

Water has also an important office to perform, if we admit the principle discovered by Macaire, that plants reject through their roots those portions of the sap which are the residue of its elaboration, and which are of no further use to the plant, but rather injurious if they are again imbibed by the roots. Plants seem to require a removal of their excrements, as animals do when tied up in stalls, or confined in a small space. If this is not effected, they suffer and contract diseases. The percolation of water through the soil is the means which nature has provided for this purpose. Hence we can readily suppose that the mere washing of the roots has a beneficial effect, and to this in a great measure must be ascribed the fertilizing effects of pure and soft running water.

If water stagnates and is evaporated, and the noxious matter held in solution remains in the soil, all the advantage of irrigation is lost, and the better kinds of grasses are succeeded by rushes and coarse aquatic plants, as may be seen in all marshy spots. The circulation of the water therefore appears to be as necessary as its presence; and, provided there be a sufficient supply of water of a proper quality, the more porous the soil, and especially the subsoil, is, the more vigorous is the vegetation. It is on this principle alone that we can rationally account for the great advantage of irrigation in those climates where rain is abundant, and where the soil, which is most benefited by having a supply of water running through it, is of a nature to require artificial draining as an indispensable preliminary to being made fertile by irrigation. By keeping these principles in view great light will be thrown on the practical part of irrigation, which, having been long established by experience before these principles were thought of, depends not on their correctness, but only confirms their truth.

The whole art of irrigation may be deduced from two simple rules, which are, first, to give a sufficient supply of water during all the time the plants are growing, and secondly, never to allow it to accumulate so long as to stagnate. We shall see hereafter one apparent exception to this last rule, but it will be readily explained.

The supply of water must come from natural lakes and rivers, or from artificial wells and ponds, in which it is collected in sufficient quantity to disperse it over a certain surface. As the water must flow over the land, or in channels through it, the supply must be above the level of the land to be irrigated. This is generally the principal object to be considered. If no water can be conducted to a reservoir above the level of the land, it cannot be irrigated. But there must also be a ready exit for the water, and therefore the land must not be so low as the natural level of the common receptacle of the waters, whether it be a lake or the sea, to which they run. The taking of the level is therefore the first step towards an attempt to irrigate any lands.

Along the banks of running streams nature points out the declivity. A channel, which receives the water at a point higher than that to which the river flows, may be dug with a much smaller declivity than that of the bed of the river, and made to carry the water much higher than the natural banks. It may thence be distributed so as to descend slowly and water a considerable extent of ground in its way to rejoin the stream. This is by far the most common mode of irrigation, and the shape, size, and direction of the channels are regulated by the nature of the surface and other circumstances, which vary in almost every situation. A few examples will give to those who are not acquainted with the best modes of irrigating land a pretty accurate notion of the system.

We shall suppose a river to run with a rapid current between high banks. At some point of its course a portion of the water is diverted into a canal dug along the bank, with a very small declivity. The water in this canal will flow with less rapidity than the river, but will keep the same level as that part of the river where it has its origin. Thus the water may be carried over lands which are situated considerably above the bed of the river farther down. All the lands between this canal and the river may be irrigated if there is a sufficient supply of water. The canal may be carried to a considerable distance from the river. The size of the canal and its declivity depend on the quantity of water which may be made to flow into it. A dam is often constructed across a river, in order that as much of its water as is possible may be diverted, and the original channel is often laid quite dry, to take advantage of all the water at the time when it is advantageous to irrigate the land. To have an entire command of the water there are flood-gates on the main channel and on the lesser branches. By opening or shutting these the water may be stopped or made to flow as may be required. It must be remembered, that to carry water to a considerable distance, and in great quantity, a larger channel and more rapid declivity are required; and it is a matter of calculation whether it is most advantageous to bring a smaller quantity to a higher point, or a greater abundance somewhat lower. Having a certain command of water, it may be carried from the main channel by smaller branches to different points, so as to irrigate the whole equally. These branches should be nearly horizontal, that the water may overflow the sides of them, and be equally distributed over the land immediately below. Every branch which brings water over the land should have a corresponding channel below to carry it off; for the water must never be allowed to stop and stagnate. When it has run 15 or 20 feet, according to the declivity, over the land situated below the *feeder*, or the channel which brings the water, it should be collected into a drain to be carried off, unless it can be used to irrigate lands which lie still lower. Finally it runs back into the river from which it was taken, at a lower point of its course.

When there is a considerable fall and a sufficient supply of water, a series of channels may be made, so situated below each other, that the second collects the water which the first has supplied, and in its turn becomes a feeder to irrigate the lower parts of the declivity: a third channel receives the water and distributes it lower down, until the last pours it into the river. This is called *catch work*, because the water is caught from one channel to another. This method is only applicable where there is a considerable fall of water and a gentle declivity towards the river. But it must be borne in mind that the water is deteriorated for the purpose of irrigation, when it has passed over the land, and that it is not advantageous to let it flow over a great extent when a fresh supply can be obtained: but where only a small portion of water can be commanded, that must be made the most of; and it will irrigate three or four portions of land in succession without there being any very marked difference in the effect: beyond this it rapidly loses its fertilizing qualities. This is not owing to the water having deposited the fertilizing substances which it held in solution, or which were diffused through it, but it is owing to its having taken up some which are detrimental to vegetation, and being saturated with them: at least this is the most probable opinion when all circumstances are taken into the account.

The general principle of irrigation may be described as the supplying every portion of the surface with an abundance of water, and taking it off again rapidly. In many situations the great difficulty in irrigation arises from the want of a supply of water; but even then a partial irrigation may be effected, which, although not perfect, will have its advantages. A small rill which is often quite dry in summer may still, by judicious management, be made to improve a considerable portion of land: its waters may be collected and allowed to accumulate in a pond or reservoir, and let out occasionally, so that none be lost or run to waste. If there is but a small quantity it must be husbanded and made to flow over as great a surface as possible. If there is water only at particular seasons of the year, and at a time when it would not be of much use to the land, it may be kept in ponds, and it will lose none of its qualities by being exposed to the air. If animal or vegetable matter in a partial state of decomposition is added to this water, it will much improve its quality, and by a judicious distribution of it over the land a great benefit may be obtained.

If there is not a want of water, there may be a want of declivity to enable it to flow off, which, it should always be remembered, is an essential part of irrigation. Art may in this case assist nature by forming a passage for the water, either in its course towards the land to be irrigated, or from it after it has effected its purpose. Where there is no natural exit, and it might lead to too great an expense to make an artificial one, the water may sometimes be led into shallow ponds, where a great part is evaporated; or porous strata may be found by boring, into which it can be made to run and be dispersed. Along rivers where the fall is very imperceptible a channel brought from a considerable distance may give such a command as to throw the water over a great extent of surface; and to carry it off another channel may be cut, emptying itself at some distance below: so that lands which lie along the banks of a river may be irrigated, although they are actually below the level of the river, and require banks to protect them from inundation.

When the surface to be irrigated is very flat and nearly level, it is necessary to form artificial slopes for the water to run over. The whole of the ground is laid in broad beds, undulating like the waves of the sea. The upper part of these beds is quite level from end to end, and here the channel or float which brings the water on is cut. From the edge of this channel the ground is made to slope a foot or two on both sides, and a ditch is cut at the botttom parallel to the float. The whole of the ground is laid out in these beds. All the floats are supplied by a main channel at right angles to the beds, and somewhat above them, and all the ditches or drains run into a main ditch parallel to the main float, and below the lowest drain. The course of the water is very regular. As soon as the flood-gates are opened it flows into all the upper channels, which it fills till they overflow in their whole length. The sloping sides are covered with a thin sheet of running water, which the lower drains collect and carry into the main ditch.

Experience has shown that there are particular seasons when the water has the best effect; a perfect command of it is therefore indispensable, and also a regular supply. During frost, when all dry meadows are in a state of torpor, and the vegetation is suspended, the water-meadows, having a current of water continually flowing over them, are protected from the effect of frost, and the grass will continue to grow as long as the water flows over it. Too much moisture however would be injurious, and the meadows are therefore laid dry by shutting the flood-gates, whenever the temperature of the air is above freezing. By this management the grass grows rapidly at the first sign of spring. Before the dry upland meadows have recovered the effects of frost and begun to vegetate, the herbage of the water-meadows is already luxuriant. As soon as they are fed off or cut for the first crop of hay, the water is immediately put on again, but for a shorter time; for the warmer the air, the less time will the grass bear to be covered with water. A renewed growth soon appears, and the grass is ready to be cut a second time when the dry meadows only give their first crop. Thus, by judicious management, three or four crops of grass are obtained in each season, or only one abundant crop is made into hay, and the sheep and cattle feed off the others. The usual way in which the grass of water-meadows is made profitable is by feeding ewes which have early lambs till the middle of April. A short flooding soon reproduces a crop, which is mown for hay in June; another flooding gives an abundant aftermath, which is either mown for hay, or fed off by cows, bullocks, and horses; for at this time the sheep, if pastured in water-meadows, are very subject to the rot. The value of good water-meadows could scarcely be believed by those who are not familiar with them. Where the water is suited to irrigation they never require manuring. Their fertility is kept up continually, and the only attention required is to weed out coarse aquatic plants, which are neither nutritious nor wholesome in hay or pasture.

The best soil for a water-meadow is a good gravel. The finest water-meadows on the Avon in Wiltshire, where the richest herbage is found, have scarcely any soil at all, but are on a bed of shingle and pebbles matted together by the roots of the grass, which proves to demonstration that the waters of the Avon contain all the principles essential to rapid vegetation. Great attention is required, and some experience, to irrigate meadows, so as to give the greatest profit.

In hot weather, when we should imagine that the land must be thirsty, and that too much water cannot be poured over it, much mischief may be done by injudicious flooding. In winter, on the contrary, the land may be covered with water for weeks without injury; and if an earthy deposit takes place, the subsequent fertility is greatly increased. But this is not properly irrigation: it is inundation, and the effects depend on entirely different causes. When low meadows are inundated in winter and spring, it is the muddiness of the water which enriches the land: a fine layer of extremely divided matter is deposited, and when the water subsides this acts as a coat of manure.

Water may be carried in small channels through meadows without being allowed to overflow, and in this case the effect is similar to that caused by rivers or brooks which wind slowly through valleys, and produce a rich verdure along their course. This is watering, but not properly irrigating. When this is done judiciously, the effect is very nearly the same as when the land is irrigated; and in hot climates it may be preferable, by giving a constant supply of moisture to the roots, while the plants are growing. The great advantage of water-meadows in England is not so much the superior quantity of grass or hay which is obtained when they are mown, as the early feed in spring, when all kinds of nutritive fodder are scarce; when the turnips are consumed before the natural grass or the rye sown for that purpose is fit to be fed off, the water-meadows afford abundant pasture to ewes and lambs, which by this means are brought to an early market. The farmer who has water-meadows can put his ewes earlier to the ram, without fear of wanting food for them and their lambs in March, which is the most trying season of the year for those who have sheep. At that time an acre of good grass may be worth as much for a month as a later crop would for the remainder of the year. When it is intended to form a water-meadow on a surface which is nearly level, or where a fall of only two or three feet can be obtained in a considerable length, the whole of the land must be laid in beds about 20 or 30 feet wide, the middle or crown of these beds being on a level with the main feeders, and the bottoms or drains on a level with the lower exit of the water, or a little above it. To form these beds most expeditiously, if the ground is already in grass, the sod may be paired off and relaid after the beds are formed, by which means the grass will be sooner re-established; but except in very heavy soils, where the grass is some time in taking root, the easiest and cheapest way is to plough the land two or three times towards the centre, and dig out the drain with the spade: the earth out of the drains, and that which is taken out of the upper trench or feeder, may be spread over the bed to give it the proper slope. A roller passed over the bed in the direction of its length will lay it even, and the seeds of grasses being sown over it, the water may be let on for a very short time to make them spring. As soon as the grass is two or three inches above ground a regular flooding may be given, and in a very short time the sward will be complete. Instead of sowing seed, tufts of grass cut from old sward may be spread over the newly formed beds, and they will soon cover the ground. The Italian rye-grass, which has been lately introduced into this country from Lombardy and Switzerland, grows so rapidly, that if it be sown in February, or as soon as the snow and frost are gone, it will afford a good crop to feed off in April, or to mow for hay by the beginning of May; and after that it may be cut repeatedly during the summer. But where the soil is good and the water abundant, good natural grasses will spring up without much sowing, and soon equal the old water-meadows.

It seems essential to the formation of a good water-meadow that the bottom be porous and free from stagnant water; hence under-draining is often indispensable before a water-meadow can be established; and a peat-bog, if drained and consolidated, may have water carried over its surface, and produce very good herbage. If the soil is a very stiff clay, draining is almost indispensable where a water-meadow is to be made. The more porous the soil the less depth of water is required, which is not obvious at first sight; but the clay lets the water run over the surface without soaking into the roots, whereas the porous soil is soon soaked to a considerable depth. The water must therefore be longer on the clay than on the sand or gravel to produce the same effect. If the water is properly applied all kinds of soils may be converted into fertile water-meadows. On very stiff clays a coat of sand or gravel, where it can be easily put on, will greatly improve the herbage. It should not be ploughed in, but laid on the surface two or three inches thick: chalk will also improve the herbage.

The usual time of letting on the water on water-meadows is just before Christmas, and it may continue to flow over the land as long as the frost lasts: in mild weather it may be turned off during the day and put on again at night until the frost is gone. The grass will soon begin to grow, and be ready to be fed off. When this is done the water is immediately let on for a short time, and turned off again to allow the ground to dry after a few days' flooding, and the water is let on again at short intervals. The warmer the air is, the shorter time must the water be allowed to cover the meadows. As soon as the grass is five or six inches long it must be left dry entirely till it is mown or fed off. In summer the floodings must be very short; seldom more than twenty-four hours at a time, but frequent. Thus a great weight of grass may be obtained year after year without any manure being put on the land, care being taken that where the surface is not quite even the hollows be filled up with earth brought from another place, or dug out of the drain, if that should be partially filled up with the soil which the water has carried into it. We alluded before to a case where water may remain a considerable time on the land without injury; this is, when there are inundations from rivers, which rise above their beds in spring and cover the low meadows which lie along their

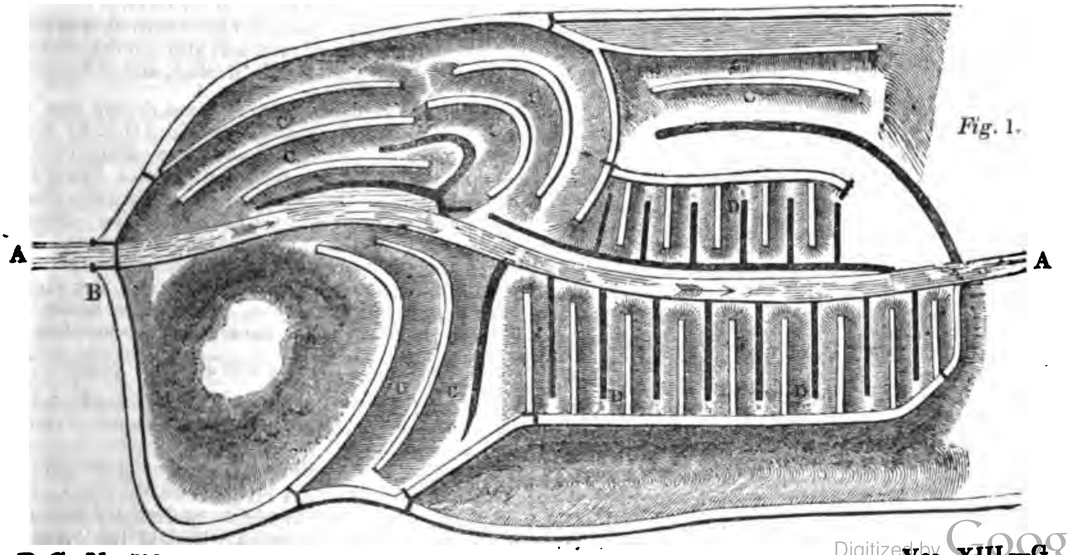


Fig. 1.

banks. In this case the grass, which has not yet sprung up, is protected from the cold, and if there is a deposit from the water there is a considerable advantage. But when it subsides, it must be made to run off entirely, without leaving small pools, by which the grass would invariably be injured. Small ditches or channels are usually dug, by which all the water may run off, unless where the subsoil is very porous, or the land is well under-drained, which is seldom the case in these low meadows, for the drains would be apt to be choaked by the earthy deposit from the water. These inundations can sometimes be regulated by means of dykes and flood-gates, in which case they partake of the advantages of irrigation, and also of that deposition of fertilizing mud which is called warping. [WARPING.]

The preceding plan (*fig.* 1) will explain what has been briefly said respecting the different modes of irrigating land. A A is a river which has a considerable fall, and then flows through a level plain. A considerable channel is cut at B, where there is a rapid fall over a natural or artificial dam. This channel is carried round a hill and supplies a series of channels, C, C, C, placed below each other, forming catch-work along a declivity. A portion of the water goes on to D, where it supplies the feeders of a regular set of ridges, or beds, made as before described, from which the water returns into the river by a main trench, into which all the drains run.

On the other side of the river, where the slopes lie somewhat differently, there are several examples of catch-work, the black lines representing the drains which receive the water after it has flowed over the surface and carry it into the river below. It is evident that all the feeders are nearly horizontal, to allow the water to flow over their sides.

Fig. 2.

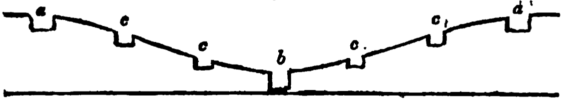
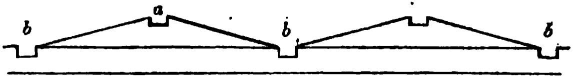


Fig. 2 is the section of catch-work. *a, a,* are the feeders; *b,* the drain; *c, c, c, c,* intermediate channels which act as feeders and drains.

Fig. 3.



Ridge-work.

Fig 3 is the section of two adjoining ridges. *a, a,* the feeders; *b, b, b,* the drains.

Fig. 4.

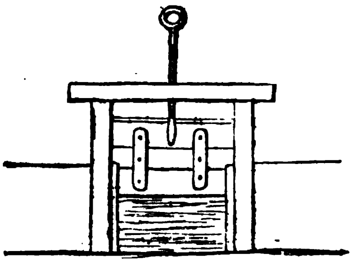


Fig. 4 is a sluice to regulate the flow of water

IRRITABILITY. [HALLER.]

IRTISCH. [SIBERIA.]

IRVINE, a royal borough and seaport town in the district of Cunningham and county of Ayr, 68 miles south-west by west from Edinburgh. It is situated on a rising ground to the north of the river Irvine, and about half a mile distant from the harbour, which lies to the south-west of it. The town is dry and well aired, and consists of one broad street, which communicates with the southern suburb by means of a narrow stone bridge of four arches, rebuilt in the year 1826. The principal public buildings are the church and town-house. The harbour is commodious, having from nine to eleven feet water on the bar at spring-tides; though during violent gales from the south it rises to sixteen feet. The rapid growth of Kilmarnock has tended greatly to increase the trade of Irvine, which is the nearest seaport to that town. The dues levied at the port during the five years preceding 1832 averaged 450*l.* per annum. Ship-building is carried on upon a small scale. Irvine, in union with Rothsay, Inverary, Campbelltown, and Ayr, returns one member to parliament. The school, wherein Greek, Latin, French, and the mathematics are taught, is ably conducted by the rector and an English assistant. The population of the burgh and parish of Irvine in 1831 was 5200. (Carlisle's *Dictionary; Beauties of Scotland; Population Returns,* &c.)

ISABELLA of CASTILE. [COLUMBUS; FERDINAND V.]

ISÆUS, one of the ten Athenian orators, was a native of Chalcis, or, according to other accounts, of Athens. Dionysius could not ascertain the time of his birth or death. So much as this appears certain: the vigour of his talent belonged to the period after the Peloponnesian war, and he lived to see the time of king Philip. Hermippus, who wrote the lives of the pupils of Isocrates, has recorded nothing more of Isæus than that he was a pupil of Isocrates, instructed Demosthenes, and enjoyed the society of the chief philosophers of his time.

The author of the Life of Isæus, attributed to Plutarch, mentions sixty-four orations of Isæus, fifty of which were allowed to be genuine. At present there are only eleven extant, all of which are of the forensic class (λόγοι δικανικοί), and all treat of matters relating to wills and the succession to the property of testators, or persons intestate, or to disputes originating in such matters. These orations are valuable for the insight which they give us into the laws of Athens as to the disposition of property by will, and in cases of intestacy, and also as to many of the forms of procedure. Dionysius, in his laboured comparison between Lysias and Isæus, sums up as follows:—'In reading Lysias one would not suppose that any thing is said either in an artificial manner or without perfect sincerity, but everything appears natural and true; thus forgetting that it is the height of art to imitate nature. In reading Isæus one has just the contrary feeling; nothing appears to be spoken naturally and without an effort, not even what really is so spoken; but everything seems of set purpose, framed to deceive, or for some other sinister end. One would believe Lysias, though he were stating what was false; one cannot, without some feeling of distrust, assent to Isæus, even when he speaks the truth.' Again:—'Lysias seems to aim at truth, but Isæus to follow art: the one strives to please, the other to produce effect.'

Dionysius adds that, in his opinion, with Isæus originated that vigour and energy of style (δεινότης) which his pupil Demosthenes carried to perfection. So far as the extant specimens of Isæus enable us to form an opinion, this judgment appears to be just. The perspicuity and the artless simplicity of the style of Lysias are admirable; but on reading Isæus we feel that we have to do with a subtle disputant and a close reasoner, whose arguments are strong and pointed, but have too much the appearance of studied effect, and for that reason often fail to convince.

The best edition of the text of Isæus is by Bekker. The oration on the 'Inheritance of Menecles' was first published by Tyrwhitt, London, 1785; and that on the 'Inheritance of Cleonymus' first appeared in its complete form at Milan, 1815, by Ang. Mai. The translation of Isæus by Sir William Jones (1779, 4to.) will give an English reader a sufficient notion of this orator; but the translation is somewhat deficient in critical accuracy, and also wanting in force.

ISAIAH (יְשַׁעְיָהוּ, LXX. Ἡσαΐας), one of the most celebrated of the Hebrew prophets, lived during the reigns of Uzziah, Jotham, Ahaz, and Hezekiah (*Is.* i. 1; vii. 1; xiv. 28; xxii.; xxxvi.—xxxviii.), and was contemporary with the prophets Amos, Hosea, Joel, and Micah. We possess no particulars in the Old Testament respecting the place of his birth or his history; but we learn from the inscription of the book that he was the son of Amoz, who was, according to one Jewish tradition, the brother of Amaziah, king of Judah; but according to another was considered to be the same person as the prophet Amos. The latter tradition is evidently wrong; since the name of the prophet is עָמוֹס, while the name of the father of Isaiah is אָמוֹץ. It is probable, from the 6th chapter of the book, that Isaiah entered upon his prophetical office in the last year of the reign of king Uzziah, B.C. 759. He continued to prophesy at least till the fourteenth year of the reign of Hezekiah, B.C. 713 (2 *Kings*, xix. 2-7; *Is.* xxxvi.—xxxviii.), a period of forty-six years. According to an antient Jewish tradition, which is also given in the apocryphal book of the 'Ascension of

Isaiah,' he was put to death during the reign of the cruel Manasseh (2 *Kings*, xxi. 16); who is said by Josephus (*Antiq.*, x. 3, § 1) to have slain all the prophets in Jerusalem. Manasseh commenced his reign B.C. 697; and Isaiah must therefore have continued to prophesy for sixty-two years at least, if this tradition is correct. Isaiah had a greater influence in public affairs than any other prophet, except Elijah and Elisha. He appears to have been the intimate friend of Hezekiah; and it was principally owing to his advice and firmness that the army of Sennacherib was defeated.

The prophecies of Isaiah consist of sixty-six chapters, all of which were considered, till within the last thirty or forty years, to have been composed by the prophet himself. But it is the common opinion of the critics in Germany usually called Rationalists, that the book of Isaiah is a collection of prophecies delivered by different persons, which were collected and arranged in their present form during the Babylonian exile. The whole of the latter part of the book, from ch. xl. to ch. lxvi., is supposed to have been written at Babylon during the exile, and a considerable part of the first thirty-nine chapters is attributed to other authors than Isaiah. Some critics have called the book a 'poetical anthology.' This opinion was first maintained by Koppe, and has been supported by Döderlein, Justi, Eichhorn, Bauer, Paulus, Rosenmüller, Bertholdt, De Wette, Augusti, and at great length by Gesenius in his translation of Isaiah, Leip., 1821-9. The best arguments in defence of the common opinion are given by Jahn in his 'Introduction to the Bible,' by Professor Lee in his 'Sermons and Dissertations on the Study of the Scriptures,' and by Hengstenberg in his 'Christologie des alten Testaments,' Berl., 1829-35.

If we admit Isaiah to have been the author of the book which bears his name, it is nearly certain that the prophecies are not arranged at present in the order in which they were delivered. The sixth chapter apparently contains an account of the inauguration of the prophet in his sacred office, and appears to have been the first prophecy that was published by him. The twenty-second chapter consists of two separate parts which have no connexion with each other, and were probably published at different times; the former half of the chapter (1-14) containing a prediction of the invasion of the Medes and Persians, while the latter half gives an account of the disgrace of a courtier of the name of Shebna during the reign of Hezekiah. It is therefore difficult to give any connected account of the contents of the book; but the following arrangement, taken from Gesenius, is perhaps the best upon the whole.

The first part (i.—xii.) principally consists of prophecies relating immediately to the Jewish people; the second part (xiii.—xxiii.) contains predictions against the Babylonians, Assyrians, Philistines, Moabites, Syrians, Egyptians, and other foreign orations; the third part (xxiv.—xxxv.), with an historical appendix (xxxvi.—xxxviii.) containing an account of the invasion of Sennacherib, contains prophecies of the invasion of Judæa by the Babylonians, of the destruction of Jerusalem, the captivity of the people, and their final restoration to their native country; the fourth part (xl.—lxvi.) principally refers to the restoration of the church; it contains many prophecies respecting the deliverance of the Jews from captivity, the destruction of idols, the spread of the true religion over the earth, the conversion of the Gentiles, and the coming of the Messiah.

The prophecies of Isaiah have always been held in great veneration by the Jews. Jesus, the son of Sirach, speaks of Isaiah as 'a prophet great and faithful in his vision, who saw by an excellent spirit what should come to pass at the last, and comforted them that mourned in Sion. He showed what should come to pass for ever, and secret things before they came.' (*Ecclesiasticus*, xlviii. 22-25.) Josephus and Philo frequently speak of Isaiah in terms of the greatest respect; and his prophecies are constantly quoted by the writers of the New Testament. See *Matt.* i. 22, 23, compared with *Is.* vii. 14; *Matt.* iii. 3, with *Is.* xl. 3; *Matt.* iv. 14-16, with *Is.* ix. 1, 2; xlii. 7; *Matt.* viii. 17, with *Is.* liii. 4; *Matt.* xiii. 14, 15, with *Is.* vi. 9, 10; *Matt.* xxi. 13, with *Is.* lvi. 7; *Luke*, iv. 17-19, with *Is.* lxi. 1-3; *Acts*, xiii. 34, with *Is.* lv. 3; *Acts*, xxviii. 25-27, with *Is.* vi. 9, 10; *Rom.* ix. 27, 28, with *Is.* x. 22; *Rom.* ix. 29, with *Is.* i. 9; *Rom.* ix. 33, with *Is.* viii. 14; *Rom.* x. 16, with *Is.* liii. 1; *Rom.* x. 20, 21, with *Is.* lxv. 1, 2; 1 *Cor.* i. 19, 20, with *Is.* xliv. 25; 2 *Peter*, iii. 13, with *Is.* lxv. 17.

A considerable part of the prophecies of Isaiah are supposed by most Christian divines to relate to the Messiah. The following list is taken from Gray's 'Key to the Old Testament,' pp. 369, 370: the divine character of Christ (vii. 14; ix. 6; xxxv. 4; xl. 5, 9, 10; xlii. 6-8; lxi. 1; lxii. 11; lxiii. 1-4); his miracles (xxxv. 5, 6); his peculiar qualities and virtues (ix. 2, 3; xl. 11; xliii. 1-3); his rejection (vi. 9-12; viii. 14, 15; liii. 3); his sufferings for the sins of man (liii. 4-11); his death, burial (liii. 8, 9), and victory over death (xxxv. 8; liii. 10-12); his final glory (xlix. 7, 22, 23; lii. 13-15; liii. 4, 5), and the establishment, increase (ii. 2-4; ix. 7; xlii. 4; xlvi. 13), and perfection (ix. 2-7; xi. 4-10; xvi. 5; xxix. 18-24; xxxii. 1; xl. 4, 5; xlix. 9-13; li. 3-6; lii. 6-10; lv. 1-3; lix. 16-21; lx.; lxi. 1-5; lxv. 25) of his kingdom. The number of Isaiah's prophecies relating to the Messiah was thought by Jerome to be so numerous and important, that he says, in his preface to the book, that Isaiah ought rather to be called an Evangelist than a prophet; and many modern commentators give him the title of the Evangelical Prophet.

The style of Isaiah is said by Lowth (*Prælect.* xxi.) 'to abound in such transcendent excellencies, that he may be properly said to afford the most perfect model of the prophetic poetry. He is at once elegant and sublime, forcible and ornamented; he unites energy with copiousness, and dignity with variety. In his sentiments there is uncommon elevation and majesty; in his imagery the utmost propriety, elegance, dignity, and diversity; in his language, uncommon beauty and energy; and notwithstanding the obscurity of his subjects, a surprising degree of clearness and simplicity. To these we may add that there is such sweetness in the poetical composition of his sentences, whether it proceed from art or genius, that if the Hebrew poetry at present is possessed of any remains of its native grace and harmony, we shall chiefly find them in the writings of Isaiah.'

In addition to the book of prophecies, Isaiah is also said to have written the lives of Uzziah (2 *Chron.* xxvi. 22) and Hezekiah (2 *Chron.* xxxii. 32). The former work is entirely lost; but we probably possess the greater part, if not the whole, of the latter in chapters xxxvi.—xxxviii. of his prophecies.

We learn from the Fathers that several aprocryphal works [APOCALYPSE], which were in circulation in the early ages of the Christian æra, were attributed to Isaiah. An Ethiopic translation of one of these works, entitled the 'Ascension of Isaiah,' which was originally written in Greek and is quoted by Epiphanius (*Hæres.* xl. 2) and Jerome (*Commentary upon Is.* lxiv. 4), was published for the first time by Dr. Laurence, Oxf. 1819, 8vo. This work contains an account of the prophet's ascension through the firmament and the six heavens into the seventh, and also of his martyrdom during the reign of Manasseh.

(The Introductions of Eichhorn, Jahn, De Wette, Augusti, and Horne; Vitringa, *Commentarius in Librum Proph. Isaiæ*, 2 vols. fol. 1714-1720; Lowth's *Isaiah*, Lond. 1778, frequently reprinted; there is a good German translation of this work with many additions by Koppe, 4 vols. 1779-1781; Döderlein's *Esaias*, 8vo., 3rd ed., 1789, with excellent notes; Rosenmüller's *Scholia;* Gesenius, *Der Prophet Jesaia, übersetzt und mit einem vollständigen philologisch-critischen und historischen Commentar begleitet*, Leip. 1821-9, the best translation and commentary that has yet appeared.)

IS'CHIA, the antient Ænaria, an island situated at the northern entrance of the Bay of Naples, the smaller island of Procida lying between it and the promontory of Misenum on the mainland. Procida (Prochyta), according to an old tradition, was rent from Ischia by an earthquake. The island is mountainous; the highest summit, called Mount Epomeo, which is an extinct volcano, rises about 2500 feet above the sea, and has near its summit distinct traces of two very large craters. The volcanic district of Naples is considered to comprise not only Vesuvius, with Pozzuoli and Cumæ, but also the islands of Procida and Ischia. The last eruption of the Epomeo was in 1301, when a broad stream of lava ran over the eastern part of the island, for nearly two miles, as far as the sea. Strabo calls this island by the name of Pithecusæ, which is not, as Pliny observes, derived from pithécus (an ape), but from a word of similar form, which signifies an earthen vessel. The clay of the island, it seems, has been used for earthenware from the remotest time. The island was settled by Greeks of Chalcis and Eretria. There were numerous traditions of volcanic action having taken place in this island; and Timæus mentions a violent eruption of Epomeo a little before his time. The soil of Ischia is very fertile, and produces corn, abundance of wines, and all sorts of fruit. The hills are covered with chesnut trees. The island is about twenty miles in circuit, and contains 24,000 inhabitants, who have a reputation for good behaviour much above that of their neighbours of the mainland. Robbery and murder are very rare in the island, and the houses are frequently left by the owners with the door merely on the latch without any suspicion or fear. The people are industrious, very frugal, and good tempered. Ischia forms part of the province of Naples; it contains four small towns or villages: 1. Ischia, which is a bishop's see and has a castle; 2. Foria, which is the most commercial place on the island; 3. Casamicciola, the neighbourhood of which contains excellent clay, of which a great quantity of pottery is made and sent to Naples; 4. Lacco: besides several hamlets. The island abounds with mineral springs, which are much frequented by invalids from Naples, and are found efficacious for curing several distempers. Ischia is altogether one of the finest islands near the coast of Italy. (De Quintis, *Inurime, seu de Balneis Pithecusarum, libri vi.*, 8vo., Naples, 1726; G. Poulett Scrope, *On the Volcanic District of Naples*, in *Geolog. Trans.*, second series, vol. ii.; Strabo, *Casuub.*, p. 248; Plin., *Nat. Hist.*, ii. 88, iii. 6.)

ISEGHEM, a market-town in the province of West Flanders. The population of the town is 2100, and that of the parish about 7000 inhabitants. The inhabitants manufacture considerable quantities of linen and tape It is nine miles north by west of Courtray, and twenty miles south of Bruges.

ISER. [BAVARIA.]

ISÈRE, a river in the south-eastern part of France, belonging to the system of the Rhône. It has its source near Mont Iseran (13,262 feet high), in the chain of the Pennine Alps in Savoy. It flows 20 miles north-west to St. Maurice, and then 15 miles south-west to Moutiers or Moutier; from Moutiers it turns again to the north-west and flows 12 miles to Conflans, the most northern point of its course; and again turning south-west, flows 22 miles to Montmeillan, where its navigation commences. In the upper part of its course it receives some small tributaries, the combined streams of the Darou and the St. Jean at Moutiers; the combined streams of the Arli and Doron at Conflans; and between Conflans and Montmeillan, the Arc, an alpine stream 68 miles long, which passes St. Jean de Maurienne. Just below Montmeillan the Isère turns to the south, crosses the French frontier, gradually bends to the southwest and west, passes Grenoble, dividing that town into two parts, and unites with the Drac, its most important tributary. From the junction of the Drac the Isère flows northwest for a short distance, and then turning to the southwest, flows past St. Marcellin and Romans into the Rhône, which it joins between Tournon and Valence. The length of the navigable part of the Isère below Montmeillan is about 90 miles: its whole course is about 160 miles.

The Drac rises in the department of Hautes Alpes, and has a course of 72 or 73 miles. It receives the Sevrayes, the Bonne, the Romanche, and other streams.

The Isère is of moderate breadth, but of great depth. Its waters are of a blackish colour, which is attributed by some to the débris of the slate rocks of the Tarentaise, a district in Savoy, through which it flows. The stream is liable to inundations, which cause the most disastrous effects. It is used for floating timber from Moutiers, 34 miles above Montmeillan. Between the last-mentioned town and Grenoble the navigation is very difficult, on account of the great number of islets in the bed of the river. Iron, hemp, linen and woollen cloth, and wood are carried down the stream. Barges laden with salt and other merchandise ascend it from the Rhône to Grenoble and Montmeillan.

ISÈRE, a department of France, taking its name from the river above mentioned. It is bounded on the north by the department of Ain, from which it is separated by the Rhône; on the west by the departments of Rhône, Haute Loire, and Ardèche, from which also it is separated by the Rhône; on the south-west and south by the department of Drôme; and on the south-east by that of Hautes Alpes: on the east and north-east it is bounded by the duchy of Savoy, part of the dominions of the king of Sardinia. Its form, though irregular, approximates to that of a parallelogram; having its sides facing the north-east, south-east, south-west, and north-west respectively. Its greatest length is from the north-west, on the banks of the Rhône, near Lyon, to the south-east, not far from Briançon, in the department of Hautes Alpes, 92 miles; its greatest breadth at right angles to the length is from near the little town of Allevard, amid the Alps, to the bank of the Isère, below St. Marcellin, 55 miles. Its area is 3205 square miles, which is considerably above the average area of the French departments, and above the area of any English county except Yorkshire; it is about equal to the conjoint areas of Shropshire, Staffordshire, and Worcestershire. The population by the census of 1831 was 550,258; by that of 1836, 573,645; showing an increase in five years of above 23,000 in a population of more than half a million. The census of 1836 gives 179 inhabitants to a square mile, which is above the average density of population in France, but very far below that of the above-mentioned English counties. Grenoble, the capital, is on the banks of the Isère, in 45° 11′ N. lat., and 5° 43′ E. long.

Nearly the whole of this department is covered with mountains. A branch of the Alps, which joins the principal chain between Mont Genèvre and Mont Cenis, and extends to the Rhône, forms the boundary between this department and the Sardinian dominions. In this branch or in its subordinate ramifications are the summits, Mont Trois Ellions, 12,737 feet high; Col de Saix, 10,971 feet; Pic de Belladone, 10,229 feet; La Roche Grenico, 9973 feet; Sept Laux (upper summit), 9743 feet; and the Col du Galibier, 9154 feet. Some of the summits of this mountainous tract are covered with perpetual snow, and enclose glaciers. The mountains are traversed by narrow passes, and the slopes and precipices are covered with dark forests. Mountain streams tumble from rock to rock, or pass rapidly through deep glens. Grottos with stalactites are common in the mountains: that of La Balme was counted among the wonders of Dauphiné. [BALME, LA.] Some of the valleys are of tolerable width and of great beauty, as that of Grésivaudan, watered by the Isère; but there are no plains except in the northern and western parts towards the banks of the Rhône. The whole department is comprehended in the basin of the Rhône.

The chief rivers are the Rhône, which borders the department on the north and west. The Guiers, formed by the junction of two streams, the Guiers Vif and the Guiers Mort, skirts the north-eastern boundary, and joins the Rhône on its left bank at the point where the latter first touches the department. A number of small streams, which successively fall into the Rhône on its left bank, water the more level districts of the north-west. The Isère crosses the department in the direction of its breadth, watering the valley of Grésivaudan: its junction with the Rhône is in the adjacent department of Drôme. The Drac has the greater part of its course in this department.

In the alpine country are many lakes; the principal is that of Paladru, near the head of the Fure, which runs through the lake. There are also several marshes.

The mountains east of the junction of the Isère and the Drac consist of granitic and other primitive rocks. To the north and west of this district, extending to the banks of the Bourbre and the junction of that river with the Rhône, and to the lower part of the valley of the Isère, are found the rocks intervening between the chalk and the new red or saliferous sandstone. Still more to the west, extending to the banks of the Rhône below the junction of the Bourbre, are found the supercretaceous strata.

The high road from Paris by Lyon, Chambéry, and Mont Cenis to Turin, passes through this department, also the road from Paris by Lyon to Aix, Marseilles, Toulon, Nice, and Genoa. The former enters the department just after it leaves Lyon, and passes by Bourgoin and La Tour du Pin to Pont de Beauvoisin, where it crosses the Guiers into Savoy. The road to Aix also enters the department just after leaving Lyon, and runs south by Vienne, along the valley of the Rhône, into the department of Drôme. The road from Paris to Grénoble branches from that to Chambéry and Turin at Bourgoins, and passes by Moirans and Voreppe, and along the valley of Grésivaudan to Grenoble: from this city two roads lead, one by the valley of the Isère into the Turin road at Montmeillan, the other by the valley of the Romanche to Briançon (Hautes Alpes) and by Mont Genèvre to Turin, with a branch by the valley of the Drac to Gap in the department of Hautes Alpes. The aggregate length of the *Routes Royales* is 336 miles, about two-thirds of which are in good repair; the rest is out of repair or unfinished. The aggregate length of the *Routes Départementales* is 284 miles, more than seven-eighths of which are in good repair. The bye-roads and paths have an aggregate length of nearly 1400 miles.

The inland navigation is made up of that of the Rhône, 97 miles; and that of the Isère, 60 miles; together 157 miles.

The climate differs much according to the nature of the surface. In the plains the summer is very hot and the winds violent; in the marshy flats the temperature is lower and the air moister; in the deep valleys there are sometimes rapid changes of temperature, and at other times long periods both of rain and drought. The high mountains have but two seasons, a long winter of nine months, with a brief summer. The air of the department is generally keen, pure, and healthy; but the changes render the crops very uncertain. From the different elevation of the surface the natural productions are of very various character. The valley of Bourg d'Oysans, the most elevated of the larger valleys, produces rye, barley, potatoes, and a considerable quantity of hay: the valley of St. Laurent du Pont, or of the Chartreuse [Chartreuse], is in general covered with pine forests; some spots produce grain and hemp: the valleys of Voiron and Vizille are chiefly productive of hemp: the valley of Grésivaudan, one of the most fertile districts in France, produces grain of all sorts, wine, fruit, &c. The more level districts of the department have generally a dry, sandy, or stony soil; some parts however are marshy. The advancement of agriculture has increased the productiveness of these districts; some of the marshes have been drained, and the drier soils are improved by irrigation. The crops consist of wheat, rye, pulse, hemp, wine, fruit, and hay: and notwithstanding the injury done by a changeable climate, violent winds, and storms of hail, the produce of the department exceeds its consumption. The wines, especially those of the neighbourhood of Vienne, are in good repute. The forests yield beech, elm, and especially pine timber. Many horses are bred; the mules are excellent; the asses small. The cattle are small, but the cows give much milk; and the cheese called Sassenage cheese, from a village or small town of that name near Grenoble, where it is chiefly sold, is excellent. Sheep are numerous, and have a fine soft fleece: immense flocks are driven every spring from the neighbouring departments to the upland pastures of the Alpine valleys. Goats, pigs, and poultry are numerous; and a considerable number of silkworms are reared in those parts which admit of the growth of the mulberry. Of wild animals there is considerable variety: the bear, the lynx, the chamois, the wild goat, and the marten, are found in the mountains: game is tolerably plentiful, and fish abundant.

The mineral wealth of the department is considerable. Gold, silver, lead, copper, iron in abundance, zinc, mercury, antimony, bismuth, cobalt, coal, rock-crystal, granite, marble, alum, sulphur, gypsum, marl, potter's clay, and sandstone are found; but of these, only lead, iron, and coal, with some marble quarries and clay pits, are wrought. The gold and silver mines have been abandoned, not being sufficiently productive to pay more than the cost of working them. There are several mineral springs.

The department is divided into four arrondissements as below: it contains forty-five cantons, or districts under a justice of the peace, and 555 communes:—

Name of Arrondissement and Situation.	Area in sq. miles.	Pop. 1836.	Communes.
Grenoble, S. & E. . .	1599	213,568	214
La Tour du Pin, N. . .	512	129,809	125
St. Marcellin, S.W. .	413	85,267	84
Vienne, W. . . .	681	145,001	132
	3205	573,645	555

In the arrondissement of Grenoble are the capital (population in 1836, 28,969) [Grenoble], Voreppe (population 1505), Sassenage, Goncelin, Theys, Allevard, and Fort Barraux, all on or near the Isère; Corps, Mens, La Mure (pop. 2785), Monetier de Clermont, Vif, Varces, and Claix, in or near the valley of the Drac; Le Bourg d'Oysans (pop. 3052) [Bourg], and Vizille (pop. 2422 town, or 2750 commune), in that of the Romanche; Le Villard de Lans on the Bourne; Les Echelles (pop. about 1500) and St. Laurent du Pont (pop. 3156) on the Guiers; the establishment, formerly monastic, of the Grand Chartreuse [Chartreuse, Grand], in the desert near St. Laurent; Chirens, and Voiron (pop. 6924). At Vizelle are manufactures of printed cottons, yarn, and paper. Sassenage is the great mart for the cheese of the surrounding districts. It is also remarked for a natural curiosity,—two cylindrical excavations in two grottoes, in which the supply of water was once supposed to presage the abundance or failure of the harvest. Voiron is the mart for the linens manufactured in the department.

In the arrondissement of La Tour du Pin are the capital (pop. in 1836, 2484), Bourgoin (pop. 3447 town, 3762 commune), Virieu and Le Grand Temps near the Dourbe; St. Clef or St. Chef (pop. 3397) between that river and the Bourbre; St. Geoire (pop. 4635) and Le Pont de Beauvoisin (pop. 1943 town, 2139 commune) in or near the valley of the Guiers; Moretel, Quirieu, and Crémieu or Crémieux (pop. 2058 town, 2401 commune), in or near the valley of the Rhône. There are mineral springs at Le Pont de Beauvoisin.

In the arrondissement of St. Marcellin are St. Marcellin (pop. in 1836, 2885), St. André, Beauvoir, Vinay, Lalbene, Tulliens or Tullins (pop. 1806 town, 3807 commune), Moirans and St. Quentin, on or near the Isère; St. Antoine on the Furand; Roybon on the Galaure; Viriville and St. Etienne de Geoirs. St. Marcellin is in a pleasant situation amid vine-covered hills; it is well built, and surrounded with walls. The inhabitants trade in raw silk, chesnut and walnut oil, and wine.

In the arrondissement of Vienne, are the capital (pop. in 1836, 16,484) [Vienne], Roussillon, Le Péage, and St. Symphorien, on or near the Rhône; Beaurepaire (pop. 1924 town, 2138 commune) on the Suzon; La Côte St. André (pop. 2800 town, 4568 commune), Chatonnay, St. Jean de Bournay (pop. 1820 town, 3392 commune), St. Georges (pop. 1636 town, 2872 commune), Heyrieux, and La Verpilière. The inhabitants of La Côte St. André carry on a considerable trade in liqueurs and in the light and sparkling white wines grown round the town.

The department contains many smelting-houses for iron, and some for lead; and a flatting-mill for copper. Iron guns for shipping, nails, and steel are manufactured: there are several potteries and a glass-house for making bottles. Sail-cloth, canvass for wrappers, coarse and fine linens, cotton yarn, calico and printed cottons, thrown silk, woollen cloth for the troops and for other uses, hats, leather of different qualities, and gloves (especially at Grenoble), paper and vellum (especially at Vienne), liqueurs, mineral acids, and turpentine are made. These various articles, with wine, brandy, wool, silk, hemp, and deals, constitute the exports.

The department constitutes the diocese of Grenoble; and is in the jurisdiction of the Cour Royal and the Académie Universitaire of that city. There is a Protestant consistory, of which Mens is the seat. The department is included in the seventh military division, of which the head-quarters are at Grenoble. It returns seven members to the Chamber of Deputies.

In respect of education the department is below the average of France. The proportion of young men enrolled in the military census of 1828-9 who could read and write was 29 in every 100.

This department formed in antient times part of the territories of the Allobroges, a nation of the Celtic stock; the southern parts were probably comprehended in the territories of two other people of Celtic race, the Segalauni and the Vocontii. In the Roman division of Gaul it was included in the province of Viennensis, a subdivision of the more antient and extensive province of Narbonensis. It contained the Roman cities of Vienna (Vienne) and Cularo, afterwards Gratianopolis (Grenoble). From the Romans it passed successively to the Burgundians and the Franks; and in the middle ages was included in Dauphiné. [Burgundians; Dauphiné'; France]

ISIDORE, SAINT, of Pelusium in Egypt, lived in the beginning of the fifth century, and wrote, according to Suidas (*Isidorus*), '3000 epistles, explaining the divine Scriptures.' Upwards of 2000 are still extant; they are for the most part very short, and contain many repetitions. They have been published in Greek and Latin by Scholt, Paris, 1638. Dr. Heumann has published a 'Dissertation on Isidore' (Hanover, 1738, 4to.), in which he argues that most of the letters are fictitious, and not a real correspondence.

ISIDORE, SAINT, bishop of Seville, in Spain, from A.D 595 or 596 to A.D. 636, one of the most celebrated of the Spanish bishops, was born at Carthagena. He was well acquainted with Greek and Hebrew, and was considered by the Council of Toledo (A.D. 650) as the most learned man of his age. The style of his works is however not very clear, and his judgment appears to have been very defective.

The most important of his works are: 'A Chronicle from the Beginning of the World to A.D. 626;' 'A Book of Ecclesiastical Writers,' in 33 chapters; 'Three Books of Opinions, selected from the writings of the fathers, and especially from St. Gregory;' 'Commentaries upon the historical books of the Old Testament;' 'Allegories on the Old and New Testaments;' 'Two Books of Ecclesiastical Duties,' printed in the 'De divinis Catholicæ Ecclesiæ Officiis ac Ministeriis,' Cologne, 1568; 'A Book of Prolegomena to the Old and New Testaments;' 'Twenty Books of Origines or Etymologies,' which were left unfinished and were published after his death by Braulio, bishop of Saragoza; the first edition of this work was published at Augsburg, 1472.

The works of Isidore have been published by Du Breul, Paris, 1601, and Cologne, 1617; at Madrid, 1778; and by Arevali, Rome, 1797, 1803.

ISIDORE of Charax *, lived probably in the first century of our æra. It appears from Athenæus (*Deip.* iii.) that he wrote an account of the Parthian empire, of which there is only a small part extant, entitled *Σταθμοὶ Παρθικοί*, or the 'Parthian Halting-places.' This work gives a list of the eighteen provinces into which the Parthian empire was divided, with the principal places in each province, and the distances between each town. This list was probably taken from official records, such as appear, from the list of provinces, &c. in Herodotus, to have been kept in the antient Persian empire.

This work has been printed in the second volume of Hudson's 'Geographiæ veteris Scriptores Græci Minores,' with a Dissertation by Dodwell. There is also a Mémoire on Isidore by Sainte-Croix in the 50th volume of the 'Académie des Belles-lettres;' and some remarks on the 'Parthian Halting-places' in the 'Journal of Education,' vol. ii., p. 305, where the question of the site of Ecbatana is discussed and determined.

ISINGLASS is animal jelly, or gelatin, nearly pure. The best isinglass is prepared in Russia from the membranes of the sturgeon, especially from its air-bladder and sounds, which are remarkably large. These, when removed from the fish, are washed with cold water, and exposed a little to the air, in order that they may stiffen; the outer skin is then taken off and rejected, and the remainder cut out, and loosely twisted into rolls, according to the intended size of the pieces, which are called *staples*, and are known in commerce by the names of long and short staple, and of these the first is the best: these are dried in the air. The best sort of isinglass is used for the table and in confectionary; it is also largely employed in refining wine and beer.

Isinglass is nearly colourless, has but little taste or smell, is translucent in thin pieces, and is soluble in water; one part of it dissolved in 100 parts of hot water give a solution which completely stiffens in cooling.

Isinglass is also dissolved by most acids readily, and also in solution of potash and soda, but not in alcohol. Several metallic salts and oxides have the property of precipitating a solution of isinglass, but corrosive sublimate does not produce this effect, which serves to distinguish it from albumen; but it resembles this substance in being precipitated by infusion of galls or of oak-bark. Isinglass is extremely nutritious.

According to Gay-Lussac and Thenard it consists nearly of—

Seven equivalents of	hydrogen	. 7
Seven „	carbon	. 42
Three „	oxygen	. 24
One equivalent of	azote	. 14
	Equivalent	. 87

ISIS, one of the chief deities of the Egyptians, the sister of Osiris, was represented as the Goddess of Fecundity, and the cow was therefore sacred to her. She was said to have first taught men the art of cultivating corn. The annual festival of Isis in Egypt lasted eight days, during which a general purification took place. The priests of Isis were bound to observe perpetual chastity, their heads were shaved, and they went barefooted. The goddess was often represented as a woman with the horns of a cow. She also appears with the lotus on her head and the sistrum in her hand; and her head in some instances is seen covered with a hood. Heads of Isis are a frequent ornament of Egyptian capitals on the pillars of the temples. [DENDERAH; EGYPTIAN ARCHITECTURE.]

As the worship of Isis passed into foreign lands, it assumed a foreign character, and many foreign attributes, as we see from the Greek and Roman writers. Sometimes she is represented like Diana of Ephesus, the universal mother, with a number of breasts. The mysterious rites of Isis were probably in their origin symbolical: on one of her statues was the inscription, 'I am all that has been, that shall be; no mortal has hitherto taken off my veil.' But the Isiac rites, transplanted to Italy, became a cloak for licentiousness; and they were repeatedly forbidden at Rome. Tiberius had the images of Isis thrown into the Tiber, but the worship revived, and Juvenal speaks of it in an indignant strain. The Isiac table in the Turin Museum, which is supposed to represent the mysteries of Isis, has been judged by Champollion to be the work of an uninitiated artist, little acquainted with the true worship of the goddess, and probably of the age of Hadrian. (Plutarch's *Treatise on Isis and Osiris*, Wyttenbach's ed., ii. 441; Herod., ii. 41, 42, 123, &c.; Pausan., ii. 13, 7, and particularly x. 32, 13.)

ISLA, or ISLAY, the most southern of the Hebrides, belongs to the shire of Argyle, and is 28 miles long and about 18 in breadth. This island, which was once the kingdom of the Norwegian Lords of the Isles, retains but few vestiges of the manners of its early inhabitants. Though generally of a mountainous character, especially towards the north, there is much low and cultivated land. Many of the farmers are comparatively opulent, and practise the lowland system of agriculture. The houses are good, and the roads are kept in good repair. There are several lakes, and the island is well watered by numerous streams and rivulets, which abound with trout and salmon. Isla appears also to be rich in minerals. A copper-mine has been worked here for many years, but the ore is much mixed with lead, which renders the separation expensive and troublesome. The district of Islay comprises six parishes, besides the island of Callonsay, the united population of which in 1831 was 19,780.

(M'Culloch's *Highlands and Western Isles of Scotland; Population Returns*, &c.)

ISLAM. [MOHAMMED.]

ISLE of BOURBON. [BOURBON.]

ISMAELITES, or ISMAELIANS, were originally a branch of the Shiites, or followers of ALI BEN ALI TALEB. Djafar Madeck, the sixth Imaum in a direct line from Ali having lost his elder son Ismael, appointed his younger son Mousa to be his successor. This caused a schism among the Shiites in the second century of the Hegira. Those who contended that the office of Imaum ought to have descended to the posterity of Ismael, and not to his younger brother, were called Ismaelites, and also Karmathi and Batenis; in Persia they were called Talimis, from the word Talimi, which means 'learning,' because they maintained, contrary to the orthodox Mussulmans, that man can learn the truth only by studying. They established two powerful dynasties, one in Egypt [FATIMIDES], and another in the Irak Ajemi, a part of Persia, the capital of which was Casbin. The Assassins of Persia and Syria were a fanatical sect of Ismaelites. [ASSASSINS.] The Ismaelites of Persia, Syria, and Arabia had frequent wars against the Abbaside caliphs and the other Sunnee Mussulmans, until the dynasty of Casbin was overthrown by the Tartars about the middle of the thirteenth century. After that time the Ismaelites became scattered through Asia, maintaining their tenets and observing their rites in concealment and obscurity. Their tenets appear to have been of a loose kind; they were the freethinkers of Mohammedanism. At the end of the last century they were still existing in Persia, and had their Imaum at Khakh, a village in the district of Khom, enjoying the protection of the Shah, although considered as heretics by the Persian Shiites. They had followers even in India. (J. F. Rousseau, *Mémoire sur les Ismaelis et les Nosaïris*, with notes by De Sacy.) Those of Syria have continued to live in the mountains of

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* There were several towns of this name; one in Media, another in Parthia, and a third at the mouth of the Tigris. It is doubtful at which of them Isidore was born.

Semmak, which join Lebanon, and their chief place was Masyad, near Hamah on the Orontes. The Druses are supposed by some to be a ramification of the old Ismaelites, but they are a distinct people, both in their religious and social character, from the present Ismaelians. [DRUSES.] In 1809 the Nosaïris, another sect living in the same mountainous tract, took Maszyad by surprise, murdered the Emir, with most of the Ismaelian inhabitants, and carried off a large booty. The Ismaelians of Syria have never recovered from that blow, but have remained poor in importance and numbers, and are under the nominal dominion of the Turks. Their tenets are not well known, but they seem to have deviated from the original doctrines of the great Ismaelite sect, and to have mixed them up with gross superstitions. They can hardly be called Mussulmans; they have no mosques, but are circumcised, and they still visit the tomb of Ali at Meshed. They are said to be simple and hospitable, and have a better reputation than their neighbours the Nosaïris.

ISMAIL. [BESSARABIA.]

ISMID, or ISNIKMID. [ANATOLIA; BITHYNIA.]

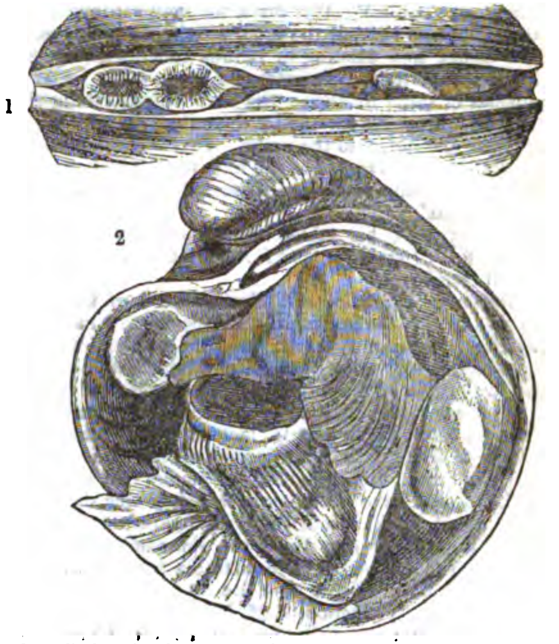
ISOCA'RDIA, a genus of conchifers. Linnæus placed the form under *Chama;* Bruguière arranged it among the *Carditæ;* Lamarck, who made it the last of the genera of his *Cardiacées*, separated it from the last-mentioned genus, giving it the generic name at the head of this article. Mr. G. B. Sowerby (*Genera of Recent and Fossil Shells*) thinks that this separation was effected with good reason, because the involute divaricate *umbones* of *Isocardia*, and its consequently dichotomous ligament running in each valve to the point of the *umbo*, serve to distinguish it from the other *Carditæ* of Bruguière. M. de Blainville, under the name of *Isocardium*, inserts it between *Tridacna* and *Trigonia* among his *Camacés*. M. Rang retains it in the same family, but restores Lamarck's original termination of the name, and places it between *Caprina* and *Tridacna*.

M. Deshayes, in his edition of Lamarck, remarks that the *Isocardiæ* have, in truth, large and contorted *umbones* like *Chama* and *Diceras*, but that they are regular and always free, while the true *Chamæ* are adherent and irregular. From the *Carditæ*, he observes, they are to be distinguished, both as respects the shell and the animal. In *Cardita* the lobes of the mantle are separated throughout their length, and are without siphons. In *Isocardia* the lobes of the mantle are united posteriorly, and provided with two short siphons, or rather perforations, which may be compared with those of the *Cardia*. Here doubtless, says M. Deshayes, the *Isocardiæ* approach the *Cardiæ;* but when the foot and the form of the branchiæ in these two genera are compared, the distinction is obvious. In the *Cardia* [CONCHACEA, vol. vii., p. 426-7], the foot is cylindraceous, very long, and bent in an elbow-like form in the middle; in the *Isocardiæ*, on the contrary, it is flat, subquadrangular, and rather short.

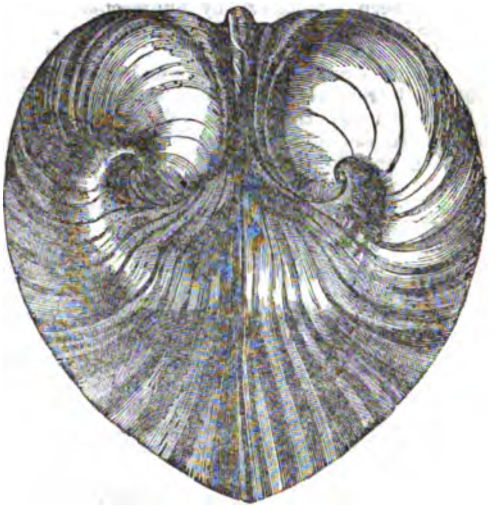
Generic Character.—*Animal* more or less globular, having the borders of the *mantle* fringed with very fine tentacular papillæ, leaving a rather large opening between them at the lower part, and united posteriorly by a transverse delicate band, pierced with two orifices surrounded by papillæ, one for the vent, and the other, lower, for respiration: *foot* of moderate size and trenchant.

Shell sometimes with an epidermis, very convex, globulose, heart-shaped, equivalve, inequilateral; *umbones* divaricated, and widely divergent, curved forwards and outwards, and slightly spiral; *hinge* composed of two flattened hinge-teeth; *ligament* external, forked at one of its extremities; *muscular* impressions very distant.

The Rev. James Bulwer, from whose figure in the *Zoological Journal*, vol. ii., the two upper figures are taken, saw the animal when in sea-water, and in the position represented at No. 1. The feelers, or ciliated fringe of the upper orifice (the largest) of the mantle, moved slowly, as if in search of food. Having remained in this situation about ten minutes, water was ejected with considerable force from the lower orifice, which had till then remained motionless. The expulsion of the water appeared to be effected by a sudden contraction of the muscles, because this was never done without the valves nearly closing at the same instant. After a few seconds, the valves gradually returned to their open position, and remained quiescent as before, till the water was again ejected with a jerk; this alternating process was repeated during the whole time his specimens (which were trawled up in very deep water on the east coast of Ireland) were under his examination, but at shorter intervals on receiving fresh supplies of sea-water. The animal appeared to Mr. Bulwer to be insensible both to sound and light, as the presence or absence of either did not at all interrupt its movements; but its sense of feeling appeared to be very delicate. Minute substances dropped into the orifice of the mantle instantly excited the animal, and a column of water strongly directed expelled them from the shell; with so much strength was the water in some instances ejected, that it rose above the surface of three inches of superincumbent fluid. (*Zool. Journ.*, vol. ii., p. 359.)



Isocardia Cor. 1, valves open, to show the animal and the feelers or ciliated fringe of the upper and lower orifices; 2, one of the valves, showing the animal with its sharp-edged foot and the muscular impressions.



Shell of Isocardia Cor, valves closed.

Lamarck recorded four species, including *Isocardia semisulcata*, which we shall presently have to notice: M. Deshayes, in his edition of that author, adds four others, reckoning that species; making eight in all, recent and fossil.

Geographical Distribution of the Genus.—The European and East Indian Seas, and those of New Holland.

Isocardiæ have been dredged up from mud and sand at depths ranging from 10 to 20 fathoms.

FOSSIL ISOCARDIÆ.

Mr. G. B. Sowerby remarks (*Genera of Recent and Fossil Shells*) that several fossil species are given in plate 295 of Sowerby's 'Mineral Conchology,' one of which is from the London clay, and the other from Kelloway's. Mr. G. B. Sowerby, in a note, states that a fossil species also occurs in the *crag*, which so nearly resembles the *I. Cor* that he knows not wherein the specific difference consists; and, in the text, goes on to state that according to Brocchi (*Conch. Foss. Subap.*, ii. 520), two varieties of *I. Cor* are found in a fossil state in several parts of Italy; but as a subject upon which much diversity of opinion exists is here brought into question, he would recommend an attentive and comparative re-examination of the fossil with recent specimens, before the inquirer comes to an absolute decision upon this point. Another fossil species, he observes, is found at Piacenza, viz. *I. arietina*, Lam.; and he has figured *I. Basochiana* (Defr., *Dict. des Sciences Naturelles*), a new species found by M. de Basoches de Falaise, in the district of Coutances. He thus concludes his remarks upon the fossil species of this genus: 'We think we may venture to express our opinion that all the fossil specimens published in various books, and existing in various collections, are not distinctly characterized *Isocardiæ*, but only the casts of the insides of other bivalves: the best distinguishing character is in the groove formed for the extension of the ligament from the hinge to the umbo. It is incumbent on us to mention that in *Isocardia* the line to which the mantle is attached, passing from one muscular impression to the other, is entire.'

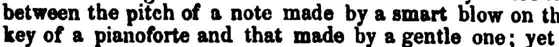
M. Deshayes, in his tables, records two living species and three fossil (tertiary); and *Isocardia Cor* as both living and fossil (tertiary).

Of *Isocardia semisulcata* M. Deshayes (ed. of Lamarck) states that it is to be presumed that the species had been added after the calamity which had befallen the professor: this distressing privation compelled Lamarck to have recourse to the eyes of others; and M. Deshayes is of opinion that this species owes its presence among the *Isocardiæ* to its external form, which has in fact an approximation to the shells of that genus. But, continues the same author, if the hinge and other essential characters had been examined, it would have been perceived that this shell had nothing about it which constitutes the character of an *Isocardia*. He thinks that the form approaches *Mya* and *Anatina*, and that it ought to constitute a particular genus. M. Deshayes then relates that he had some time ago remarked in the collection of M. Michelin a small fossil shell from the environs of Senlis, which afforded such characters as induced M. Deshayes to comprehend it in the group of *Anatinæ* as a genus. He states that this genus had already been established by Shumacher under the name of *Periploma;* but he thinks it right to adopt the name of De Haan, so well known for his treatise on Ammonites and other important works, who had shown to him a recent shell from New Holland presenting exactly the same characters with those of M. Michelin's fossil. M. Deshayes then saw that the two species could not make part of the genus *Periploma*, and that they ought to constitute a new genus. The shell which M. De Haan communicated to him was, he says, the same as that named *Isocardia semisulcata* by Lamarck. M. Deshayes describes it under the name of *Cardilia;* and he records two species—one living, *Cardilia semisulcata*, Deshayes (*Isocardia semisulcata*, Lam.), the other *Cardilia Michelini*, Deshayes, for which he gives as a synonym *Hemicylconosta Michelini*, Deshayes.

Mr. Lea places his genus *Hippagus* (of which he gives an engraving) under the family *Cardiacea*. (*Contributions to Geology*, 8vo., Philadelphia, 1833.) He states that he has in vain endeavoured to place this shell in one of the established genera. In its general character he says that it approaches most closely to the *Isocardia Cor*, but that it cannot be placed in that genus, being destitute of teeth. It bears, he adds, some resemblance to the genus *Inoceramus;* but, he continues, the hinge in that genus 'closes by a series of oblong fossets,' and besides it is very inequivalve. In its natural order he thinks that it seems to follow the genus *Isocardia*, and he proposes to place it in that position. *Hippagus* occurs in the Claiborne beds (tertiary of Alabama—Eocene of Lyell).

ISOCHRONOUS, ISOCHRONISM (ἴσος, equal, χρόνος, time). Vibrations or oscillations which are performed in equal times are called isochronous; and isochronism is the name given to a remarkable property of all systems which are in equilibrium, namely, that when slight disturbance, be the same more or less, is given, the oscillations which take place are all performed in the same time, or so nearly in the same time, that any acceleration or retardation is totally imperceptible. Thus, when a pendulum is allowed to vibrate till it rests, it will be found that there is no perceptible difference between the vibrations of longer and shorter extent; of which any reader may satisfy himself by attaching a weight to a string, and observing the vibrations. But a still better proof may be found in a musical string. the finest ear cannot detect any difference between the pitch of a note made by a smart blow on the key of a pianoforte and that made by a gentle one; yet a very small difference in the number of oscillations per second would be perceptible, and the amount of disturbance from the position of equilibrium is twenty or thirty times greater in the first case than in the second.

When, under two different circumstances, the longer space is described in the same time as the shorter, it must be that the force acting in the first case is greater than that in the second; and it is sufficiently known from experience, that the more a system at rest is disturbed, the greater is the effort which it makes to return. But in order that there may be isochronism, it is not sufficient that the effect to return should increase with the amount of disturbance, but the increase must take place according to one particular law. This law is as follows:—the force of restitution must be always proportional to the disturbance, so that whatever force begins to act when the disturbance is *a*, twice as much acts when the disturbance is twice *a*; and so on for all proportions. That this law does prevail when the disturbance is not great, either absolutely, or so nearly that its error is extremely small, may be proved both by theory and experiment. The most complete proof is to be found in the 'Mécanique Analytique' of Lagrange. Granting the law, we can make it sufficiently apparent that the consequence must follow, namely, that all vibrations are performed in equal times. Let A and B be two material points which are urged towards the point O by pressures which are proportional to OA and OB; and further let each pressure diminish as either point approaches towards O, so as always to preserve between the pressures at any two points the proportions of the distances of those points from O. Take a minute portion of time, so small that the pressure may not vary sensibly during its continuance: then [Acceleration; Fall of Bodies] the velocities created and the spaces described in that time will be proportional to the pressures producing them. If then, during that time, A move to K and B to Q, AK and BQ (and therefore OK and OQ) will be in the proportion of OA to OB, and the points will be at K and Q, with pressures and velocities proportional to OK and OQ. In a second such instant let the points move to L and R: then KL and QR, partly due to velocities which are as OK to OQ, and partly to accelerations which are in the same proportion, will still be in the proportion of OK to OQ, or of OA to OB. Consequently the whole AL is to the whole BR in that proportion: and reasoning in this way for successive small accelerations, we show that the whole space moved over by A in any time is to that moved over by B in the same time in the proportion of OA to OB. Consequently A describes AO in the same time in which B describes BO; or the half of a vibration of A is made in the same time as half a vibration of B.



To make this process perfectly strict, recourse must be had to the considerations in Integral Calculus.

ISO'CRATES, one of the Greek orators commonly called the Ten, was born at Athens, 436 B.C. He studied rhetoric under Prodicus, Gorgias, Tisias, and Theramenes, and became a master of his art. A certain timidity and feebleness in his delivery prevented him from speaking in public (*Panathenicus*, c. 4), and he was therefore debarred from occupying the high stations which were open to the ambition of his contemporaries. He taught rhetoric both at Chios and at Athens, and his school was attended by numerous disciples, among whom were Xenophon, Ephorus, Theopompus, and other distinguished men of his time. Although no orator himself, he formed many orators; and Isæus, Demosthenes, and others, are said to have studied under him. He is said to have charged one thousand drachmæ for a complete course of oratorical instruction, and to have said to some one who observed on the largeness of the amount, that he would willingly give ten thousand drachmæ to any one who should impart to him the self-confidence and the command of voice requisite in a public orator. The orations of Isocrates were either sent to the persons to whom they were addressed for their private perusal, or they were entrusted to others to deliver in public. He is said to have delivered only one himself. Isocrates treated of great moral and political questions: his views are distinguished by a regard for virtue, and an aversion to all meanness and injustice. His politics were conciliatory; he was a friend of peace; he repeatedly exhorted the Greeks to concord among themselves, and to turn their arms against their common enemy Persia. In his 'Panegyrical Oration' (published about B.C. 379), which he wrote in the time of the Lacedæmonian ascendency, he exhorted the Lacedæmonians and Athenians to vie with each other in a noble emulation, and to unite their forces in an expedition against Asia; and he descanted eloquently on the merits and glories of the Athenian Commonwealth, on the services it had rendered to Greece, and on its high intellectual cultivation; while he defended it from the charges, urged by its enemies, of tyranny by sea, and of oppression towards its colonies. He addressed Philip of Macedon in a similar strain after his peace with Athens (B.C. 346), exhorting him to reconcile the states of Greece, and to unite their forces against Persia. He kept up a correspondence with Philip, and two of his epistles to that prince are still extant, as well as one which he wrote to the then youthful Alexander, congratulating him on his proficiency in his studies. But although Isocrates was of a mild and conciliatory disposition, he displayed considerable courage on several occasions, as when he showed his sympathy for Theramenes, who had been condemned by the thirty tyrants; and lastly, he proved that though no violent partisan, he was a warm-hearted patriot, when, at the news of the battle of Chæronea, he refused to take food for several days, and thus closed his long and honourable career at ninety-eight years of age, B.C. 338.

There are extant eight orations of Isocrates of the class called judicial, or forensic (*λόγοι δικανικοί*), which are valuable for the subject matter. In his oration in favor of the Platæans he took the part of that people, who were expelled from their homes by the Thebans. The oration against Euthynous, which appears to be incomplete, and may possibly never have been spoken, is a most ingenious attempt to determine a dispute as to the restoration of a deposit of money where there was an absence of all direct testimony as to the main fact. The orator puts the probabilities on each side in two opposite scales, and weighs them with consummate skill. Three of the orations of Isocrates—to Demonicus, to Nicocles, and the oration entitled Nicocles, belong to the Parænetic or hortatory class, and the first two partake in some degree of the epistolary style. Isocrates' 'Panathenaicus' is a panegyric of Athens, which he wrote when he was 94 years of age. (*Panath.* c. 1.)

The style of Isocrates is singularly perspicuous, but highly laboured, and somewhat diffuse. In Cicero's opinion it was he who first gave to prose writing its due rhythm. The art of Isocrates is always apparent, a circumstance which of itself diminishes in some degree the effect of his writings, and is almost inconsistent with vigor and force. The oration to Demonicus is an almost uninterrupted series of antitheses. Isocrates, though he falls far below the great orator of Athens, is still a perfect master in the style which he has adopted, and has well merited the high encomium of Dionysius for the noble spirit and the rectitude of purpose which pervade his writings. This judicious critic has thus briefly summed up his comparison between Lysias and Isocrates. 'As to the charm of composition, Lysias is superior to Isocrates in the same kind that a naturally handsome person is to one made so by art: the composition of Lysias pleases naturally; that of Isocrates aims at pleasing.' Plutarch says that sixty orations went under the name of Isocrates, of which only twenty-five or twenty-eight at most were his; twenty-one of these have come down to us, together with a few epistles, probably not genuine. 'Isocratis Opera,' Greek and Latin, were edited by the Abbé Auger, 3 vols. 4to., Paris, 1782, with several biographies of Isocrates: this edition is of small value. The best edition of the Greek text is by Bekker; the edition of Koray, Paris, 1807, 2 vols. 8vo., is useful. Isocrates was translated into English by Richard Sadleir, London, folio (no date); by Dinsdale, London, 1752, 8vo.; and by Gillies, together with the Orations of Lysias, London, 1778, 4to. (Dionysius of Halicarnassus; *Life of Isocrates*, attributed to Plutarch; Cicero, *De Claris Oratoribus*, c. 8; Quintilian, *Instit.* iii. x. &c.; Photius, *C.* 260.)

I'SODON. [Capromys; Muridæ.]

SOMERISM, a term suggested by Berzelius (from *ἴσος*, *equal*, and *μέρος*, *part*) to designate certain compounds which contain the same elements in the same ratio, and yet possess physical and chemical properties quite distinct. Berzelius has indeed employed three terms to include the different cases of bodies having the same composition and different properties; they are classed as *isomeric*, *polymeric*, and *metameric* substances.

Isomeric bodies are those which contain the same absolute and relative number of atoms of the same elements, and have consequently the same atomic weight. In this class are included the two states of peroxide of tin, of phosphuretted hydrogen, &c. &c. Professor Graham has however shown that the difference in the two oxides of tin is owing to one of them being a hydrate: and that the difference between the two phosphuretted hydrogens is derived from the presence of a very minute portion of an adventitious compound, which renders one of them spontaneously inflammable. The cyanic and fulminic acids are also classed as isomeric bodies, and it is admitted that cyanic acid is an oxide of cyanogen, but it is remarked by Professor Graham that we have no proof of the existence of cyanogen in fulminic acid, for though its elements are present in such proportions as to form it, they may be differently combined.

Should any real isomeric bodies be found, it is evident either that they must contain more than two elements, or two equivalents of one, if there be only two; thus supposing the two oxides of tin to have been really isomeric, they might be regarded as having their elements arranged so as to form a binoxide, SnO^2, or as a protoxide combined with oxygen, $SnO+O$; it is however exceedingly doubtful whether any such compounds exist.

Polymeric substances are those which contain the same relative but not the same absolute number of atoms of the same elements, and whose atomic weights are consequently unlike. Several carburets of hydrogen [Hydrogen, *Carburetted*] offer examples of polymerism. Hatchetine, olefiant gas, and etherin are respectively solid, gaseous, and fluid, and they differ as much in their chemical relations as in their obvious properties; yet they all consist of six parts by weight of carbon, and one part by weight of hydrogen, which are the equivalent weights of these elements, or represent one atom of each.

It has been already mentioned that of two isomeric bodies which contain only two elements, one at least must be in double proportion, for no cause would otherwise appear to exist for their different forms and properties. If however, in the case of the hydrocarbons above cited, and such as are analogous, we suppose hatchetine to consist of one equivalent of each of its elements, olefiant gas of two, and etherin of four, their similarity of proportions is maintained though their quantities differ, and their elements may be so differently arranged as to cause the difference of properties which they are actually found to possess. Thus the one equivalent of hydrogen and carbon in hatchetine may be arranged $H+C$; the double quantities in olefiant gas $HHC+C$; quadruple proportions in etherine $HHHC+HCCC$. The first is a binary compound of elements; the second is constituted of a compound and an element; and the third of two compounds. Unless there were reasons for supposing etherin to consist of four equivalents of each of its elements, it might be imagined to result from a different arrangement of double elements, as $HCC+H$. With respect to olefiant gas, it actually happens that its combining weight is exactly double that of a simple carburet of hydrogen; for 36, or 1 equivalent of chlorine, unite with $14=H^2C^2$, presumed to represent one equivalent of olefiant gas. [Hydrogen, *Chloride of Hydrocarbon.*]

Metameric substances are those which, while they contain the same absolute and the same relative number of atoms of the same elements, yet constitute substances belonging to an entirely *different class* of bodies, or a *different order* of chemical compounds. For a list of metameric bodies, and further information on the subject, we refer to Professor Johnstone's statement (*Reports of the British Association*, vol. i.), from which we quote the following illustrative case:—cyanuric acid when heated, and without giving off or absorbing any thing, is wholly converted into hydrous cyanic acid; that is, it is changed from a compound atom of the first order, or from an oxide of a ternary radical, $\frac{1}{3}(Cy+2O+H)$, into a compound atom of the second order; into an acid chemically combined with water $(\dot{C}y+\dot{H})$. These two substances Berzelius calls metameric modifications of each other.

ISOMETRICAL PERSPECTIVE. [Perspective.]

ISOMORPHISM (from ἴσος, *equal*, and μορφὴ, *form*). In the year 1819 it was found by Mitscherlich that certain substances which have the property of assuming the same crystalline form may be substituted for each other in combination without altering the form of the crystal. Thus crystals which have the aspect and form of alum, a salt which is well known to contain sulphate of potash and sulphate of alumina, may be made with sulphate of potash and persulphate of iron, hence it is concluded that alumina and peroxide of iron are isomorphous; and it is also found that the primary form of alumine or corundum is a rhomboid, which differs only a few degrees from that which is the primary form of peroxide of iron or specular iron ore.

The law of isomorphism, as announced by Mitscherlich in its utmost generality, is as follows: 'The same number of atoms combined in the same way produce the same crystalline form, and the same crystalline form is independent of the chemical nature of the atoms, and is determined only by their number and relative position.' This view has however been since abandoned by its author, and, as stated by Dr. Turner, his opinion now appears to be 'that certain elements which are themselves isomorphous, when combined in the same manner with the same substance communicate the same form;' and he proceeds to state, in illustration of this doctrine, that similarly constituted salts of arsenic acid and phosphoric acid yield crystals of the same figure, because the acids, it is thought, are themselves isomorphous; and as the atomic constitution of these acids is similar, each containing the same number of atoms of the other ingredient, it is inferred that phosphorus is isomorphous with arsenic.'

Several distinct groups of isomorphous bodies have been described by Mitscherlich; from these we shall select the salts of phosphoric and arsenic acids as examples: the neutral phosphate and the biphosphate of soda have exactly the same form as the arseniate and binarseniate of soda; phosphate and biphosphate of ammonia correspond with arseniate and binarseniate of ammonia; and the biphosphate and binarseniate of potash have the same form; each phosphate has a corresponding arseniate, possessing the same form, the same number of equivalents of acid, alkali, and water of crystallization, and differing only in the fact that one series contains phosphorus and the other an equivalent quantity of arsenic.

A list of isomorphous mineral groups is given by Professor Miller, of Cambridge, in the first volume, p. 118, of the 'Reports of the British Association;' and Professor Johnstone has published a list of isomorphous bodies arranged in their several groups, in p. 225 of the same volume, from which the annexed has been abbreviated by Dr. Turner.

1.	
Silver	Ag.
Gold	Au.
2.	
Arsenious Acid (in its unusual form)	As^2O^3.
Sesquioxide of Antimony	Sb^2O^3.
3.	
Alumina	Al^2O^3.
Peroxide of Iron	Fe^2O^3.
4.	
Salts of Phosphoric Acid	P^2O^5.
„ Arsenic Acid	As^2O^5.
5.	
Salts of Sulphuric Acid	SO^3.
„ Selenic Acid	SeO^3.
„ Chromic Acid	CrO^3.
„ Manganesic Acid	MnO^3.
6.	
Salts of Oxichloric Acid	Cl^2O^7.
„ Oximanganic Acid	Mn^2O^7.
7.	
Salts of Potash	KO.
„ Ammonia with 1 eq. of water	H^4NO.
8.	
Salts of Soda	NaO.
„ Oxide of Silver	AgO.
9	
Salts of Baryta	BaO.
„ Strontia	SrO.
„ Lime (in Arragonite)	CaO.
Protoxide of Lead	PbO.
10.	
Salts of Lime	CaO.
„ Magnesia	MgO.
„ Protoxide of Iron	FeO.
„ „ Manganese	MnO.
„ „ Nickel	NiO.
„ „ Zinc	ZnO.
„ „ Cobalt	CoO.
„ „ Copper	CuO
„ „ Lead (in plumbo-calcite)	PbO
11.	
Salts of Alumina	Al^2O^3.
„ Peroxide of Iron	Fe^2O^3.
„ Oxide of Chromium	Cr^2O^3.
„ Sesquioxide of Manganese	Mn^2O^3.

The doctrine of isomorphism has been very generally received, yet the difficulties which attend it, and the liberties which some of its advocates have taken with what were previously regarded as the facts of chemical science, in order to support their theory, have prevented its universal adoption. Alluding to the supposed isomorphism of the arsenic and phosphoric acids, Mr. Brooke remarks, 'From other observations it appeared that barytes, strontian, and oxide of lead ought to be isomorphous; and hence that the salts of those substances, when produced by the same acid, ought also to be isomorphous.

But on examining the sulphates and acetates, it was discovered that their respective angular measurements were not alike, and they were ascertained therefore not to be strictly isomorphous. The sulphates are right rhombic prisms, and a corresponding dihedral angle of each afforded the following measurements:—

Sulphate of barytes	101° 42′
„ strontian	104°
„ lead	103° 42′

It became necessary therefore that the doctrine of isomorphism, in the strict sense of the term, should as a general principle be abandoned; and it is not unreasonable to conclude that the crystals which suggested the theory, and which appear to measure alike, may really differ in some small quantity which the goniometer does not detect.

But although the doctrine of isomorphism, or absolute *identity* of form, cannot be supported, it has been said that the forms in each respective case belong to the same *system of crystallization*, and they have therefore been termed *pesiomorphous* by Mr. (now Professor) Miller, of Cambridge, in a paper on some artificial crystals read to the Cambridge Philosophical Society, in March, 1830; and if ever the class of primary form can be indicated with certainty by the chemical composition of a crystallized body, a benefit will so far have been conferred on science by the the theory of M. Mitscherlich.' (*Phil. Mag. and Annals*, xi., 162.)

As connected with the subject of isomorphism, it will be proper to notice two other classes of bodies, which have been termed *dimorphous* and *isodimorphous* substances.

The case of dimorphism first ascertained was presented by carbonate of lime in the two incompatible crystalline forms of common calcareous spar and of arragonite. It was attempted to account for the difference by the fact that arragonite frequently contains a small portion of carbonate of strontia and of water; but it has since been found that these varying forms of carbonate of lime may be obtained artificially, and both in a pure state; thus when an alkaline carbonate is added to a cold solution of chloride of calcium, the carbonate of lime precipitated is analogous to calcareous spar; while that thrown down from a hot solution of the chloride is similar to arragonite.

It was also soon afterwards discovered that sulphur crystallized from fusion differs essentially in its form from the natural crystals and those deposited from bisulphuret of carbon. So also the diamond and graphite, which are both pure carbon, crystallize in forms which are incompatible with each other. A table of the dimorphous bodies at present known has been given by Professor Johnstone, in the *Seventh Report of the British Association*.

The term isodimorphous is proposed by Professor Johnstone to express the fact that two substances known to be dimorphous, the carbonates of lime and lead, crystallize each in two forms, the analogous pairs of which are also isomorphous.

In the paper above alluded to, Professor Johnstone has also given a table of isodimorphous groups.

ISOPERIMETRICAL. [Variation, Calculus of.]

ISO'PODA, Latreille's name for the fifth order of crustaceans. These Isopods, according to that zoologist, approach the *Læmodipoda* by the absence of mandibular palpi (but see post, p. 56), though they are removed from them by several points; the two anterior feet are not annexed to the head, and, like the succeeding ones, depend upon their particular segment. The feet are always fourteen in number, unguiculated, and without any vesicular appendage at their base. The under part of the tail is furnished with appendages which are very apparent, and in the form of leaflets, or vesicular purses. Of these, the two first, or external ones, ordinarily cover the others, either totally or in great part. The body is generally flattened and wider than it is thick. The mouth is composed of the same pieces as in the crustaceans which precede it in M. Latreille's system, but in the order before us those which answer to the two superior jaw-feet in the *Decapods* present more the appearance of a lower lip terminated by two palpi. Two of the antennæ, the mesial ones, are almost obliterated in the last genera of this order, which are all terrestrial, and differ besides from the other by their respiratory organs. The male sexual organs are pointed out most frequently by the presence of linear or filiform appendages, and sometimes by hooks placed at the internal origin of the first subcaudal laminæ. The females carry their eggs under the breast, either between the scales or in a membranous pouch or sac that opens to afford a passage for their young, which are hatched with the form and parts proper to the species, and only cast their skin as they increase in size. The greater number live in the waters. Those which are terrestrial have need, like other crustaceans that live out of water, of a certain degree of atmospherical humidity, in order that respiration may be carried on, and that their branchiæ may be in a fit state for performing this function.

Organization.

MM. Victor Audouin and Milne Edwards have given some most interesting particulars of the organization of the Isopods, the *Ligiæ* especially. (*Annales des Sciences Nat.*, August, 1827.) It appears from their observations that the *heart* has the form of a long vessel extended above the dorsal surface of the intestine. Its anterior extremity gives off three *arteries*, as in the *Decapods*. The lateral *branchiæ* may also be seen directed from the heart towards the feet. At the edge of the two first articulations of the abdomen, or tail, this organ receives, both right and left, small canals (the branchio-cardiac vessels) which seem to come from the branchiæ. According to the demonstrations of these zoologists in the case of the *Ligiæ*, it would appear that the *venous system* is less complete than in the *Macrurous Decapods;* and that the blood driven from the heart to the different parts of the body passes into *lacunæ*, which the organs leave between them at the lower surface of the body, and which have a free communication with the different vessels of the branchiæ. The *blood*, after having traversed the respiratory apparatus, returns to the heart in traversing the branchio-cardiacal vessels. This disposition would establish the passage from the circulating system of the *Decapod* crustaceans to that of the *Branchiopods*. According to Cuvier, the two anomalous chords composing the mesial part of the nervous system of the *Onisci* (and probably of the other *Isopods*, and even of the *Amphipods*) are not entirely approximated, and may be well distinguished throughout their length. There are nine ganglions, without counting the brain; but the two first and the two last are so approximated that they may be reduced to seven. The second and the six following furnish the nerves to the seven pairs of feet; the four anterior feet, although analogous in the order of succession of the parts to the four last jaw-feet of the *Decapods*, are really feet, properly so called. The segments which immediately succeed, or those that form the tail, receive their nerves from the last ganglion. These segments may be considered as simple divisions of a single segment, represented by that ganglion; and we accordingly see that the number of these posterior segments varies.

The following is the arrangement of M. Latreille:—

The order consists of six sections.

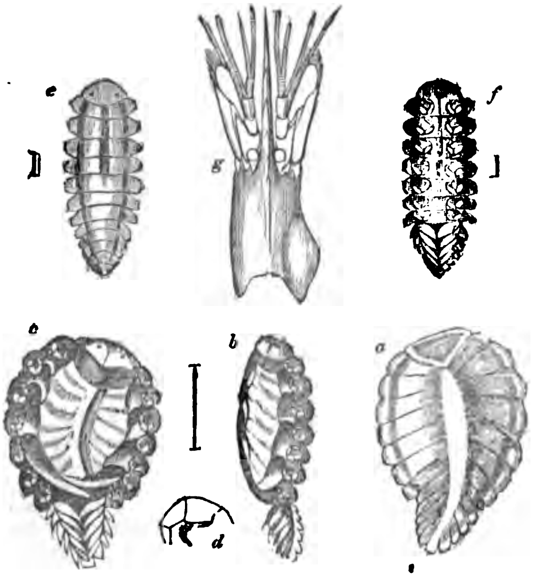
1. *Epicarides.* (Latreille.)

These are parasitical Isopods, which, according to M. Latreille, are without either *eyes* or *antennæ;* the males however have eyes, though the females are blind. The *body* is flat, very small and oblong in the males; but much larger in the females, taking, in their case, the form of an oval, which is narrowed and a little curved posteriorly, hollow below, with a thoracic border, divided on each side into five membranous lobes. On this border the *feet*, which are very small and unfit either for walking or swimming, are situated. The under part of the *tail* is furnished with five pairs of small ciliated imbricated leaflets, answering to as many segments, and disposed in two longitudinal rows; but the posterior extremity is deprived of appendages. The *mouth* presents distinctly only two membranous leaflets applied one upon the other, of the same consistence, and quadrilateral. The lower concavity, forming a sort of flat basket, is filled with eggs. Near the place of their issue is constantly found an individual, which is presumed to be the male; but M. Latreille adds, that the extreme smallness of its size seems to forbid the possibility of copulation. According to M. Desmarest, this individual is furnished with two eyes; its body is straight and nearly linear. One subgenus only belongs to this section.

Bopyrus. (Latreille.)

The most common species is *Bopyrus Crangorum*. Those who are in the habit of eating prawns will probably have observed a tumour occasionally presenting itself under the carapace on one of the sides, which is bulged out. On lifting this part of the shell, the parasite will, in such cases, be discovered immediately under it and upon the branchiæ. We have frequently detected the *Bopyrus*, but on whatever species of prawn it has been found, we have never remarked that the animal to which it adhered was more meagre than its fellows, though this perhaps may have arisen from the prawn not having been long subject to the visitation of the parasite. But there is another reason why the prawn should not suffer much from the adhesion of the parasite. The author of *Horæ Entomologicæ* informs us that he has lately found three specimens of *Bopyrus* (females) with their backs turned to the branchiæ of the prawns; and he is of opinion that they and other crustaceous parasites which adhere to the anterior parts of fishes and crustaceans fix themselves there for the sake of the currents (produced by the branchiæ in respiration), which bring with them the animalcules on which the parasites feed.

Bopyrus is found on *Palemon serratus* and *Palemon squilla*, but most frequently on the former. (See the paragraphs at the end of the account of *Serolis*.)



Bopyrus Crangorum.

a, The upper side; *b*, the animal seen in profile; *c*, the under side; *d*, one of the feet, much magnified (female); *e*, small individual, considered as the male, upper side; *f*, the same, lower side; *g*, carapace of a prawn deformed on the right side by the presence of *Bopyrus*. (Desmarest.)

M. Risso has described another species, under the female of which he states that he found eight or nine hundred living young ones. See further, Desmarest, *Considérations sur les Crustacés*, p. 324.

2. *Cymothoada.* (Latr.)

This section comprises those Isopods which have four very apparent *antennæ;* these are setaceous, and nearly always terminated by a pluriarticulate stem. These crustaceans have *eyes*, a *mouth* of the ordinary formation (Latreille refers to the generalities of the *Malacostraca* with sessile eyes), vesicular *branchiæ*, disposed longitudinally in pairs, a *tail* consisting of from four to six segments, with a fin on each side, and the anterior *feet* most frequently terminated by a strong but small nail or hook. These Isopods are all parasitic according to Latreille; but *Serolis* appears not to be a parasite. Sometimes the eyes are mounted on tubercles at the summit of the head. The tail is composed of only four segments.

Serolis. (Leach.)

One species only known (*Cymothoa paradoxa* of Fabricius). *Antennæ* placed on two lines, and terminated by a pluriarticulate stem. Under the three first segments of the *tail* there are between the ordinary appendage three others, which are transverse and terminated posteriorly in a point.

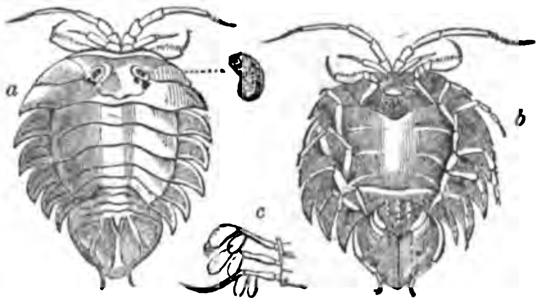
M. Desmarest describes the animal thus:—superior *antennæ* formed of four joints, larger than the three first of the inferior antennæ; the last joint composed of many others, and smaller. Inferior antennæ with five joints, the two first small; the third and fourth (principally this last) elongated; the fifth composed of many others, smaller. Second pair of *feet* having the penultimate joint enlarged and the nail or claw much elongated; the sixth pair ambulatory, rather spiny, and having the nail slightly curved. Anterior appendages of the belly, or *branchial laminæ*, formed of two equal parts, which are foliaceous, rounded at their extremity, furnished with hairs at their base, placed upon a common peduncle; the two posterior and lateral appendages small and narrow, especially the interior one, which hardly projects.

This is a very interesting animal, and has been considered to offer some resemblance at first sight to the extinct form of the *Trilobites*. M. Desmarest however remarks that it requires but a slight examination to prove that there is not the slightest resemblance between them.

Dr. Buckland, on the other hand, is of opinion that *Serolis* affords the nearest approach among living animals to the external form of Trilobites. The most striking difference, he observes, between this animal and the *Trilobites* consists in there being a fully developed series of crustaceous legs and antennæ in *Serolis*, whilst no traces of either of these organs have yet been discovered in connexion with any *Trilobite*. M. Brongniart, he adds, explains the absence of these organs by conceiving that the *Trilobites* hold precisely that place in the class Crustaceans (*Gymnobranchia*) in which the antennæ become very small or altogether fail; and that the legs, being transformed to soft and perishable paddles (*pattes*), bearing branchiæ, or filamentous organs for breathing in water, were incapable of preservation.

It is however by no means clear that we have in *Serolis* the nearest approach to those extinct crustaceans so interesting to the geologist and palæontologist. Do we not find a much nearer approximation in *Bopyrus?* Of this opinion is Mr. W. S. MacLeay, the author above quoted, who has perhaps studied the *Invertebrata* with a view to generalization more deeply than any living zoologist. The *Trilobites* exhibit no vestige of antennæ: *Serolis* has antennæ; *Bopyrus* has none; nor are we to forget the rudimentary legs of the latter. In accordance with this view the male of *Bopyrus* would represent a sort of *Bumastus* (Murchison, *Silurian System*), and the female an *Asaphus*. If this supposition be well founded, those forms among the Trilobites which systematists have separated specifically on the ground of the absence or presence of eyes, may be mere modifications arising from sexual difference; for nature makes nothing in vain; and the females of *Bopyrus* and *Cymothoa* have no eyes, because they do not require them, whilst the males do. Thus the cochineal-insect, when young and locomotive, has eyes; but the female, when fit for reproduction, becomes a fixture and is blind. So the Cirrhipeds in their youth are free and have eyes; in their adult state, when they are sessile, they lose organs which would be comparatively useless.

With regard to the observation of M. Brongniart, the softness of the texture of the *Nereidina* of MacLeay, and the perfection of the impression of *Nereites Cambrensis*, Murch. (pl. 27, *fig.* 1, of Mr. Murchison's work 'On the Silurian System of Rocks'), make it very remarkable, as Mr. MacLeay there observes, that if articulated feet existed in the Trilobites, some vestiges of them, even although membranaceous, should not come down to us more perfect than those figured by Goldfuss. [TRILOBITES.]

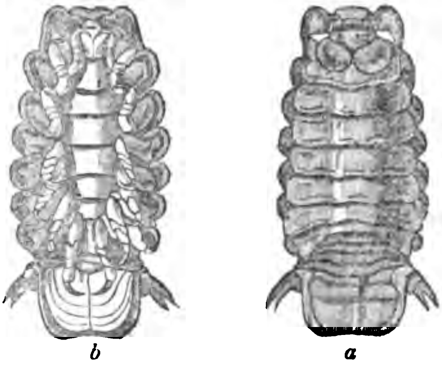


Serolis Fabricii. *a*, back; *b*, under surface, showing the union of crustaceous legs with the membranous branchiæ; *c*, magnified view of branchiæ.

Locality of the genus.—Tierra del Fuego, Straits of Magalhaens (Banks). Senegal (Dufresne). Captain Phillip Parker King, R.N., collected many specimens on the east coast of Patagonia, and also at Port Famine, in the Straits, where Capt. King saw the beach covered with dead specimens. He also observed them alive swimming close to the bottom among the sea-weed. They moved slowly and gradually, unlike a shrimp. He never saw them swimming near the surface: their legs seemed adapted for swimming and crawling on the bottom.

Cymothoa. (Fabr.)

Antennæ nearly equal in length; *eyes* but little apparent; last segment of the *tail* squared, and the two pieces terminating the lateral fins linear, equal, and styliform.



Cymothoa œstrum. *a*, upper side; *b*, lower side.

Ichthyophilus (Latr.; *Nerocila, Livoneca*, Leach).

Antennæ of equal length, and *eyes* not very visible; last segment of the *body* nearly triangular, with two pieces terminating the lateral fins, in form of leaflets or blades: the exterior of these is greatest in *Nerocila*, and of the same size as the others in *Livoneca*.

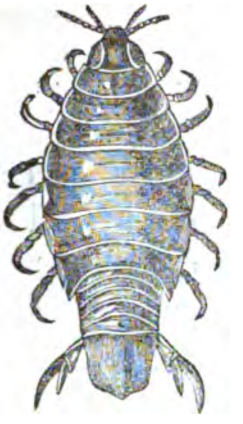
M. Latreille observes that in the four following subgenera the superior *antennæ* are manifestly shorter than the inferior.

Many, as well as the *Cymothoæ*, have all the *feet* terminated by a powerful and strongly arched nail (onglet); the last eight are not spiny; the *eyes* are always distant and convex. These, in the method of Dr. Leach, form three genera, but M. Latreille is of opinion that they may be united under one subgenus, namely,

Canolira (Leach; *Anilocra, Olencira*, of the same).

In those *Canoliræ* designated by Dr. Leach as *Olenciræ* the *blades of the fins* are narrow and armed with points. In those named by the same zoologist *Anilocræ* the external blade of the fins is longer than the internal one; the inverse of which is the case with the *Canoliræ*, in which, besides, the *eyes* are but very little granulated, while they are very sensibly granulated in *Anilocra*.

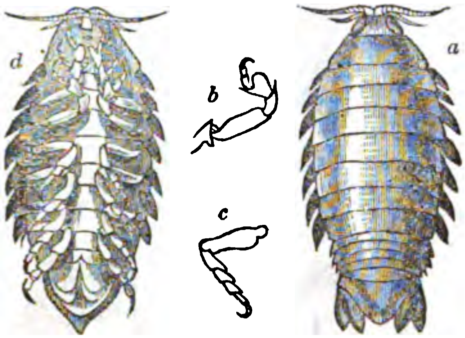
M. Latreille remarks that in the three following subgenera the second, third, and fourth *feet* only are terminated by a very strongly curved nail (onglet), and the eight last are spiny. The *eyes* ordinarily have but little convexity, and are large and converging anteriorly.



Cauolira (Anilocra) Capensis.

Æga. (Leach.)

Two first joints of the superior *antennæ* very large and compressed.



Æga emarginata.
a, upper side; *b*, anterior foot; *c*, posterior foot; *d*, under side.

Rocinella. (Leach.)

Two first joints of the superior *antennæ* nearly cylindrical, but approaching the *Ægæ* in their large and anteriorly approximated *eyes*.

Conilira. (Leach.)

Antennæ as in *Rocinella;* but the *eyes* are small and distant; and the edges of the segments are nearly straight, and not falciform and prominent.

Synodus. (Latr.)

Antennæ upon two lines, lower *antennæ* always short, tail of six segments; distinguished from all the preceding by their great and projecting jaws. Only one species.

Cirolana. (Leach.)

Length of the lower *antennæ* surpassing the half of that of the body. Six segments in the *tail*.

Nelocira. (Leach.)

Length of lower *antennæ* as in *Cirolana*. Five segments *only* in the *tail*. *Cornea* of the eyes smooth.

Nelocira Swainsonii.

Eurydice. (Leach.)

Resembling *Nelocira* in the number of the caudal segments, but differing from that form in its granulous *eyes*.

M. Latreille is of opinion that this subgenus conducts us to those whose *eyes* are formed of small grains, or which have those organs smooth, and which have besides the four *antennæ* inserted upon the same horizontal line, consisting of four joints at most, all the *feet* ambulatory, and the *tail* composed of six segments. Such a form is

Limnoria. (Leach.)

The only living species known is *Limnoria terebrans*, which, although only two lines in length, is nevertheless highly injurious in consequence of its multiplication and its habits. The rapidity with which this crustacean pierces the timber of ships makes its attacks not only mischievous but alarming. It rolls itself up like a wood-louse when it is seized; and is a native of the European Seas.

3. *Sphæromides.* (Latr.)

The Isopods composing this section have four very distinct *antennæ*, which are either setaceous or conical; and, with the exception of *Anthura*, they are always terminated by a stem divided into many small joints, and short. The lower antennæ, which are always the longest, are inserted under the lower part of the first joint, which is large and thick. The *mouth* has the usual form. The *branchiæ* are vesicular or soft, naked, and disposed longitudinally in pairs. The *tail* has only two complete and moveable segments, but has often impressed transverse lines upon it, indicating the vestiges of other segments. On each side of its posterior extremity is a fin terminated by two leaflets, the lower of which is moveable, while the upper one is formed by an internal prolongation of the common support. The *branchial appendages* are curved internally; the internal side of the first is accompanied in the males by a small linear and elongated piece. The anterior part of the *head*, situated below the *antennæ*, is triangular, and in the form of a reversed heart. Some have an oval or oblong *body*, contracting ordinarily into the form of a bowl. The *antennæ* are terminated by a pluriarticulate joint, and the lower ones at least are sensibly longer than the head. The lateral and posterior fins are formed of a peduncle and two blades, composing, together with the last segment, a fan-like fin. In these the impressed and transverse lines of the anterior segment of the *tail*, always shorter than its successor, or the last, do not reach the lateral borders. The first joint of the superior antennæ is in the shape of a triangular battledore (palette). The *head* seen from above forms a transversal square. The leaflets of the fins are very much flattened, and the intermediate piece, or last segment, is enlarged and rounded laterally.

Zuzara. (Leach.)

Leaflets of the *fins* very large, the upper of which is shortest, separated from the other to form a border to the last segment.

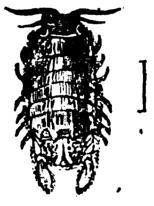
Sphæroma. (Latr.)

Leaflets of moderate size, equal, and applied one over the other.

Sphæroma dentata.

In others the impressed lines, or transverse sutures of the anterior segment of the *tail*, attain the lateral border and cut it. The first joint of the superior *antennæ* forms an elongated *palette*, which is square or linear. The leaflets of the *fins* are ordinarily narrower and thicker than in the preceding: the exterior sometimes (as in *Cymodocea*) envelops the other: their point of junction resembles a knot or joint. Sometimes the sixth segment of the *body* is sensibly longer than the preceding segments and the succeeding one. One of the leaflets of the fins only is projecting.

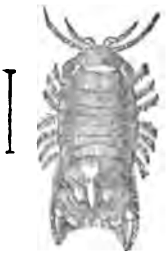
Næsa (Campecopæa, Leach).



Næsa bidentata.

Sometimes the sixth segment of the *body* is of the length of the preceding segments, and of the succeeding one, as in

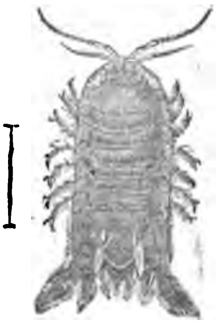
Cilicæa, where one of the leaflets of the fins only is projecting, the other leaning against the posterior border of the last segment.



Cilicæa Latreilli.

Cymodocea. (Leach.)

In this form the leaflets of the *fins* are projecting and directed backwards. The sixth segment is not prolonged posteriorly, and the extremity of the last segment has a small blade in a notch.



Cymodocea Lamarckii.

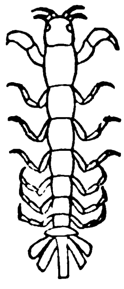
Dynamene.

Resembling *Cymodocea* in the projection and direction of the leaflets of the fins, but having the *sixth segment* prolonged backwards, and the last with a simple slit only, there being no blade.

Others again, as

Anthura,

have a vermiform *body*, and the *antennæ*, hardly so long as the head, consisting of four joints. The leaflets of the posterior *fins* form by their disposition and approximation a sort of capsule. The anterior *feet* are terminated by a monodactyl claw.



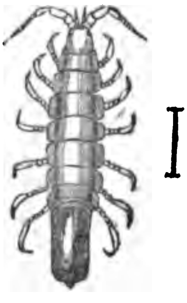
Anthura Gracilis, magnified.

4. *Idoteidæ*. (Leach.)

This section consists of Isopods whose *antennæ* are four in number, but upon the same horizontal and transverse line; the lateral ones are terminated by a stem ending in a point, gradually decreasing and pluriarticulate; the intermediate antennæ are short, filiform, or a little the largest towards the end, and four-jointed, none of the joints being divided. The conformation of the *mouth* is the same as in the preceding sections. The *branchiæ* are in the form of bladders, white in the greater part, susceptible of being blown up, capable of aiding in swimming, and covered by two blades or valvules of the last segment, adhering laterally to its borders, longitudinal, biarticulate, and opening in the middle by a straight line, like a folding door. The *tail* is formed of three segments, the last of which is much the largest, without appendages at the end or lateral fins. These crustaceans are all marine.

Idotea. (Fabr.)

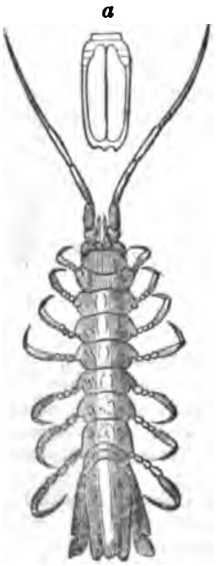
All the *feet* strongly unguiculated and identical; the *body* oval or simply oblong, and the lateral *antennæ* shorter than the half of the body.



Idotea tricuspidata.

Stenosoma. (Leach.)

Differing from *Idotea* in the linear form of the *body* and the length of the *antennæ*, which surpasses the half of that of the body.



Stenosoma lineare, natural size. *a*, laminæ of the under part of the abdomen.

Arcturus. (Latr.)

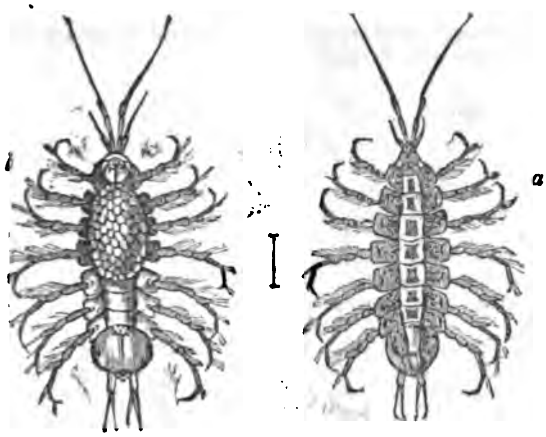
Very remarkable for the form of the second and third *feet*, which are directed forwards, and terminate by a long bearded joint, unarmed or feebly unguiculate; the two anterior feet are applied upon the mouth and unguiculated; the six last are strong, ambulatory, thrown backwards, and bidentated at their extremity. In the length of the *antennæ* and form of the body *Arcturus* approaches *Stenosoma*. M. Latreille (1829) says that he never saw but one species, *Arcturus tuberculatus*, brought home from the North Seas by one of the last English expeditions to the North Pole.

5. *Asellota*. (Latr.)

The fifth section consists of Isopods with four very apparent *antennæ* which are disposed on two lines, and are setaceous and terminated by a pluriarticulate stem. There are two *mandibles*, four jaws, ordinarily covered by a species of lip formed by the first *jaw-feet*. The *branchiæ* are vesicular, disposed in pairs, and covered by two longitudinal and biarticulate but free leaflets. The *tail* is formed of a single segment, without lateral fins, but with two bifid needle-like processes, or two very short appendages in the form of tubercles, at the middle of its posterior border. There are other lamellar appendages situated on its inferior base, more numerous in the males than in the females, and these serve to distinguish the sexes.

Asellus. (Geoffroy.)

Two bifid needle-like processes at the posterior extremity of the *body*; *eyes* distant; superior *antennæ* at least as long as the peduncle of the inferior antennæ. Hooks at the end of the feet entire



Asellus aquaticus (Idotea aquatica, Fabr.), female, magnified. a, upper side; b, under side.

This is very abundant in fresh stagnant waters, as in the pools about Paris. It moves slowly when not terrified. In the spring it comes forth from the mud, in which it has passed the winter. The male, which is much larger than the female, carries her about for a space of eight days, holding her by means of his fourth pair of feet. When he quits her, she is pregnant with a great number of eggs, enclosed in a membranous sac placed under her breast, and opening by a longitudinal slit to give passage to the young.

Oniscoda. (Latr.)

These, the *Janiræ* of Dr. Leach, differ from the *Aselli* in the approximation of their *eyes*, in having their superior *antennæ* shorter than the peduncle of the inferior ones, and in the hooks of the *tarsi*, which are not bifid. M. Latreille remarks that the only species known (*Janira maculosa* of Leach) has been found on the coasts of England among the sea-weeds and *Ulvæ*.

Jæra. (Leach.)

This form, in the place of the needle-like processes (stylets) at the end of the *tail*, has only two tubercles. M. Latreille remarks that only a single species, *Jæra albifrons*, Leach, has been found, and that it is very common on the English coast, under stones and among the sea-weed.

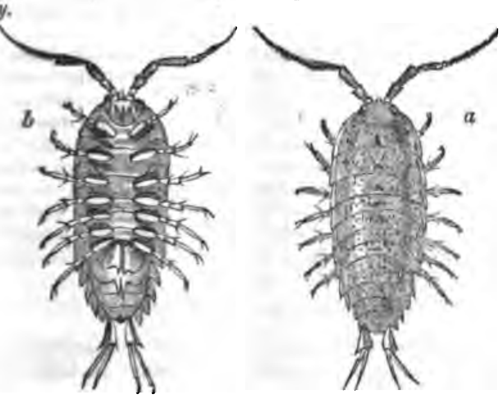
6. Cloportides, *Oniscidæ*. (Latr.)

This, the last section of Isopods, according to the arrangement of M. Latreille, consists of those forms which have indeed four *antennæ*, but the two intermediate ones are very small, little apparent, and consist of two joints at most: the lateral antennæ are setaceous. The *tail* is composed of six segments, with either two or four needle-shaped appendages at the posterior border of the last segment, and without lateral fins. Some are aquatic, others terrestrial. In the latter, the first leaflets below the *tail* exhibit a row of small holes, where the air penetrates to the organs of respiration there enclosed.

Some have the sixth joint of their *antennæ*, or their stem, so composed that in counting the small articulations of this part the total number of all the joints is nine at least. These are marine, and consist of two subgenera.

Ligia. (Fabr.)

Stem of the lateral *antennæ* composed of a great number of small joints, and two very projecting *stylets*, separated at the end into two branches, at the posterior extremity of the body.



Ligia Oceanica, nat. size; a, upper side; b, under side.

This is very common on the sea-coast, where it may be seen creeping on the rocks or on sea-walls. When an attempt is made to seize it, the animal quickly folds its feet and lets itself drop.

Tylos. (Latr.)

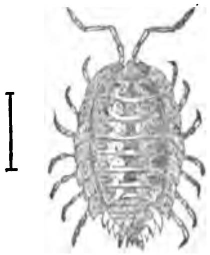
These seem to have the faculty of rolling themselves up. The last segment of the body is demicircular, and exactly fills the notch formed by the preceding. The posterior appendages are very small and entirely inferior. The *antennæ* have only nine joints, the four last of which compose the stem. On each side is a tubercle representing one of the intermediate antennæ; the intermediate space is elevated. The *branchiæ* are vesicular, imbricated, and covered by laminæ. Example, *Tylos Armadillo.* Locality, Mediterranean.

Philoscia. (Latreille.)

Lateral *antennæ* divided into eight joints and exposed at their base. The four posterior appendages nearly equal. These occur in moist places. Example, *Oniscus sylvestris*, Fabr.

Cloportes, properly so called; Oniscus, Linn. (Wood-Lice).

Eight joints to the lateral *antennæ*, but their base is covered; and the two external appendages of the *tail* are much larger than the two internal ones. These animals frequent dark and retired places, such as caves, cellars, holes in walls, &c., and are also found under stones and old logs. Their food consists of decayed vegetable and animal substances; and they scarcely ever come forth from their retreats except in rainy or moist weather. They move slowly when not in danger. The *eggs* are enclosed in a pectoral pouch. The young at their birth have a thoracic segment short, and consequently only twelve feet. These crustaceans were formerly used in medicine; but they no longer form part of the *materia medica*.



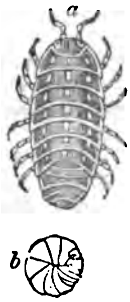
Oniscus murarius.

Porcellio. (Latr.)

Distinguished from the true wood-lice by the number of joints of their lateral *antennæ*, which are only seven. In other respects *Porcellio* resembles *Oniscus*.

Armadillo. (Latr.)

The posterior appendages of the *body* are not projecting; the last segment is triangular. A small blade, in form of a reversed triangle, or more large and truncated at the end, formed by the last joint of the lateral appendages, fills up on each side the void between the segment and the preceding. Lateral *antennæ* with only seven joints. The upper *subcaudal scales* are pierced with a row of small holes.



Armadillo pustulatus. a, expanded; b, rolled up.

Such is the arrangement of M. Latreille.

Lamarck divided the *Isopoda* into two great sections: the first consisting of those Isopods which have the *branchiæ* situated under the *tail*, and comprising two subdivisions; the second composed of those which have their *branchiæ* placed under the anterior part of the *abdomen*, between the *feet*.

Under the first he arranged the genera *Armadillo*, *Onis-*

cus, Philoscia, Ligia, Asellus, Idotea, Sphæroma, Cymothoa, Bopyrus, Typhis, Anceus, Praniza, Apseudes, Ione.

Under the second he included the genera *Leptomera, Caprella,* and *Cyamus.*

M. Desmarest divided the *Isopoda* into two great sections, with many subdivisions.

His first section, which he makes equivalent to the *Phytibranchiate Isopods* of Latreille, consists of the genera *Typhis, Anceus,* including *Gnathia* of Leach, *Praniza, Eupheus,* and *Ione.*

His second section, which he makes equivalent to the *Ptérygibranches* of Latreille, comprises the genera *Idotea, Stenosoma, Anthura, Serolis, Campecopea, Næsa, Cilicæa, Cymodocea, Dynamene, Zuzara, Sphæroma, Eurydice, Nelocira, Cirolana, Conilera, Rocinella, Æga, Canolira, Anilocra, Olencira, Nerocila, Livoneca, Cymothoa, Limnoria, Asellus, Janira, Jæra, Ligia, Philoscia, Oniscus, Porcellio, Armadillo,* and *Bopyrus.*

M. Milne Edwards (edition of Lamarck, 1838) states, in a note to that part of Lamarck's definition of an Isopod crustacean, '*mandibules sans palpes,*' that Lamarck, Latreille, and most authors are in error when they assign this character to the Isopods, for in a great number of these crustaceans the mandibles are provided with a palpiform stem, entirely resembling that which may be seen in the greater part of the *Amphipoda.*

He further remarks that the respiratory lamellæ situated under the abdomen are hardly ever *branchiæ,* properly so called, but only one of the branches of the *false feet* become membranous and vascular, as in one of the appendages of the *thoracic feet* in the *Amphipoda.* The female of *Ione,* he observes, exhibits an exception, for she carries ramose *branchiæ* on each side of the abdomen.

M. Milne Edwards, in his notes, further states that those crustaceans whose respiratory appendages are placed under the *thorax* (which Lamarck calls *abdomen*) ought not to remain in the order of *Isopoda,* but belong to the *Læmodipoda* of M. Latreille. The *egg-pouch* he describes as being formed of the flabelliform appendages, which have become foliaceous, and are raised against the sternum.

The same acute zoologist (*loc. cit.*) says that the *Isopoda,* properly so called, are *Edriophthalmous crustaceans,* whose abdomen is never rudimentary, and carries below five pair of false *branchial feet,* having all nearly the same form and the same functions. The appendages of the penultimate ring (or the false feet of the sixth pair) have a form and use different from those of the preceding. The *thorax,* composed in general of seven rings, but sometimes having only five, carries nearly always seven pair of feet, which are often furnished with a foliaceous palp, serving to protect the eggs and young, but they hardly ever carry a vesicular appendage proper for respiration, as in the *Amphipoda* and *Læmodipoda.* Finally, the conformation of their buccal apparatus varies, and the greater part of authors are in error when they assign to them as a character the possession of mandibles deprived of palpiform appendages.

M. Milne Edwards is of opinion that the *Isopoda* form three natural families, namely, the *Idoteidians,* the *Cymothoadians,* and the *Cloportidians,* and he thus distinguishes them.

A. Jaw-feet operculiform, and deprived of a palpiform stem, or only showing the vestiges of it.

- * Thoracic feet ambulatory; last segment of the abdomen smaller than the preceding segments; internal antennæ rudimentary.

These form the family of

Cloportidians.

- * Thoracic feet anchor-like (ancreuses), last segment of the abdomen nearly always much larger than the preceding segments; internal antennæ in general well developed.

These form the family of

Cymothoadians.

AA. Jaw-feet palpiform. Last abdominal ring much more developed than the preceding ones; all or nearly all the feet ambulatory.

These form the family of

Idoteidians.

In this classification, says the author, the family of the *Cloportidians* has the same limits as in the method adopted by Lamarck, and comprises the *Terrestrial Isopods.*

The family of *Cymothoadians* is composed of the *Parasitic Isopods,* and comprehends *Cymothoa* of Lamarck, *Ione, Anceus,* and *Typhis.*

The family of *Idoteidians* consists of *Marine Isopods not Parasitic,* and embraces the genera *Idotea, Sphæroma, Anthura, Asellus,* &c.

Our limits will not allow us to go further into the valuable observations of M. Milne Edwards; and we must refer the reader to the fifth volume of the new edition of Lamarck for them. His highly interesting work, *Histoire Naturelle des Crustacés,* has not yet proceeded so far as the *Isopoda,* but we learn from it that he places them, together with the *Amphipoda* and *Læmodipoda,* under the legion of *Edriophthalmia.* [Crustacea, vol. viii., p. 197.]

Fossil Isopoda.

M. Latreille states that Professor Germar had sent to M. le Comte Dejean the figure and description of a small fossil crustacean which appeared to him (M. Latreille) to be referrible to the subgenus *Limnoria;* and he further remarks that *Oniscus prægustator,* figured in Parkinson's work, comes near to that species, or at least appears to belong to the same section.

M. Desmarest (*Histoire Naturelle des Crustacés Fossiles*) enumerates two fossil species of the genus *Sphæroma:* one, *Sphæroma antiqua,* found in a fragment of white, fine-grained calcareous stone, analogous in that respect to the Pappenheim stone, but of which he knows not the origin; the others, *Sphæroma Margarum,* from the horizontal beds of green fissile marl (*marne verte fissile*) at Montmartre, above the gypseous beds, mingled with *Spirorbes.*

The reader will find the Trilobites treated of in that article.

ISOPYRE, a mineral which occurs amorphous in granite. Fracture flat, conchoidal. Brittle. Hardness, 5·5 to 6. Colour velvet or greyish-black, occasionally dotted with red. Colour of streak greenish-grey. Slightly obeys the magnet. Lustre vitreous, Opaque or slightly translucent. Specific gravity 2·9 to 3. It is with difficulty acted upon by acids. Fuses before the blowpipe. It occurs in the granite of St Just, near Penzance, in Cornwall. According to Turner's analysis, it consists of

Silica . .	47·09
Alumina . .	13·91
Lime . .	15·43
Peroxide of iron .	20·07
Oxide of copper .	1·94
	98·44

ISO'SCELES (ἴσος, equal, σκέλος, leg), a term applied to a triangle of which two sides (or legs) are equal.

ISOTHERMAL LINES are curves supposed to be traced on the surface of the earth so that each may pass through a series of points at which the mean annual temperature is the same. The situations of such points were first determined by M. Humboldt from the registers of observed temperatures in Europe, and from the numerous observations made by himself and other travellers in different regions of the world. A full account of the researches of this philosopher respecting the temperature of the atmosphere and the law of its variations, in connection with the subject of this article, is contained in the third volume of the 'Mémoires d'Arcueil;' and also in the 'Annales de Chimie et de Physique,' tom. v.

Curve lines connecting points of equal temperature in the interior of the earth have been called *Isogeothermal lines.*

The temperature of the air in any region depends on the inclination of the sun's rays to the surface of the earth in that region, on the distribution of land and water, on the state of the countries from which come the prevailing winds, on the vicinity of the sea, the elevation of the land, and numerous other circumstances; and the complexity of the subject is such as to render vain any attempt to assign a law for the actual heat at a given place. The mean annual temperatures of places remain however nearly constant, and their decrease, in going from the equatorial regions towards either pole, approaches near enough to uniformity to encourage the expectation that the precise law of that decrease may one day be discovered.

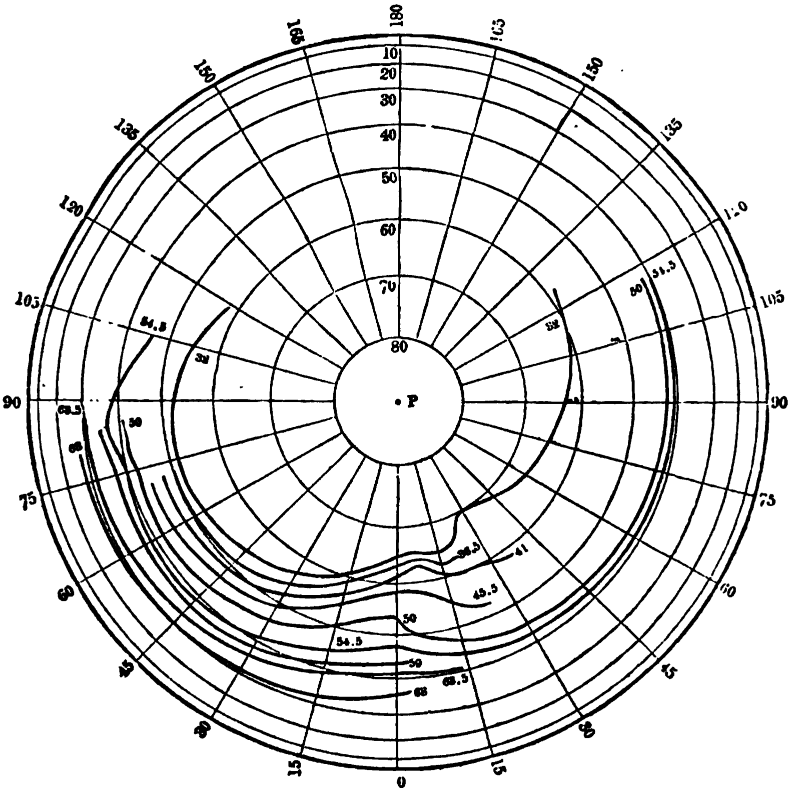
Professor Mayer of Göttingen appears to have been the first who attempted, from such observations as existed in his time, to express the law by a formula. He made the temperature on any parallel of terrestrial latitude to depend on the square of the cosine of the latitude, and with some modifications this law is even now generally admitted. At the level of the sea the value of the mean annual temperature is expressed by M + E cos. 2 L; where L is the latitude of the place, M is the mean temperature on the parallel of 45°, and M + E is that at the equator; and Professor Playfair has from this expression deduced a formula for temperature which includes the season of the year and the elevation of the place above the sea: he admits however that it agrees only with the Atlantic Ocean and the western part of the Old Continent. (*Outlines of Nat. Phil.*, 'Pneumatics.')

In the northern hemisphere, as we proceed eastward and westward from the meridians of Greenwich or Paris, it is found that the mean temperature of any parallel becomes continually less, and the severity of the winter greater than in this part of the world; the difference appears to attain a maximum at the eastern extremity of Asia, and one still higher in the central parts of North America. From a comparison of observations Humboldt found that between the parallels of 28° 25′ N. and 41° 53′ N. the difference between the latitudes of a place in Europe and a place in North America, having the same mean temperature, is about 7 degrees; and that the difference between the mean temperatures of two places having the same latitude in Europe and North America is 4·1° of Fahrenheit's thermometer.

In order to ascertain with the utmost possible precision the mean temperature of any place from the tables there kept, Humboldt divided the sum of all the temperatures observed in each day at intervals of one hour by the number of observations; and the sum of all these mean daily temperatures being divided by 365, gave the mean annual temperature. And in determining the series of points for his lines of equal temperature, when there existed no observations on which he could depend, he interpolated the temperature and geographical position between the values of those elements at two or more places where they were well known.

The period during which a traveller remains in any one place will seldom allow him to make a sufficient number of observations for determining its mean annual temperature by the process above mentioned; and therefore it may be useful to know that, according to Humboldt, the mean temperatures for the months of October and April are very nearly equal to the annual mean temperature; also that the half sum of the temperatures at sun-rise and at 2 P.M. is nearly equal to the mean temperature for the day. It may be proper to remark also that travellers, in making observations relating to temperature, should be careful to place their thermometers at some distance above the surface of the ground, and in situations where they may be unaffected by the reflection or radiation of heat from buildings or from terrestrial particles in the atmosphere. The very high temperatures which have been occasionally observed in sandy deserts are probably owing in part to the latter circumstance.

The following diagram represents an orthographical projection, on the plane of the equator, of the principal meridians and parallels of latitude in the northern hemisphere of the earth; and the strongly marked curves represent the nine isothermal lines whose forms have been determined by Humboldt. Their distances from one another are such as correspond on the earth to a change of mean annual temperature equal to 2·5 degrees of the centigrade thermometer (4·5° of Fahrenheit), and the most northern curve is that on which the mean temperature is expressed by zero on the former, or 32° on the latter scale. The number on each curve in the diagram expresses, according to Fahrenheit's thermometer, the mean annual temperature, at the level of the sea, of all the places through which the curve passes. The centre P represents the pole of the earth, and the longitudes of the meridian lines are numbered eastward and westward from the meridian of Greenwich.



The isothermal line of 32° passes about 4 degrees southward of Nain, a Moravian settlement on the coast of Labrador; and, continuing eastward through a point about 1 degree north of Umea in Sweden, it there makes a remarkable inflexion. After ascending as high as North Cape in Lapland it abruptly returns southward, and attains its lowest limit in the eastern parts of Asia. Proceeding westward from Labrador recent observations have shown that the curve descends towards the south and crosses the lower extremity of Hudson's Bay, from whence it again tends northwards to the Great Slave Lake. The positions of the other curves seem to be influenced in some measure by that which has been just mentioned. In their progress from the western coast of Europe to the eastern coast of America they incline towards the terrestrial equator, yet so that the southern curves approach very near to parallelism with that great circle of the earth. Within the territory of the United States they assume a form which is convex to the equator, and farther west they appear to re-ascend towards the north. At about 10° eastward of the meridian of Greenwich the curves have their convexities turned northwards; and farther eastward they descend towards the equator, but the want of accurate observations in Asia renders their course in that part of the world rather uncertain. The isothermal line of 54·5° alone has been traced nearly round the earth: commencing at the mouth of the Columbia, on the western coast of North America, it passes near the city of Washington with its convexity towards the south; and after crossing the Atlantic it runs through Bordeaux, from whence it continues to the city of Pekin, at which place it again becomes convex towards the equator. It may be added that by the late voyages into the Arctic seas two points have been determined in the isothermal curve of 17°, which appears to pass through Spitzbergen in lat. 78° N., and through Melville Island in lat. 65° N.

But in every country the mean temperature varies with the height of the place above the level of the sea; and Humboldt, from observations made as well on the Cordilleras as in Europe, having determined that at every 100 metres of elevation (or 328 English feet) the mean temperature of the air is diminished by a quantity equal to that diminution which is consequent on an augmentation of latitude equal to one degree, calculated a table of the corrections which should be made in the curvatures of the isothermal lines at the level of the sea, in order to obtain the forms of those which appertain to points at any given elevation. According to Playfair the diminution of heat on ascending in the atmosphere is, near the surface of the earth, at the rate of 1° (Fahr.) for every 270 feet; but Mr. Atkinson, in the 'Memoirs of the Royal Astr. Soc.,' vol 2, from a comparison of many observations, makes the diminution equal to 1° for every 251·5 feet. He has also shown that the differences of temperature between summer and winter begin to diminish at the height of about 21,000 feet above the surface of the earth.

The differences between the mean summer and mean winter temperatures are very considerable at places whose mean annual temperature is the same; and these differences are not equal in the Old and New Continent. On the isothermal line of 32° in Europe, that difference is equal to 39·6°, and in America to 54°; and on the isothermal line of 68° the differences are respectively 21·6° and 27°. It has also been remarked that the differences between summer and winter are least near the northern, and greatest near the southern bends of the curves.

The curves formed by connecting, on the isothermal lines, points at which the mean temperature of summer is the same are called *isotheral* lines; and those formed by connecting points at which the mean winter temperature is the same are called *isocheimal* lines: both these systems of lines deviate more than the isothermal lines from the parallels of terrestrial latitude.

It was long supposed that the mean temperature of the southern was much lower than that of the northern hemisphere. In fact, in the Arctic seas, large masses of floating ice are not found below the 70th degree of latitude, and permanent fields exist only beyond the latitude of 75 or 80 degrees; while in the Antarctic regions ice is found in both states between the 54th and 59th degrees of latitude: and the island of Georgia, which is there situated, is perpetually covered with snow down to the sea-shore; whereas in the northern hemisphere this circumstance does not take place till we arrive at the parallel of 80°. [CLIMATE.]

The vast extent of the Antarctic seas, the absence of great tracts of land in those regions, and the pointed forms of the African and American continents, allow the currents to carry far northwards the ices of the southern pole; and thus a considerable degree of cold is produced at particular places. But the observations which have, within a few years, been made on the temperature of the southern regions, afford good reason to believe that there is little difference between the mean annual temperatures of places similarly situated in the two hemispheres. Near the equator, as might be expected, the mean temperatures in both are the same: those of the Isle of France and of Jamaica are 80·1°; the mean temperatures of Port Jackson, the Cape of Good Hope, and Buenos Ayres (66·7° to 67·5°), correspond to those of Natchez, Funchal, Algiers, and Cairo (64·8° to 72°). The mean temperature of the Malouine or Falkland Isles is 47·3°; at an equal latitude it is in Europe about 50°, and in America 36°; and the mean temperature of Van Diemen's Land is about the same as that of Italy. M. Humboldt concludes that, as far as the parallels of 40° or 50° of latitude, north and south, the corresponding isothermal lines are nearly equally distant from the equator; and with respect to America the mean annual temperature is greater in the southern than in the northern hemisphere. The variations between the mean temperatures at the opposite seasons of the year are much less in the former than in the latter at corresponding latitudes; in Van Diemen's Land the winters are said to be milder than at Naples, where the mean winter temperature is 46°, while the summers are colder than at Paris, where the mean summer temperature is 64·6°. And at Port Jackson the mean winter temperature (= 56·8°) corresponds to that of Cairo, while the mean summer temperature (= 77·4°) is equal to that of Marseilles.

M. Humboldt considers the mean annual temperature at the equator, at the level of the sea, to be equal to 81°·4 (Fahr.); but Mr. Atkinson (*Mem. of the Royal Astr. Soc.*, vol. ii.) found, by applying the method of least squares to equations formed from the data furnished by that philosopher himself, and assuming the temperature to vary, first as the square of the cosine, and then as $\cos.^{\frac{3}{2}}$ of the latitude, that the mean temperature there is at least equal to 84·5°. It is right to observe however, that Humboldt, in a paper published in the 'Annales de Chimie' for Sept., 1826, objects to the conclusions of Mr. Atkinson, and adheres to his own determination. Dr. (now Sir David) Brewster, in the sixth volume of the 'Edinburgh Journal of Science,' by a reduction of observations made at Ceylon, and assuming the temperature to vary according to the law of Mayer, finds 80·99° for the mean equatorial temperature.

An inspection of the isothermal curves, and particularly that of 32° in the above diagram, will sufficiently show that the mean temperature of the terrestrial pole cannot be obtained from any simple formula in which the variations are made to depend on the geographical latitudes of places. And in fact Captain Scoresby, using the formula of Mayer, and subtracting from the result a correction which he conceived to be due to the frigorific influence of the ice, made the mean temperature at the pole equal to 10° (Fahr.). From the observations of Captain (Sir Edward) Parry it appears that such temperature there must be lower than 3° below the zero of the scale. Sir D. Brewster has been led, from the form of the curves, to adopt the hypothesis of two polar points at which the mean temperature is a minimum: he places both of these on the parallel of 80° N. lat., but one of them is supposed to be situated in 95° E. long., with a mean temperaiure equal to + 1°, and the other in 100° W. long., with a mean temperature equal to − 3·5°; and, by inductions from observations, he has given, for the mean temperature at any place, the formulæ

$$81\cdot8^\circ \text{ sin. } D + 1^\circ,$$
$$86\cdot3^\circ \text{ sin. } D - 3\cdot5^\circ;$$

where D is the distance of the place from the nearest pole.

By comparing the mean temperature at Van Diemen's Land with that at the Cape of Good Hope, the same philosopher concludes that in the Antarctic regions there are two points of maximum cold, whose situations correspond to those in the northern hemisphere. But it is evident that observations must be greatly multiplied in both hemispheres before the data can be considered sufficient for the determination of the isothermal equator or poles; or to serve as a foundation for the construction of formulæ for temperature in which full confidence may be placed.

In the 'Edinburgh Phil. Trans.,' 1820, Brewster has expressed the interesting idea that some connexion exists between the isothermal and the magnetic poles of the earth; in which case the revolutions of these last may produce corresponding revolutions in the others, and thus may serve to explain that augmentation of temperature which is supposed to have taken place in the west of Europe since the days of Cæsar and Ovid.

ISPAHAN. [PERSIA.]

I'SPIDA. [KINGFISHERS.]

ISRAEL, TRIBES OF. [JEWS.]

ISSOIRE. [PUY DE DOME.]

ISSOUDUN, a town in the department of Indre in France, on the River Theols, a tributary of the Arnon, which flows into the Cher; in 46° 57′ N. lat., 1° 59′ E. long.; about 130 miles in a direct line south by west of Paris, or 150 by the road through Montargis and Bourges. This town is first noticed in the time of Louis IV., *Outremer* (A.D. 936-954). In the twelfth century it was under the dominion of lords of its own, to whom is ascribed the erection of its castle, of which only a large tower remains. In A.D. 1220 it was taken by Philippe II. *Auguste* from the English, and added to the domains of the crown. In the religious wars of the sixteenth century it came into the hands of the League, but A.D. 1589 the inhabitants drove them out. The town lost many inhabitants by the revocation of the edict of Nantes.

Issoudun is in a fertile tract, and is partly on the slope of a hill. The streets are broad and the houses built with tolerable regularity. There are four churches, two hospitals, a high-school, and a theatre. The population was, in 1831, 11,664; in 1836, 11,654: the inhabitants manufacture woollen cloth, linen, hosiery, earthenware, parchment, and leather; they trade in wine, wool, corn, and cattle: there are ten fairs in the year for cattle.

Issoudun is the capital of an arrondissement which comprehends 459 square miles, and had in 1836 a population of 47,572; it contains 4 cantons and 49 communes.

ISSUE is an ulcer artificially formed for the purpose of maintaining a constant purulent discharge from the body. It is usually made by placing one or more beads or peas on an incision through the integuments in one of the limbs, or in the neighbourhood of a diseased part, and there retaining them by adhesive plaster, so as to prevent the wound from healing, and keep it in a constant state of suppuration. Other issues are made by rubbing caustic potash, or potash and quicklime, on a part of the skin till it is destroyed and sloughs, and by keeping open the ulcer thus formed, either with peas, or very stimulant dressings. Setons are another form of issue, made by passing a broad flat needle beneath a portion of the skin, and retaining in the passage thus formed either a skein of silk or a flat band of caoutchouc. The moxa and the actual cautery are also sometimes employed with the same view.

The use of issues for the cure of constitutional diseases, under the idea that they remove noxious principles from the blood, is now entirely abandoned; but they are sometimes had recourse to in order to restore an habitual discharge which has been checked by the cure of any chronic local disease, and the cessation of which has seemed to give rise to congestion of the head or of any internal organ. But the principal value of issues is as counter-irritants, by establishing a disease which is of itself unimportant in the neighbourhood of one which by its situation is more serious; and hence they are amongst the most important means in the cure of chronic inflammations of many internal organs, and especially of those of the joints and of the spine.

ISSUE. (Law.) [Pleading.]

ISSUS, BATTLE OF. [Alexander III., p. 296.]

ISTHMIAN GAMES. These were one of the four great national festivals of Greece, the others being the Olympian, Pythian, and Nemean. They were celebrated under the presidency of the Corinthians, near Corinth, on the *isthmus* connecting Peloponnesus with the continent, and were celebrated at intervals of four years, corresponding with the recurrence of the other festivals abovementioned, so that each year had its solemnity. The Isthmian games were first established in honour of Melicertes, the son of Ino (Paus., i. 44); but were reorganized by Theseus in honour of Neptune, the presiding deity of the Isthmus. The crowns bestowed on victors were of pine leaves. As all these games were similar in their object and ceremonies, it will be sufficient to refer to the article on the principal of them, the Olympian Games.

ISTIO'PHORI, a family of Bats. [Cheiroptera, vol. vii., p. 22.]

ISTIU'RUS. This genus of Saurians, according to MM. Duméril and Bibron, includes the *Hydrosaurus* (*Hydrosaurus Amboinensis*) of Kaup. [Iguanidæ.]

I'STRIA, the antient Histria, a peninsula on the north-east coast of the Adriatic Sea, between the gulf of Trieste and that of Quarnero, or Fiume, is about 50 miles long from north to south, and about 40 miles across in its broadest part, ending in a point near Pola. Till the end of the last century Istria belonged to Venice, except the north-western part of it, or the territory of Trieste, which was in the possession of the House of Austria, but by the peace of Campo-Formio in 1797 the whole of it was given up by the French to Austria, together with the other territories of Venice. Istria now forms a circle of the government of Trieste, in the kingdom of Illyria. [Austria; Illyria.] Its principal towns are Capo d'Istria, a bishop's see, with about 8000 inhabitants; Pirano, a place of considerable maritime trade, with fisheries, and about 6000 inhabitants; Rovigno, with 9600 inhabitants; and Pola, a decayed town, containing only a few hundred inhabitants, but remarkable for its fine remains of antiquity, such as an amphitheatre, several temples, one of which is dedicated to Augustus, a triumphal arch called Porta Aurea, &c. The antiquities of Pola have been described by Spon and by Cassas, 'Voyage Pittoresque de l'Istrie et Dalmatie,' with fine plates, fol., Paris, 1802. The population of Istria under the Venetian republic was 92,000 in 1789. The inhabitants of the towns and coasts are chiefly Italians, who speak a dialect of the Italian, but the peasantry and people of the interior are mostly of Sclavonian race, and speak a dialect of the Sclavonian language, like the Dalmatians and Croatians. The country produces oil, good wine, fruits, honey, corn, and silk; it is rich in salt and fisheries, and has abundant quarries of freestone and marble. It has some tanneries, and other manufactories, but in general the industry of the inhabitants is in a backward state. An offset of the Julian Alps, running to the eastward of Trieste, extends across to the shores of the gulf of Fiume, and sends out its arms into the body of the peninsula of Istria. On the southern slopes of this range several streams rise, which water the valleys of Istria.

ITALIAN ARCHITECTURE. To what was briefly said on this subject in the article Civil Architecture, some further account is now added, which may be introduced by observing, that instead of comprising buildings of every style and class to be met with in Italy, the term 'Italian Architecture' is generally restricted to signify that generic style formed by the revival of the Roman orders, and the adaptation of them, and other features derived from works of the same age, to buildings of every kind, domestic as well as public. Without such limitation, the term would apply to buildings having nothing else in common than their locality, to the Ca d'Oro at Venice, no less than to the works of Palladio, and such modernized *Palladianism* as is exhibited in the design of the Teatro Fenice in the same city. Even with such limitation, the style presents so many varieties, both in regard to modes of treatment and taste of design, as to render it difficult to draw up a succinct account of it, if more be attempted than to explain the character of the orders and other leading external features, with their application, and the taste generally manifested in architectural design.

Instead of proposing to themselves the remains of Roman antiquity as models to be freely followed in the same spirit, and modified as circumstances should require, those who endeavoured to fix a new style founded upon the antient orders began by reducing the orders themselves to the strictest mechanical system possible; notwithstanding that for the Doric and Ionic they had no better guide than the few very debased and insipid specimens which occur in Roman works, and the ambiguous explanations given in the text of Vitruvius. Superstitiously taking him as an infallible oracle, they appear to have looked at the examples which Roman structures afforded them chiefly for the purpose of finding out how they might be made to correspond with his precepts and doctrines; whereas the more proper method would have been to have abided by the latter only so far as they were supported by the authority of the best actual examples. Yet if, on the one hand, this bigoted reverence for a writer who is frequently very obscure as well as pedantic, and who is moreover liable to be greatly misunderstood from the absence of visible representations of what he describes, led to the establishment of a most cramped, dry, and formal system in regard to every member of each order and its proportions; on the other, it did not deter from setting aside all classical precedent as respects almost every thing else in a building. Different orders, or repetitions of the same order, being applied to the several stories of buildings whose fronts were pierced with windows, it became unavoidably necessary to abandon all proportion of intercolumniation, and to space the columns according to the breadth of the piers and the apertures between them; which in turn left hardly any alternative than to engage the columns themselves, that is, to attach either half or three-quarter columns to the walls, because insulated columns placed so wide apart from each other would have had an exceedingly poor and meagre effect; and where one order was placed above another, two straggling rows of low insulated pillars—for low they must be in comparison with the entire height—would have produced an appearance positively disagreeable, and instead of at all ornamenting a building, would have encumbered it with what would have resembled stages of scaffolding. Should any one question this, he has merely to fancy all the columns brought forward two or three feet, in the front of Whitehall chapel, and then judge whether it would be at all improved by two such sprawling galleries standing before it.

For a somewhat similar reason, either pilasters were substituted for engaged columns, or the entablature was made to break over every column,—as in the building just mentioned, which may be referred to as a tolerably characteristic specimen of Italian style in buildings of that class, without those capricious abnormities which so frequently offend us even in the buildings of Palladio himself, although he has the reputation of being comparatively chaste in his designs. For if, instead of being thus broken, the entablature were continued from column to column in each story, overhanging the face of the wall, it would produce the appearance of heaviness as well as weakness.

One defect attending this practice of giving a separate order to each story is, that the columns become insignificant, both in proportion to the entire front and to the windows between them, more especially when the columns are further shortened by being placed on pedestals. In fact windows and doors are generally the predominant features in Italian composition, even where two series are comprised within one order, being generally more prominent in their cornices and pediments than the other projections. They are often decorated with smaller columns or pilasters (as in the front of the Atlas Fire Office, Cheapside, and that of the Legal Assurance Office, Fleet Street), and Palladio has sometimes loaded them by recumbent figures on the raking cornices of their pediments. Sometimes, as in the upper order of the Procuratie Nuove, by Scamozzi, at Venice, the windows (decorated with a lesser order) are carried up to the height of the capitals. In the court of the Louvre the pediments of the windows come immediately beneath the architrave of the order, so that in proportion to the entire mass, and to the windows, the entablatures of the several orders become little more than deep moulded string-courses dividing the stories of the building, and the columns mere expletive decorations attached to the piers. The ornamental details may be in imitation of the members of an antient order, but the character of the antique itself is entirely gone. Even where the windows are kept more subordinate to the order itself, the effect of the latter is frequently diminished by the addition of a heavy attic pierced with windows occupying its entire length, and surmounted in turn by a balustrade, having perhaps a formal row of statues on its pedestals, which viewed at a little distance assume the appearance of so many pinnacles on the summit of the building, while the balusters themselves in such case suggest the idea of perforated battlements, in which, we may remark, they appear to have originated, since there can be little doubt that their name is derived from *Balestra*, the cross-bow, from which arrows were shot through apertures in the parapets of fortified buildings.

Notwithstanding the pedantical strictness with which rules are laid down for the different orders, they so seldom contribute anything either towards character or effect in external design, that the Italian style exhibits itself to most advantage where columns have been discarded, and windows and arches made the chief features in the composition, and the façade crowned by a bold and rich *cornicione*. Of this particular style, in which much may be effected by means of rusticated surfaces, a species of decoration well adapted to it, and admitting very great diversity in itself, we have a small yet exquisite example in the Travellers' Club House, Pall Mall, whose two fronts serve to show what variety of expression may be thus obtained. The front towards the court of the Strand portion of Somerset House is also a good sample of a purified Italian style, where an order is placed on a decorated basement.

Of late years the Italians have abandoned many of their worst architectural faults, corruptions, and caprices, and that taste for exaggerated and frittered ornament which, with here and there an exception, forms so striking a contrast to the antique. But they are still inclined to 'swear by Vitruvius,' and cherish a reverence for Palladio and Vignola. Even Cagnola (who died in 1834), one of their most distinguished architects, seems to have had very little feeling for the beauties of Greek detail as connected with the orders. In fact Greek architecture has hardly been adopted in any one instance, if we except Canova's church at Possagno, which has an octastyle portico of two ranges of columns of the antient Doric order, whose frieze is enriched with reliefs in the metopes. For an account of the modern Palladian architecture of Italy we refer to a paper on the subject in the 63rd number of the 'Quarterly Review,' which contains notices of several buildings not before described.

ITALIAN DRAMA. [ENGLISH DRAMA.]

ITALIC SCHOOL of Philosophy comprises properly two distinct schools, the Pythagorean and the Eleatic. Occasionally however it has been employed in a more restricted sense, and Italic and Pythagorean have been used as equivalent to denote the same philosophical system. The looseness and inconsistency of these different acceptations of the phrase have led to much confusion in the history of philosophy, by giving rise to a personal connection of master and teacher between philosophers who maintained respectively the opinions of Pythagoras and Xenophanes. The peculiar fitness of the designation does not easily appear, and seems to have been owing to an idle endeavour on the part of Greek literary historians to give uniformity to their divisions of the history of philosophy, which were principally drawn from an outward circumstance of a local nature, rather than any internal character of doctrine. Thus we have the Academy, the Stoics, the Megarians, the Eleatics, the Ionians, and so forth.

ITALY, one of the great natural divisions of Europe, extends from its most southern point, Capo dell' Armi, in 37° 55′ N. lat., to 46° 32′ N. lat., its most northern limit, where the Piave, the Adda, and the Ticino have their sources at the foot of the Pennine, Rhætian, and Noric Alps. It lies between 7° and 18° 30′ E. long., the latter being the longitude of the most eastern point of Italy, near Otranto. The northern part of Italy is bounded on the north, north-east, and north-west by the Alps, which sweep round it in a semicircle, beginning from the coast near Nizza, on the Mediterranean, and extending to the Adriatic in the neighbourhood of Trieste.

The ridge of the Apennines, which runs along the Riviera of Genoa, and the northern boundaries of Tuscany, to near Rimini on the Adriatic coast, divides Italy into two distinct regions. One of these regions is situated north of the Apennines, and is chiefly occupied by the basin of the Po and its numerous affluents; while its north-east extremity, which is contracted between the Carnic Alps and the Adriatic, contains the basins of the Brenta, the Piave, and the Tagliamento. The whole region extends in length, from west to east, from Mount Viso in 7° E. long. to the river Isonzo 13° 25′, a distance of 320 miles. [FRIULI.] Its greatest breadth, from the Tuscan Apennines to the sources of the Adda, is about 150 miles. [PO, BASIN OF THE.]

The other region, which is the real peninsula, extends in a south-east direction, between the Adriatic and the Mediterranean seas, for above 500 miles, its breadth varying from 130 to 50 miles, and still less in some parts of Calabria. The Apennines, and the lower ranges which are connected with them, occupy the greater part of the Italian peninsula. The tracts of level country, with the exception of the Roman Campagna and the plains of Foggia and Campania, are of inconsiderable extent, and the peninsula may be viewed as determined in its chief physical features by the long mountain range which traverses it in its whole length. [APENNINES.] The Tuscan Apennines, after running in a direction east-south-east to within a few miles of the Adriatic near Rimini, make a bend to the south-south-east, and run parallel to and near the Adriatic coast, towards which they detach numerous offsets which terminate abruptly on the sea, whilst towards the Mediterranean the slope of the ground is much more gradual, the offsets or secondary ridges running more obliquely to the coast, and forming considerable longitudinal valleys. The larger rivers of the peninsula are on the western side, and the principal basins are those of the Arno, the Tiber, the Garigliano, and the Volturno. [ABRUZZO; ARNO; CAMPAGNA DI ROMA; PAPAL STATES.] In the neighbourhood of Isernia, between the sources of the Volturno and those of the Sangro, the main ridge of the Apennines begins to run more in the centre of the peninsula, leaving to the east the vast plain of Foggia [CAPITANATA], and to the west the plains of Campania.

[Terra di Lavoro.] Farther south, near the sources of the Ofanto, two ridges detach themselves from the main group, one of which runs eastward through the Messapian peninsula, and the other westward through the peninsula of Sorrento to Cape Campanella. The central chain continues to run southward between the basin of the Sele on one side, and those of the Bradano and Basiento on the other. [Basilicata.] It then runs through Calabria, keeping however nearer to the western than to the eastern coast, but occupying with its offsets nearly the whole breadth of that part of the peninsula. [Calabria.]

Northern Italy includes the Sardinian states, Lombardy, Parma, Modena, the Venetian territories, Bologna, Ferrara, and the Romagna. Southern Italy includes Tuscany, the greater part of the Papal States, and the kingdom of Naples. With regard to climate and aspect, the narrow strip called the Riviera of Genoa, which stretches between the Apennines and the sea, may be included in Southern Italy. The islands of Sicily and Sardinia, and several minor ones near the coast, belong to Italy. A general view of the surface and geology of Italy is given in the article Apennines.

The climates of north and south Italy are very different. In the north, frosts and snow are of common occurrence in winter, and delicate plants, such as the orange and the lemon, do not thrive, except in sheltered situations; but in the south, especially near the sea-coast, tender plants thrive in the open air, and in the southernmost part of the peninsula, as well as in Sicily, even tropical plants, such as the sugar-cane, the cotton-plant, the Indian fig, and the date-palm come to maturity. The vine grows all over Italy, but the best wines are made in the south. The high Apennine regions however are bleak and cold even in the south, and as they are hardly anywhere much farther than a day's journey from the coast, there is great variety of climate in the peninsula. The staple products of Italy are corn, rice, wine, oil, silk, and fruits of every kind, and the mountains afford summer pasture for the cattle. The system of irrigation prevails in the north, especially in Piedmont and Lombardy, but the southern parts are subject to droughts in summer. The rivers which have their sources in the Alps or in the higher Apennines are perennial, whilst the other streams are mostly dry in summer. The atmosphere is remarkably clear, especially all along the coast of the Mediterranean, and the tints of the mountains and of the clouds are beautifully warm. Italy is emphatically the land of painting, of melody, and of poetry. The scenery of the Bay of Naples, of the Straits of Messina, and of the Riviera of Genoa, is unrivalled in the world.

History.—The name 'Italia' appears to have been limited in remote times to the most southern part of the peninsula as determined by a line drawn from Tarentum to Posidonia (Herodotus, i. 24; Dionysius, i. 73); and indeed its boundaries were once even more contracted. In the age of Timæus (about 264 B.C.) it stretched as far north as the Tiber, and beyond Picenum. Until the time of Augustus, Italia Proper was understood to extend only as far as the Rubicon on one side and the Macra on the other; the rest was called Cisalpine Gaul, the country of the Veneti, and Liguria.

The history of antient Italy, as a whole, is a part of the history of Rome, and the history of the several antient divisions, such as Etruria and others, requires a separate consideration. The history of those nations which preserved their independence for several centuries after the foundation of Rome, has been treated by several authors, and particularly by Micali, *Storia degli Antichi Popoli Italiani*, and sketches of it are given in this work in the articles Apulia, Campania, Etruria, &c. The reader may also refer to the 1st volume of Niebuhr's 'Roman History.' The period that elapsed after the fall of the Western Empire is noticed in the articles Belisarius, Longobards, and Theodoric.

The modern history of Italy begins properly with the reign of Charlemagne, who was crowned king of the Romans and emperor of the West in the year 800. Under the weak rule of his successors, the counts, marquises, and other great feudatories of the new Western Empire became, *de facto*, independent, and Italy was parcelled out into numerous principalities or states. As the principal towns rose in population and wealth they made themselves independent of the feudatories, and formed so many commonwealths. Then came innumerable quarrels between the towns and the great lords; of the towns among themselves; of the lords with one another; and last of all, of part of both towns and lords against the kings of Germany, who styled themselves the successors of Charlemagne, and assumed the often merely nominal title of kings of Italy and emperors of the West. (Guelphs and Guibelines.) In the midst of all this confusion some considerable states were formed, such as the Papal State, the kingdom of Sicily and Apulia under the Normans, the republics of Venice, Florence, and Genoa, and lastly the duchy of Milan. The dukes of Savoy, originally a transalpine dynasty, also acquired large possessions on the south side of the Alps. Here we have the origin of the present Italian states. A general history of modern Italy is a most intricate and unmanageable subject; sketches of the history of the various states are given in the articles Amadeus, Florence, Genoa, Sicily, Venice, &c.

At the beginning of the sixteenth century Charles V. established by conquest the dominion of the House of Austria over the duchy of Milan and over the kingdoms of Naples and Sicily, which dominion, on his abdication, he gave up to his son Philip II. and his successors of the Spanish branch of the House of Austria. Spain continued to rule these fine territories till the beginning of the eighteenth century, when, by the extinction of the Spanish branch of the House of Austria, Lombardy was transferred to the German branch of the same House, and Naples, and Sicily were formed into an independent kingdom under a Spanish infante. The duke of Savoy at the same time assumed the title of king of Sardinia. The work of amalgamation, consolidation, and national independence in Italy made great progress during the eighteenth century. Venice, Tuscany, Genoa, the Sardinian monarchy, Naples and Sicily, figured among the sovereign states of Europe, while the only part possessed by a foreign power was Lombardy. The French revolution and subsequent invasion of Italy deranged this order of things. Under the pretence of establishing republics the French exercised a military sway over Italy, whilst Venice disappeared from the list of sovereign states and became an Austrian province. Napoleon, having become emperor, formed a kingdom of Italy which however did not include one third of Italy: he annexed another third to the French empire, and gave Naples to his brother-in-law Murat. In 1814 the French evacuated Italy, and the former states were restored, with the exception of Venice, which remained under Austria. Genoa was annexed to the Sardinian monarchy, which kingdom and that of the Two Sicilies are now the two principal Italian powers: the Pope and Tuscany are the two next in importance. Several little territories and jurisdictions on the coast and the island of Elba were annexed to Tuscany, and it was also stipulated that on the demise of Maria Louisa, duchess of Parma, the duke of Lucca should succeed to her states, and Lucca should be annexed to Tuscany. Upon the whole therefore the work of amalgamation and consolidation has made further progress in the present century. The best general historians of modern Italy are Guicciardini, 'Storia d'Italia,' with the continuation by Botta till 1814; Muratori, 'Annali d'Italia,' continued by Coppi till 1820, and Bosti, 'Storia d'Italia Antica e Moderna.' Histories of particular states, towns, and periods are innumerable; the history of Florence has been written by Malispini, Dino Compagni, Villani, Poggio, Bruni, Machiavelli, Varchi, Segni, &c. Pignotti and Galluzzi have written a general history of Tuscany; that of Naples by Giannone, has been continued by Colletta to the present time; Giulini, Rosmini, and Verri have written the history of Milan; a series of writers have treated of the history of Venice, 'Istorici delle cose Veneziane,' and the historians of Genoa are equally numerous. There is hardly a town in Italy which cannot boast its native chronicler. Among the foreign historians of Italy, Sismondi deserves especial mention for the 'Histoire des Républiques Italiennes,' a work of vast research, of conscientious accuracy as to facts, and of attractive eloquence, but with a decided bias in its judgments and inferences in favour of those very unequally administered and very factious and turbulent municipal communities.

Political Divisions.—The area of Italy, with Sicily, Sardinia, and the adjacent small islands, is estimated at about 123,000 English square miles, and the population is estimated at 21 millions.

The following view is from Count Serristori's 'Saggio Statistico dell' Italia' (Vienna, 1833); the areas are taken from Neigebaur's 'Gemälde Italiens' (Vienna, 1832), but they are to be considered only as approximations, as there is considerable discrepancy between the various authorities.

The LOMBARDO-VENETO kingdom, of which the emperor of Austria is king, consists of two great divisions: Provincie Lombarde, or government of Milan, with an area of 8460 square miles, and 2,379,000 inhabitants; and Provincie Venete, or government of Venice, with 9472 square miles, and 1,900,000 inhabitants. 2. The SARDINIAN monarchy consists of two great divisions: the Stati di Terra Ferma, or continental territories, with an area of 20,850 square miles, and 3,750,000 inhabitants, and the island of Sardinia, with an area of 8200 square miles, and 510,000 inhabitants. 3. The Grand Duchy of TUSCANY, with an area of 8700 square miles, and 1,300,000 inhabitants. 4. Duchy of LUCCA, with an area of 420 square miles, and 152,800 inhabitants. 5. Duchy of PARMA, with an area of 2300 square miles, and 454,000 inhabitants. 6. Duchy of MODENA and MASSA, with an area of 2068 square miles, and 350,000 inhabitants. 7. Republic of SAN MARINO, with an area of 27 square miles, and 7000 inhabitants. 8. PAPAL STATES, with an area of 17,860 square miles, and 2,707,000 inhabitants. 9. The kingdom of the Two SICILIES, consisting of two great divisions: Dominj di quà dal Faro, or kingdom of NAPLES, with an area of 31,610 square miles, and 5,809,000 inhabitants; and Dominj di là dal Faro, or SICILY, with an area of 12,900 square miles, and 1,681,000 inhabitants.

The most densely inhabited state is that of Lucca, which contains 362 individuals for every square mile, and one proprietor for every four inhabitants. Next to it in population come the Lombard provinces. The most thinly inhabited parts are the Campagna of Rome and the island of Sardinia. There is no country of Europe which has so many considerable towns in proportion to its extent as Italy. Besides one city, Naples, which has above 350,000 inhabitants, there are six others, namely, Milan, Venice, Turin, Florence, Rome, and Palermo, which exceed 100,000 each; five more, namely, Genoa, Leghorn, Verona, Bologna, and Messina, have from 60,000 to 80,000; six contain between 30,000 and 40,000, namely Padua, Vicenza, Parma, Bergamo, Brescia, and Catania; seventeen contain from 20,000 to 30,000, namely, Alessandria, Asti, Cremona, Pavia, Mantua, Piacenza, Modena, Lucca, Pisa, Siena, Ancona, Perugia, Ferrara, Ravenna, Foggia, Trapani, and Cagliari; and a still greater number have a population varying from 10,000 to 20,000. The population is everywhere on the increase, at the average rate of one per cent. annually.

Of the actual social condition, manners, and temper of the Italians, we have had numerous accounts from travellers since the peace. All those which affect to give a general sketch of Italian character, even the best of them, are imperfect, and partly inaccurate; and this they necessarily must be. It is almost impossible for a foreigner to have all the requisites for such a work—the time, the preparatory information, the facilities, the introduction to the various classes of society, which would be requisite to secure a satisfactory performance of the task. Italy is not one country, inhabited by one people long fashioned and amalgamated under one central government, and receiving its form and pressure from the influence of one capital. There are not only many provincial differences, as in France and other compact states, but national differences of character, different institutions and customs, and even different languages. The steady plodding inhabitants of the broad, level, and rich plain of the Po are a very different sort of people from the active, frugal, money-seeking, adventurous, and free-spirited Genoese, or the caustic, refined, but somewhat consequential and verbose Tuscans; while the Tuscan himself is different from the mercurial, fantastical, careless and pleasure-seeking, but quick and acute Neapolitan. Again, Italian domestic society is not of easy access to foreigners; the Italians are more reserved than the French, and there is also a remarkable difference between the manners of the various classes, and between the inhabitants of the towns and the country people. It may be affirmed however of the Italians that they are possessed of great capabilities, fit for all intellectual pursuits, and for art in general; that they have a quick discernment, considerable elasticity of temper and flexibility of disposition; a natural taste for music and poetry; that they are more fond of pleasure than of assiduous labour, more inventive than persevering, naturally of warm and kind feelings, but prone to suspicion and jealousy. Morals in Italy have greatly improved within the last half century, owing chiefly to a greater diffusion of instruction, better laws, and a better system of police. Heinous crimes are become much more rare, but considerable looseness of conduct still exists in the towns; much time is lost in idle gallantry, and the conjugal bond is not sufficiently respected, especially among the middling and higher classes, though this remark admits of course of innumerable exceptions. The charge however is applicable to other southern countries besides Italy. Industry has made and is making considerable progress; better modes of agriculture have been adopted, manufactories are established everywhere, new roads and canals have been made, particularly in Lombardy, the Sardinian states, and Tuscany; and several railways are in course of being laid. The chief towns are all embellished and increasing in population. The maritime trade, especially of Genoa, Leghorn, Venice, and Naples, is thriving, though inferior to that of Trieste. And here we may observe that the trade with Italy is of greater importance to England than is commonly imagined: it appears by the official returns, that the value of British produce and manufactures exported to Italy amounts nearly to three millions sterling annually, exclusive of colonial produce, which is more than is exported to any other European country, with the exception of Germany. The annual imports from Italy into the United Kingdom are about one million and a half sterling.

Among the writers who have given the best accounts of particular parts of Italy in the present century, we may mention Rose, 'Letters from the North of Italy,' which treat of the Venetian territories; Châteauvieux's 'Lettres écrites d'Italie,' chiefly on the state of agriculture; Keppel Craven, 'Tours in Calabria and the Abruzzi;' Tournon, in his elaborate work 'Etudes statistiques sur Rome et la Partie Meridionale des Etats Romains,' which gives a faithful account of that important portion of Italy; and a very impartial article on 'Education in Tuscany in 1830,' in No. III. of the 'Quarterly Journal of Education.' Some information concerning Italian society and manners may also be derived from Millin, 'Voyages en Piémont;' Vieusseux, 'Italy and the Italians in the Nineteenth Century;' Simond, 'Voyage en Italie,' though hurriedly written and deficient in discrimination; Valery, 'Voyages littéraires en Italie;' Della Marmora and Captain Smyth 'On the Island of Sardinia;' Captain Smyth 'On the Island of Sicily;' and Benson's 'Corsica,' which last is essentially an Italian island, although belonging to France. Two critical sketches 'On modern Books of Travels in Italy' appeared in Nos. IV. and VIII. of the 'Quarterly Journal of Education;' and another on Valery's book in No. 33 of the 'Foreign Quarterly Review,' January, 1836. Accounts of the state of education in all its branches in the various Italian states are given in Nos. I., V., VI., and XVI. of the 'Quarterly Journal of Education.' Elementary or popular education is best attended to in Lombardy and Tuscany; but it is making progress also in the other states. The judicial system has also received considerable improvement. In Tuscany, Naples, and Genoa examinations of witnesses and trials are now public; while in other states the system of written depositions and trials with closed doors still prevails. Torture has been long since universally abolished. The Inquisition exists only in the Papal States.

Italian Language and Literature.—The language called Italian is the written language of Italy, and bears the same analogy to the spoken language of Tuscany and Rome as the written languages of France and England bear to the oral language spoken in the towns and provinces of those respective kingdoms in which dialects do not prevail. But while in France and England the use of dialects is confined in great measure to the peasantry of districts remote from the capitals or to mountainous parts, most of the Italian states have each a living dialect, which is the oral language of the people, and spoken even by educated people among themselves, although all educated people speak also the Italian or common written language, which they learn as a branch of education. The dialects of Italy are numerous, and most of them contain written and printed works, especially plays and other poems. The principal dialects are the following:—1. The Milanese is spoken at Milan and its territory, with some variations according to the different districts. It has been cultivated by several writers of real poetical genius, such as Maggi, Parini, and in our times by Grossi and Porta. A selection of Milanese poems has been made, 'Collezione delle migliori Opere scritte in Dialetto Milanese,' 12 vols. 12mo. 2. The Venetian is one of the most graceful of the Italian dialects, and under the late republic was the language of the senate and of the courts of justice. There are numerous writers in this dialect; among others, Gritti, Lamberti, Goldoni, and, in our time, Buratti. A selection has been likewise made of these, 'Collezione delle migliori Opere scritte in Dialetto Veneziano,' 14 vols. 12mo. 3. The Mantuan dialect has been illustrated by the writings of the eccentric wayward monk Folengo. 4. Calvo has written in the Piedmontese, and Alfieri has given a short vocabulary of it, with the corresponding words in Tuscan. The Piedmontese has considerable affinity with the Languedocian and other Romance dialects. 5. Genoese: Foglietta and Cavalli are two of the best writers in this dialect. 6. The Bolognese is one of the most uncouth dialects of Italy, but it has some poets, among others Giulio Cesare Croce. These are the principal dialects of North Italy, besides which there are many other local ones, such as Bresciano, Bergamasco, that of Padua, which resembles the Venetian, and that of the Friuli. In South Italy the principal dialects are the following:—7. The Neapolitan, or Apulian, was the language spoken at the court of Frederic II. in the thirteenth century, and in which the history of that prince by the contemporary chronicler Matteo Spinello is written. It was afterwards spoken at the court of the Anjou and Aragonese kings of Naples, and has been in fact used within our own times by King Ferdinand and his courtiers. It is very copious, abounds with diminutives and vituperative terms, and is well suited for broad humour and for the purpose of imitative harmony. The Neapolitan among all other Italian dialects has been perhaps the most cultivated by writers. There is a collection of Neapolitan poems in 28 volumes, several of which, such as those by Cortese, Sgruttendio, Capasso, both in the humorous and the pathetic styles, have considerable poetical merit. The other South Italian dialect is, 8, the Sicilian, which can boast of Giovanni Meli, dead not many years since, who ranks among the first lyric poets of Italy, and whose works have been collected and published in seven volumes. Between the Neapolitan and Sicilian is the Calabrian dialect, which participates more of the latter, and in which there is a spirited version of Tasso's 'Gerusalemme.' Lastly, 9, the dialect of the Island of Sardinia has a great resemblance to the Catalonian and Valencian and other dialects of the Romance or Provençal language. The Sardinian is also a written dialect. There is an article 'On the Study of the Italian Language and Literature' in Nos. X. and XII. of the 'Journal of Education,' and another 'On the Dialects and Literature of Southern Italy' in No. IX. of the 'Foreign Quarterly Review' for November, 1829.

The Italian dialects must not be considered as corruptions of the written Italian, but as languages which have an affinity to and are anterior to it, and derived from the corrupt dialects of the familiar Latin or Roman which were spoken in the provinces of Italy remote from Rome, and perhaps also in part from the older languages of Italy existing previous to the Roman conquest. The influx of the northern nations effected a total corruption of the spoken Latin; articles and auxiliaries were introduced; terminations were altered or neglected; some, though not a great many, words of Teutonic origin were introduced; and various dialects resulted from these various combinations which were called by the general name of Romanc, Romanic, or Romance language, like those spoken in the south of France. The dialects spoken in Central Italy retained a greater affinity to one another, as well as to their common Latin parent. If we look at the old chronicles and other documents of the thirteenth century, written in a familiar style, whether at Naples, Rome, Bologna, or Tuscany, we see a great similarity in their syntax and etymology. The oral dialect of Tuscany seems to have attained a considerable degree of polish and grammatical regularity sooner than the others; probably it had never been so corrupt as the rest, owing to the local position of Tuscany, which was not extensively or permanently colonized by the northern tribes, and also owing to the early independence of the Tuscan cities, and their prosperity and civilization. In the rest of Italy a few men of education used also an oral language more refined than the generality of the people, which was called Lingua Aulica, or Cortigiana, and thus the early versifiers, including princes and courtiers, Frederic II. and his chancellor Pietro delle Vigne at Naples, Guido Guinicelli and Frà Guidotto at Bologna, Guido delle Colonne, a Sicilian, Can della Scala at Verona, Guido da Polenta, prince of Ravenna, wrote in a language which differs little from that of Brunetto Latini, Guitton d'Arezzo, Guido Cavalcanti, and other Tuscan poets of the same age. But Tuscany had this advantage over the rest, that its familiar spoken language was more generally polished, so as to resemble the poetical and select language of the other Italians, and the Tuscan poets had the benefit of writing in a living dialect, 'lingua volgare,' and their poems were understood by the generality of their countrymen. The writers of the fourteenth century, Dante, Dino Compagni, Petrarch, Boccaccio, Cino da Pistoja, Sacchetti, Villani, Pandolfini, were all Tuscans, and they permanently impressed on the written language of Italy the stamp of Tuscan spirit and idiom. As people of education in every part of Italy applied themselves to write in the 'lingua volgare,' the use of writing in Latin being gradually dropped, this 'lingua volgare,' or written Italian, began to form an essential part of education, and all those who received school instruction learned to speak it more or less correctly. It came afterwards to be adopted in many places as the language of the government, of the courts of justice, of the pulpit, and of the stage, and thus it has been styled emphatically the Italian language, because it is used as the general medium of communication, written and oral, all over the peninsula. But it is nowhere, except in Tuscany and in part of the Roman states, the language of the lower orders, the language of the nursery, of the markets, of convivial familiarity, of every-day life. Its general adoption is however strongly urged of late years by the various governments, and particularly attended to in all elementary schools.

The writers of the fourteenth century are called by the Tuscans the 'Trecentisti,' and they are considered by many as the purest models of Italian composition. In the fifteenth century there was a retrograde movement in the cultivation of the Italian language. The Latin again resumed the ascendency as a written language, and the 'lingua volgare' was left to the vulgar, or employed merely for familiar purposes. The discovery of the antient classics, the revival of the study of the Roman law, the arrival of many learned Greek refugees flying from the Ottoman conqueror, the influence of the Roman hierarchy, whose language was the Latin—all these circumstances gave a general impulse towards classical learning, and the Italian literati disdained to write except in the language of their presumed forefathers. Alberti, Bracciolini, Bruni, Filelfo, Panormita, Platina, Pontano, Valla, Ficino, and other learned men and also women of that age, wrote in Latin. But Lorenzo de' Medici at Florence, the Este at Ferrara, the Gonzaga at Mantua, countenanced Italian poetry, and Pulci, Bello, and Bojardo gave the first specimens of the Italian epic, while Poliziano and Lorenzo himself excelled in lyrics. In this same century Cennino Cennini wrote an Italian treatise upon painting, and the illustrious Leonardo da Vinci, painter, architect, and engineer, composed his precepts on the same art, which were published long after his death; 'Trattato della Pittura,' 1651.

The sixteenth century was the second æra of Italian literature. It has been styled the age of Leo X., because that pontiff, in the early part of the century, surrounded himself with some of the most learned men of his time. But the two great historians and statesmen Machiavelli and Guicciardini, the 'Divino Ariosto,' and Michelangelo Buonarroti, who was sculptor, painter, architect, and poet, are four names sufficient of themselves to adorn any age or country. The other principal writers of the sixteenth century were: the historians and biographers, Varchi, Segni, Bembo, Paruta, Davanzati, Costanzo, Vassari, Cellini; the poets, Sannazaro, Berni, Molza, Trissino, Guarini, and above all Tasso; the essayists, Castiglione, Della Casa, Speroni, and Bottero; the critics, Castelvetro and Salviati; the novelists, Bandello, Firenzuola, Grazzini; the architects, Barocci da Vignola, Palladio, and Marchi, and numerous others in almost every branch of learning. The learned Sigonio, Baronius, Panvinio, Vida, the jurists Alciati and Turamini, the mathematicians Maurolico and Cardano, and many other men of science, wrote in Latin. The authors of the sixteenth century are called by the Italians 'Cinquecentisti,' and are considered as models of Italian writing, though some critics observe in most of them a falling off from the freshness and raciness of the great Florentine writers of the fourteenth century.

The seventeenth century, called by the Italians the age of the Scientisti, exhibited a degeneracy of taste, both in literature and the arts. The leaden yoke of Spanish viceroys, armed with all the terrors of delegated absolutism and of clerical inquisition, ignorant or careless of the very elements of government and administration, weighed heavily over the finest regions of Italy. The miseries resulting from that system have been described by Boccalini and Giannone, and again vividly retraced in our own time, by Manzoni in his 'Promessi Sposi,' and by Cantù in his 'Ragionamenti sulla Storia Lombarda del Secolo XVI.' The Italian writers, and especially the poets, adopted a turgid hyperbolical style, replete with false conceptions, and all the tinsel of rhetorical adulation. The school of Marini and of his worse disciples has become proverbial as the school of depraved taste in composition. However the same causes of mental degradation and corruption did not operate equally over all the peninsula. Tuscany, Venice, Genoa, Piedmont, retained their independence and with it their national spirit. Accordingly we meet here and there with writers distinguished by their sentiments as well as by their language, such as the celebrated Sarpi, the learned prelates Bentivoglio, Pallavicino, and Bellarmino; the historian Davila; the Jesuits Segneri and Bartoli; the poets, Guidi, Chiabrera, Filicaja, Tassoni, Rinuccini, Menzini; the painter and poet Salvator Rosa; the philologist Salvini; while Italian science can boast in the same age of Galileo, Cassini, Torricelli, Malpighi, Borelli, Marsigli, Redi, Viviani, and Guglielmini. Antonio Serra, one of the earliest, if not the earliest, writer on political economy, published in 1613 a treatise showing the various causes through which countries may become enriched; a work neglected and forgotten for ages after. The historian Noris, the learned antiquarian Bianchini, and the jurist Gravina, wrote in Latin.

In the eighteenth century Italian literature assumed a new character. The historians Maffei, Muratori, and Giannone, and the philosophic writers Vico, Stellini, and Genovesi, brought a new light into their respective departments. The spirit of investigation and deep reflexion was now busy at work. Goldoni effected a revolution in the Italian stage, and Metastasio imparted a new vigour and poetical freshness to the melodrama or opera. In the department of criticism there were Zeno, Baretti, Gozzi, Mazzuchelli, and Cesarotti; Milizia, Lanzi, and Bottari wrote eloquently on the fine arts; Martini and Tartini, on music; Verri, Carli, Galiani, Neri, on political economy; Bettinelli, Tiraboschi, and Corniani, on the history of Italian literature; Buonafede, on the history of philosophy; Beccaria, Filangieri, and Mario Pagano, on legislation; Vallisnieri and Spallanzani, on natural history; Volta and Galvani, on physics; Denina, on the history of Italy; Passeroni, Varano, and Parini wrote moral poetry; and lastly Alfieri created the Italian tragedy.

The invasion of Italy by the French in 1796 and the political revolution which followed, whilst they served to stimulate the minds of the Italians to exertion, had an unfavourable influence upon the language. French was the language of the conquerors, and it became the fashionable language of the conquered. Those Italians, and they formed an immense majority, who did not know French, intermixed French idioms with their already imperfect and dialectic Italian, and a spurious unseemly compound was thus formed which was neither French nor Italian, and which found its way into the political essays, the newspapers, the pleadings, and even the acts of government. A few writers, formed in a better school, opposed the torrent; among these are Alfieri, Monti, Foscolo, Ippolito Pindemonte, Napione, Cesari, and Giordani. The other principal writers of the present century are—the historian Botta, the best that Italy has produced since the sixteenth century; the tragedians Niccolini and Pellico; the romantic poets Grossi and Sestini; the didactic Arici; the satirist D'Elci; and above all, the novelist, philosopher, dramatist, and lyric poet Manzoni, who has given Italy the first model of an historical novel, an example followed by Professor Rosini in his 'Monaca di Monza,' and by several others. Nota has supplied the Italian stage with many good comedies. Micali has written the history of Italy before the Roman dominion; Bossi, a general history of Italy; Vacani, the military history of the Italian army employed in Spain under Napoleon; Cuoco and Colletta, the history of Naples; Pignotti, the history of Tuscany; Manno, that of the island of Sardinia; and Serra, the history of Genoa. Cicognara has given a history of sculpture; and Missirini, an interesting biography of the great sculptor Canova. Ugoni and Lucchesini have written on the Italian literature of the eighteenth century. Gioja has written largely on political economy and legislation; Romagnosi and Tamburini, on jurisprudence; Brocchi and Breislak, on geology and mineralogy.

These, who are only a few out of many, are the principal writers that Italy has yet produced in the present century. The best historians of Italian literature are Tiraboschi, continued by Lombardi to the end of the eighteenth century; Corniani, continued by Ugoni; Ginguené, continued by Salfi; and Fontanini's 'Biblioteca dell' Eloquenza Italiana,' with the notes by Zeno. Numerous writers have treated of particular branches, such as Aldeano, Quadrio, Crescimbeni; and series of Italian historians, dramatists, lyric poets, satirists, &c., have been published.

Italy, which has been for ages the nurse of the fine arts, has still, since the death of Canova, many respectable artists, but hardly a first-rate sculptor or painter. With architects and engineers she is better provided. The art of engraving is in a highly flourishing state; Morghen, Longhi, Gandolfi, Anderloni, and others, are first-rate artists, and the splendid works illustrative of the arts which appear in Italy, such as 'The Churches of Italy,' the 'Famiglie Celebri Italiane,' edited by Litta, and others, are equal to anything of the sort produced by any other country. (*Quadro della Letteratura, Scienze, ed Arti in Italia nell' anno* 1820, di Giuseppe Acerbi; *Saggio sulla Storia della Letteratura Italiana, nei primi* 25 *Anni del Secolo XIX.*. 8vo., Milano, 1831; Sacchi, *Indole della Letteratura Italiana nel Secolo XIX.*)

The journals, both literary and political, of which forty years ago there hardly existed a dozen in all Italy, have increased to nearly two hundred since the last peace, embracing every branch of literature, science, and art. The statistics of every state of Italy are also published, as well as accounts of the state of education, legislation, industry, commerce, and other useful knowledge. Such is the condition of Italy at the time we are writing (1838), very different in reality from what it was at the end of the last century, or from what party exaggeration and querulousness would represent it still to be. An immense progress has been made, though many further improvements may still be wanted. In machinery, mercantile speculation, and practical political economy, Italy is certainly behind Germany and England, and perhaps France.

The religion of Italy is the Roman Catholic, with the exception of a few valleys among the Alps of Piedmont, inhabited by the Valdenses, and of the Jews, who live in most of the principal towns, and have synagogues. At Leghorn, Florence, Venice, and other mercantile places, chapels for foreign Protestants and Greeks are tolerated.

ITCH, or, as it is termed by nosologists, Scabies or Psora, is a disease of the skin, of which the most prominent symptom is a constant and intolerable itching. The eruption consists most commonly of minute vesicles filled with a clear watery fluid, and slightly elevated on small pimples; but its character is often obscured by a mixture of papulæ and pustules with the vesicles. Hence the disease has been divided into distinct species according to the predominance of each kind of eruption; but the distinction is artificial, and of no practical utility. The eruption occurs principally on the hands and wrists, and in those parts most exposed to friction, as the spaces between the fingers and the flexures of the joints. After a time it extends from these parts to the arms, legs, and trunk; but very rarely, if ever, appears on the face.

The itch is attended by no constitutional disorder, except in those severest forms in which the eruption consists chiefly of large pustules surrounded by considerable inflammation of the adjacent skin. It never appears to arise spontaneously; but, where cleanliness is not strictly observed, it is easily communicated by contact. Minute insects, of a species of Acarus, are often found in the vesicles; but as they are also often absent, the disease cannot be considered to depend entirely upon their presence.

A certain specific for the cure of the itch, which never gets well without treatment, is the local application of sulphur; all the parts on which the eruption is visible should be plentifully smeared with the *unguentum sulphuris* every night, or every night and morning, till the cure is perfected, which will require from three days to a fortnight, according to the severity and extent of the disease. The ointment must remain on the parts after each application, and occasional warm baths ought to be used during the treatment.

ITHACA, called Thiaki by the modern Greeks, celebrated in antient poetry as the country of Ulysses, and now one of the seven Ionian Islands, is situated north-east of Cephalonia, from which it is divided by a channel between three and four miles wide. It is twelve miles long, and about four miles in its greatest breadth. On the east coast of the island, facing the mainland of Acarnania, from which it is about twenty miles distant, is the deep Bay of Bathi, with a good harbour, and the little town of Bathi, with 2000 inhabitants. The country around is planted with vines, olive and orange trees. The remainder of the island is hilly and rocky, especially towards the western coast, with small but deep valleys between the hills, which have a good soil, and produce currants, wine, corn, oil, and all kinds of fruits. The red wine of Ithaca is one of the best in Greece. There is abundance of springs on the island, but wood is scarce. The whole population is 9566, and is scattered among eight or nine villages. The habits and manners of the natives are like those of their neighbours of Cephalonia. They belong to the Greek church, and the clergy are under the direction of a protopapa. The cultivation of the soil, fishing, and some coasting trade, form the occupation of the people. They export currants, oil, and wine. The climate of Ithaca is healthy and mild. (Neigebaur, *Gemälde Italiens und der Ionischen Inseln.*) [IONIAN ISLANDS.]

ITHO'ME. [MESSENIA.]

ITTNERITE. This mineral occurs crystallized in rhombic dodecahedrons and massive. Structure compact. Fracture imperfect conchoidal, passing into uneven. Hardness 5·0 to 6·0. Colour bluish or ash-grey. Lustre resinous to vitreous. Specific gravity 2·3. It forms a jelly when put into acids. Fuses *per se* before the blowpipe, with effervescence of sulphurous acid, into an opaque blebby glass. It yielded by analysis—

Soda	11·29
Potash	1·57
Silica	30·17
Alumina	28·40
Lime	5·24
Oxide of iron	0·62
Sulphate of lime	4·89
Common salt	1·62
Sulpuretted hydrogen and water	10·76
	94·56

ITURBIDE. [MEXICO.]

IVAN. [RUSSIA.]

IVES, ST. [CORNWALL; HUNTINGDONSHIRE.]

IVIÇA, or IBIZA, the Ebusus of the antient geographers, one of the Balearic Islands, lies forty-two miles south-west of Majorca, and is about twenty-seven miles long from north-east to south-west, and about fifteen in its greatest breadth. It is divided by a channel three miles wide from the island of Formentera, which lies due south of it. The south-west point of Iviça is fifty miles east by north of the Cabo Nao on the coast of Valencia on the mainland of Spain. The island is hilly and stony in many parts, but in others very fertile. It produces oil and wine, corn, fruits of every kind, has a large stock of sheep, and the sea near the coast abounds with fish. The manufacture of salt in salt-pans constitutes a great branch of industry. The mountains are covered with timber-trees. The inhabitants are indolent and uninformed: their mode of agriculture is slovenly. They speak a dialect of the Limosin, the language of Valencia and Catalonia, which is a branch of the Romance language once spoken all over the south of Europe. The island is divided into five cuartones or districts, namely,—Llano de Villa, Santa Eulalia, Balanzat, Pormañy, and De Salinas. The capital, Iviça, built on a peninsula on the south-west coast of the island, is fortified, has a good harbour, and reckons about 6600 inhabitants: it has a cathedral and six other churches, two hospitals, and a public school or gymnasium. (Miñano, *Diccionario Geografico de España.*)

IVORY, the name given to the substance which composes the tusks of elephants, is extensively used in the arts for making or embellishing numberless small articles in almost universal use, and which do not require to be further described. The principal supplies of elephants' teeth to this country are derived from the west coast of Africa and from Ceylon. Out of 5846 cwt. imported in 1837, we received 2246 cwt. from the former quarter, and 2297 cwt. from Ceylon. The remaining imports are from the coast of Barbary, the Cape of Good Hope, Madagascar, and Siam. The United States of America also send to this country some of the ivory which they import. The total quantities imported and used respectively in each of the last ten years have been—

	Imported.	Taken for Consumption.
1828	3596 cwt.	3531
1829	4345	3605
1830	5469	3628
1831	5267	3368
1832	2992	2533
1833	5042	3958
1834	6732	4282
1835	5204	3698
1836	6524	4584
1837	5846	3725

IVORY BLACK, or, as it is commonly called, *animal charcoal* and *bone black*, is prepared usually, as the latter appellation indicates, from bones heated in iron cylinders to dissipate the more volatile products of the animal matter which they contain, and to leave the phosphate of lime intermixed with much charcoal and some of the saline portions of the bone. Carbonate of ammonia is one of the products obtained.

Animal charcoal does not greatly differ in appearance from common charcoal; but there are points in which they greatly differ; thus animal charcoal obstinately retains some azote, while wood charcoal often contains hydrogen.

Ivory, or bone black, possesses the singular property of completely destroying the colour of a great number of animal and vegetable solutions to much greater extent than common charcoal; thus an ounce of animal charcoal will in a few minutes entirely remove the colouring matter of a pint of red wine. This effect is more readily produced on hot than on cold fluids. It is largely employed on account of its decolouring power in sugar refining, and the finer the powder to which it is reduced the greater is its efficacy.

It is difficult to give a satisfactory explanation of the decolorizing power of animal charcoal; but it appears that it is entirely dependent upon the carbonaceous matter, the action of which is however modified by the presence of the earthy salts, as the carbonate and phosphate of lime. It further appears that the charcoal combines with the colouring matter, but only when it is in a state of fine powder.

IVORY COAST. [COAST, GOLD.]

IVRE'A, a province of the Continental Sardinian States, stretches from the foot of the Alps, which divide it from Savoy and the Val d'Aosta, southward to the Po, and is watered in its length, which is about 20 miles, by the Dora Baltea. The Orca, another affluent of the Po, having its source on Mount Iseran, one of the high Graian Alps, waters the western parts of the province of Ivrea, where it borders upon that of Turin. To the east, Ivrea is bounded by the province of Vercelli; and to the north, by that of Aosta. The country consists in great part of hills, being the lowest offsets of the Alpine chain, and some fine valleys between; the southern part of it merges into the great plain of the Po. The soil produces abundantly corn, good wine, hemp, and pastures on which a great number of cattle are fed. The system of irrigation by water drawn from the Dora and other streams is here in full operation. Silk is also made, and the mountains produce plenty of chestnuts. This province was a marquisate in the middle ages, when Berengarius, marquis of Ivrea, became king of Italy. It is called 'Il Canavese,' from the quantity of hemp ('canapa') which it produces, and the inhabitants are noticed in the 'History of Piedmont' as quarrelsome and warlike. The population of the province is 118,000. The chief town is Ivrea, in a fine situation on the slope of a hill on the left bank of the Dora, across which is a Roman bridge of a single arch: it is at the entrance of the lowland of Italy for travellers coming by the St. Bernard Pass. Ivrea is an old-looking town, with walls and a castle; it is a bishop's see, has six churches, besides the cathedral and several convents, a seminary for clerical students, a royal college, an hospital, and about 8000 inhabitants. There are some remains of antiquity at Ivrea; among others, a fine urn with figures in relief. The cathedral is built on the ruins of a temple of the Sun. Ivrea, called antiently Eporedia, was a town of the Salassi, and afterwards was colonized by the Romans.

The other towns of the province are: Castellamonte, with 4800 inhabitants; Caluso, 5400 inh., and a college; Cuorgnè, 3000 inh., and a grammar-school and copper-works; Agliè, 3000 inh., with a castle and a handsome park; S. Giorgio Canavese, 3300 inh., and a college; Locana, 5000 inh., with brass-works; Valperga, 2700 inh.; Pont, 2600 inh., in a delightful valley watered by the Orca and its affluent the Saona. In this valley are many natural curiosities, and the traces of silver and gold mines, said to have been once worked by the Romans. Copper is found in the Val d'Orca, and iron in the Val Brozzo, where there are several iron-works. There are several other small towns of above 2000 inh., such as Azeglio, Bolengo, Vische, S. Giusto, Pavone, Chiaverano, &c. (Neigebaur, *Gemälde Italiens*; *Calendario Sardo*; Saussure, *Voyages dans les Alpes*.)

IXA. [LEUCOSIANS.]

I'XALUS, a form of herbivorous Mammifers, placed, with doubt, by Mr. Ogilby under his family *Moschidæ*. That zoologist observes that the genus, founded upon the observation of a single specimen, may eventually prove to belong to a different family. He remarks that it differs little from the true Antelopes; but even supposing it to be correctly placed among the *Moschidæ*, other forms, he observes, are still wanting to fill up the chasms which evidently exist among that group. The type is *Ixalus Probaton*. (*Proc. Zool. Soc.*, part iv., p. 119.)

IXO'RA, a genus of Rubiaceous plants of the tribe Cinchonaceæ, so named, it is supposed, from the Indian god Iswara. The genus is characterized by having a small four-toothed calyx; corolla 1-petalled, funnel-shaped; tube long, with the four stamens in its mouth; ovary 2-celled, 1-seeded; style single; berry drupaceous, inferior, 2-seeded. The species are numerous, and chiefly confined to India and the Oriental Archipelago. They form shrubs or small trees, with opposite leaves, and stipules arising from a broad base, but acute at the apex. The flowers are in terminal corymbs, and are usually red, but sometimes white, and are generally highly ornamental, whence several are cultivated in our hothouses, where they require to be kept in a moist heat to thrive well. Some of the species are used medicinally, but not to any extent. Dr. Horsfield mentions *I. coccinea* as employed in Java as a stimulant, and Rheede two or three other species; but none appear to be possessed of any very active properties.

IXOS, a genus of birds established by M. Temminck, for those thrushes which have the bill shorter than usual, and embracing the greatest part of the *Brachypodinæ* and nearly the whole of the *Crateropodinæ* of Swainson. Ornithologists generally admit this genus; but Mr. Swainson is of opinion that, though it may be continued in artificial systems, it cannot be adopted in natural classification, since it includes genera long before defined, and unites under one name birds which actually belong to different families.

INDEX TO THE LETTER I.

VOLUME XII.

I. page 424
Iambics, 424
Iámblichus, 424
Iánthina [Janthina]
Ianthocincla [Merulidæ]
Iaxt [Jaxt]
I'bacus [Scyllarus]
Ibéria, 425
Ibéria, 425
Ibex [Goat]
Ibis [Abau-Hannes; Tantalidæ]
Ibycter [Falconidæ, vol. x., p. 167]
Ice [Freezing; Water]
Iceland, 425
Iceland Moss, 427
Iceland Spar [Calcareous Spar]
Icéni [Britannia]
Ichneumon, 427
Ichneumon (Entomology) [Pupivora]
Ichthyology, 429
Ichthyosaurus, 430
Ichthyosiágones, 433
Icolmkill [Iona]
Icónium [Asia Minor]
Icononzo, Bridge of [Granada, p. 353]
Icosahedron [Solids, Regular]
Icosándria, 433
I'cterus [Sturnidæ]
Icterus [Jaundice]
I'ctides, 433
Ida [Candia]
Ida [Troad]
Idea, 434
Ideal, 435
Idealism, 435
Ideology, 436
Identity, 436
Ides [Kalendar]
Idia, 436
Idmónea, 436
Idocrase, 436
Idotea [Isopoda]
Idria [Illyria]
Idrialin [Hydrogen, p. 397]
Idumæa, 437
Idya, 437
Idyia, 437
Idyll, 437
Ierea, 437
Iglau [Moravia]
Ignátius, 437
Ignátius Loyola [Jesuits]
Ignition [Heat]
Iguána, 437
Iguánidæ, 439
Iguánodon, 441
Ilchanic Tables [Nasir Eddin]
Ilchester [Somersetshire]
Ildefonso, S. [Castilla]
Ile de France, 442
I'leum [Intestines]
I'leus, or Iliac Passion, 442
Ilex, 442
Ilfracomb [Devonshire]
Iliad [Homer]
Ilissus [Attica]
I'lium [Troas]
Illanus, 443
Ille et Vilaine, 443
Illecebráceæ, 444
Illícium, 444
Illinois, 445
Illuminating [Manuscripts]
Illyria, 445
Imaginary [Negative and Impossible Quantities]
Imagination, 447
I'maus [Himalaya Mountains]
Imbecility [Insanity]
Imbros, 448
Imirétia [Georgia]
Imitation, in Music [Fugue]
Immaterialism [Berkeley; Materialism]
Immortality [Materialism]
I'mola, 448
Impact, 448
Impátiens, 449
Impenetrability, 450
Imperátor [Emperor]
Imperial Chamber, Kammergerichte, 450
Impetígo, 450
I'mpetus [Momentum]
Imports and Exports, 451
Impossible [Negative and Impossible Quantities]
Impost, 452
Impregnation (of Plants), 452
Impressment of Seamen [Seamen]
Impropriations [Benefice, p. 219; Tithes]
Improvvisatori, 452
Impulse, 452
Ina, 452
I'nachus, 453
Inarching [Grafting]
Inca [Peru]
Incandescence [Heat]
Incidence, Angle of, 453
Incisors [Dentition]
Inclination (magnetism), 453
Inclination (mathematics), 455
Inclined plane, 455
Incommensurable, Incommensurables, Theory of, 455
Incompatibles (chemistry), 456
Inconcinnous Intervals, 456
Increment and Decrement, 456
Incus [Ear]
Indefinite, 456
Indenture [Deed]
Independents, 457
Indeterminate, 458
Index [Exponent]
India, 458
India Company [East India Company]
Indian Corn [Maize]
Indian Ink [Ink]
Indian Rubber [Caoutchouc]
Indiána, 458
Indianite, 459
Indians [North American Indians]
Indicatorínæ, 459
Indiction; Cycle of Indiction [Period of Revolution]
Indictment, 460
Indies, East [East Indies]
Indigestion [Dyspepsia]
Indigo, 460
Indigófera, 462
Indivisibles [Cavalieri]
Indore, 462
Indre (river), 463
Indre (department), 463
Indre et Loire, 464
Induction (mathematics), 465
Induction (logic), 466
Induction [Benefice, p. 219]
Indulgence, 466
Indus [Hindustan]
Indus (constellation), 467
Inequality, 467
Inértia, 467
Infant, 467
Infant Schools [School]
Infanticide, 468
Infantry, 469
Infection, 470
Inferobranchiáta, 470
Infinite, Infinity, Infinitesimal, Infinitesimal Calculus, 471
Inflammation, 473
Inflexion [Diffraction]
Inflexion [Flexure, Contrary]
Inflorescence, 473
Influenza, 474
Information, 474
Infundíbulum [Brain]
Infusions, 474
Infusória, 474
Inga, 476
Ingatestone [Essex]
Ingolstadt, 477
Ingrossing, 477
Ingulphus, 477
Injunction, 477
Ink, 478
Inn [Bavaria]
Innocent I.—XIII., 478—481
Inns of Court and of Chancery, 481
Inocéramus, 482
Inoculation (surgery), 483
Inoculation (of plants), 483
Inoculation [Grass Land]
Inquest [Coroner]
Inquisition [Office, Holy]
Insanity, 484
Insecta, 488
Insectívora [Vol. vi., p. 306]
Insessóres, 495
Insolvency, 495
Insolvent, 496

VOL. XII.
Inspiration [Revelation]
Inspiration [Respiration]
Innspruck, 496
Institút Nationál, 497
Institution [Benefice, p. 219]
Instruments, Astronomical, 497
Instruments, Musical, 498
Insurance, Fire, 498
Insurance, Life [Life Insurance]

VOL. XII.
Insurance, Marine [Ship]
Intáglio, 498
Integer, 498
Integration, Integral Calculus, 498
Integration, Finite, 500
Intellect, 500
Intercalary [Kalendar]
Interdict, 501

VOL. XII.
Interdict, Ecclesiastical, 501
Interest, 501
Interjections, 507
Interlocutory, 507
Interlude (music), 507
Interlude [English Drama]
Interment, 507
Intermittent [Fever]

VOL. XII.
Internal and External, 508
Interpleader, 508
Interpolation, 508
Interpretation, 509
Interval [Scale]
Interval (music), 510
Intestacy, 510
Intestína, 510

VOLUME XIII.

Intestines, page 1
Intonation, 1
Intrádos and Extrádos [Arch]
Intricária, 1
Intuition, 1
I'nula, 2
I'nula Helenium, 2
Inulin, 2
Invariable, 2
Invention, 2
Inventory [Executor]
Inverary, 3
Inverness, 3
Inverness-shire, 4
Inverse, Inversion, 5
Inversion (music), 6
Involúcrum, 6
Involute and Evolute, 6
Involution and Evolution, 7
Iodine, 11
Iona, 13
Ione, or Jone, 13
Ionia and Ionians, 13
Ionian Islands, 14
Ionian School, 16
Ionian Sea [Ionia]
Ionic dialect, 16
Ionic order [Civil Architecture; Column]
Ionídium, 16
Iöra, or Jora, 16
Ios [Archipelago, Grecian]
Ipecacuanha, 16
Iphícrates, 17
Iphis [Leucosians]
Ipomæa, 17
Ipsambul [Abousambul]
Ipsus, Battle of [Antigonus, p. 103]
Ipswich, 18
Irak Ajemi [Persia]
Irak Arabi [Bagdad]
Irapuáto [Mexico]
Ireland, 18
Ireland, New [New Ireland]
Iréna [Oriolinæ]
Irenæus, Saint, 25
Ireton, Henry, 26
Iriarte [Yriarte]
Iridáceæ, 26
Iridína [Conchacea, vol. vii., p. 426]
Irídium, 26
Iris [Eye; Rainbow]
Irítis, 27
Irkutsk [Siberia]
Iron, 27
Iron (Medicinal Properties) [Chalybeate Springs]
Iron Bridges [Bridges]
Irony, 35
Iroquois, 35
Irrational Quantity, 35
Irrawaddi [Birman Empire]
Irreducible Case, 38
Irrigation, 39
Irritability [Haller]
Irtisch [Siberia]
Irvine, 42
Isabella of Castile [Columbus; Ferdinand V.]
Isæus, 42
Isaiah, 42
Is'chia, 43
Iseghem, 44
Iser [Bavaria]
Isère (river), 44
Isère (department), 44
Isidore, Saints, 45, 46
Isidore of Charax, 46
Isinglass, 46
Isis, 46
Islam [Mohammed]
Isla, or Islay, 46
Isle of Bourbon [Bourbon]
Ismaelites, 46
Ismail [Bessarabia]
Ismid, or Isnikmid [Anatolia; Bithynia]
Isocárdia, 47
Isochronous, 48
Isocrates, 48
I'sodon [Capromys; Muridæ]
Isómerism, 49
Isometrical Perspective [Perspective]
Isomórphism, 50
Isoperimetrical [Variation, Calculus of]
Isópoda, 50
Isopyre, 56
Isósceles, 56
Isothermal Lines, 56
Ispahan [Persia]
I'spida [Kingfishers]
Israel, Tribes of [Jews]
Issoire [Puy de Dome]
Issoudun, 58
Issue, 59
Issue (law) [Pleading]
Issus, Battle of [Alexander III., p. 296]
Isthmian Games, 59
Istióphori [Cheiroptera, vol. vii., p. 22]
Istiúrus [Iguanidæ]
I'stria, 59
Italian Architecture, 59
Italian Drama [English Drama]
Italic School, 60
Italy, 60
Itch, 64
I'thaca, 65
Ithóme [Messinia]
Ittnerite, 65
Iturbide [Mexico]
Ivan [Russia]
Ives, St. [Cornwall; Huntingdonshire]
Iviça, 65
Ivory, 65
Ivory Black, 65
Ivory Coast [Coast, Gold]
Ivréa, 65
Ixa [Leucosians]
I'xalus, 66
Ixóra, 66
Ixos, 66

J.

J, in the English language, has a sibilant sound, closely connected with that of the syllable *di* before a vowel. [ALPHABET, p. 379.] It has a similar sound in the French tongue; but in German it is pronounced altogether as our *y* before a vowel. What its pronunciation was in Latin may admit of dispute, for although it is generally laid down that its power with the Romans was the same as with the Germans, there is reason for thinking that our own sound of the letter was not unknown to the antient inhabitants of Italy. The name of Jupiter was undoubtedly written originally Diupiter, so Janus was at first Dianus, just as the goddess Diana was called by the rustics Jana. (See D and I.) The argument might be strengthened by comparing the Latin *jungo* with the Greek *ζευγνυμι*, Jupiter with *Ζευ πατερ*, &c., and also by referring to the modern Italian forms, *Giogo*, *giovare*, *giovenco*, *giovane*, &c. There is no absurdity in supposing that two pronunciations may have co-existed in the same country. As to the form of the letter *j*, it was originally identical with that of *i*, and the distinction between them is of recent date. Exactly in the same way, among the numerals used in medical prescriptions, it is the practice to write the last symbol for unity with a longer stroke, *vj*, *vij*, *viij*.

In the Spanish language *j* represents a guttural, and is now used instead of *x*, which had the same power: thus Jeres rather than Xeres is the name of the town which gives its title to the wine called by us sherry. For the changes to which *j* is liable, see D, G, and I.

JA'BIRU, the name of a genus of Grallatorial or Wading Birds, *Mycteria* of Linnæus, and thus characterized:—

Bill long, conical, smooth, robust, compressed, and pointed; upper mandible trigonal and straight, the lower thicker and turned up. *Head* and *neck* more or less bare of feathers. Anterior *toes* united at the base by a membrane. *Size* gigantic.

Geographical Distribution of the Genus.—South America, Western Africa, Australasia.

Habits almost entirely the same with those of the Storks.

There are three species known, distributed geographically as above. We select *Mycteria Americana* as an example.

Mycteria Americana.

Description.—Very large in size, white; the *head* and *neck* (excepting the occiput) without feathers, and covered with a black skin, which becomes reddish towards the lower part. On the occiput are a few white feathers. *Bill* and *feet* black.

Locality, South America, where it frequents the borders of lakes and marshes, preying on reptiles and fish. [HERONS, vol. xii., pp. 165, 166.]

JABLONSKI, PAUL ERNEST, the son of Daniel Ernest Jablonski, a distinguished minister of the Protestant church, was born at Berlin in 1693. He was educated at the university of Frankfort on the Oder; where he applied himself with great diligence and success to the study of the Coptic and other Oriental languages. At the age of twenty-one he was sent at the expense of the Prussian government to the various public libraries in Europe, in order to pursue his studies and to make extracts from Coptic MSS. In 1720 he was appointed minister of the Protestant church at Lieberberg; and in 1722, professor of theology at Frankfort on the Oder; and also minister of the Protestant church in the same place. He died on the 13th of September, 1757.

The most important of Jablonski's works are:—'Pantheon Ægyptiorum, sive de Diis eorum Commentarius, cum Prolegomenis de Religione et Theologia Ægyptiorum,' 3 vols. 8vo., 1750-52; 'De Memnone Græcorum et Ægyptiorum, hujusque celeberrima in Thebaïde Statua,' 4to., 1753; 'Remphah Ægyptiorum Deus ab Israëlitis in Deserto cultus,' 8vo., 1731; 'Dissertationes Academicæ de terra Gosen,' 4to., 1735, 1736; 'Disquisitio de Lingua Lycaonica' (which is mentioned in the *Acts of the Apostles*, xiv. 11), 4to., 1714, 1724; 'Exercitatio Historico Theologica de Nestoranismo,' 8vo., 1724; 'De ultimis Pauli Apostoli Laboribus a Luca prætermissis,' 4to., 1746; 'Institutiones Historiæ Christianæ Antiquioris,' 8vo., 1754; 'Institutiones Historiæ Christianæ recentioris,' 8vo., 1756. Several of these works have been republished with many additions and corrections by Te Water, under the title of 'Opuscula quibus Lingua et Antiquitates Ægyptiorum, difficilia Librorum Sacrorum Loca, et Historicæ Ecclesiasticæ Capita illustrantur,' &c., 4 vols. 8vo., Leyden, 1804-13.

JA'CAMAR. [KINGFISHERS.]

JA'CANA. [RALLIDÆ.]

JACCHUS, or **IACCHUS** (Mammalogy), the name of a genus of monkeys applied by Geoffroy, Desmarest, and others to the form denominated *Hapale* by Illiger, *Ouistitis* of the French, the type of which may be considered to be *Simia Jacchus* of Linnæus.

M. Geoffroy treats them as a family divided into two subgenera (*Hapale* and *Midas*), under the name of *Arctopitheci*; but the term *Arctopithecus*, it seems, had been applied by Gesner as a denomination for another animal, probably the Three-toed Sloth, whilst the latter uses *Galeopithecus* to designate the *Sagoin*.

Generic Character.—Upper intermediate incisors larger than the lateral ones, which are isolated on each side; lower incisors elongated, narrow, and vertical, the lateral ones longest; upper canine teeth conical and of moderate size; two lower ones very small.

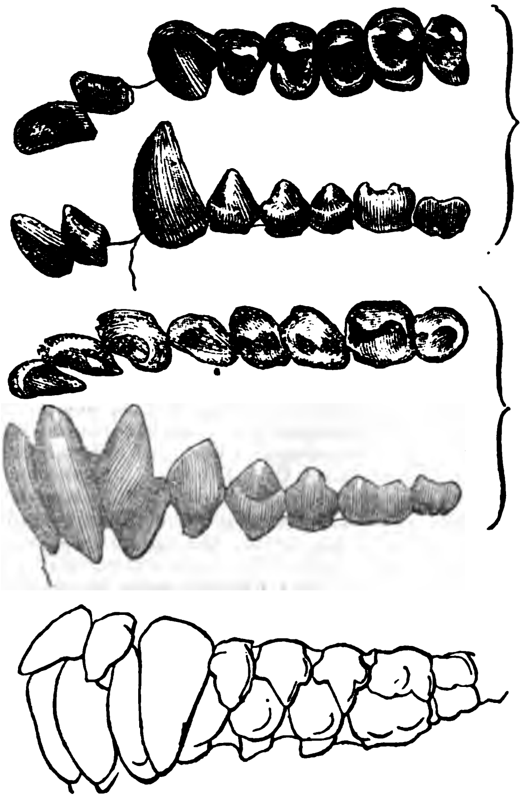
Dental Formula: incisors $\frac{4}{4}$; canines $\frac{1-1}{1-1}$; molars $\frac{6-6}{6-6}$ $=36$.

Size small, muzzle short, facial angle about 50°. Head round, prominent at the occiput; the five fingers armed with claws, with the exception of the thumbs of the posterior extremities, which are furnished with nails; thumb of the anterior extremities in the same direction as the fingers; fur very soft; tail full and handsome.

Geographical Distribution.—South America. How Ludolph, who figures two in his 'History of Ethiopia,' could have been so far misled as to place the form in that part of the world, does not appear.

The species, which are not few, have been separated into two sections; the first consisting of those which have an annulated tail, *Jacchus vulgaris* for instance; and the second of those whose tail is not annulated, as *Jacchus melanurus*.

We select *Jacchus vulgaris* as our example.



Teeth of Jacchus four times larger than nature. (F. Cuvier.)

Description.—This appears to be the *Simia Jacchus* of Linnæus and others; *Callithrix Jacchus* of Erxleben; *Hapale Jacchus* of Illiger and Kuhl; *Cercopithecus Jacchus* of Blumenbach; *Cagui*, *Sagouin*, *Sagoin*, *Sanglain*, and *Sanglin*, of Edwards and various authors, the latter terms being probably derived from *Sahuim*, the name by which it is said to be known near Bahia; *Ouistiti* of Buffon and the French; *Striated Monkey* of Pennant.

Length of *body* about eight inches; *tail* rather more than eleven; *colour* olive-grey, darkest on the head and shoulders, where it becomes nearly black; tail and lower part of the back barred or annulated with pale grey; lower parts of extremities brownish-grey. *Face* of a flesh colour; two tufts of pale hair spring round the ears; front *claws* hooked and thick.

Locality, Guyana and Brazil.

Habits.—The habits of the genus generally are squirrel-like, though they are, occasionally at least, carnivorous. *Jacchus vulgaris*, in a wild state, is omnivorous, feeding on fruits, roots, seeds, insects, and little birds or nestlings. The individual (in captivity) from which Edwards took his drawing fed upon biscuits, fruit, greens, insects, snails, &c., and once, when loose, it suddenly snatched a Chinese gold-fish from a basin of water and devoured it: Mrs. Kennon, to whom it belonged, after this gave it live eels, which frightened it at first by twisting round its neck, but it soon mastered and ate them. Mrs. Moore, of Rio Janeiro, sent a living specimen of *Jacchus penicillatus*, which was said to have been obtained from Bahia, to the Zoological Society of London, with the following note: 'Like most monkeys, it will eat almost anything; but its chief and favourite food, in its wild state, is the banana. It is a very delicate animal, and requires great warmth; and its very beautiful tail is in this respect eminently conducive to the comfort of the little creature, who, on all occasions when he requires warmth, rolls himself up in the natural boa with which Providence has in its wisdom endowed him.'

The *Ouistitis*, or *Sanglins*, not unfrequently breed in confinement. Edwards notices a pair that bred in Portugal, and M. F. Cuvier possessed two which had young. Three little ones were born, and the female soon ate off the head of one; but the others beginning to suck, she became careful of them and affectionate to them. The male seemed more fond of them than the mother, and assisted her in her care of them. Lady Rolle addressed a letter to the secretary of the Zoological Society of London (February, 1835), giving an account of the birth of two young ones, the produce of a pair of *Ouistitis* (*Jacchus penicillatus*, Geoff.) in her ladyship's possession. The parents were obtained in London during the preceding summer, and the young were brought forth on the 1st January. One was born dead, but the other was surviving at the date of the letter, being then about six weeks old, and appearing likely to live. It was every day put on the table at the dessert, and fed upon sweet cake. Lady Rolle stated that the mother took great care of it, exactly in the manner described by Edwards in his 'Gleanings.' It was observed that young of the same species had been born at the Society's Gardens, but not living, and that a female in the collection of the president, the Earl of Derby, at Knowsley, had produced, about the same time as Lady Rolle's, two living and healthy young ones, which were then still thriving. (*Zool. Proc.*)

Jacchus vulgaris.

Mr. Gray places the form among the Anthropomorphous *Primates* in the family *Sariguidæ*, and in its last subfamily (the 5th), *Harpalina* (Hapalina?), which is immediately preceded by *Saguinina*.

Mr. Swainson, who arranges it under his family *Cebidæ*, gives the group the appellation of *Mouse Monkeys*, because the large cutting teeth in the lower jaw strongly indicate, in his opinion, 'a representation of the order *Glires*.' [MIDAS.]

JACKAL, or TSCHAKKAL, *Chacal* or *Loup dore* of the French, *Adive* of Buffon, *Canis Aureus* of Linnæus.

Dental formula that of the Dog. Pupil of the eye round like those of the Dog and Wolf.

Description. — Yellowish-grey above, whitish below, thighs and legs yellow, ears ruddy, muzzle very pointed, tail reaching hardly to the heel (properly so called). The colours sometimes vary, and the back and sides are described by Mr. Bennett as of mixed grey and black, and as abruptly and strikingly distinguished from the deep and uniform tawny of the shoulders, haunches, and legs. The head nearly of the same mixed shade with the upper surface of the body.

Geographical Distribution.—India, other parts of Asia, and Africa. Cuvier says that Jackals are met with from India and the environs of the Caspian Sea to Guinea, but that it is not certain that they are all of the same species.

Habits gregarious, hunting in packs, and the pests of the countries where they are found, and where they burrow in the earth. In their huntings the Jackals will frequently attack the larger quadrupeds, but the smaller animals and poultry are their most frequent prey. Their cry is very peculiar and piercing. Captain Beechey notices it as having something rather appalling when heard for the first time at night; and he remarks, that as they usually come in packs, the first shriek which is uttered is always the signal for a general chorus. 'We hardly know,' continues the Captain, 'a sound which partakes less of harmony than that which is at present in question; and indeed the sudden burst of the answering long-protracted scream, succeeding immediately to the opening note, is scarcely less impressive than the roll of the thunder-clap immediately after a flash of lightning. The effect of this music is very much increased when the first note is heard in the distance (a circumstance which often occurs), and the answering yell bursts out from several points at once, within a few yards or feet of the place where the auditors are sleeping.' These animals are said to devour the dead on the battle-field and to scratch away the earth from the shallow graves in order to feed on the corpses.

John Hunter (*Phil. Trans.*) has recorded the case of a female Jackal which whelped in this country. The period of gestation was about the same as that of the dog, and the whelps were blind at first.

The story of the Jackal being the lion's provider may have arisen from the notion that the yell of the pack gives notice to the lion that prey is on foot, or from the Jackal's being seen to feed on the remnants of the lion's quarry.

Cuvier observes that it is not certain that all the Jackals are similar ('of the same species'); those of Senegal, for example (*Canis Anthus*, F. Cuv.), he remarks, stand higher on the legs, and appear to have the muzzle sharper and the tail rather longer.

The offensive odour of the Jackal has been given as one of the reasons against reducing it to a state of domestication. We do not see what advantage is to be derived from such a process; but, if it were desirable, that objection, it seems, would not hold. Colonel Sykes, who notices it as the *Kholah* of the Mahrattas, and as being numerous in Dukhun (Deccan), had in his possession at the same time a very large wild male and a domesticated female. The odour of the wild animal was almost unbearable; that of the domesticated Jackal was scarcely perceptible.

Jackal.

Some are of opinion that the three hundred foxes between whose tails Samson is said to have put firebrands in order that they might set fire to the crops of the Philistines (*Judges*, xv., 4, 5) were Jackals. Many of the modern Oriental names for the last-mentioned animals, *Chical* of the Turks, *Sciagal*, *Sciugal*, *Sciachal*, or *Shacal* of the Persians, come very near to the Hebrew word שועל, *Shual*. Hasselquist, speaking of '*Canis aureus*, the Jackcall, Chical of the Turks,' says (translation), 'There are greater numbers of this species of Fox to be met with than the former (*Canis Vulpes*), particularly near Jaffa, about Gaza, and in Galilee. I leave others to determine which of these is the Fox of Samson. It was certainly one of these two animals.' This does not seem however to be quite so certain, for there are not wanting those—and Dr. Kennicott is one of them—who reject all quadrupedal aid as ancillary to the vengeance of him of Zorah. Dr. Kennicott alludes to the remark that the Hebrew word translated 'foxes' signifies also handfuls (*Ezek.* xiii. 19, 'handfuls of barley'), if the letter ו, which has been inserted or omitted elsewhere almost at pleasure, be left out. 'No less than seven Hebrew MSS. want that letter here,' says Dr. Kennicott in continuation, 'and read שעלים. Admitting this version, we see that Samson took three hundred handfuls (or sheaves) of corn, and one hundred and fifty firebrands; that he turned the sheaves end to end, and put a firebrand between the two ends in the midst; and then, setting the brands on fire, sent the fire into the standing corn of the Philistines.' Our limits will not allow us to dwell upon this subject, which the reader will find elaborately discussed by Dr. Harris and others.

JACKDAW, the well-known English name for *Corvus Monedula* of Linnæus.

JACKSAW, one of the provincial English names for the *Dun Diver*. [MERGANINÆ.]

JACKSON, WILLIAM, who alone is almost sufficient to refute the opinion too generally entertained, even in this country, that the English have no school of music, was born in 1730, at Exeter, of which place his father was a highly respectable tradesman. He there received a liberal education, and having evinced distinct proofs of musical genius, was placed under the tuition of the organist of the cathedral, but completed his professional studies in London, under the celebrated Travers, of the Chapel-Royal. He returned to and settled in his native city, and in 1777 was appointed sub-chanter, organist, lay-vicar, and master of the choristers of the cathedral.

Jackson first made himself known as a composer by the publication of *Twelve Songs*, which immediately spread his fame throughout the kingdom. His next work was *Six Sonatas for the Harpsichord*; but this proved unsuccessful: his power was in vocal music—in giving melodious expression to good lyric poetry, of which he always made a judicious choice, for he was too sensible a man to waste his strength in such nonsense-verses as are commonly set by the numberless pseudo-composers of the present day. His third work, *Six Elegies for Three Voices*, completely established his reputation; they are, and will ever continue to be, admired by all who have a cultivated, unprejudiced love of the art. This was followed by his Opera IV., consisting of twelve more songs, among which is, if we mistake not, the very lovely air, 'Go, gentle gales:' and subsequently he published two other sets of the same number of songs in each, many of which deserve to be rescued from that neglect to which fashion, that is, the rage for novelty, has condemned them. His *Twelve Canzonets for Two Voices*, all of them more or less ingenious and pleasing, were once the delight of every musical circle. Of these, 'Time has not thinned my flowing hair' has lost none of its charms; and 'Love in thine eyes for ever plays' is a duet familiarly known to most, if not all, persons of taste in the British isles. Of his three dramatic compositions *The Lord of the Manor* alone survives. The exquisitely tender air in this, 'Encompass'd in an angel's frame,' is one among the many admirable things in the opera; the words by General Burgoyne, who in a preface to the drama pays an exceedingly elegant well-deserved compliment to the composer, viewing him both as a musician and as a man.

'Originality and grace are the attributes of JACKSON *of Exeter:* there is in his works a total absence of those phrases—cant phrases they may be called—which, though fashionable and admired at the time, soon became vulgar and distasteful. He wrote not only for his own age, but for future ages. He is already admitted into the list of classical English composers, and will hereafter, when the 'venerable garb of antiquity' is thrown over him, be better known and more esteemed than at the present period; though even now all real judges of musical excellence justly appreciate his best productions. He was decried by his professional contemporaries, because superior to most of them in genius, and infinitely beyond them in education and in those attainments which become a gentleman. He was a critic too, and wrote as well as said caustic things. His mind was of large calibre; it was powerful and active; he thought for himself, and commonly thought right. His *Thirty Letters on various Subjects*, and his *Four Ages, together with Essays on various Subjects*, display the extent of his knowledge, the correctness of his judgment, and the originality of his conceptions. From those volumes music is not wholly excluded, though it occupies only a small portion of them. But what he has written on the subject is much to the point, his criticism is just, and he has expressed his opinions in easy, appropriate language.' (*Supplement to Musical Library.*)

Jackson was no mean proficient in the sister art of painting: he chiefly employed his pencil in landscapes, making his friend Gainsborough his model; and it has been said, perhaps rather hyperbolically, that he occasionally imitated him so well, as almost to become a kind of rival. This very accomplished man died at the age of 73, leaving a widow, two sons, and a daughter. One of his sons accompanied Lord Macartney to China; his name and further history have eluded our inquiry. The other son, Francis James, filled, with great honour to himself, many diplomatic situations; he was successively secretary of legation at Berlin, minister plenipotentiary at Madrid, ambassador to the Ottoman Porte, and envoy extraordinary and minister plenipotentiary to the United States of America. He died some years ago, leaving a son and daughter.

JACKSON, PORT. [SIDNEY.]

JA'COBI, FREDERICK HENRY, a philosophical writer of Germany, was born at Düsseldorf, in 1743, and died at Munich, 10th March, 1819. He was distinguished, not so much as the author of a peculiar system of philosophy, as for the critical acumen and forcible eloquence with which he detected and exposed the incoherences and defects of the prevailing systems, of which he traced the inevitable consequences with great rigor and sagacity. Originally educated for a mercantile profession, Jacobi united the pursuits of literature to those of commerce until his appointment as councillor in the Hofkammer of his native city, which he obtained by the good offices of the Count von Golstein, enabled him to indulge his natural tastes and inclination by devoting his whole time and attention to literature. In this new career he sought to combine poetry with philosophy, and his earliest publication was a philosophical poem, entitled 'Friendship and Love,' which first appeared in 1777, but was republished two years afterwards under the simpler title of 'Woldemar.' In this year Jacobi was invited to Munich, and appointed geheimrath, in which situation he evinced the honesty and independence of his character by exposing publicly the injurious tendency and imprudence of the Bavarian system of finance. In 1781 he commenced an able controversy with Mendelsohn, by his work 'On the Doctrine of Spinosa,' which he further prosecuted in his 'Observations on Mendelsohn's Apology for the Doctrine of Spinosa.' By the essay, entitled 'David Hume, or Idealism and Realism,' he provoked the hostility of the followers of Kant, and that of the admirers of Fichte by his 'Sendschreiben an Fichte,' whose respect however, as well as that of most of his controversial opponents, he secured by the known sincerity of his character and opinions. When the troubles arising out of the French revolution extended to Germany, Jacobi retired to Holstein, whence he removed successively to Wandsbeck and Hamburg; from the latter he was called, in 1804, to Munich, to assist in the formation of the new Academy of Sciences, of which he was appointed president, in 1807. This dignity Jacobi resigned upon attaining his 70th year, but was allowed to retain the salary and emoluments. Shortly previously his work 'On Divine Things and on Revelation' (Leipz. 1811) had involved him in a bitter controversy with Schelling, who, in his answer, which bore the title 'Memorial to the Work on Divine Things,' professed to give the real position of Jacobi with respect to science and theism, or in other words, to philosophy and religion, and generally to literature. Notwithstanding the unfavourable estimate which this great philosopher drew therein of the literary and philosophical merits of Jacobi, he still maintains a high rank among sincere and honest inquirers after truth; and even if, exclusively occupied with detached speculations, he rather prepared than established a system of philosophy, the profoundness and originality of his views have furnished materials of which more systematic minds have not scrupled to avail themselves for the construction of their own theories.

As a poet, in which capacity he was greatly inferior to his brother (John George), Jacobi was a reflective rather than an imaginative thinker. His poetical merits are chiefly confined to vividness of description and to boldness of style. His philosophical writings, notwithstanding the want of all scientific method, are remarkable for the beauty of the exposition, which is conveyed in a form at once vigorous and harmonious. His views of philosophy, as far as they can be gathered from his scattered and occasional compositions on the subject, were rather of a sceptical than of a dogmatical character, and he denied the possibility of certainty in human knowledge. He maintained that all demonstrative systems must necessarily lead to fatalism, which however is irreconcileable with man's consciousness of the freedom of his rational nature. The general system of nature indeed, and man himself, so far as he is a part of that system, is pure mechanism; but in man there is unquestionably an energy which transcends and is superior to sense, or that faculty which is bound up with and regulated by the laws of nature. This higher energy is liberty, or reason, and consequently sense and reason distinguish to man two distinct spheres of his activity—the sensible or visible world, and the invisible or intelligible. The existence of these worlds no more admits of demonstrative proof than that of sense and reason themselves. Now sense and reason are the supreme and ultimate principles of all intellectual operations, and as such legitimate them, while they themselves do not receive their legitimization from aught else; and the existence of sense and reason necessarily implies the existence of sensible and intelligible objects about which they are conversant. But this existing system of things cannot have originally proceeded either from nature or from man's intellect or reason, for both nature and the human mind are finite and conditionate, and there must be something infinite and unconditionate, superior to and independent both of nature and man, to be the source and principle of all things. This being is God. Now as man's liberty consists in his personality or absolute individuality, for this constitutes his proper essence, while the mechanism of nature is hereby distinguished from man, that none of its members are individual of character, therefore that which is superior both to nature and to man must be perfectly and supremely individual; God consequently is one only, and strictly personal. Moreover, as the ground of all subsistence, he cannot be without subsistence; and as the principle of reason, he cannot be irrational. Of the existence of this divine intelligence however all direct proof is as impossible as a demonstration of existence simply. Generally indeed nothing can be known except upon testimony, and whatever rests on testimony is not certainty but *faith*, and such a faith or belief, when its object is the existence of a good and supreme being, is religion.

Jacobi's complete works have been published in 6 vols., Leipz. 1819-20.

JACOBINS is the name of a faction which exercised a great influence on the events of the French Revolution. This faction originated in a political club formed at Versailles, about the time of the meeting of the first National Assembly, and which was composed chiefly of deputies from Britanny, who were most determined against the court and the old monarchy, and some also from the South of France, among whom was Mirabeau. When the National Assembly removed its sittings to Paris (October 19, 1789), the Breton club followed it, and soon after established their meetings in the lately suppressed convent of the Jacobins, or Dominican monks, in the Rue St. Honoré. From this circumstance the club and the powerful party which grew from it assumed the name of Jacobins. During the year 1790 the club increased its numbers by admitting many men known for violent principles, which tended not to the establishment of a constitutional throne, but to the subversion of the monarchy. A schism broke out between these and the original Jacobins, upon which Danton, Marat, and other revolutionists seceded from the club, and formed themselves into a separate club called 'Les Cordeliers,' from their meetings being held in a suppressed convent of Franciscan friars. [DANTON.] These men openly advocated massacre, proscription, and confiscation, as the means of establishing the sovereignty of the people. In 1791 the Cordeliers reunited themselves with the Jacobin club, from which they expelled the less fanatical members, such as Louis Stanislas Freron, Legendre, and others. From that time, and especially in the following year, 1792, the Jacobin club assumed the ascendency over the legislature; the measures previously discussed and carried in the club being forced upon the assembly by the votes of the numerous Jacobin members, and by the out-door influence of the pikemen of the suburbs, with whom the club was in close connexion. The attack on the Tuileries in August, 1792, the massacres of the following September, the suppression of royalty, and most of the measures of the reign of terror, originated with the club of the Jacobins. [Committee of Public Safety.] The club had affiliations all over France. After the fall of Robespierre in July, 1794, the convention passed a resolution forbidding all popular assemblies from interfering with the deliberations of the legislature. The Jacobins however having attempted an insurrection in November, 1794, in order to save one of their members, Carrier, who had been condemned to death for his atrocities at Nantes, the convention ordered the club to be shut up; and Legendre, one of its former members, proceeded with an armed force to dissolve the meeting, and closed the hall. The spirit of the club however survived in its numerous adherents, and continued to struggle against the legislature and the Executive Directory, until Bonaparte put an end to all factions, and restored order in France. The name of Jacobin has since continued to be used, though often improperly applied, like other party names, to denote men of extreme democratical principles, who wish for the subversion of monarchy and of all social distinctions, and are not over-scrupulous about the means of effecting their object.

JACOBITES. [Eutychians.]

JADE, a name which has been given to several minerals which resemble each other but little, except in colour, and therefore it is one which it would be well should fall into disuse.

Serpentine, nephrite, and Saussurite have all been described under the name of jade. Yu, or Chinese jade, is supposed to be prehnite.

JAEN, an intendencia, or administrative province, of Spain, once a Moorish kingdom, is included in the geographical division of the Peninsula called Andalusia. The province of Jaen consists in great measure of the upper basin of the Guadalquivir, and of the numerous streams which contribute to the formation of that river, and it lies between the Sierra Morena on the north, which divides it from Castile, the great southern range or Sierra Nevada on the south towards Granada, and the Sierra de Cazorla on the east, which forms the connecting link between the other two, on the borders of Murcia. To the west the ground slopes with the course of the Guadalquivir towards Cordova. Numerous offsets of the above chains enter and cross the territory of Jaen; such are the Sierra de Bedmar, Sierra de Ubeda, &c. The province of Jaen is 75 miles from east to west, and nearly as much from north to south, and its area is estimated at about 4000 square miles, with a population of 277,000 inhabitants, distributed among 71 pueblos or communes. The province is divided into five partidos or districts, Jaen, Andujar, Baeza, Martos, and Ubeda. The soil in the valleys is extremely fertile, but very imperfectly cultivated. The produce is wine, oil, corn, vegetables and fruits of every kind; honey and silk are also gathered. The mountains abound with rich pastures; sheep and a fine breed of horses are the principal cattle in the country. Jaen, the capital of the province, is a bishop's see, with a fine cathedral, and has 19,000 inhabitants. At Cazalla, south of Jaen, are mines of lead and silver, and veins of copper are found in various parts of the province. In the northern part, at the foot of the Sierra Morena, is the German colony of La Carolina, founded by the philanthropist Olavides, in 1767. (Miñano; Bowles; Ponz; Bourgoing.)

JAEN. [Ecuador, vol. ix., p. 267.]

JÆRA, or JAËRA. [Isopoda, vol. xiii., p. 55.]

JAFFA. [Syria.]

JAFFNAPATAM, the principal town of the province of Jaffna in the island of Ceylon, is situated in 9° 47′ N. lat. and 80° 9′ E. long.; 215 miles north from Colombo, and 296 south-west from Madras. It possesses a large fort built in the form of a pentagon, with five bastions, furnished with a broad moat and an extensive glacis; and having within its walls a church in the form of a Greek cross, a commandant's house, and some other good buildings, besides barracks and accommodations for soldiers. The town stands to the eastward at the distance of half a mile, and contains several broad parallel streets intersected by smaller ones. The houses are for the most part built with brick. The majority of the inhabitants of the town formerly consisted of the Dutch and their descendants, but since the British conquest many have emigrated to different parts of the island, and some have gone to Batavia. The bazaar is abundantly supplied with the necessaries of life at a cheap rate. In the neighbourhood there is a church belonging to the Tamul Protestants, called St. John's, in which the Tamul colonial chaplain of the district officiates. The Hindus have a large temple in the neighbouring town of Wannapanny, which far exceeds in grandeur all the rest in the province. It is ornamented with an accumulation of small towers, and enclosed by a wall having a large gateway. It was founded and endowed by one Wyti Linga Chetty, about forty years ago. There is a band of dancing girls attached to the temple, who enliven the processions with their dancing.

Jaffnapatam is not accessible to vessels of any considerable size, owing to the shallowness of the water. The cargoes of the larger vessels are unloaded at Kails, and conveyed up to the town in small boats.

Jaffnapatam is the seat of a government agent, who is deputy fiscal, and of a provincial judge, who are gentlemen of the civil service. They form a minor court, to decide on appeals from the courts of the subordinate magistrates of the province of Jaffna.

JAGANATH. [Juggernauth.]

JAGER. (Ornithology.) [Laridæ.]

JAGUAR. [Leopards.]

JAINAS, a religious sect of the Hindus. The name is derived from the Sanskrit *jina*, 'victorious,' which is the generic name of the deified saints of this sect.

The Jainas are very numerous in the southern and western provinces of Hindustan; they are principally engaged in commerce, and from their wealth and influence form a very important division of the population of the country. The history and opinions of this sect are also interesting from their striking similarity to the chief peculiarities of the religion of Buddha. The earliest information concerning this sect was given in the 9th vol. of the 'Asiatic Researches,' in an 'Account of the Jains, collected from a priest of this sect, at Mudgeri, translated for Major Mackenzie;' in 'Particulars of the Jains,' by Dr. Buchanan; and in 'Observations on the sect of Jains,' by Colebrooke. Several particulars concerning them are also given in Buchanan's 'Journey from Madras through Mysore,' &c.; Wilks's 'Historical Sketch of the South of India;' in the work of the Abbé du Bois; and in Ward's 'View of the History, Literature, and Religion of the Hindus.' Information still more important is given in the 1st volume of the 'Transactions of the Royal Asiatic Society,' by Colebrooke, 'On the Philosophy of the Hindus;' by Major Delamain, 'On the Srâwaks, or Jains;' by Colebrooke, Dr. Hamilton, and Col. Franklin, 'On Inscriptions in Jain Temples in Behar;' by Dr. Hamilton, 'On the Srâwaks, or Jains;' and also in the 2nd volume of the Transactions, by Major Todd, 'On the Religious Establishments in Mewar.' But the most complete acccount of this sect is given by Prof. Wilson, in his 'Sketch of the Religious Sects of the Hindus.' (*As. Res.*, vol. xvii.)

A view of the literature of the Jainas is given by Wilson in his 'Descriptive Catalogue of the MSS., &c., of Col. Mackenzie,' vol. ii., pp. 144-162. The Jainas have their own Purânas and other religious works, which are principally devoted to the history of the Tôrthankaras, or deified teachers of the sect. The chief Purânas are supposed to have been written by Jina Sena Achârya, who was probably the spiritual preceptor of Amoghaversha, king of Kânchî, at the end of the ninth century of the Christian æra. They have also their own works on astronomy, astrology, medicine, the mathematical sciences, and the form and disposition of the universe, of which a list is given in Wilson's 'Descriptive Catalogue.' 'But the list there given is very far from including the whole of Jain literature, or even a considerable proportion. The books there alluded to are in fact confined to Southern India, and are written in Sanskrit or the dialects of the peninsula; but every province of Hindustan can produce Jain compositions, either in Sanskrit or its vernacular idiom; whilst many of the books, and especially those that may be regarded as their Scriptural authorities, are written in the Prakrit or Magadhi, a dialect which, with the Jains as well as the Bauddhas, is considered to be the appropriate vehicle of their sacred literature.' (Wilson, *As. Res.*, vol. xvii., p. 242-3.) The Jainas are also said to have a number of works entitled Siddhântas and Agamas, which are to them what the Vedas are to the Brahmanical Hindus.

The Jainas are considered by the Brahmans to form no part of the Hindu church. The principal points of difference between them and the Brahmanical Hindus are:—

1st, a denial of the divine origin of the Vedas; 2dly, the worship of certain holy mortals who have acquired by self-mortification and penance a power which renders them superior to the gods; and 3dly, extreme tenderness for animal life. These doctrines and customs are essentially the same as those of the Buddhists. The Jainas do not entirely reject the gods of the Hindu mythology; but they consider them greatly inferior to the Jinas, who are the objects of their religious adoration. The Jainas enumerate 72 mortals who have raised themselves to the rank of Jinas by their virtue and self-mortification; of whom 24 belong to the former age, 24 to the present, and 24 to the age to come. The statues of all or part of these are in all their temples, sculptured in black or white marble. They are distinguished from each other in colour and stature: two are represented as red, two as white, two as blue, two as black, and the rest as of a golden hue or yellowish-brown. Of these Jinas the most celebrated are Pârsvanâtha and Mahâvira, who alone can be regarded as having any historical existence. The last Jina is said, according to some accounts, to have died at the age of seventy-two, about B.C. 500; but, according to others, about B.C. 663, two hundred and fifty years after the preceding Jina Pârsvanâtha; but these dates, in common with most others in early Hindu history, are very uncertain.

The origin of this sect has been a subject of much dispute. Some have endeavoured to prove that Buddhism and Jinism are more antient than the Brahmanical religion; but several arguments have already been brought forward in another part of this work which render this hypothesis exceedingly improbable. [BUDDHA, vol. v., p. 526-7.] It has, on the contrary, been maintained with greater probability, from the absence of all allusion to Jinism in the antient Brahmanical and Buddhistic works, and from the comparatively late date of all inscriptions and monuments relating to the Jainas which have yet been discovered, none being earlier than the ninth century, that the sect of the Jainas did not become of any importance till the eighth or ninth century of the Christian æra. The striking similarity between the Buddhists and Jainas renders it probable that they had the same origin; and that Jinism is merely another form of Buddhism, accommodated to the prejudices of the Brahmanical Hindus. In the southern provinces of Hindustan, where the Jainas are the most numerous, the distinction of castes is preserved among this sect; but it appears probable, from many circumstances, that originally they had no distinction of caste; and even in the present day, in the upper provinces, the Jainas all profess to be of one caste, namely, the Vaisyas, which is equivalent to their being of no caste at all. The Jainas also allow Brahmans to officiate as the priests of their temples. The period in which we have supposed Jinism to have first risen into importance corresponds with the time in which the Buddhists were finally expelled from Hindustan. (Wilson's *Sanskrit Dictionary*, 1st edit., preface, pp. xv.-xx.) It therefore appears probable that those Buddhists who were allowed to remain adopted the opinions and practices of Jinism, which may previously have existed as an insignificant division of the Buddhistic faith. In the eleventh and twelfth centuries the religion of the Jainas appears to have been more widely diffused than at any other period. Many princes in the southern part of the peninsula embraced this faith; but it gradually lost much of its power and influence, in consequence of the rapid progress of the Vaishnavas and Saivas. [HINDUSTAN, vol. xii., p. 233.]

The Jainas were antiently called Arhatas, and are divided into two sects, of which the former is called Vivasanas, Muktavasanas, Mucktâmbaras, or Digambaras, in reference to the nakedness of this order; and the latter Swetâmbaras, 'clad in white,' because the teachers of this sect wear white garments. The former are the more antient. In the early philosophical writings of the Hindus, in which the Jainas are mentioned, they are almost always called Digambaras, or Nagnas, 'naked.' The term Jaina rarely occurs, and that of Swetâmbara still more rarely. These two sects, though differing from each other in very few points, oppose one another with the bitterest animosity. A few years ago the British government at Benares was obliged to call in the military to put down a riot in the city, which had been produced by the quarrels of these sects.

The Jainas are also divided into Yatis and Srâvakas, clerical and lay; the former of whom subsist upon the alms of the latter. The religious ritual of the Jainas is very simple. The Yatis dispense with acts of devotion at their pleasure; and the Srâvakas are only bound to visit a temple daily, where some of the images of the Jinas are erected, and make a trifling offering of fruit and flowers, accompanied by a short prayer. The Jaina temples are generally superior in size and beauty to those which belong to the Brahmanical religion. Bishop Heber (*Journal*, i., p. 292) has given us an account of his visit to one of these temples, from which strangers are usually excluded with jealous precautions. 'The priest led us,' he says, 'into a succession of six small rooms, with an altar at the end of each, not unlike those in Roman Catholic chapels, with a little niche on one side, resembling what in such churches they call the *piscina*. In the centre of each room was a large tray with rice and ghee strongly perfumed, apparently as an offering, and men seated on their heels on the floor, with their hands folded as in prayer or religious contemplation. Over each of the altars was an altar-piece, a large bas-relief in marble, containing, the first five, the last in succession twenty-five figures, all of men sitting cross-legged, one considerably larger than the rest, and represented as a negro. He, the priest said, was their god; the rest were the different bodies he had assumed at different epochs, when he had become incarnate to instruct mankind. The doctrines he had delivered on these occasions make up their theology, and the progress which any one has made in these mysteries entitles him to worship in one or more of the successive apartments which were shown us.'

The moral code of the Jainas is expressed in five *Mahâvratas*, or 'great duties:' 1st, refraining from injury to life; 2nd, truth; 3rd, honesty; 4th, chastity; 5th, freedom from worldly desires. There are also four *Dhermas*, or 'merits:' liberality, gentleness, piety, and penance.

JALAP. [CONVOLVULUS JALAPA.]

JALAPA. [MEXICO.]

JALISCO. [MEXICO.]

JALLOFFS, or **YALLOFFS**, are a negro tribe who occupy a considerable tract of country between the rivers Senegal and Gambia. They are considered as the finest race of negroes in this part of Africa; they are tall and well made, their features are regular, and their physiognomy open. Though bordering on the Foolahs and Mandingos they differ from both, not only in language, but in features. The noses of the Jalloffs are not so much depressed nor the lips so protuberant as among the generality of Africans, but their skin is of the deepest black. They are chiefly employed in agriculture, and have made some progress in the useful arts, especially in the manufacture of cotton cloth, which they make better than any of the neighbouring tribes. Though Mohammedans they have not adopted the system of the Arabic numbers, but count only up to five, so that six is expressed among them by five and one, seven by five and two, and so on. They are divided into several independent states, or kingdoms, which are frequently at war either with their neighbours or with each other. (Mungo Park's *First Travels into the Interior of Africa*; Golberry's *Fragments*.)

JAMAICA, one of the Greater Antilles, and the most important possession of the British in the West Indies, extends from 76° 15′ to 78° 25′ W. long., and from 17° 40′ to 18° 30′ N. lat. Its length from east to west is nearly 150 miles, and its width may on an average be 40 miles. It contains, according to Mr. Robertson's survey, 2,724,262 acres, or 4256 square miles, and is much less in extent than the county of York. Only 1,100,000 acres are stated to be under cultivation.

The surface of this island is very uneven, and the tracts which are level probably occupy less than one-twentieth of its area, but it is only the eastern part that can properly be called mountainous. This part is almost entirely filled up by the Blue Mountains, whose principal ridge occupies the middle of it, and runs nearly east and west. This range varies from 5000 to 6000 feet in elevation; its summit is in some places so narrow as not to be more than three or four yards across. Its numerous offsets run south and south-east, or north and north-west. On one of the latter offsets rise three peaks, of which the most northern and the highest attains an elevation of 7150 feet above the sea. The western boundary of this mountain-region is formed by a ridge, running across the whole island from south-east to north-west. This ridge begins on the south at Yallah Point, and terminates to the north-east of the mouth of the Agua Alta, or Wagwater river. It rises to a considerable height, frequently to 2500 and 3000 feet; and S. Catherine's Peak, at the point where it is united to the range of the Blue Mountains, is 4500 feet above the sea-level. The declivities of the mountains are rather steep, partly bare, and partly covered with woods, but the level summits are generally overgrown with trees. The valleys are mostly narrow, and contain but little level ground, with the exception of the vale of Bath, which extends about eight miles from the town of that name to the mouth of the Plantain Garden river, near the promontory of Morant Point, the most eastern cape of the island. This vale is about one mile and a half wide, and covered with sugar plantations.

West of the range in which S. Catherine's Peak stands the mountains subside, and are divided from those farther west by a depression which extends across the island over the plain of Liguanea and the hilly country which encloses the banks of the Wagwater river. Yet north of the plain the country seems to be 1000 feet above the sea-level, or nearly so. The greatest plain in the island is that of Liguanea, which begins a few miles east of Kingston, and extends westward to a point west of Old Harbour, a distance of about thirty miles: its average breadth is about five miles. The western portion of this plain has a considerable inclination. It is defended from the sea by the Palisados, a sand-bank several miles in length, which joins the town of Port Royal to the mainland of the island. A part of this plain consists of savannahs, or natural pasture-ground, covered with grass. West of Port Henderson a range of low hills called Healthshire Hills lie betwen the plain and the sea.

The plain of Liguanea is divided from the plain of Vere by a narrow range of low hills, which approach the sea west of Old Harbour, near Salt River Bay. The plain of Vere extends from south-east to north-west about 18 miles, with an average breadth of 7 or 8 miles. On the south-east of this plain is the Portland Ridge, which terminates in Portland Point, the most southern cape of Jamaica. On the north-west it is joined by the Mile Gully, a picturesque valley, several miles in length, traversed by the upper course of the Minho river. The soil of the plain of Vere is of moderate fertility, and mostly used as pasture-ground.

The mountains which enclose these plains on the north rise with a steep and abrupt ascent, but they do not attain a great elevation, hardly any summit being 3000 feet high, and most of them not 2000 feet. These mountains do not occupy the whole of the country, but enclose valleys of considerable extent and fertility, and the basin of St. Thomas-in-the-Vale, a plain embosomed in hills, about 9 miles long and 2½ miles across, which is covered with sugar plantations, and is very fertile. Towards the northern coast the mountains sink down into low and well-wooded hills.

The mountains, which cover nearly the whole of the island west of the basin of St. Thomas-in-the-Vale, do not rise much higher than those which enclose the basin. Their mean elevation falls short of 2000 feet, and few of their summits attain more than that elevation. The highest seems to be the Peak near Blewfields, not far from the southern coast, which rises to 2560 feet. Properly speaking, the ridges do not extend in one general line, but intersect each other in various direction, so as to form valleys, which open to nearly every point of the compass. Near the central line of the island, the hills present the characteristics of the limestone formation, of which they consist. Caverns occur in several places, and some of them are very extensive. In the midst of the hills are also cavities and depressions, sometimes of considerable extent. The water which runs down from the hills or falls into these cavities during the rains forms small rivers, which flow for a short distance and then disappear in sink-holes, and sometimes come again to the surface and again sink. These districts are only provided with running water during the rains, and the inhabitants are obliged to have recourse to tanks or cisterns, in which they collect the rain-water for the dry seasons. In the western part of the island the level grounds are not of great extent. The largest plains are the Pedro Plains, near Great Pedro Point, and the Savanna la Mar, towards South Negril Point, the most western cape of the island. A considerable portion of these plains is low and covered with swamps. No plains occur on the northern coast. The country between Montego Bay on the west and St. Ann's Bay on the east consists only of low though abrupt and precipitous hills; the valleys between them are covered with high forest-trees, which exhibit a very luxuriant vegetation.

Except the districts which lie within the limestone formation above mentioned, Jamaica has the advantage of being well watered by numerous rivers, rivulets, and springs. None of the rivers are navigable, except the Black River, in the parish of St. Elizabeth, by which goods are brought down and carried up about 30 miles in flat-bottomed boats and canoes. But the other rivers are of great importance for the water which they supply for the irrigation of the plantations, the numerous mills which they turn, and the beauty and interest that they give to the country through which they flow. Some of them form beautiful cascades.

The want of river navigation can hardly be felt in an island like Jamaica, which has a coast-line of more than 500 miles, in which hardly any place is more than 30 miles from the sea, and whose shores are sufficiently indented to supply it with numerous harbours and other shelters for shipping. There are 30 principal harbours, besides more than double that number of bays, creeks, and coves, capable of affording more or less shelter to vessels. The safest and most capacious of the harbours are those of Port Morant, Kingston, and Old Harbour on the southern, and those of Lucia and St. Antonio on the northern shores.

The climate of Jamaica is considered exceedingly hot, but this is only the case in the lower plains along the southern coast. The mean heat of the summer months (from June to November) is about 80°, whilst the mean heat of the other six months does not exceed 75°. In summer the thermometer sometimes rises to 96°, and occasionally, though rarely, to 100°. In winter it sinks to 69°. But the changes of the temperature are very slow and gradual, the difference between noon and midnight rarely exceeding 5° or 6°. The mean heat on the hills, which are 1000 feet and upwards above the sea, in summer is stated to be 75°, and in winter between 70° and 72°, though the thermometer occasionally sinks to 55°, and on the higher mountains even to 48°. Snow has never been observed, even on the most elevated peaks; hail is not a rare occurrence on them, but it melts as soon as it reaches the ground. The climate is cooler and more salubrious on the north side of the island than on the south. The heat of the low coast is considerably diminished by the daily sea-breeze, which sets in generally about nine o'clock in the morning and ceases only towards sunset. Its salubrious effects are so obvious, that it has obtained from the seamen the name of the *doctor*. During the hottest part of the day, and in the most sultry months, a succession of light flying clouds continually pass over the sun, and, by interrupting its rays, contribute to moderate the heat.

In Jamaica there are two rainy and two dry seasons. The spring rains begin some time after the sun has passed the equator, in the middle of April or beginning of May. But in these months the rains are generally partial, and come down only in showers: the dry weather frequently continues to the month of June, especially on the southern side of the island. The heavy rains commence in June or even later, and last about two months; they are by far the most violent of all that occur during the year, and at this time the air is most intolerably sultry. This intense heat, joined to a still breathless atmosphere, is a presage of the approaching torrents. The clouds hastily gather, and form into a compact mass, overspreading the sky, which just before was cloudless and serene. A tremendous peal of thunder bursts from these dark clouds, and in a few minutes the rain descends in torrents, of which no one can form an idea who has not witnessed them. During the continuance of the rain the heavens are rent with incessant peals of thunder and quick and vivid flashes of lightning. These rains set in regularly every day, and continue from two to three hours, sometimes for the space of several weeks. Sometimes very heavy rain descends for several days and nights with little intermission. The autumnal or *fall rains*, as they are called by the planters, come in October and November: they are by no means so heavy as those of the spring, nor are they usually accompanied with thunder and lightning, but they are often attended with heavy gusts of wind from the north. In the mountains the rains are earlier, more frequent, and more heavy than in the low country.

Jamaica is from time to time visited by those terrific phenomena called hurricanes. They generally set in from the north or north-west, but only in the summer months between the two rainy seasons, which months are therefore called the hurricane months in the West Indies. They are usually succeeded by long droughts, by which those crops which are spared by the tempest are arrested in their growth, and a famine is the consequence. But hurricanes occur less frequently in Jamaica than in the Lesser Antilles.

The low tracts along the coast are unhealthy, but the hilly and mountainous country is much less so. The most common diseases are the yellow fever, common bilious fever, and the typhus fever; the first is by far the most destructive, especially to new comers, who are not yet inured to the climate.

The staple articles of the island occupy the greatest portion of the time and industry of the agriculturist, but he does not neglect the cultivation of several kinds of grain, of ground provisions, and even of grasses for the numerous herds of cattle which are kept. Sugar, rum, and molasses form by far the most important articles of export. The sugar plantations are very numerous and extensive, especially in the lower and warmer tracts of the island. On the hills and their declivities coffee is cultivated to a great extent. Next to these the pimento plantations supply the most important article of export. Arrowroot, indigo, which formerly was much more cultivated than at present, ginger, turmeric, and cacao are also cultivated. The last-mentioned article has been gradually neglected, and at present little more is raised than is sufficient for the consumption of the inhabitants. A considerable quantity of castor-oil is produced, but the greater part is consumed in the island. Tobacco is only cultivated by the negroes for their own use, and it is inferior to that of Cuba.

No kind of European corn is raised in Jamaica. Indian corn is universally cultivated, and yields an abundant produce; two and even three crops of it can be raised within the year. Guinea-corn is not much raised on the north side of the island, but in some districts on the south the negroes chiefly subsist on this grain, which is adapted to resist the two greatest obstacles to vegetation, poverty of soil and drought. Rice could be raised on the low and marshy lands, but it is not an object of attention.

A variety of wholesome and nutritious roots cultivated in this island are called by the name of *ground-provisions;* such as the yam (Dioscorea alata), cassava (Jatropha Manihot), the sweet potato (Convolvulus Batatas), and some other roots. As these roots are not liable to sustain very severe injury from the frequent storms, or the hurricanes, every plantation has several acres planted with such provisions, over and above the negro-grounds and the plantain-walks.

A few kinds of grass are cultivated for cattle. The most important is the Guinea-grass, a hardy plant, which covers the rugged and stony portions of land, and yields three and sometimes four cuttings, or as many grazings, in the year. The Scotch grass grows with great luxuriance by the sides of the rivers and other moist situations; but it cannot be cultivated to a great extent.

None of the European fruits arrive at perfection except grapes. Apples are of very inferior quality and peaches rarely produce fruit. No other kinds succeed in any degree except a few tolerable strawberries. But there is a great abundance and variety of other delicious fruits, as the pine-apple, the orange, the shaddock, the pomegranate, the fig, the granadilla, the sapodilla, the star-apple, the sweet-sop, the sweet-lemon, the citron, the avocado-pear &c. Several exotics have been introduced within the last sixty years, as the mango, the cherimoyer, the bread-fruit, &c. But the most important is the plantain, or banana, which is extensively cultivated on every plantation.

The forests of Jamaica abound with a great variety of the most valuable woods. Some of them, which are susceptible of the highest polish, are too hard to be used in cabinet-work. The most beautiful woods for such work are the mahogany, the bread-nut hearts, and the satin-wood. The Jamaica mahogany is superior to that of Cuba or Belize, but there are not many mahogany-trees now remaining. The bread-nut tree is still abundant in most parts. The cedar-tree attains a great size, but it is not of so fine a grain as that of the Levant. Other trees produce dye-woods, as the fustic, the logwood, &c. The cotton-tree is the largest of all, but is only used for making canoes, which are hollowed out from the trunks; its cotton is employed for stuffing beds. The bamboo grows wild, and is also cultivated. The cabbage-palm (areca oleracea) and the cocoa-nut-tree are the most useful trees of the palm tribe. Notwithstanding this abundance of useful trees, white oak is imported for rum-puncheons, and considerable quantities of pine of all dimensions from the United States, this wood being sold at a lower price than the native timber.

The horned cattle are very numerous, oxen being employed in the waggons, which bring down the produce to the wharfs, and also in carts and in the plough. The horses are of a middle size, hardy and active, but only fitted for the saddle and harness. Mules are numerous, and employed in the sugar-mills and in conveying the sugar-canes to the works. Sheep and goats abound; many of the former have no fleece, and are covered with hair, like goats. Hogs are very plentiful: they are of a smaller size than the English hog, but their flesh is superior in delicacy to the British or American pork. All kinds of poultry are raised in the greatest abundance, excepting geese and the common duck. But the muscovy-duck, the turkey, the guinea-fowl, and the common-fowl thrive very well. Domestic pigeons likewise abound. Rats exist in incredible numbers, and destroy about one-twentieth part of the sugar-canes throughout the island. Fish abound in the sea and rivers. The alligator appears in some of the largest of the rivers, but does not attack men.

No metal but lead is known to exist. There are some salt-springs.

Jamaica is politically divided into three counties, Surrey, Middlesex, and Cornwall, and contains one city, Kingston, and thirty-three towns and villages. The counties are subdivided into 21 parishes.

1. The county of Surrey extends over the eastern portion of the island, comprehending the whole of the region of the Blue Mountains and the eastern portion of the Plain of Liguanea, or that which commonly passes by that name. In this division are Port Antonio, Morant Bay, and the harbour of Kingston. Kingston is a considerable city and a place of great trade, with a population of more than 33,000 persons of all descriptions. It is regularly built, and contains many good houses, two churches, and some charitable institutions; also five schools. The harbour is protected by the narrow slip of land on whose western extremity Port Royal is built. The greatest part of the produce of the southern districts is sent to Kingston and hence exported to Europe or America. Port Royal, once the capital of the island, has been repeatedly destroyed by earthquakes, hurricanes, and fire, but is still a considerable place, as its harbour is the station for the ships of war, and it contains the naval arsenal and good fortifications. The bulk of its inhabitants are people of colour. Morant Bay, nearly at an equal distance between Port Royal and Morant Point, carries on a considerable trade and is a thriving place. The population is between 6000 and 7000. Antonio has a good harbour, but little trade.

2. The county of Middlesex occupies the central part of the island, comprehending on the south the western portion of the plain of Liguanea, or the plains of St. Catherine and St. Dorothy, with the whole of the plain of Vere and the basin of St. Thomas-in-the-Vale; also the hills enclosing these level grounds, and the hilly and mountainous country which extends along the northern shores from the mouth of the Wagwater River to Rio Bueno Harbour. On its southern coast are Port Henderson and Old Harbour; but they are only visited by small vessels, which carry the produce of the country to Kingston. On the northern shores are Annotto Bay, Maria, and St. Ann's Bay, which carry on some commerce by sea, especially Annotto Bay, where there is a small but thriving town. On St. Catherine's plain is built the town of S. Jago de la Vega, commonly called Spanish Town, which is considered the capital of the island, being the seat of government. It is a small town with about 6000 inhabitants, but embellished by the king's house (the residence of the governor) and the public offices. The superior courts sit here. It has a free-school and some charitable institutions.

3. The county of Cornwall extends over the western part of the island, comprehending the plains of Pedro and Savanna la Mar, and the hilly country lying between them and north of them. The two most frequented harbours on the southern shores, Black River and Savanna la Mar, have little trade; but on the northern coast are three thriving towns, S. Lucia, Montego Bay, and Falmouth, each containing a population of between 5000 and 8000 inhabitants. Montego Bay is the chief town of the county, and the

assize courts are held here. The harbour is exposed to a heavy swell, which sets in during the prevalence of the north winds; but a breakwater has been erected as a protection against the sea. Fifty years ago Falmouth was an inconsiderable village, but it is now nearly as large and populous as Montego Bay, and carries on a considerable commerce.

The population of Jamaica appears to be less than 400,000 souls; but it cannot be exactly ascertained, as no complete census has ever been taken. In 1834 there were 297,186 negro slaves, all of whom have been made free in this present year (1838), by separate acts of the legislatures of Great Britain and of Jamaica.

The Maroons were originally runaway slaves, partly from Jamaica itself, partly from Cuba, who lived in the forests on the northern side of the island. In 1738 a tract of land was granted to them in those parts, which they cultivated and on which they built two small towns, and though a portion of them forfeited their privileges by a rebellion, others have preserved them to this day. The other inhabitants are either whites or people of colour. The whites are either natives of Great Britain or descendants of Europeans, and probably amount to about 30,000 individuals. The people of colour, of whom there are perhaps 40,000, are the offspring of Europeans and negro women. They are subdivided into *mulattoes*, the offspring of a white and a black; *samboes*, the offspring of a black and a mulatto; *quadroons*, the offspring of a white and a mulatto; and *mestees*, the offspring of a white and a quadroon. No traces of the native population of the island existed when it was taken by the English from the Spaniards.

The people are occupied either in agriculture or in trade. The following tables show the share which every town has in the trade of the island, and the imports and exports, and their value in sterling money for the year 1834.

1. Number, Tonnage, and Crews of Vessels which entered into the Harbours of Jamaica in 1834.

Ports.	Great Britain.			British Colonies.			United States.			Foreign States.			Total.		
	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.
Kingston .	109	30,437	..	81	10,480	..	82	13,754	..	145	13,991	..	417	68,662	3983
Antonio .	8	2,318	118	3	337	20	1	109	7	..	..	..	12	2,764	145
Montego Bay	26	7,981	..	24	3,577	..	25	3,843	..	31	1,995	..	106	17,396	1039
Morant Bay .	28	8,975	494	7	1,137	57	2	282	13	..	..	..	37	10,394	564
Annotto Bay	17	5,237	..	..	..	..	1	129	..	..	..	..	18	5,366	290
Maria . .	8	2,453	..	2	562	..	1	223	..	5	193	..	16	3,431	201
St. Ann's Bay	3	668	56	..	..	..	..	..	..	..	..	..	3	668	56
Black River	5	1,633	89	..	..	..	..	..	..	..	..	..	5	1,633	89
Falmouth .	21	6,901	..	18	2,225	..	16	2,230	..	12	300	..	67	11,656	642
S. Lucia . .	11	4,341	..	..	..	..	4	647	..	..	..	..	15	4,988	253
Savanna la Mar . .	..	..	..	..	..	..	3	438	..	1	125	..	4	563	30
Total	236	70,944	..	135	18,318	..	135	21,655	..	194	16,604	..	700	127,521	7292

2. Number, Tonnage, and Crews of Vessels cleared at the Ports of Jamaica in 1834.

Ports.	Great Britain.			British Colonies.			United States.			Foreign States.			Total.		
	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.	No.	Tons.	Men.
Kingston .	72	21,184	..	67	8,326	..	47	7,544	..	191	20,273	..	377	57,327	3360
Antonio .	6	1,545	..	6	695	..	1	109	..	..	..	..	13	2,349	138
Montego Bay	31	9,500	..	21	2,714	..	20	2,785	..	36	3,057	..	108	18,056	1067
Morant Bay .	21	6,379	..	4	489	..	1	98	..	1	380	..	27	7,346	391
Annotto Bay	17	5,237	..	..	..	..	1	129	..	..	..	..	18	5,366	290
Maria . .	19	5,534	769	..	..	..	..	..	..	..	..	..	19	5,534	769
St. Ann's Bay	10	2,357	..	..	..	..	2	221	..	3	59	..	15	2,637	162
Black River	27	7,806	..	1	104	..	..	..	..	..	..	..	28	7,910	431
Falmouth .	33	10,462	..	16	1,618	..	13	1,825	..	12	399	..	74	14,304	780
S. Lucia . .	14	5,273	..	4	699	..	4	583	..	1	171	..	23	6,726	335
Savanna la Mar . .	8	2,737	..	5	717	..	3	477	..	..	..	..	16	3,931	242
Total	258	78,014	..	124	15,362	..	92	13,771	..	244	24,339	..	718	131,486	7965

The imports into Jamaica in the year 1834 amounted to 1,589,720*l*. Some of the largest articles in amount were apparel and slops, beef and pork, butter, grain and flour, cotton articles, salted fish, glass, hardware and cutlery, iron, wrought and unwrought, hats, leather, linen articles, soap, stationery of all sorts, wine, wood and lumber, and woollen articles. The value of books imported was only 3755*l*. The exports from Jamaica during the year 1834 amounted to 3,148,797*l*. The chief articles were arrowroot, coffee, colonial and foreign cotton manufactures, dye and hard woods both of the growth of the island and imported, ginger, iron and steel manufactured articles, linens, molasses, pimento, sarsaparilla, spirits, rum and shrub, sugar colonial and foreign, tobacco unmanufactured, tortoiseshell, and woollens.

Towards the end of the last century and in the beginning of the present Jamaica was the entrepôt of the immense quantity of European merchandise which was destined for consumption on the Spanish Main and the Spanish islands, and though at present a free intercourse between these countries and Europe exists, yet a considerable quantity of British manufactures is still sent to Jamaica, and thence to Mexico, Central America, New Granada, and Venezuela. Dye and hard woods, indigo, and other articles are sent in return to Jamaica. The Americans of the United States also carry on a considerable trade with this colony, which they furnish with lumber and provisions, taking in return rum and molasses. But by far the most important commerce of Jamaica is that with the mother-country. The time when the ships arrive from Great Britain is from October to May, and they continue to depart as they get freighted, from April to the first day of August, after which day, and until the hurricane months are over, ships and their cargoes sailing for Great Britain pay double insurance.

Jamaica was discovered by Christopher Columbus on his second voyage, the 3rd of May, 1494, but was not settled by the Spaniards before 1510. In 1655 it was taken from the Spaniards by the English, who for some time did not appreciate its value; at present it may be considered as the most important possession of any European nation in the West Indies. Since 1655 it has remained in the undisputed possession of the British, and its internal peace has only been disturbed by the rebellion of the Maroons in 1795. Though Jamaica has had an assembly since 1663, its present constitution was only completed in 1728. The executive is in the hands of the governor, who, as well as the council, consisting of twelve persons, is appointed by the king of Great Britain. The governor has the chief civil and military authority. The council constitutes the Upper House. The Lower House, or the Assembly, is composed of forty-five members, chosen by the freeholders, two from each of the 21 parishes; Spanish Town, Kingston, and Port Royal send one member each.

There is a Bishop of Jamaica whose see comprises the Bahamas and Honduras. Besides the clergy of the Established church, who have the care of the several parishes, there are Scotch, Presbyterian, Wesleyan, Baptist, and Moravian ministers.

Education is in a low state in the island. Most of the opulent persons send their children to England to be educated. According to an official Report presented to the British Parliament in 1834, the total number of children in the schools was 2019; of whom 133 were whites, 1365 were free persons of colour, and 521 slaves. Out of this number of 2019, only 1035 were taught writing and arithmetic in addition to reading and scriptural instruction. It must be observed however that this Report cannot be implicitly depended upon, and is also defective. The Report only comprises 12 parishes out of the 21; and does not include either Kingston or Spanish Town.

(Bryan Edwards, *History of the West Indies;* Stewart's *Past and Present State of Jamaica; Jamaica as it was, as it is, and as it may be;* De la Beche, in the *Geological Transactions*, 2nd series, vol. ii.; *Tables published by the Board of Trade.*)

JAMES, SAINT, THE EPISTLE OF, one of the books of the New Testament. There are at least two individuals of the name of James mentioned in the New Testament.

1. *James*, one of the Apostles, son of Zebedee, and brother of the apostle John (*Matt.* iv. 21; x. 29; *Mark*, i. 19, 29; iii. 17; x. 35; xiii. 3; *Luke*, v. 10; vi. 14; ix. 54; *Acts*, i. 13), who was chosen with Peter and John to accompany Christ to the Mount of Transfiguration (*Luke*, viii. 51; *Matt.* xvii. 1). He was beheaded at Jerusalem by order of Herod Agrippa about A.D. 44 (*Acts*, xii. 1, 2). He could not have been the author of the epistle; since it bears marks of having been written at a later period.

2. *James* 'the Less' as he is called in *Mark*, xv. 40, the son of Alphæus and Mary (*Matt.* x. 3; xxvii. 56; *Mark*, xv. 40) was also one of the apostles (*Matt.* x. 3; *Mark*, iii. 18; *Luke*, vi. 15; *Acts*, i. 13).

There is also mentioned in the New Testament a James, a brother of Jesus (*Matt.* xiii. 55; *Mark*, vi. 3); who according to Josephus (*Antiq.*, xx. 9, § 1) was put to death by the high-priest Ananias about A.D. 62 or 63. He was probably the same individual as the James who appears to have had the greatest influence in the church at Jerusalem (*Acts*, xv. 13; xxi. 18; *Gal.* ii. 12); and who, according to ecclesiastical tradition, was the first bishop of that church. Since James is also mentioned by St. Paul (*Gal.* i. 19) as one of the apostles, and as the Lord's brother, we meet with three individuals of the name of James who are said to be apostles; which is contrary to the lists of the apostles given in the Gospels. It was therefore supposed by the fathers, and has also been maintained by most modern divines, that James the son of Alphæus was the same person as James the brother of our Lord; and that the Greek word (ἀδελφός), which is translated 'brother' in our version, is used, like the Hebrew אָח, in the sense of 'cousin.' The epistle is almost universally attributed to this James by the Fathers and modern critics; it was probably written shortly before his death.

The Epistle is addressed to all the Jewish Christians 'which are scattered abroad' (i. 1); and its principal object is to exhort them to perseverance; to inculcate several moral lessons of great importance, and especially to explain the doctrine of justification by faith, which many persons appear to have misunderstood.

The canonical authority of this Epistle has been much disputed. Clement of Rome (1 *Corinth.* x) and Irenæus (*Hæres.*, iv. 16, § 2) had probably read it, but they do not quote it as of inspired authority. Eusebius places it among the *antilegomenai*, that is, writings which were not generally received, and also mentions several doubts which were entertained against it. Origen speaks of it as the Epistle said to be written by St. James. After this period it was generally received by the church, till the time of the Reformation, when its canonical authority was rejected by Luther and several other reformers on account of the difference, real or supposed, which was thought to subsist between the writings of St. Paul and those of St. James, in reference to the doctrine of justification by faith. The principal argument in favour of the canonical authority of this Epistle is in its forming part of the Peshito, that is, the Syriac version of the New Testament, which was made at the latter end of the first or the beginning of the second century of the Christian æra.

(The Introductions of Eichhorn, De Wette, Hug, Michaelis, and Horne; Herder, *Briefe zweener Brüder Jesu*, 1775; and the Commentaries of Schulthessius (1828), Gebser (1828), Schneckenburger (1832), and Theile (1833).

JAMES I., King of Scotland, was a younger son of King Robert III., who, hearing of the licentious conduct of his other son, David prince of Scotland, directed Robert duke of Albany, the boy's uncle, to seize him and keep him a prisoner till he promised amendment. This foolish order was readily obeyed by Albany, who wished nothing better than an opportunity to usurp the throne; and in a short time the prince died of dysentery, as it was said, but in truth of hunger in confinement. The king now began to fear Albany; and accordingly had his remaining son James secretly put on board a vessel for France. He did not escape however; for when but a short way on her voyage the vessel was taken by an English ship of war, and the prince carried prisoner to London. His weak old father was so affected by the news that in a few hours after he died of a broken heart. The duke of Albany was thereupon made Regent of the kingdom.

James, now in the 13th year of his age, was on the 14th April, 1405, conducted to the Tower, where he was detained till the 10th June, 1407, when he was removed to the castle of Nottingham. He was carried back to the Tower again on the 1st March, 1414, but a few months afterwards he was taken to Windsor, where he remained till the summer of 1417, when King Henry V. took him with him on his second expedition to France. The Duke of Albany died in 1419, and from that time measures began seriously to be taken for his release. During all this period James was receiving the best education which could be procured. He became familiar with sights of regal pomp and power, and with the manners and customs of the English court, at a time when there was much to interest and captivate the youthful mind: his habits were active, his conduct prompt and resolute, and at his return to his native kingdom he was in the spring and vigour of his life. He was long afterwards remembered in Italy as the inventor of a plaintive sort of melody, which had been admired and imitated in that country: he was one of the best harpers of his time, and excelled all the Irish and Scotch highlanders in their use of that instrument; and in the three pieces of his which have come down to our day—*Christ's Kirk on the Green, the King's Quhair* (or Book), and *Peebles at the Play*—we have no mean specimens of intellectual power and literary skill.

At his accession, in 1424, Scotland was in many respects a perfect contrast to England: it was in fact rather an aggregate of rival powers than a settled and united kingdom. There were still two Justiciars of co-ordinate authority, one on the north and the other on the south of the Forth; and in the former portion of the realm, which alone was properly denominated *Scotland*, and where the seat of authority still principally lay, there were numerous and powerful clans. The regencies, in the absence of James, had contributed to the national disorder—the two Albanies sacrificing to their own ambitious projects the just authority of government and the supremacy of the law.

James entered on the administration of his kingdom with a spirit and energy suitable to the high notions of prerogative which he had imbibed. Immediately on his arrival he proceeded against the family and adherents of the late regents, and eventually had several of them condemned and forfeited. All the customs of the realm, great and small, were annexed to the crown; and every valuable mine of gold or silver. A new coinage was struck, of like weight and fineness with the money of England; hospitals were to be visited and reformed; idleness and begging were forbidden; the law records of the kingdom (which seem to have been in a state of neglect) were to be inspected and ascertained; and the statutes of parliament were ordered, for the first time, to be regularly enrolled. This was not all however; for in the spirit of King Henry IV.'s time, which had witnessed some detestable examples of religious persecution, an act was passed *anent heretics*, that inquisition be taken by every bishop in his diocese, and, 'gif it misteris,' that secular power be called in support and aid of the church. In his time the chancellor and clergy first got a footing in the administration of the common law. This was in the year 1425, when the chancellor and certain persons of the three estates chosen by the king were empowered, under the name of the Court of Session, to hear and finally determine all complaints, causes, and quarrels competent before the king and his council.

We have already alluded to the king's conduct towards the family and friends of the regent Duke of Albany immediately on his accession to the throne. At a later period of his reign we have another signal instance of the king's energy and promptitude of purpose in his conduct toward the Lord of the Isles. About the year 1427 the Lord of Isla was slain by a person of the name of Campbell, who had, it seems, a commission from the king to apprehend Isla; but, it is added, he exceeded his powers in putting that chieftain to death. The circumstance occasioned great disturbance throughout the highlands and isles. Determined to restore order, and to enforce the laws in those wild districts, the king summoned a parliament at Inverness, to which the Lord of the Isles and the other highland chiefs were cited to appear. On their arrival, to the number of about forty, they were seized by a stratagem of the king, and committed to prison in separate apartments. The Lord of the Isles and some others were at length liberated; but deeply feeling the indignity he had suffered, the Lord of the Isles, immediately on his return home, gathered together his friends and vassals, and at the head of a vast force wasted all the crown lands near Inverness, and made an attempt also to destroy the town. Information of this inroad being communicated to the king, orders were instantly given to repair to the spot; and leading his troops in person, he succeeded by forced marches in coming up with the rebels in Lochaber, at a time when they least expected such a thing. The consequence was that at length the rebels made an unconditional surrender, and the Lord of the Isles was obliged to make his submission on his bended knees at the court of Holyrood House.

The king's vigour and determination were not a little obnoxious to the nobles, who saw in it the speedy ruin of their usurped authority. But it is probable that his devotion to the ecclesiastics wounded them more keenly than all the exercise of his royal power. They felt humbled, not so much before the sovereign as before the clergy. A conspiracy was accordingly formed against him, under the Duke of Athol, the king's uncle, and on the 21st February, 1437, the king was murdered, in the 44th year of his age. A year or two afterwards also his adviser Wardlaw, bishop of St. Andrew's, died; and immediately on this event Bishop Cameron, Wardlaw's favourite, was turned out of the chancellorship which he had held from the institution of the Court of the Session, and Sir William Crichton, a layman, and the first who had held the great seal for a long period, was constituted chancellor; the Court of Session expired, and the course of the old common law was re-established.

JAMES II., King of Scotland, only son of James I., succeeded to the crown when but about seven years old. The rivalry which existed between the nobles and ecclesiastics at his father's death continued; and the one party or the other prevailed according as by violence or stratagem they obtained possession of the king's person. Disorder naturally spread throughout the kingdom, and the power of individuals grew most insolent from neglect to enforce the laws. The Earl of Douglas in particular erected a sort of independent principality in the country, and forbidding his vassals and dependents to acknowledge any authority save his own, he created knights, appointed a privy-council, named officers, civil and military, and appeared in public with a splendour and magnificence more than royal. To add to the calamities which the nation suffered, the country was visited by a plague, and there was also a great famine. The king was immature in mind as in years, and altogether deficient in the vigour necessary in his circumstances and situation: his partialities were also misplaced. During his whole reign the country was disturbed by intestine broils, and though continual executions and forfeitures took place yet no regular or effectual measure was adopted to obtain or secure peace. He was also attacked from England, and at the siege of Roxburgh, which was occupied by the English, he was killed by the bursting of a cannon near him. This was in the year 1460, and in the 29th year of the king's age.

JAMES III., King of Scotland, was, like his father James II., about seven years old at his accession to the throne, 3rd August, 1460. He had scarcely begun his reign when Donald, the Lord of the Isles, seeing the weakness of government and the distracted state of the kingdom, assembled a council of his friends and vassals at his castle of Ardtornish, and in the style of an independent prince granted a commission to ambassadors to confer with deputies from Edward IV., king of England, with a view to the settlement of the realm. The commissioners met at Westminster, and after a negotiation, concluded a treaty, dated at London, 13th February, 1462, the object of which was no less than the conquest of Scotland by the vassals of the chieftain and the auxiliaries to be furnished by Edward, with such assistance as could be given by the banished earl of Douglas. While this rebellion was going on in the north, Robert lord Boyd, one of the lords of the regency, and also lord-justiciar south of the Forth, and lord-chamberlain of the kingdom, was grasping in another part of the country at all the chief honours and places of government, and it would seem that the minor offices of magistrates and common-councilmen in the several burghs were also then objects of tumultuous contest; for it was at this time the act 1469, c. 29, was passed, by which the entire system of burgh election was changed, on the pretence of such confusion. This act was the foundation of the *close system*, which was only remedied by the late Burgh Reform Act for Scotland. The same year the act 1469, c. 30, was passed, subjecting all notaries to the examination and authority of the Ordinary. This act was passed to please the clergy, who had the ear of the king. The latter indeed appears to have been the known slave of his ecclesiastics, and Sir James Balfour (*Annals of Scotland*, an. 1481), records a trick played off upon him by King Edward IV. of England, who trimmed up a person in the habit of a papal legate, and sent him to James with injunctions and excommunications in the name of his Holiness. The imposition succeeded completely. The king took up also with low favourites, and on their account involved himself in a quarrel with his nobles, which ended in the encounter at Bannockburn. The king fled in fright from the field, and falling from his horse was *harled* into a miller's cottage, where, on being discovered, he was secretly killed and carried off, nobody knew where (Pitscottie, 220). The king's death took place in June, 1488, in the 35th year of his age.

JAMES IV., King of Scotland, son of James III., was about fifteen years old at his accession to the throne, which took place on the 11th June, 1488. He was of an active disposition, full of life and vigour; and in his time the commerce and literature of the country flourished under his encouragement. But though he possessed not a few of the elements of a great mind, he unfortunately became the slave of superstition, and thence in his public conduct a meer tool in the hands of his clergy.

In 1494, having fallen into a state of melancholy on the reflection that he had countenanced the rebellion in which his father perished, he received a legate from the pope, and, in obedience to him, bound about his waist an *iron belt*, to be worn in penance, day and night, for the remainder of his life. Sometime after this his queen fell sick, and immediately thereupon he made a pilgrimage to St. Ninian's in Galloway, on foot, for her recovery, and she having afterwards recovered, they both went thither in pilgrimage the same year. That year also he went to St. Duthin's in Ross —which was to the extreme north of the kingdom, as the other shrine was at the extreme south; and we cannot hesitate to think it was at the desire of the ecclesiastics that he made those repeated progresses to the highlands and isles in which we find him engaged, with the ostensible purpose of quieting that part of the realm, but in fact to remove him from the seat of authority and government. In the meantime the clergy were not idle. In the above year, 1494, the university of Aberdeen (the third of the Scottish universities) was founded; and in the same year an act was passed in parliament, enjoining all barons and freeholders of substance to put their eldest sons to grammar learning, and thereafter for three years to the universities to study the canon and civil laws. In 1503, while the archbishop of St. Andrew's was lord chancellor, the court of *Daily Council* was instituted—a court of the same nature and extensive jurisdiction as the previous Court of the Session, composed of the chancellor and others appointed by the crown; and the same year an act was passed subjecting all notaries to the examination of the Ordinary. In 1512 a great council of the clergy was held at Edinburgh, where the famous *Valor beneficiorum*, called 'Bagimont's Roll,' was made up. The following year the king, taking up the French cause, entered, with the flower of the kingdom, on the fatal field of Flodden, where he perished. [Henry VIII., p. 132.]

JAMES V., King of Scotland, son of James IV., was little more than a year old when the crown devolved upon him. But so equally poised was the balance of power in Europe at this time, that as the favour of Henry VIII. of England was anxiously sought by the rival monarchs of Germany and France, so all three courted the favour of James's government. The state of the papal see was also peculiar at this time; for besides the risks which it ran from the collision of temporal interests, it was now raising up for itself determined enemies within its own dominions. The reforming spirit of Martin Luther and his followers spread into Scotland, and introduced new elements of discord into a country then in a singularly distracted state. The regency of the young king was long an object of ambition; and in the struggle every thing was forgotten by the contending parties but success. The king was besieged, captured, and re-taken; and personal rencountres between nobles and their vassals in the streets of the metropolis were of frequent occurrence. The loss of laymen however at Flodden had given a decided advantage to the clergy, and the ecclesiastical interest at last bore undisputed sway. Gavin Dunbar, who had been the king's preceptor, was made archbishop of Glasgow in 1524; in 1528 he was appointed lord chancellor; and in four years afterwards the Court of Session was erected—a court of general and supreme jurisdiction under the chancellor. The latter was now at the head both of the church and common law; and when Cardinal Beaton became chancellor, his vast powers were exercised with such force and rapidity as threatened and well nigh accomplished the extermination of every power in the kingdom but his own and the papal. It was a matter of course that all attempts at an alliance with the king by King Henry VIII., who had become embroiled with the papacy, should be rejected. A war was thus provoked, and James was obliged to court those nobles whom it had been the policy of his court to humble. They now determined on a disgraceful revenge. In an attack on the Scottish border the English were repelled, and an opportunity offered to the Scots of cutting off their retreat. The king accordingly gave orders to that end, but his barons obstinately refused to advance; and in a subsequent engagement 10,000 of the Scots deliberately surrendered themselves prisoners to the enemy. The spirit of James sunk under his contending passions, and he died of a broken heart, in the 33rd year of his age.

JAMES I. of England, and VI. of Scotland, was the only offspring of Mary queen of Scots by her second husband Henry Stuart, lord Darnley, who, through his father Matthew Stuart, earl of Lennox, being descended from a daughter of James II., had some pretensions to the succession of the Scottish throne in case of Mary dying without issue, and who was the grandson, as Mary was the granddaughter, of Margaret Tudor, through whom the Scottish line claimed and eventually obtained the inheritance of the crown of England after the failure of the descendants of Henry VIII. The son of Mary and Darnley (or king Henry, as he was called after his marriage), was born in the castle of Edinburgh, 19th June, 1566, and was baptized according to the Catholic ritual in Stirling Castle, on the 17th of December following, by the names of Charles James. The murder of Darnley took place on the 18th of February, 1567; and was followed by Mary's marriage with Bothwell, 15th May of the same year; her capture by the insurgent nobles, or lords of the congregation as they called themselves, at Carberry, 14th June; her consignment as a prisoner to the castle of Lochleven, on the 17th; and her forced resignation of the crown, on the 24th of July, in favour of her son, who was crowned at Stirling on the 29th as James VI., being then an infant of little more than a year old.

The circumstances of the time, which was that of the final struggle in Scotland between the two great interests of the old and the new religion, which besides their intrinsic importance were respectively identified with the French and the English alliance, and also with the old and the new distribution of the property of the kingdom, made the minority of James stormy beyond even the ordinary use and wont of Scottish minorities. Before his mother's marriage with Bothwell he had been committed by her to the care of the earl of Mar, a nobleman of the most estimable character, who had retired with his charge to Stirling Castle, and there resolutely withstood all Bothwell's attempts to obtain possession of the infant prince. Here he continued to reside during the regencies of the earl of Murray (22nd August, 1567—23rd January, 1570), of the earl of Lennox (27th January, 1570—4th September, 1570), of the earl of Mar (6th September, 1570—29th October, 1572), and of the earl of Morton (24th November, 1572—10th March, 1578), his education being placed under the general direction of Mar's brother, Alexander Erskine, under whom were employed George Buchanan and three others of the most distinguished among the Scottish scholars. After his brother's death not only the custody of the king's person, but also the command of the castle, were left in the hands of Erskine, and principally by his management, in concert with the earls of Argyle and Athol, a plot was arranged in the beginning of the year 1578, the result of which was that at a council composed of nearly all the nobility of the kingdom, which met at Stirling, James, young as he still was, was requested to take the government into his own hands, and Morton was compelled to resign the regency at Edinburgh on the 10th of March, to the great joy of the nation, with whom the severity and rapacity of his administration had made him universally odious. Affairs were now nominally administered by the king, assisted by a council composed of twelve of the nobility. The new government however soon became unpopular, principally from the presumed or notorious inclination of its leading members in favour of popery; and this state of things in a few weeks opened a way for Morton to the resumption of nearly all his former authority. Into the hands of this man, undoubtedly one of the chief actors in the tragedy of his father's murder, the young prince now fell; and Morton succeeded in retaining his prize, notwithstanding all the efforts of the opposite party, till, partly by force, partly by skilful negotiation, he had apparently re-established his power on a foundation of complete security. It was not long however in being undermined, chiefly by the intrigues of two individuals, who seem to have first made their appearance at the Scottish court in the latter part of the year 1579, and immediately became the objects of the unbounded fondness of the young king. One of these earliest of James's succession of favourites was Esmé Stuart, a son of a younger brother of the earl of Lennox, and therefore a near relation of his own: he was a native of France, and bore in that country the title of Lord D'Aubigny, to which James rapidly added the Scottish honours of Lord Aberbrothock, earl of Lennox, and then duke of Lennox, with the appointments of governor of Dumbarton Castle, captain of the royal guard, first lord of the bedchamber, and lord high chamberlain. The other, a much darker character, was a Captain James Stuart, the second son of Lord Ochiltree. On the 30th of December, 1580, the mind of the king having been previously prepared for what was to be done, Captain Stuart entered the council chamber, and formally accused Morton of having been accessory to the murder of the late king Henry. The earl was immediately committed to prison, and notwithstanding the most strenuous efforts in his behalf by the English queen, he was brought to trial before the court of justiciary, condemned, and executed at Edinburgh, 2nd June, 1581. The two favourites, Lennox, and Stuart, recently created earl of Arran, were now the rulers of the kingdom, and they exercised their uncontrolled power with unmeasurable insolence. At length a party of the nobles, including the earls of Mar, Glencairn, and Gowrie, lords Lindsay, Boyd, and others, concerted a scheme for seizing the king's person, which they carried into effect, 12th August, 1582, at Gowrie's Castle of Ruthven, in Perthshire, whence the enterprise is known in Scottish history by the name of the Raid of Ruthven. On this revolution Arran was thrown into confinement, Lennox was ordered to leave the kingdom, and soon after died in France, and James himself remained a captive in the hands of the conspirators, whose proceedings immediately received the full approval of a convention of the estates. They had also the active though unavowed support of Queen Elizabeth, who in the overthrow of the government of Morton and the ascendancy of Lennox and Arran had seen her whole policy with regard to the northern kingdom thwarted. On the other hand Henry III. of France interposed his influence, though unsuccessfully, to rescue the Scottish king from the thraldom in which he was now kept.

James remained in a state of restraint amounting almost to actual imprisonment for about ten months. At last, on the 27th of June, 1583, having been permitted to go from Falkland to St. Andrew's, he contrived, with the assistance of some friends, with whom he had arranged his plans, to throw himself into the castle there, and to maintain his position till the faction of his enemies, finding themselves outnumbered by those who flocked from all parts to his assistance, threw down their arms and gave up the contest. One of the king's first acts after he recovered his liberty was to release and recal to court the infamous Arran, and again to commit the management of affairs to that luckless minion, whose government speedily became as harsh and arbitrary as ever. James in the first instance had evinced a disposition to follow a moderate and conciliatory course with the faction lately at the head of affairs; he had even visited the earl of Gowrie at Ruthven Castle and granted him a full pardon; but under the influence of Arran he soon changed his conduct. An act was obtained from the convention of estates declaring all those who had been concerned in the Raid of Ruthven guilty of high treason: most of them made their escape to England; but Gowrie, who relying on his pardon had made his submission, was seized, thrown into prison, tried, condemned, and sent to the block. Seeing the power of that party thus to all appearance broken for ever, Elizabeth now applied herself to form an alliance with Arran, who readily undertook that the government of Scotland should be conducted in conformity with the wishes of the English queen, and by his unbounded influence over his royal master was easily able to perform that engagement. James was induced, among other acts of subserviency, to write to his mother in such undutiful and unfeeling terms as to make Mary, in the bitterness of her resentment, threaten to leave him the load of a parent's curse. Soon after this, 29th July, 1585, a treaty of intimate alliance was concluded between Elizabeth and the Scottish king, and an annual pension of 5000*l.* was settled by the former upon the latter. A chief manager in these transactions had been a new court favourite of James's, the eldest son of the Lord Gray, styled the Master of Gray, an individual formed by nature and education for intrigue and treachery. With the view, it is supposed, of removing a formidable rival, Arran had caused Gray to be sent as ambassador to the English court, where the unprincipled politician appears to have been immediately gained over by Elizabeth, and engaged by her to act his part in forwarding her various schemes of policy with regard to Scottish affairs. One of the first uses which Elizabeth made of this new instrument was to effect the overthrow of Arran, on whose unsteadiness and caprice she felt that she never could place any sure reliance. With her connivance, the lords who had been banished on account of the Raid of Ruthven entered Scotland at the head of a force of 10,000 men, in the end of October, 1585, and advancing to Stirling, where the king and Arran were, invested the castle, on which Arran took to flight, and the king was compelled to negotiate with them upon their own terms. All their past offences were pardoned; the principal forts of the kingdom were put into their hands; and, a parliament having been called, Arran and his late associates were all dismissed from power, he himself being besides stripped of his titles and estates—the latter, chiefly the confiscated property of those whose moment of retaliation was now come. The new settlement of the government was followed by the conclusion, 8th July, 1586, of another treaty with England, by which the two kingdoms bound themselves in a league offensive and defensive against all foreign powers who should invade the territories or attempt to disturb the reformed religious establishment of either.

In October of the same year James's mother, the unfortunate Mary, after her imprisonment of nearly twenty years, was at last brought to trial, and on the 8th of February following she was put to death. Between her condemnation and her execution James had made considerable exertions to save her; in addition to solicitations and remonstrances, he took steps to obtain the aid of France, Spain, and other foreign courts in support of his demands; but his ambassador to the English court, the infamous Master of Gray, is said to have betrayed his trust, so far as actually to be the most urgent instigator of the execution, often reminding Elizabeth and her ministers that the dead cannot bite, and undertaking that no unpleasant consequences should follow from any momentary resentment which James might show. In point of fact, the Scottish king was very soon pacified; he blustered at first under the sting of the insult that had been offered him; but reflecting that by any violent course he should put in hazard both his pension and his chance of the English succession, he prudently allowed himself to be soothed by Elizabeth's hollow excuses, and continued on the same terms of friendship with her as before. Gray was indeed, on the discovery of the part he had acted, disgraced and dismissed from court. The next year James signalized his zeal in the service of his English patroness by firmly rejecting all the overtures of the king of Spain and the other Catholic powers to induce him to join them, and by co-operating zealously with Elizabeth in her preparations for repelling the attack of the Armada.

In 1589, James was married to the princess Anne, the second daughter of Frederick II., king of Denmark. He proceeded in person to Upalo in Norway, to which place his bride, after having put to sea, had been driven back by a storm, and there the marriage was solemnized on the 24th of November. James did not return to Scotland till the 20th of May, 1590. The character of Queen Anne, who survived to 1st March, 1619, is depicted in the scandalous chronicles of the time in not very creditable colours; she is represented as an eager and restless intriguer, both in politics and in gallantry; on the other hand however, Archbishop Abbot, who knew her well, and who was not likely to regard with indulgence some of the faults she is charged with, speaks of her memory with great respect. She seems to have been a person of greater energy and decision than her husband, over whom she exerted considerable influence, notwithstanding his constant doting fondness for one male favourite after another. The first memorable event that occurred in Scotland after the king's return was a daring attempt made by his relation, Francis Stuart, lately created earl of Bothwell, a grandson of James V. by his son John, prior of Coldingham. He had been committed to prison on the absurd charge, made by some unhappy persons apprehended and tortured as witches, that he had employed their art to raise the storms by which the life of the queen had been endangered on her first attempted voyage to Scotland, and the king had afterwards been so long detained in Denmark. Upon effecting his enlargement, he collected a force of his retainers, and on the night of the 27th December, 1591, entered the palace of Holyrood-House, with the design, as he pretended, of expelling the chancellor Maitland from the king's council, but apparently with still more daring intentions. The alarm was given after he had set fire to several of the apartments and had nearly made his way to where the king was; he succeeded however in making his escape, and fled to the north. The earl of Huntly having been sent in pursuit of him, took that opportunity of falling upon his private enemy the young Earl of Murray (son-in-law and heir of the late regent), and slaying him, after burning his house to the ground; an atrocity which excited the deepest popular indignation at the time, and is celebrated in Scottish song. Bothwell and all his adherents were soon after attainted in parliament; but this did not put an end either to his audacious proceedings or to the treasonable attempts of other parties. In the beginning of 1593 a new conspiracy of Huntly and the other heads of the popish faction was detected for bringing a Spanish force into the kingdom, with the object of re-establishing popery and invading England; and a few months later, Bothwell, after having failed in another attempt to seize the royal person at Falkland, having associated himself with the remaining adherents or connexions of the late favourites Lennox and Arran, suddenly returned from England, where he had been protected by Elizabeth, and on the 24th of July, 1593, entered the palace with a band of armed followers, and made the king his prisoner. James was obliged both to grant a full pardon to the traitor and to dismiss the chancellor Maitland and his other chief ministers; and he remained in durance till a convention of the nobles at last assembled at Stirling in the beginning of September, when his gaolers found it necessary to release him. Disturbances however were again and again excited in the course of this and the two following years by the attempts both of Bothwell and the popish lords; and at length these two factions, which had hitherto professed the most opposite principles, joining their forces, under the conduct of the earls of Huntly and Errol, encountered the royal army commanded by the young Earl of Argyle, at Glenlivat in Aberdeenshire, 3rd October, 1594, and, notwithstanding their inferiority in numbers, put it completely to the rout. This disaster however was immediately repaired by the results of an expedition conducted into the northern districts by James in person, who forced the popish lords first to retreat to the mountains, and eventually to make their submission, when they were allowed to retire beyond seas on giving security that they would engage in no further intrigues against the Protestant religion or the peace of the kingdom. Bothwell fled to France, and afterwards withdrew to Spain and Italy, where he professed himself a convert to popery, and spent the rest of his days in obscurity and indigence.

These commotions had scarcely been quieted when James became involved in new troubles in consequence of a contest into which he was brought with the clergy of the Presbyterian church, which had been legally established as the national form of religion by an act of the Scottish parliament in 1592. Although James had been induced by considerations of policy to give his assent at the moment to this popular act, he was himself an avowed admirer of episcopacy, and was even very generally suspected of a strong inclination towards popery; so that the alliance of Church and State in this case was one of a very frangible nature. To make matters worse, both parties cherished the loftiest notions of their powers and rights, each indeed looking upon itself as entitled to lord it over the other. In December, 1596, in a tumult of the people of Edinburgh, excited by the harangues of their clergy, the life of the king was placed in the greatest danger, and the decided measures that followed on both sides made the contest assume the appearance of the commencement of a civil war. Nearly all the aristocracy and the upper classes however were with the king; the clergy and the people in vain endeavoured to find one of the nobility who would espouse their cause and come forward as their leader; and by an unusual exertion of vigour and firmness James was enabled not only completely to crush the insurrection, but to turn the occasion to account in bringing the Church into full subjection to the civil authority. In the course of the following year, 1598, the substance of episcopacy, in a political sense, was restored by seats in parliament being given to about fifty ecclesiastics on the royal nomination. Even the General Assembly was gained over to acquiesce in this great constitutional change.

The most memorable event in the remainder of James's Scottish reign was the very mysterious affair known in history by the name of the Gowrie conspiracy. On the 5th of August, 1600, James, being then at Falkland, was induced by Alexander Ruthven, a younger son of the earl of Gowrie who was executed in 1584, to accompany him with a few attendants to the house of his brother the earl of Gowrie at Perth. Some time after his arrival he was led by Ruthven into a retired apartment of the house; there a struggle took place between the two, in the presence only of the earl's steward, who was in full armour, but either did not interfere at all, or, according to his own account, only for the king's protection. Meanwhile, what was going on was perceived from the street, on which the people assembled, and the king's attendants rushed to the room: in the end the king remained unhurt, but both Alexander Ruthven and his brother the earl were killed. These are nearly all the undoubted facts of this strange transaction: they seem to establish a design on the part of the Ruthvens to obtain possession of the king's person, and there are some circumstances leading to the conjecture that they were prompted by the English government. That they intended to take his life, as James endeavoured to make it appear, the whole circumstances of the case will scarcely allow us to suppose. The passage however is one of the darkest in history, and, after the expenditure of much ingenuity in the attempt to clear it up, it may be pronounced that no explanation of it which is satisfactory at all points has yet been given, or is likely ever to be attained. Whatever was the nature of the affair, it stands isolated from all the other events of the time, and had as little effect upon anything that came after it as it is known to have had of connection with anything that went before.

In the last years of his residence in Scotland James was much occupied in taking measures for securing his succession to the English throne, an object which, from the capricious temper of Elizabeth, and other circumstances of the case, remained of doubtful attainment up to the very moment of its accomplishment. Although no party to the rash attempt which cost the earl of Essex his life in 1601, he had been previously in correspondence with that nobleman, who seems to have led the Scottish king to believe that zeal for his cause was the motive of his conduct; and after receiving the news of the ill success of his friend, James appears to have been prepared to go all lengths to save him from the block, having even ordered the ambassadors, whom he despatched immediately to the English court, to follow up their entreaties and remonstrances, if necessary, with an open declaration of war. The head of Essex however had fallen before the Scottish ambassadors reached London. Eventually Sir Robert Cecil himself became James's chief confidant; but it is remarkable that even after he had thus secured the important services of the English prime minister, James continued to hold a clandestine correspondence on the same great subject of the succession with other parties, of whose participation in the business Cecil apparently was kept in entire ignorance. (See Lord Hailes's 'Remarks on the History of Scotland,' ch. xiv.) Many of Cecil's letters have been preserved, and were published at Edinburgh by Lord Hailes (Sir David Dalrymple) in 1766, under the title of 'The Secret Correspondence of Sir Robert Cecil with James VI., King of Scotland,' 12mo.

James at length became king of England by the death of Elizabeth, 24th March, 1603, when his accession took place without a murmur of opposition from any quarter. Having set out from Edinburgh on the 5th of April, he entered London on the 7th of May, after a journey which in both countries resembled a triumphal progress. Many of his Scottish courtiers accompanied their sovereign, and the prodigality with which he distributed the wealth and honours of the kingdom among these hungry northern adventurers was one of the first things in his conduct that disgusted his new subjects. In his foreign policy James began by continuing in the same course that had been pursued by Elizabeth, entering into a close alliance with Henry IV. of France for the support of the Dutch and resistance to the aggressions of Spain. The conspiracy of Sir Walter Raleigh, Lord Cobham, and others, to place on the throne the Lady Arabella Stuart, James's cousin, was the first domestic affair of interest. [RALEIGH, WALTER.] The next business that engaged James's attention was the settlement of the disputes between the Church and the Puritans, for which purpose a conference was held at Hampton Court, in January, 1604, and the points of difference discussed in the king's presence, he himself taking a conspicuous part in the debate. [CONFERENCE.] James's first parliament met on the 19th of March, and was opened by a speech which, as Hume remarks, 'proves him to have possessed more knowledge and greater parts than prudence or any just sense of decorum and propriety.' Among other things he zealously urged the union of England and Scotland into one kingdom; but nothing came of this proposal for the present. James however, of his own authority, now assumed on his coins and in his proclamations the title of King of Great Britain. [GREAT BRITAIN.]

Peace with Spain was concluded, much to the gratification of the king's wishes, on the 18th of August this year. The great event of the year 1605 was the Gunpowder Plot. [FAWKES, GUY; GARNET, HENRY.] For some years after this the history of the reign is marked by no memorable events either foreign or domestic; but, although James still continued to govern by parliaments, various causes were contributing gradually to alienate the House of Commons from the crown, and to prepare the elements of that open contest between the two powers which broke out in the next reign. In 1612, the death of James's eldest son, Henry prince of Wales, in the nineteenth year of his age, spread a general grief through the nation, to which the prince had already endeared himself by the promise of a character which may be most shortly described as being in almost all respects—in its defects as well as in its virtues—

the reverse of that of his contemptible father. A rumour arose at the time, and has been preserved by some contemporary writers of a violent party spirit, that the prince had been carried off by poison, and not without the privacy and consent of the king; but this accusation, too monstrous to be admitted without the strongest evidence, rests upon neither proof nor probability of any kind. The death of Prince Henry was followed, 14th February, 1613, by the marriage of James's daughter, the Princess Elizabeth, with Frederick the Elector Palatine, an alliance which was attended with important results both in that age and in the next.

The ruling favourite whom James had brought with him from Scotland was Sir George Hume—whom in 1604 he created Lord Hume in the English peerage, and in 1608 earl of Dunbar in that of Scotland—a man of integrity, as well as of superior talent. The king's silly and mutable fondness however was in course of time transferred to other objects—to Philip Herbert, the second son of the earl of Pembroke, whom he made earl of Montgomery in 1605, and who many years after succeeded his elder brother as earl of Pembroke; and to another Scotchman, Sir James Hay, made a Scottish peer by the title of Lord Hay of Bewlie in 1609, and who afterwards bore successively in the English peerage the titles of Lord Hay of Sawley (1615), Viscount Doncaster (1617), and earl of Carlisle (1622), by which last he is best remembered. It is said to have been Hay who, about the beginning of the year 1610, introduced at court a young countryman of his own, Robert Carr, or more properly Ker, of a good family, but chiefly distinguished by his handsome person, an advantage which never failed to attract the king's attention and regard. Carr was immediately taken into the highest favour, made a knight of the Bath, and the next year a peer by the title of Viscount Rochester. In 1613 the young and beautiful Frances Howard, countess of Essex, having by an infamous process, in urging which the king took a part that alone ought to consign his memory to abhorrence, obtained a divorce from her husband, was married to the favourite, her previous profligate passion for whom is believed to have incited her to the proceedings by which she succeeded in dissolving her first marriage. The king on this occasion raised Rochester to the rank of earl of Somerset (November, 1613). Somerset's fall however was still more rapid than his rise His chief friend Sir Thomas Overbury, who had strenuously exerted his influence to prevent his marriage with Lady Essex, which he represented as the sure destruction of his fortunes, was first, by the contrivance of the unprincipled woman whom he had thus made his enemy, thrown into the Tower, and soon after taken off by poison administered to him by her means, and with the privity of her husband. The crime, though suspected from the first, was not fully discovered till about two years after its commission; but in 1615 all the parties concerned in it were brought to trial, and their guilt completely established. Four persons who had been accomplices in the murder were left to the executioner; the two principals, the wretched Somerset and his wife, had their better merited punishment commuted into confiscation of their property, and imprisonment, from which they were both after some years released. Their condemnation of course threw down the earl from his place and favour at court, and he was given up with the most easy indifference, not unaccompanied with some touches of gratuitous baseness, by James, whose mind had now been taken possession of by a passion for a new object, another handsome youth, named George Villiers, who had been recently introduced to his notice. Villiers, who, after having been knighted, was created successively Viscount Villiers (1616), earl of Buckingham (1617), marquis of Buckingham (1618), and duke of Buckingham (1623), continued the first favourite and ruling minister during the remainder of the reign. [Buckingham.]

In the summer of 1617 James paid a visit to Scotland, and, having summoned a parliament, succeeded, though not without great difficulty, in obtaining the assent of that body, and also of the General Assembly, to such regulations as, along with other innovations previously made since his accession to the English throne, brought the Scottish church, in government, in ceremonies, and in its position in relation to the civil power, very nearly to the model of the English. It was now no longer a Presbyterian, but nominally as well as substantially an Episcopal church. But the popular feeling of the country was never for a moment reconciled to these enforced changes.

The year 1618 was disgraced by the execution of Sir Walter Raleigh, on the monstrous pretence of the sentence passed upon him for the conspiracy in which he had been involved in the first year of the king's reign, but in reality as a sacrifice to the court of Spain. [Raleigh.] But the public indignation at James's subserviency to that Catholic power was roused to a still higher pitch by the great foreign events of the two following years, when, Austria assisted by Spain having attacked the Bohemians, who had chosen the Elector Palatine for their king, James not only refused to take part with his son-in-law and the Protestant interest on the Continent, of which he was thus installed as the champion, but even refused to acknowledge his new regal title. Frederick was soon driven both from his acquired and his hereditary dominions by the arms of the Catholic powers confederated against him, and obliged with his family to take refuge in Holland. Staggered by this sudden catastrophe, and by the vehemence with which the people expressed their rage and grief, James now hastened to take some steps to repair the disasters which his pusillanimity and inaction had mainly occasioned. After endeavouring to raise money in the way of a benevolence, he found himself obliged to call together a parliament, the first that had been allowed to meet for six years. In this parliament, memorable among other things for the impeachment of Bacon [Bacon, Francis], the first decided stand was taken by the Commons in their contest with the crown by their famous protest, passed 18th December, 1621, in reply to the king's assertion that their privileges were derived from the grace and concession of his ancestors and himself,—'That the liberties, franchises, and jurisdiction of parliament are the antient and undoubted birthright and inheritance of the subjects of England.' This resolution, which the king tore from the Journals with his own hand, was followed by the immediate prorogation and soon after by the dissolution of the parliament; several of the leading members of the House of Commons being at the same time sent to the Tower or to other prisons.

James had for some time before this set his heart upon the marriage of his son Prince Charles with a Spanish princess: the project of that match had principally influenced him to the course he had taken in the affair of Bohemia, and he now hoped by the same arrangement to be able, ,without having recourse to arms, to recover the Palatinate for his son-in-law. But in both these expectations he was disappointed. For some time the negotiations seemed to proceed favourably; but they were in 1623 brought to an abrupt termination, apparently by the rash interference of Buckingham, who, after having persuaded Prince Charles to proceed along with him to Spain for the purpose of expediting the matter, disgusted and quarrelled with the leading personages of the Spanish court, and then successfully exerted his influence with James, or perhaps rather with the prince, to prevent the match. As the public clamour for the recovery of the Palatinate still continued, another parliament was assembled in February, 1624, which eagerly granted supplies for the attainment of that object by force of arms; war was in consequence declared against Spain, and an army under Count Mansfeldt was sent into Germany in the latter part of the year. But this expedition turned out an utter failure; the force, reduced to half its numbers by a pestilential disorder before it had crossed the sea, never even entered the Palatinate; and that principality remained in the hands of the Emperor, or rather of the Duke of Bavaria, to whom it had been assigned, along with the electoral dignity, by the Imperial diet.

James's reign of nearly fifty-eight years in Scotland, and rather more than twenty-two in England, was terminated by his death on the 27th of March, 1625, when he was within three months of completing the fifty-ninth year of his age. As happened in the case of the death of almost every person of eminence in that and the preceding age, a rumour sprung up that he had been carried off by poison; and when Buckingham was impeached by the Commons in the beginning of the next reign, one of the charges brought against him was that the late king owed his death to some plasters and drinks which he had administered to him without the knowledge of the physicians. In fact something of this kind does appear to have taken place, although Buckingham's intentions in what he did may possibly have been innocent enough. It was even said, in the violence of party hate, that Charles himself was implicated in the poisoning of his father; and this grossly improbable imputation has received the eager sanction of Milton. The statements upon the subject are collected in Harris's 'Life of James I.,' pp. 281-258; and 'Life of Charles I.,' pp. 21-25 (edit. of 1814).

James's children by his queen, Anne of Denmark, born 12th December, 1574, married 24th November, 1589, died 2nd March, 1619, were: 1. Henry Frederick, born at Stirling Castle, 19th February, 1594, died 6th November, 1612; 2. Robert, died in infancy in Scotland; 3. Charles, who succeeded his father as king; 4. Elizabeth, born 19th August, 1596, married to Frederick V. Elector Palatine 14th February, 1613, died 8th February, 1662; 5. Margaret, born 24th December, 1598, died in infancy; 6. Mary, born 1605, died 16th December, 1607; and 7. Sophia, born 21st June, 1606, died two days after. The Electress Sophia, the mother of George I., was the youngest of the thirteen children of the Princess Elizabeth and her husband the Elector Palatine. [GEORGE I.]

Besides the well authenticated public acts of James I., many materials may be found for the illustration of his character in the works of various writers who were his contemporaries; especially Sir Anthony Weldon's 'Court and Character of King James,' 12mo., 1651; Arthur Wilson's 'Life and Reign of King James the First, King of Great Britain,' fol. 1653, or as reprinted in the second vol. of Bishop Kennet's 'Complete History;' Sir Edward Peyton's 'Divine Catastrophe of the Kingly Family of the House of Stuarts,' 8vo., 1731; 'The Non-such Charles, his Character,' 12mo., 1651 (supposed by some to be written by Peyton); Sir Ralph Winwood's 'Memorials of Affairs of State in the Reigns of Queen Elizabeth and King James I.' fol. 1725; Francis Osborne's 'Traditional Memoirs on the Reign of King James,' in Works, 8vo., 1673, &c.; and Roger Coke's 'Detection of the Court and State of England,' 2 vols. 8vo., 1697. See also 'Dr. James Welwood's 'Memoirs of the most material Transactions in England for the last Hundred Years preceding the Revolution,' 8vo., Lond. 1700, and Glasg. 1744. Although some of the above-named writers are avowedly very unfavourably disposed to the memory of this king, and relate scarcely anything of him that is not to his discredit, there is too much ground for believing that the most severe of them have scarcely exaggerated the more despicable features of his character. Even his better qualities leaned to the side of vice or weakness; his easiness of temper was but an indolent sensuality, and his pacific disposition and aversion to war mere pusillanimity and cowardice. Of dignity or elevation of mind he had no conception; his tastes, opinions, passions, and habits were all alike low and vulgar, if indeed for some of them these be not far too gentle epithets. With such a moral nature it was impossible that his intellect could be other than a stinted one; yet his education had given him a good deal of learning, at least for a king, and although he was far from being either the profound scholar, philosopher, or divine that he supposed himself, and that he was flattered with being by his contemporaries, who called him Solomon the Second, he was certainly not destitute of some literary talent, however dashed most of the exhibitions of it were with occasional grotesqueness and absurdity. He was a voluminous author, and any account of him would be very incomplete which did not notice his various printed works in prose and verse. They have been partially enumerated by Harris, in his 'Historical and Critical Life,' and by Horace Walpole, in his 'Royal and Noble Authors;' but the fullest account that we have met with is that given by Dr. David Irving, in his 'Lives of the Scottish Poets,' 2nd edition, 2 vols., Edinb. 1810, vol. ii., pp. 207-291. His first publication, a collection of poems, under the title of 'The Essays of a Prentice in the Divine Art of Poesy,' 4to., appeared so early as 1584. About the same time also he appears to have composed his 'Fruitful Meditation,' upon part of the Revelation of St. John, which however was not printed till 1588. Of his subsequent works the following are the chief:—'His Majesty's Poetical Exercises at Vacant Hours,' 1591; his 'Dæmonologie' (a dialogue, in three books, in defence of the belief in witches), 4to., 1597; 'The True Law of Free Monarchies, or the Reciprocity and Mutual Duty betwixt a free King and his Natural Subjects' (Anonymous), 1598; 'Βασιλικὸν Δῶρον, or his Majesty's Instructions to his dearest Son Henry the Prince,' 1599 (a treatise which, on account of the doctrines it contained on church government, was censured as libellous by the synod of St. Andrew's); 'A Discourse of the Unnatural and Vile (Gowrie) Conspiracy against his Majesty's Person,' 1600 (reprinted, with notes, by Lord Hailes, 1757, and along with his 'Annals,' 1819); 'Triplici Nodo Triplex Cuneus, or an Apology for the Oath of Allegiance,' 1605 (which was answered by Cardinal Bellarmin, and produced a long controversy, and many other publications on both sides, for an account of which see a note by Dr. Birch in the Appendix to Harris's Life); 'A Premonition to all Most Mighty Monarchies, &c.' 1608 (on the same subject); 'A Declaration (in French) concerning the Proceedings with the States-General of the United Provinces of the Low Countries, in the Cause of D. Conradus Vorstius' (appointed Professor of Divinity at Leyden), 1612; and 'A Remonstrance for the Right of Kings (in French), in answer to Cardinal Perron,' 1615. A collected edition of all the preceding prose works, except the Discourse on the Gowrie Conspiracy, was published, in folio, in 1616, under the title of 'The Works of the Most High and Mighty Prince James, &c., by James (Mountague), Bishop of Winton.' The volume also contained some treatises that had not before appeared, particulary 'A Counterblast to Tobacco' (this however, according to Harris, was first printed in quarto, without name or date), and 'A Discourse of the Manner of the Discovery of the Powder Treason.' A Latin translation of this collection was published under the care of Bishop Mountague, in 1619. To the works already enumerated are to be added a number of speeches to parliament, some of which are not the least curious or characteristic of the royal author's compositions; various sonnets and other short pieces of verse, in English and Latin, scattered in different collections, printed and manuscript; and a metrical version of the Psalms, published at Oxford, 12mo., 1631, in which however, according to his funeral sermon, preached by Bishop Williams, he had only proceeded as far as the thirty-first Psalm at his death. It ought also not to be forgotten, that the authorized translation of the Bible was commenced and completed under his auspices. [BIBLE.]

Of the changes in the law introduced in this reign the most important were effected by certain acts of the parliament which met in February, 1623. By one of these (the statute 21 Jac. I., c. 2), entitled 'An Act for the General Quiet of the Subjects against all Pretences of Concealment (of Lands belonging to the Crown) whatever,' it was enacted that no person could in future be sued or impeached by the king for any manors, lands, revenues, &c., unless it might be proved that he or his progenitors had a title to them within sixty years before the meeting of that parliament. This was a very valuable modification of the old law maxim, *Nullum tempus occurrit regi.* By another of these acts (the statute 21 Jac. I., c. 3), entitled 'An Act concerning Monopolies and Dispensations with Penal Laws,' it was declared that all charters, licences, and letters patent granted to any person by the crown to dispense with any law or statute should be void, and that all licences and privileges for the sole buying, selling, or working of anything should be void, except patents for a term not exceeding fourteen years to the authors of new inventions, and a few other existing patents, which were specially enumerated. [MONOPOLY.] This abolition of the dispensing power, and of the power of granting unlimited monopolies, both of which had hitherto been considered to be vested in and had been extensively exercised by the crown, was the extinction of two great practical evils. Blackstone enumerates as the chief improvements made in the administration of private justice in this reign, the abolition of sanctuaries and the extension of the bankrupt laws, the limitation of suits and actions, and the regulating of informations upon penal statutes. To this short list, it has been observed, may be added 'the statutes for extending the benefit of clergy to women in certain offences, the restriction upon costs in certain frivolous actions, and the salutary assistance afforded to magistrates in their defence to actions brought against them for things done in the execution of their office.'—*Note by Mr. Justice Coleridge to Com. IV.*, 436.

JAMES II. of England, and VII. of Scotland, was the second surviving son of Charles I. by his queen Henrietta Maria of France, and was born at St. James's, 15th October, 1633. He was immediately declared duke of York, but not formally created to that dignity till 27th January, 1643. After the surrender of Oxford to Fairfax in June, 1646, the duke, with his younger brother Henry, afterwards created duke of Gloucester, and his sister Elizabeth, was committed by the parliament to the care of the earl of Northumberland, and he continued in the custody of that nobleman till the 21st of April, 1648, when he made his escape from St. James's Palace, disguised in female attire, and took refuge in Holland with his sister Mary, princess of Orange. Here he immediately joined a part of the English fleet which had revolted from the parliament, and was then lying at Helvoetsluys; but although at first received on board as admiral, he soon after resigned that post to his brother, the prince of Wales, on the arrival of the latter from Paris, and returned to the Hague. When Charles, now styled king by his adherents, came to Jersey, in September, 1649, he was accompanied by the duke, who remained with him during his stay of three or four months. He then returned to the Continent, and resided for some time with his mother at Paris. 'Never little family,' says Clarendon, who had an interview with him at Breda in 1650, 'was torn into so many pieces and factions. The duke was very young, yet loved intrigues so well that he was too much inclined to hearken to any men who had the confidence to make bold propositions to him. The king had appointed him to remain with the queen, and to obey her in all things, religion only excepted. The Lord Byron was his governor, ordained to be so by his father, and very fit for that province, being a very fine gentleman, well bred both in France and Italy, and perfectly versed in both languages, of great courage and fidelity, and in all respects qualified for the trust; but his being absent in the king's service when the duke made his escape out of England, and Sir John Berkley being then put about him, all pains had been taken to lessen his esteem of the Lord Byron; and Sir John Berkley, knowing that he could no longer remain governor when the Lord Byron came thither, and hearing that he was on his journey, infused into the duke's mind that it was a great lessening of his dignity at that age (when he was not above fourteen years of age, and backward enough for that age) to be under a governor; and so, partly by disesteeming the person, and partly by reproaching the office, he grew less inclined to the person of that good lord than he should have been.' (*Life*, i. 284, edit. of 1827.) Shortly before his meeting with Clarendon it had been reported that Charles, then in Scotland, was dead; upon which the duke, looking upon himself as almost already king, had set his mother's authority at defiance, and left Paris for Brussels, with the view of taking counsel, as to what he ought to do, with the duke of Lorraine. When the falsehood of the intelligence about Charles was discovered, he and the advisers by whom he was attended resolved upon going to the Hague; 'and when they had wearied all people there,' says Clarendon, 'they came to Breda, where the chancellor had met them. The duke himself was so young that he was rather delighted with the journeys he had made than sensible that he had not entered upon them with reason enough; *and they had fortified him with a firm resolution never to acknowledge that he had committed any error*.' (*Ibid*, p. 290.) In the end he found himself obliged to return to his mother at Paris; and here he chiefly resided till he attained his twentieth year, when he received a command in the French army, and served for some time under Marshal Turenne. The peace concluded with Cromwell however in October, 1655, compelled him, with his elder brother, to quit France; upon which, on the invitation of Don John of Austria, the governor of the Low Countries, he retired thither, and entered the Spanish service. Both he and his brother the duke of Gloucester fought on the Spanish side at the siege of Dunkirk, which surrendered to the French in June, 1658.

At the Restoration (May, 1660) the duke of York returned to England with the king, and was immediately made lord-high-admiral and lord-warden of the Cinque Ports. The course of his conduct for the next twenty-five years forms an important part of the public history of his brother's reign, and only the leading incidents can be shortly noticed here. In September, 1660, he married Anne, the eldest daughter of the Chancellor Hyde (afterwards earl of Clarendon), to whom it was affirmed that he had been married, or at least contracted, at Breda about a year before. The lady was at any rate far gone with child when the present marriage took place, and produced a son in about six weeks, a circumstance which makes her father's professed ignorance and want of suspicion as to the whole affair the more extraordinary. For some curious details touching his behaviour when the matter was first communicated to him by the king, his 'Life,' written by himself, may be consulted. It is asserted by Burnet that the duke endeavoured to avoid the marriage, and that 'he thought to have shaken her from claiming it by great promises and as great threatenings; but she was a woman of great spirit, and would have it known that she was so, let him use her afterwards as he pleased.' This is altogether opposed to her father's account, according to whom the duke petitioned the king to give his consent to the marriage with a 'passion which was expressed in a very wonderful manner, and with many tears, protesting that if his majesty would not give his consent he would immediately leave the kingdom, and must spend his life in foreign parts.' But the delay of the step till so near the last moment does not look much like impatience on the duke's side, and rather gives ground for suspecting that there was some reluctance which it required great exertions to overcome.

The duke of York took an eager part in promoting the war with Holland, which broke out in the close of 1664, and as lord-high-admiral he assumed the command of the fleet which was fitted out, and which put to sea even before any declaration of hostilities. The motive that has been sometimes assigned for the conduct of both the brothers on this occasion is their wish to crush the Dutch as a Protestant people, and to disable them from interfering to prevent the re-establishment of popery in England. On the 3rd of June, 1665, the duke gained a great victory off Harwich over the Dutch fleet commanded by Admiral Opdam, who was killed, and nineteen of whose ships were taken or sunk, with the loss of only one on the part of the English. The death of the duchess of York took place in the thirty-fourth year of her age, on the 31st of March, 1671, hastened, as is supposed, by the neglect, if not the positive ill-usage, of her husband, who, notwithstanding his professions of zeal for religion, indulged himself in a fair share of the reigning licentiousness, and kept a mistress almost from the date of his marriage. A few months before her death the duchess had signed a declaration of her reconciliation to the antient religion; and immediately after that event the duke also publicly avowed his conversion to popery, an act which, although his concealed inclinations had been long suspected, did not fail to create a great sensation, especially as, from his brother's want of issue, he was now looked upon as Charles's probable successor on the throne.

When war was anew declared against Holland, in March, 1672, the Duke of York again took the chief command at sea. The most remarkable event of this contest was the action fought 28th May, 1672, in Solebay, off the coast of Suffolk, between the combined English and French fleets under the duke and Count D'Estrées, and the Dutch fleet commanded by De Ruyter, who attacked the allies with a very inferior force, and was not driven off till the engagement had lasted the whole day, and the English fleet had been so shattered as to be disabled from pursuing him. The French are accused of having taken little part in the affair; the object of their government, it is conjectured, having been to allow the English and Dutch to destroy each other. On the passing, in the beginning of the following year, of the Test Act, which required all officers, civil and military, to receive the sacrament according to the usage of the Established Church, the duke necessarily resigned both the command of the fleet, in which he was succeeded by Prince Rupert, and the office of lord-high-admiral, which however was assigned to a board of commissioners consisting of his friends and dependants, so that he still remained substantially at the head of the naval affairs of the country. On the 21st of November, 1673, he married Mary Beatrix Eleanora, daughter of Alphonso IV., duke of Modena, a lady then only in her fifteenth year. Before concluding this union he had paid his addresses to Susan, Lady Belasye, daughter of Sir William Armine, Bart, and widow of Sir William Belasye, the son of Lord Belasye; but that affair was broken off, partly by the obstinate Protestantism of the lady, partly by the interference of her father, who gave the king information of what was projected, when Charles sent for his brother and told him that having played the fool in making an unequal marriage once already, he ought to be satisfied without repeating the same thing in his advanced age. The lady was induced, partly by promises, partly by threats, to relinquish the claim she had, founded upon a written promise of marriage, and by way of compensation was, 25th March, 1674, created Baroness Belasye for life. She survived till 1713. On the 4th of November, 1677, the Duke's daughter Mary, then in her sixteenth year, was, greatly to the public satisfaction, married to her cousin William, prince of Orange, the consent of her father having been obtained to this Protestant alliance by the persuasions of the king, his brother, who represented to him how much he might soften the popular hostility to him on account of his religion by so apparently strong an evidence of his liberality.

During the excitement produced by Titus Oates's Popish Plot, in 1678-9, the Duke of York by the advice of his brother retired to the Continent, and he resided at Brussels with his wife and his youngest daughter for five or six months. While he was absent the famous bill for his exclusion from the throne was twice read in the Commons, and ordered to be committed, by large majorities, and was only prevented from being passed in that house by the prorogation of the parliament, 27th May, 1679. To this date may be assigned the commencement of the open rivalry between the Duke of York and Charles's natural son the Duke of Monmouth, whose popularity with the nation, still more than the presumed partiality of his father, undoubtedly made him a somewhat formidable competitor for the succession, in the actual circumstances of the legitimate heir. For the present however the latter succeeded in maintaining the ascendency. Returning home in the beginning of September he had the satisfaction of seeing Monmouth removed from his post of captain-general and exiled, while he obtained from the king for himself the government of Scotland. Before he set out for that country however he became involved with other persons of his religion in the discredit of giving countenance to the story of the Meal Tub Plot, which the Catholics got up with the hope, in which they were greviously disappointed, of counteracting the effects of Oates's pretended discoveries. The share which the Duke had in this business only added to the dislike in which he was held by the great body of the nation, and which was still further increased by the bigoted severity of his administration of affairs in Scotland. In November, 1780, a new exclusion bill was brought into the House of Commons, but although it was carried through all its stages in that House by great majorities, it was thrown out in the lords. The bill was again introduced in the Lower House in the following January; but the prorogation of the parliament on the 10th of that month, and its dissolution a few days after, prevented the business being proceeded with. A new parliament having met at Oxford in March, the bill was again brought forward there, and again defeated by the same expedient, this the last parliament held by Charles II. having been dissolved after it had sat only seven days.

A visit which the Duke of York paid to London in March, 1682, is memorable on account of a disaster which happened to the ship in which he sailed on his return to the north in May; it struck upon a sand-bank near the mouth of the Humber, when the Duke and a few of his attendants, among whom was Mr. Churchill, afterwards the great Duke of Marlborough, were the only persons saved. The solicitude the Duke was said to have shown on this occasion for the safety of his priests and his dogs contributed considerably to deepen the popular odium of which he was the object. Very soon after this he finally left Scotland, his government of which country had been throughout an oppressive and cruel tyranny, and again taking up his residence at the English court, became his brother's chief counsellor, and, much more than Charles himself, whose increased indolence and infirmities now more than ever indisposed him for exertion, the mainspring and director of the conduct of public affairs. To his instigation are chiefly attributed the general attack upon corporations, the executions of Russell and Sidney, and the other violent and despotic acts which crowd the two closing years of Charles's reign.

On the death of his brother, 6th February, 1685, no opposition was made to the accession of James. In his address to the privy council, he said, 'I have been reported to be a man for arbitrary power; but that is not the only story that has been made of me; and I shall make it my endeavour to preserve this government, both in church and state, as it is now by law established.' In his very first measures however the new king showed, to borrow the expressions of Hume, 'that either he was not sincere in his professions of attachment to the laws, or that he had entertained so lofty an idea of his own legal power, that even his utmost sincerity would tend very little to secure the liberties of the people.' He began by issuing a proclamation ordering the customs and excise duties to be paid as usual, although the parliamentary grant of them had expired with the termination of the late reign; and this step, it appears, he took after a secret consultation with the French minister, Barillon, with whom arrangements were soon completed for the continuance of the pension that Charles had received from King Louis, and the general dependence of the government upon that of France. (Sir John Dalrymple's *Memoirs of Great Britain*, Appendix, part i., pp. 100-113, and Fox's *History of the Early Part of the Reign of James II.*) In another direction James made an equally offensive display of his principles, by going openly and in great state to the illegal celebration of the mass; he even lost no time in sending an agent to Rome to make his submissions to the pope and to prepare the way for the re-admission of England into the bosom of the Catholic church.

He determined however to call a parliament, for reasons which he explained to Barillon partly in person, partly through the earl of Rochester, lord treasurer. 'Hereafter,' said he, 'it will be much more easy for me to put off the assembling of parliament, or to maintain myself by other means which may appear more convenient for me. . . . I know the English; you must not show them any fear in the beginning. . . . I will take good care to hinder parliament from meddling in foreign affairs, and will put an end to the session as soon as I see the members show any ill will.' By the mouth of Rochester, he observed in addition that he would be too chargeable to Louis if he should be obliged to come to him for all the supplies he at present wanted; what he was doing did not however exempt him from also having recourse to the French king for some assistance; he hoped that in the difficult beginning of his reign Louis would help him to support the weight of it; that this fresh obligation would engage him still more not to depart from the road which he used to think the deceased king his brother should have kept with regard to the French monarch; and would be the means of making him independent of parliament, and putting him in a condition to support himself without the assistance of that body, if they should refuse him the continuation of the revenues which the late king enjoyed. (Barillon's *Dispatch* of the 19th February.) When, a few days after, in compliance with these broad hints, or rather importunate solicitations, Louis transmitted bills for 500,000 livres, James expressed his gratitude in the most rapturous terms, even shedding tears as he spoke; and Rochester, Sunderland, and Godolphin hastened to Barillon to tell him he had given life to the king their master. It was readily agreed, in requital of Louis's bounty, that the chief obstacle which stood in the way of the seizure by the French king of the Spanish Netherlands should be immediately removed, by the existing treaty between Spain and England being held to have terminated with the death of Charles.

These curious details of its commencement supply the key-note to the whole course of James's disgraceful reign. All that followed flowed naturally from such a beginning. The parliament met according to proclamation on the 19th of May, and, in the usual temper of the nation at the accession of a new sovereign, was found abundantly compliant. The revenue which the king demanded was granted to him for life by the Commons, with little or no debate, and by a unanimous vote; and on almost every other subject that came before it that assembly manifested the same complete subserviency to the wishes of the court; a strong attachment to the Established church, and a still lingering horror of the popish plot, being the only dispositions on the part of the generality of the members that gave James any trouble in managing them. The influence of the court indeed had been unscrupulously employed in their election, and with so much success that James declared there were not forty of them whom he would not himself have named. A Scottish parliament, which had assembled a few weeks before that of England, responded to all the royal demands in a spirit still more slavish. Scotland indeed, by the unheard-of atrocities of the late king's government, had been now humbled for the moment almost to the point of utter despair. While the two parliaments were still sitting, both England and Scotland were invaded, the former by the duke of Monmouth, the latter by the earl of Argyle, both of whom had for some years been exiles in Holland. The disastrous issue of each of these attempts is well known. Argyle, after the dispersion of his few followers, was apprehended and executed at Edinburgh, on the 30th of June.

Monmouth, whose landing did not take place till the 11th of that month, by which time Argyle was all but an unattended fugitive, was, after having met in the first instance with a much greater promise of success than his confederate in the north had experienced, defeated, 5th July, in the decisive battle of Sedgemoor, and being two days after found concealed in a ditch, was brought to London, and delivered to the executioner on the 15th of the same month. His uncle obdurately refused to grant him either his life or even the briefest respite. The suppression of Monmouth's insurrection was followed by the savage military vengeance of Colonel Kirke, and the more revolting enormities of the western 'campaign,' as it was jocularly called by the king, of chief-justice Jeffreys. Between the two the south-western counties were strewed with the carcasses and the dismembered limbs of human beings, women as well as men, butchered by the sword or the axe.

When the parliament re-assembled in November, the king told them that in the late crisis he had employed a great many Catholic officers, and that he had, in their favour, by his own authority dispensed with the legal test of conformity to the Established Church to be taken by every person appointed to any public office. This was too much to be borne without some expressions of dissatisfaction and alarm; but the resistance of the House of Commons was exceedingly timid and feeble. A very respectful and submissive address having been answered by the king with great arrogance and violence, nothing further was done in the matter; the supplies were at once voted; and one of the members, who had ventured to observe, when the king's answer was read, that he hoped they were all Englishmen and not to be frightened by a few hard words, was even sent by a vote to the Tower for his audacity. In the Lords a more formidable opposition seemed to be threatened, to get rid of which the parliament was prorogued after it had sat for little more than a week. One of the acts of this parliament was to extinguish completely the liberty of the press by the revival of an act originally passed for two years in 1662 (the 13 and 14 Car. II., c. 33), and afterwards extended for seven in 1664 (by the 16 Car. II., c. 8); a most important piece of legislation, which yet, as Mr. Fox remarks, has been scarcely noticed by any historian.

James's persevering attempts however to establish the dispensing power, which in the particular instance he chose to begin with was an attack upon the established religion as well as upon the law, eventually involved him in a dispute with the Church, which was productive of the most important consequences. In the beginning of April, 1687, he published a declaration at once suspending and dispensing with all the penal laws against Dissenters, and all tests, including even the oaths of allegiance and supremacy, directed to be taken by persons appointed to offices civil or military. In Ireland all places of power under the crown were immediately put into the hands of Catholics. The earl of Castlemaine was at the same time publicly sent as ambassador extraordinary to Rome, to express the king's obeisance to the pope, and to effect the reconcilement of the kingdom with the holy see. In return the pope sent a nuncio to England, who resided openly in London during the remainder of the reign, and was solemnly received at court, in face of the act of parliament declaring any communication with the pope to be high treason. Four Catholic bishops were consecrated in the king's chapel, and sent to exercise the episcopal function each in his particular diocese. Even in Scotland and England, as well as in Ireland, offices of all kinds, both in the army and in the state, were now filled with Catholics; even those of the ministers and others who had shown themselves disposed to go farthest along with the king were dismissed, or visibly lost his favour, if they refused to conform to the antient religion. An attempt had already been made to compel the university of Cambridge to confer a degree of Master of Arts on a Benedictine monk. This was not persevered in; but soon after a vacancy having happened in the presidency of Magdalen College, Oxford, the vice-president and fellows were ordered by royal mandate to fill it up by the election of a person named Farmer, a late convert to popery (for whom was afterwards substituted Parker, bishop of Oxford, who avowed himself a Catholic at heart), and on their refusal were cited before an ecclesiastical commission, and expelled. On the 27th of April, 1688, the king published a second declaration of indulgence to dissenters from the Established church, and commanded it to be read by the clergy immediately after divine service in all the churches. On this Sancroft, archbishop of Canterbury, and six bishops, Lloyd of St. Asaph, Ken of Bath and Wells, Turner of Ely, Lake of Chichester, White of Peterborough, and Trelawny of Bristol, met in the archbishop's palace at Lambeth, 18th May, and drew up a petition to the king, representing their aversion to obey the order, for many reasons, and especially because the declaration was founded upon such a dispensing power as parliament had often declared illegal. For this they were all, on the 8th of June, sent to the Tower, and afterwards, on the 29th, brought to trial before the Court of King's Bench, on the charge of publishing a false, fictitious, malicious, pernicious, and seditious libel, when a verdict of Not Guilty was pronounced by the jury, which was received with acclamations by the whole kingdom as a great national deliverance. This defeat however in no degree checked at the moment the infatuated king. To quote the summary of Hume, 'He struck out two of the judges, Powel and Holloway, who had appeared to favour the bishops; he issued orders to prosecute all those clergymen who had not read his declaration, that is, the whole Church of England, two hundred excepted; he sent a mandate to the new Fellows whom he had obtruded on Magdalen College to elect for president, in the room of Parker lately deceased, one Gifford, a Doctor of the Sorbonne, and titular bishop of Madaura: and he is even said to have nominated the same person to the see of Oxford.' It was in the midst of this great contest with the Church and the nation that, on the 10th of June, a son was announced to have been born to James, a piece of intelligence which was very generally received with a strong suspicion that the child was supposititious, and that the queen had never been delivered or pregnant at all. For this notion however it is now generally admitted that there was no good ground.

James's son-in-law, the Prince of Orange, had not been an unobservant spectator of what was passing in England; and to him the hopes of the English people were now very generally turned. The heads of the several parties in the state, though probably with no great definiteness or complete union of views, joined in applying to him for his assistance to save the public liberties; and he at last made up his mind to comply with their solicitations. Having set sail with a fleet of about fifty men-of-war and 300 transports, having on board a land force of about 14,000 men, he landed, on the 5th of November, at Torbay in Devonshire. Before the end of that month James found himself nearly deserted by every body; all were gone over to the prince, the people, the gentry, the nobility, the army, his immediate servants and friends, even his children. In the night of the 12th December, having previously sent over the queen and the young prince to France, he embarked with a single attendant in a boat at Whitehall Stairs, with the intention of proceeding to the same country, but was driven back by contrary winds, and forced the next day to land at Feversham, from which he returned on the 16th to Whitehall. The next day the prince, having arrived with his army in London, desired James to leave the palace, on which he proceeded to Rochester, and on the 23rd embarked from that port on board a frigate, in which he was conveyed to Ambleteuse in Britanny. Hence he repaired to St. Germain's, where Louis XIV. received him with great kindness, gave him the castle of St. Germain's for his residence, and settled on him a revenue sufficient to support the expenses of his small court.

Meanwhile the English crown was settled upon the prince and princess of Orange as King William III. and Queen Mary. [WILLIAM III. and MARY.] In the beginning of March in the following year James, having sailed from Brest, landed at Kinsale, and thence immediately marched to Dublin, with a small force with which he had been supplied by the French king. A few weeks after he laid siege to Londonderry, which however he was not able to reduce, although his forces continued to encompass it for three months before it was relieved. He himself, returning to Dublin, held a parliament, and for some time continued to exercise the rights of sovereignty in that capital; but after various military operations, the detail of which belongs properly to the history of the next reign, his cause was finally ruined by the signal defeat which he received from King William in person at the battle of the Boyne, fought 1st July, 1690. [BOYNE.] He soon after returned to France, and continued to reside at St. Germain's till his death, 6th September, 1701, in the 68th year of his age.

By his first wife, Anne Hyde, James II. had the following children:—1. Charles, duke of Cambridge, born at Worcester House in the Strand, 22nd October, 1660, died 5th May, 1661; 2. Mary, afterwards queen of England; 3. James, duke of Cambridge, born 12th July, 1663, died 20th June, 1667; 4. Charles, duke of Cambridge, born 4th July, 1664, died 22nd May, 1667; 5. Anne, afterwards queen of England; 6. Edgar, duke of Cambridge, born 14th September, 1667, died 8th June, 1671; 7. Henrietta, born 13th January, died 15th November, 1669; and 8. Catherine, born 9th February, died 5th December, 1671. By his second wife, Mary of Modena, who survived till 8th May, 1718, he had, 9. Charles, duke of Cambridge, born 7th November, died 12th December, 1677; 10. Catherine Laura, born 10th January, died 4th October, 1675; 11. Isabella, born 28th August, 1676, died 2nd March, 1681; 12. Charlotte Maria, born 15th August, died 6th October, 1682; 13. James Francis Edward, prince of Wales, styled the elder Pretender, born 10th June, 1688, died at Rome, 30th December, 1765; and 14. Maria Louisa Teresia, born at St. Germain's, 28th June, 1692, died 8th April, 1712. He had also the following illegitimate issue: 1. By Arabella, sister of John Churchill, afterwards duke of Marlborough, Henrietta, born 1670, married Sir Henry Waldegrave, afterwards created Baron Waldegrave, died 3rd April, 1730; 2. By the same, James, surnamed Fitzjames, born in 1671, created duke of Berwick 1687, died 12th June, 1734; 3. By the same, Henry Fitz-James, styled the Grand Prior, born 1673, died 7th December, 1702; 4. By the same, a daughter, who became a nun in France; 5. By Catherine, daughter of Sir Charles Sedley, created in 1686 countess of Dorchester for life, Catherine, born 1681, married 1699 to James Annesley, earl of Anglesey; secondly, after having obtained a divorce from him, to John Sheffield, duke of Buckingham; died 1735.

James II. employed part of the leisure of his retirement in writing an account of his own life, the original manuscript of which, extending to nine folio volumes, was preserved in the Scotch College at Paris till the Revolution, when it was forwarded to St. Omer for the purpose of being transmitted to England, but was there destroyed, having, it is said, been committed to the flames by the wife of the person to whose charge it was consigned, in her fears for the safety of her husband if it should be found in his possession. A digest or compendium however of the matter of the royal autobiography had been long before drawn up by an unknown hand, apparently under the direction either of James or his son; and this performance (of which there was also at least one other complete copy in existence), having formed the principal portion of the papers formerly belonging to the Stuart family, which were obtained by George IV. when regent, has been printed under the title of 'The Life of James the Second, King of England, &c., collected out of Memoirs writ of his own hand. Together with the King's Advice to his Son, and his Majesty's Will. Published from the Original Stuart Manuscripts in Carlton House, by the Rev. J. S. Clarke, LL.B., F.R.S., Historiographer to the King, Chaplain of the Household, and Librarian to the Prince Regent,' 2 vols. 4to., Lond. 1816.

JAMES RIVER. [VIRGINIA.]

JAMESONITE, a mineral, which occurs crystallized and massive. It consists of—sulphur 0·225, lead 0·387, antimony 0·349, iron 0·026. Its specific gravity is 5·564.

JANEIRO, RIO DE, commonly called Rio, but whose full name is S. Sebastião de Rio de Janeiro, the capital of the empire of Brazil in South America, is situated in 22° 54′ S. lat. and 43° 15′ W. long., on the western shores of a large and safe bay, called Bahia do Rio de Janeiro.

This bay is only inferior in extent to Bahia de Todos os Santos, being nearly 24 miles in length, almost north and south, 15 miles in its greatest width, and about 120 miles in circuit. Its entrance at the southern extremity is rather narrow, being formed by two rocky and projecting tongues of land, whose extremities are hardly a mile distant from one another. On the extreme point of the eastern tongue is built the fortress of S. Cruz, and on that of the western the batteries of S. Jose and S. Theodosio. At no great distance from, and opposite to, the entrance, but within the bay, is a low rocky island, Ilha da Lagem, on which also a fortress is built, so that the entrance of the bay is very well defended. The average depth of the entrance is 14 fathoms: good anchoring ground is found everywhere within the bay. As the tide rises within the bay 16 feet at full and change, some precaution is necessary to avoid anchoring in too shallow water at high tide. The bay, being at a short distance from its shores enclosed by high hills and mountains, is not exposed to any kind of wind, and in every respect is one of the best harbours on the globe. It is diversified by numerous islands and rocks, but only one of them is of considerable extent, the Ilha do Governador, situated in the northern and wider portion of the bay. Numerous rivers fall into the bay. Though all of them have a short course, most of them are navigable for a few miles from their mouth, and facilitate the transport of the produce to Rio de Janeiro.

Near the entrance of the bay, and where it is only from four to eight miles wide, the town is built on its western shore, as already observed. It extends along the shore about three miles on an undulating plain, which contains a high hill with the church of Nossa Senhora da Gloria on it. To the west of the plain rises a range of high hills called Corcovado, containing many picturesque valleys, among which that of Laranjeiras, or 'of the oranges,' is distinguished by its beauty. The substance of which the mass of the hills round the town is composed is gneiss, in which numerous quarries are opened near the city. The gneiss is intersected by granite veins varying in thickness from two or three feet to as many inches. That part of the town which is south of the hill Da Gloria is very narrow, consisting only of one or two streets which extend south as far as the small bay of Botafogo. The city or principal town is built a little north of the hill Da Gloria, and on a rocky shore of some elevation opposite the small island called Ilha das Cobras. A fine pier of stone projects a short distance into the bay, and is ascended by a flight of steps. It leads immediately to the Palace Square, which is 150 yards long and 80 wide. Two sides of this square are occupied by the Imperial Palace, which was formed by uniting the Palace of the Viceroys, which stands on the southern side of the square, with the Convent of the Carmelites and the Senate-house by passages; the two latter buildings occupy the western side of the square. The palace has more the appearance of a manufactory than of the residence of an emperor. The northern side of the square is occupied by a row of houses two stories high, which are private property. The city itself stands on a level plain, and extends in the form of a rectangular oblong from north-west to south-east; on its northern border are five low hills. It consists of eight straight and parallel but narrow streets, intersected by many still narrower streets at right angles. A large square, called Campo de S. Anna, which joins it on the north-west, divides the city from the Cidade Nova, or New Town, which extends westwards to the neighbourhood of the royal villa of S. Christovao.

The streets are paved, and they also have foot-pavements, which however are so narrow as scarcely to admit of two people passing one another. The houses are generally built of stone, and have two stories; the upper one is sometimes of wood: the roofs are of tiles. The latticed windows, which formerly were general, have disappeared. The town is lighted but sparingly, and only for a part of the night. The most distinguished buildings are the cathedral, and the churches De Candelaria and S. Francisco de Paula. The college, which once belonged to the Jesuits, is also a fine building; and a magnificent theatre and an Exchange in a good style have lately been erected. The most remarkable of the public buildings is the aqueduct, which brings down the water from the mountains of Corcovado (2400 feet, according to others 2100 feet, above the sea) to the town. It consists of two walls built of hewn stone, a yard from each other, the space between being arched over with bricks. The water thus brought to the town is distributed into several fountains, but not conducted to the houses, as is the case in many other towns in South America.

Rio de Janeiro contains a population of more than 200,000. The number of whites and of black slaves seems to be nearly equal; the people of colour are comparatively few in number. Most of the inhabitants are engaged in the different branches of commerce. There are some manufactures, as sugar-houses, tanneries, cotton manufactures, rum distilleries, and houses for the extraction of train oil. Several persons are occupied with cutting diamonds and other precious stones. Charitable institutions are not wanting, though they are scanty in proportion to the great population. There is a large library, an academy of arts, a military academy, an observatory, a botanical garden, and a grammar-school, and steps have lately been taken to increase the number of such and similar institutions. As to the commerce of Rio, see BRAZIL, vol. v., p 268.

(Cazal, *Corografia Brasilica;* Henderson's *History of Brazil ; Travels in Brazil of* Spix *and* Martius; Caldcleugh; *On the Geology of Rio de Janeiro*, in *Geolog. Trans.*, 2nd series, vol. ii.)

JANI'RA. [ISOPODA, p. 55.] The word is also employed by Oken to designate a genus of *Acalephans* apparently nearly allied to the *Callianiræ.*

JANIZARIES is the name of a Turkish militia once formidable but now extinct. The origin of this body dates from the reign of Amurath, or Murad I., who, after having overrun Albania, Bosnia, Servia, and Bulgaria, claimed the fifth part of the captives, from among whom he chose the young and able-bodied, and had them educated in the Mohammedan religion, and for the military profession. These recruits, being duly disciplined, were formed into a distinct body of infantry, divided into ortas, or battalions, and they were consecrated and blessed by a celebrated dervish called Hadji Bektash, who gave them the name of Yeni Cheri, or 'New Soldiers.' They soon became the terror of the enemies of the Ottomans: being completely weaned from their friends and homes, they were enthusiastically devoted to the sultan as their common father; and a strict discipline, regular pay, and constant service gave them habits of order and obedience far superior to the irregular bodies which formed at the time the armies of the princes of Christendom. After the death of Solyman the Magnificent, and the general though gradual decay of the Ottoman warlike spirit, when the sultans no longer took the field in person, the Janizary body was no longer recruited exclusively from choice and young captives, but by enrolments of Osmanlees, who, being born and bred in the faith of Islam, had not the zeal of proselytes, and were besides connected by ties of consanguinity and friendship with the body of the people around them, and not exclusively devoted to the will of the sultan. In 1680 Mohammed IV. abolished the law by which the Christian rayahs, or subjects of the Porte, were obliged to give a portion of their children to the sultan to be educated in the Mohammedan faith and enrolled into the militia. By the original laws of their body the Janizaries could not marry, but by degrees the prohibition was evaded, and at last totally disregarded. Their children's names were then inscribed on the rolls of their respective ortas; and their relations and friends, men often unfit for any warlike service, obtained a similar honour, which gave them certain privileges and protection from the capricious oppression of their rulers. In this manner a crowd of menials, low artisans, and vagabonds, came to be included in the body of Janizaries; even rayahs and Jews purchased for money the same privilege; but all this motley crew lived out of the barracks, where only a few in time of peace were present at the appointed hours for receiving their soups or rations. Military exercises were abandoned; the Janizaries merely furnished a few guards and patroles for the city, many of them being only armed with sticks; and they never assembled as a body except on pay-day, when they defiled two by two before their nazirs, or inspectors. Still they were formidable to the government from their numbers, which were scattered all over the empire, and their influence and connexions with the mob of the capital. They repeatedly mutinied against the sultans, and obliged them to change their ministers, or even deposed them. In our own days they dethroned Selim; and in the beginning of the reign of the present Sultan Mahmood they broke out into a dreadful insurrection which lasted three days, and in which the Vizir Mustapha Bairactar lost his life. In both instances they were impelled by their hatred of the Nizam Djedid, or new troops, disciplined after the European fashion. At last Mahmood resolved to put down the Janizaries; and having for several years matured his plan with the advice of his favorite Halet Effendi, and gained over their aga and others of their principal officers, he issued an order that every orta or division should furnish 150 men to be drilled according to the European tactics. This, as he had foreseen, led to a revolt; the Janizaries assembled in the square of the Etmaidan, reversed their soup-kettles according to their custom in such cases, and, invoking the name of their tutelat saint Hadji Bektash, they began by attacking and plundering the houses of their enemies. But the body of topjis, or cannoniers, the bostandjis, or guards of the seraglio, and the galiondjis, or marines, were prepared; the sultan, mufti, and the ulemas, assembled in the mosque of Achmet, pronounced a curse and a sentence of eternal dissolution on the body of the Janizaries; the sandjak shereef, or sacred standard, was unfurled, and a general attack on the Janizaries began, who, cooped up in the narrow streets, were mowed down by grape-shot, and the rest were despatched by the muskets and the yataghans of their enemies, or burned in their barracks. About 25,000 Janizaries are said to have been engaged in the actual revolt, and most of them perished: the others concealed themselves or were exiled into Asia. This carnage took place in June, 1825, and from that time the Janizaries as a body have ceased to exist. Macfarlane, in his 'Constantinople in 1828,' gives a vivid account of that catastrophe.

JANSENISTS, a sect which appeared in the Roman Catholic church about the middle of the seventeenth century. They professed not to attack the dogmas but only the discipline of that church, which however stigmatized them as heretical in some of their tenets. They took their name from Janssen, or Jansenius, bishop of Ypres in the Netherlands, who published a book entitled 'Augustinus,' in which he supported, by means of passages from the writings of St. Augustine, certain principles concerning the nature and efficacy of divine grace which appear to partake greatly of Calvin's doctrine of predestination. This question of grace and predestination had already been discussed in the church at various times, and had proved a stumbling-block to many theologians. Michael Baius, professor at Louvain, had been condemned in 1567 by a Papal bull, and obliged to disown seventy-six propositions taken from his writings, chiefly concerning that abstruse subject. Jansenius however died quietly at Ypres in 1638, and it was not till several years after his death that some Jesuit theologians, on examining his book, discovered in it the following five propositions, which they denounced as heretical:—1. That there are certain commandments of God which even righteous men, however desirous, find it impossible to obey, because they have not yet received a sufficient measure of grace to render obedience possible. 2. That nobody can resist the influence of inward grace. 3. In our fallen state of nature it is not required, in order that we be accounted responsible beings, that we should be free from the internal necessity of acting, provided we are free from external constraint. 4. The Semi-Pelagians were heretical in maintaining that the human will has the choice of resisting or obeying the internal grace. 5. That to maintain that Christ died for all men, and not solely for those who are predestinated, is Semi-Pelagianism.

After much controversy, these five propositions were condemned by a bull of Pope Innocent X., in the year 1653, as impious and blasphemous, and the bull was received by the French prelates, and promulgated throughout France with the king's consent. Several learned men, who disliked the Jesuits and their latitudinarian system of ethics, wrote not to defend the five propositions, but to prove that these propositions did not exist in the book of Jansenius, at least not in the sense for which they were condemned. The Jesuits again appealed to the pope, and a curious question arose for the pope, which was, to determine the exact meaning of an author who was dead. Alexander VII. however, by a new bull, in 1656, again condemned Jansenius's book as containing the five propositions in the sense ascribed to them by the former bull. Arnauld and other learned men of Port-Royal persisted in denying this assumed meaning; and thus they, and all those who thought like them, received the appellation of Jansenists. A formulary was now drawn out conformable to the Papal bull, which all ecclesiastical persons in France were required to sign, on pain of being suspended from their functions and offices. A great many refused, and this occasioned a schism in the French church, which lasted many years. Arnauld, Pascal, Nicole, and other reputed Jansenists attacked vehemently the corruption, discipline, and morality of the church, and the Jesuits as supporters of that relaxation. They also inculcated the necessity of mental rather than outward or ceremonial devotion; they promoted the knowledge of the Scriptures among the people, and they encouraged general education by numerous good works which came from the press of Port-Royal. Meantime the controversy with Rome continued, although Clement IX., in 1668, entered into a sort of compromise with the French non-subscribing clergy, and Innocent XI. behaved with still greater moderation towards them. But Father Quesnel's 'Moral Observations on the New Testament,' published in 1698, added fuel to the flame. Quesnel, being now considered at the head of the Jansenist party, was driven into exile; Louis XIV., urged by his Jesuit confessor, suppressed the monastery of Port-Royal in 1709; and Pope Clement XI., in 1713, fulminated the bull 'Unigenitus' against 101 propositions of Father Quesnel's work. [CLEMENT XI.] A fresh contention now arose; a great part of the French clergy, many of whom were not Jansenists, including Cardinal de Noailles, appealed from the bull of the pope to a general council. The Regent d'Orléans however insisted on unconditional submission to the bull, and the recusants, or 'appellants,' were persecuted and driven into exile. This persecution made many fanatics, and Jansenism became a name for a set of visionaries and impostors. A certain Abbé Paris, who had been one of the appellants, and had died in 1727, was said to perform miracles from his tomb. For an investigation of these pretended miracles see Bishop Douglas's *Criterion, or Miracles Examined.* Next came a set of men called Convulsionnaires, who were seized with spasms and ecstasies; and others who were styled Flagellants, who whipped themselves in honour of the Saint Abbé Paris. This frenzy lasted for years, and the government by harsh measures only increased it; in fact it became mixed up with political discontent, and the parliament of Paris took the part of the appellants. [DAMIENS.] At last the paroxysm subsided, having had the effect of discrediting the name of Jansenism, which, as a sect, never afterwards revived, though its opinions are still held by many. As the original Jansenists maintained the absolute independence of the civil power on ecclesiastical authority, and as even in ecclesiastical matters they were not favourable to the supremacy of the Roman see, their principles had the effect of inducing many of the French clergy to take the oath to the constitution of 1791; these were called 'prêtres insermentés,' and were considered as schismatics by the see of Rome. The Jansenist principles extended to Italy, especially to Tuscany, where bishop Ricci and his partisans also effected a temporary schism.

JANSSEN, CORNELIUS, was born at Amsterdam, and lived several years in England. He was employed by King James I., and painted several fine portraits of that sovereign and of his children, as well as of the principal nobility. His colouring is very clear and natural; the carnations are remarkably soft, and except in freedom of hand and in grace he was esteemed equal to Vandyck, and in finishing superior to him. He generally painted on pannel, and his draperies are commonly black, which he probably chose because that colour gives greater brightness to the flesh tints. His pictures still retain their original lustre, which is supposed to be in consequence of his having used ultramarine in his black colours, as well as in the carnations. He left England soon after the arrival of Vandyck, about the beginning of the civil wars, and returned to his own country, where he died in 1665.

JANSSENS, ABRAHAM, born at Antwerp in 1569, was a competitor of Rubens, and was considered to be equal to him in many of the most important parts of the art. In colouring he was certainly inferior to Rubens alone. His compositions are spirited, his drawing correct, his pencil decided, and his draperies natural and free from stiffness. He painted subjects illuminated by torchlight, and delighted in the contrast of the most brilliant light with the deepest shade. Most of the Flemish churches possess fine pictures by this master.

JANSSENS, VICTOR HONORIUS, born at Brussels in 1664, after having been for four years painter to the duke of Holstein was sent by his highness, at his own request, to Italy, where he diligently studied Raphael and the antique, and sketched the beautiful scenery in the environs of Rome. His paintings were soon so highly esteemed that he was employed by the chief nobility of Rome. He composed historical subjects both on a large and small scale, but the latter being most sought after, he in general painted in that size. He took Albano for his model, and was superior in his own style to all his contemporaries. On his return to Brussels his pictures were as much admired there as they had been in Italy; but having a large family to support, he found it most profitable to paint large pictures; and most of the palaces and churches of his own country are adorned with his compositions. His invention was fruitful, and his execution rapid, as appears from the vast number of his works. He died in 1739.

JA'NTHINA, or IANTHINA, Lamarck's name for a genus of turbinated testaceous mollusks of remarkable habits.

Linnæus placed the form among the *Helices,* under the name of *Helix Janthina,* between *Helix perversa* and *Helix vivipara;* and he was aware of its Pelagic distribution.

Lamarck arranges it next to *Natica,* the last genus of his *Neritaceans,* between which family and the *Macrostomes* it appears in his list of *Phytiphagous* (plant-eating) *Trachelipods.*

Cuvier assigns to the *Janthinæ* a place among his *Pectinibranchiate Gastropods,* between the *Pyramidellæ* and the *Neritæ.*

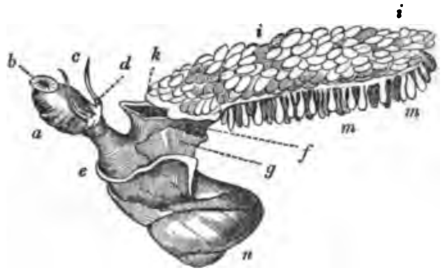
M. De Blainville elevates the group into a family, under the name of *Oxystomes,* being the fifth and last of his order *Asiphonobranchiata.* This family comes next to the *Hemicyclostomes,* which comprise the *Nerits,* &c.

M. Rang makes *Janthina* a genus of the *Trochöids* of Cuvier, giving it a position between *Ampullaria,* Lam., and *Litiopa,* Rang.

Generic Character.—*Animal* with a very large *head* and a proboscidiform muzzle, at the extremity whereof is the *mouth* furnished with two vertical subcartilaginous lips (which are armed with long and very sharp points curved inwards), and with a lingual enlargement (renflement); *tentacles* two, conical, pointed, not very contractile, and very distant, each bearing at its base a rather long peduncle, which is oculated beneath its extremity; *foot* oval, divided into two parts, the anterior being concave and in the form of a cupping-glass (ventouse), the latter flattened, thick, and fleshy; *natatory appendages* lateral, rather large and fringed; *respiratory cavity* very open, and containing two pectinated *branchiæ;* orifice of the *ovary* at the bottom of this cavity; exciting *male organ* very small, and on the right side.

Shell ventricose, globular or conoid, very fragile, with a low spire, and the last whorl larger than all the rest together; *aperture* large, subtriangular, with disunited borders; the *columella* straight and long, forming the whole of the left border or lip; right border or lip trenchant, and often notched in the middle; *colour* of all the species hitherto discovered violet, more or less intense.

Operculum modified into a vesicular appendage, which serves to suspend the animal at the surface of the water, and which adheres to the posterior and fleshy part of the foot.



Janthina Fragilis (Common Oceanic Snail). Shell with the animal, the float expanded. *a,* head; *b,* mouth; *c,* tentacles; *d,* eyes; *e,* border of the mantle at the entrance of the branchial cavity; *f,* foot, the posterior part, which is flat; *g,* lateral expansion of the mantle, provided for swimming; *k,* foot, anterior part forming a sort of pouch; *i,* bunch of aerated vesicles, serving to suspend the mollusk at the surface of the water; *m,* eggs suspended under the vesicular bunch; *n,* shell. (Rang.)

Geographical Distribution very extensive, the form having been met with in the four quarters of the world floating on the ocean or driven on the shores by tempests. It has occurred on the coasts of our islands, but there is reason for thinking that it is not to be found in very cold latitudes. In warm climates it is very plentiful.

Habits, Reproduction, Food, &c.—Sir Everard Home published in the 'Phil. Trans.' for 1817, a paper which is appended (Appendix, No. III.) to Captain Tuckey's 'Narrative of the Expedition sent to explore the River Zaire, usually called the Congo,' wherein he describes and figures among other ova of mollusks, or *Vermes Testacea,* as he denominates them, the camerated nidus of *Helix Janthina* (pl. xiii., figs. 1, 2, 3, 4, 5, 6). 'This animal,' observes Sir Everard, 'not living at the bottom of the sea, like the Vermes testacea in general, deposits its ova upon its own shell, if nothing else comes in its way; one of the specimens of the shell of the Janthina caught in the voyage to the Congo fortunately has the ova so deposited.' And he then refers to the drawings of Mr. Bauer, engraved as above quoted.

In the 4th vol. of the 'Journal of the Philadelphia Academy' will be found 'Remarks on the floating apparatus and other peculiarities of the genus Janthina,' by Reynell Coates, M.D. This highly interesting paper, the result of the author's personal observations during a voyage to the East Indies, establishes the correctness of Cuvier's remark, that no anatomical connexion exists between the animals and the air-cells of their float; but does not corroborate the views of Sir Everard as to the camerated nidus on the shell which he saw with so much satisfaction. Dr. Coates placed some *Janthinæ* in a tumbler of brine, and having removed a portion of the float of one with scissors, the animal soon set to work to supply the deficiency after the following manner:—The foot was advanced upon the remaining vesicles, until about two-thirds of that part rose above the surface of the water; it was then expanded to the uttermost, and thrown back upon the water, like the foot of a *Lymnæa* when it begins to swim; it was then contracted at the edges, and formed into the shape of a hood, enclosing a globule of air, which was slowly applied to the extremity of the float. There was now a vibratory movement throughout the foot, and when it was again thrown back to renew the process, the globule was found enclosed in its newly-made envelope. From this it results that the membrane enclosing the cells is secreted by the foot, and that there is no attachment between the float and the animal, other than that arising from the nice adaptation and adjustment of proximate surfaces. Dr. Coates states that the float varies in different species. In *Janthina fragilis* he describes it as convex, subcarinate above and concave beneath, straight, and composed of large vesicles: in *J. globosa* he found the vesicles smaller, and the float flat both above and beneath, added to which it is formed by the reunion of one of the edges into a spiral and nearly circular disk. In *J. exigua* it was straight, narrow, and flattened, and the vesicles were small. Along the under surface of the float a little line of pearly fibres was remarked, to which are attached the eggs of the animal.

Although Dr. Coates had no opportunity of observing the eggs of *J. fragilis*, he is strongly inclined to believe that the eggs figured and described in 'Phil. Trans.,' as above alluded to, belong to some other marine animal; and he grounds his belief on the dissimilarity between those figures and the eggs of *J. globosa* and *J. exigua*. In these two species the eggs are contained in little membranous bags of some consistence, which are attached in rows to the pearly fibres of the under surface of the float by small filamentous pedicles similar in appearance to the fibres. These bags are covered with minute, gelatinous, conical eminences, and are partially divided by incomplete septa, as may be seen by the aid of a powerful lens. In *J. exigua*, the division is very partial; but in *J. globosa* it gives to the whole sac a chambered appearance. It would seem that the animal consumed considerable time in depositing its eggs, for the bags nearest to the extremity of the float were constantly found empty, while the central bags contained young shells fully formed: those towards the animal were filled with eggs. The probability is, that the young animals when hatched ascend the float of the mother, and thus gaining access to the surface, construct the elements of their future support.

M. Rang, who also notices Sir Everard's statement, mentions it as certain that *Janthina* deposits its eggs sometimes in considerable number, as he has had occasion to remark, under the float, where they are attached by means of small pedicles; and he goes on to say, that the animal abandons them, together with the float, which is then charged with their preservation. M. Rang adds, that it is possible that, at this epoch, the natatory appendages of the mantle, being sufficiently developed, permit the animal to use them for swimming, and thus supply the loss; or one must suppose that these animals have the faculty of replacing the float. That they have that faculty we have, above, seen.

Browne, in his 'Natural History of Jamaica,' gives by no means a bad account of the floats of these animals, many of which he encountered between the Bermudas and the Western Islands, in his voyage from Jamaica. He says, 'I have observed many of the vesiculæ themselves swimming upon the surface of the water, which induced me to think that they were thrown off as the creatures retired.' Sloane also saw these oceanic snails, and figures them.

In January, 1833, Dr. Grant exhibited to a meeting of the Zoological Society of London numerous specimens of *Janthina vulgaris*, Lam., and of *Velella limbosa*, Lam., both animals of rare occurrence on the English coast, and chiefly met with floating in tropical or warmer seas. They were obtained by him at the beginning of September, 1832, in Whitsand Bay, close to the point of the Land's End, Cornwall, where they were thrown in great numbers on the sands, after a storm of three days' continuance from the north-west: they must, he observed, consequently have been floating before they were directed to the coast by the storm, in latitudes at least as high as that in which they were found. Dr. Grant regards it as probable that neither of these animals is capable of discharging at will the gaseous fluid by which they are supported on the surface of the sea; otherwise, in such a violent and continued tempest as that which stranded them, they would have emptied their vesicles and have sunk to the stiller bottom. (*Zool. Proc.*) Browne on the other hand says, speaking of the float, 'This raises and sustains it while it pleases to continue on the surface; but when it wants to return, it throws off its bladder and sinks.'

Lamarck placed *Janthina* among the plant-eaters; but in the communication by Dr. Grant above noticed, it is suggested that *Janthina*, a predaceous *Gastropod* accompanying *Velella*, as there described, may prey upon it, and acquire from it the blue colouring matter of its shell.

Several authors speak of the beautiful purple liquor which the living animal diffuses when it is touched.

We select as an example *Janthina fragilis.*

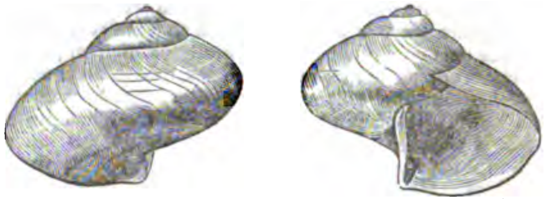
Description.—*Shell* pale; body whorl angulated; the base flattened, striated, and deep violet; aperture broader than long; outer lip deeply emarginate. (Swainson.)

Locality.—Oceanic in warm and temperate climates; several instances are recorded of its capture near the British Islands, and on them.

Janthina exigua has also occurred on the English and Irish coasts. (*Zool. Proc.*, 1835.)

Mr. Swainson, who in his 'Zoological Illustrations' has given beautifully correct figures of *J. fragilis* and *J. globosa*, justly remarks that the shells are so brittle that it is rare to find them perfect.

M. de Blainville is inclined to think that those shells which are notched belong to females.



Shell of Janthina fragilis.

Fossil Janthinæ ?

Mr. G. B. Sowerby (*Genera*) states that he has never seen any fossil species of this genus, nor is he aware that any exist, but he refers to a fossil engraved in *Min. Con.* pl. 10, which bears a very near resemblance to it. The fossil is named, in the valuable work alluded to, *Helix carinata*, and the solid grey limetone near Settle in Yorkshire is said to be the locality. *Janthina* does not appear in the tables of M. Deshayes.

JANUARY, the first month in our present Calendar, was also the first month in the Roman Calendar. It was not the first month of the year in this country till 1752, when the legislature, by an act passed in the preceding year, altered the mode of reckoning time from the Julian to the Gregorian style. At this time it was directed that the legal year, which then commenced in some parts of this country in March, and in others in January, should universally be deemed to begin on the first of January. January derives its name from Janus. Macrobius expressly says it was dedicated to him because, from its situation, it might be considered to be retrospective to the past, and prospective to the opening year. It consists of thirty-one days, though originally of only thirty days. The Anglo-Saxons called January *Wolf-monath*. (Brady, *Clavis Calendar.*, i. 55, 56; Macrobii *Saturn.*, i. 13.)

JANUS, in mythological history, is the earliest of the Italian kings, and reigned in Latium, being contemporary with Saturn. He was succeeded by Picus and Faunus, who, as well as himself, were worshipped by the Etruscans and Romans. Janus, by some accounts, was the son of the sun, and his attributes appear to connect him with sun-worship. He is the porter of heaven; he opens the year, the first month being named after him; he presides over the seasons, whence he is sometimes represented with four heads (Janus Quadrifrons), and his temples in that capacity were built with four equal sides, but only one entrance. He presides over production. He is the keeper of earth, sea, and sky; the guardian deity of gates, on which account he is commonly represented with two heads, because every door looks two ways; and thus he, the heavenly porter, can watch the east and west at once without turning. (Ovid, *Fast.*, i. 140.) He usually carries a key in his left hand and a staff in the other. (*Ib.*, 99.) His temples at Rome were numerous. In war time the gates of the principal one, that of Janus Quirinus, were always open; in peace they were closed to retain the wars within (*Ib.*, 124); but they were shut once only between the reign of Numa and that of Augustus. In reference to this attribute he has the epithets of Clusius and Patuleius, the shutter and opener. All his attributes, numerous and complicated as they are, appear to have reference to this notion of opening and shutting, and are explained, by those who see in Janus a modification of the sun, in reference to the phenomena of day and night, and the pervading vivifying influence of the solar rays. As to the probable origin of the word Janus, see the article DIANA.

JAPAN is an empire in Asia, which consists of an unknown number of islands of different dimensions. These islands may be considered as constituting the western boundary of the Pacific between 31° and 45° N. lat.; but the Japanese settlements on the island Tshoka, or Tarakai, better known by the name of Sakhalia, seem to extend as far north as 47° or 48° N. lat. Between these islands and the continent of Asia is a closed sea, called the Sea of Japan, which at its southern extremity is united to the Tong-Hai, or Eastern Sea of the Chinese, by the Strait of Corea, and at its northern with the Sea of Okhotzk, or Tarakai, by the still unexplored strait which divides the island of Tarakai from Manchuria. The Sea of Japan is united to the Pacific by several straits, which divide the Japanese islands from one another. The most remarkable is the Strait of Sangar between the large islands of Nipon and Yeso. Japan is situated between 129° and 150° E. long. from Greenwich. It is divided into Proper Japan and the dependent islands.

Proper Japan consists of three large islands, Kioosioo, Sitkokf, and Nipon or Nifon, which are surrounded by a great number of smaller islands. Kioosioo, the most western, may be about 200 miles long, with an average breadth of 80 miles, which would give it a surface of 16,000 miles, nearly equal to that of the island of Sardinia. On its western coast are two deep bays, that of Simabara, in the middle, which is by far the largest, and that of Omoora, north of it: at its southern extremity is the Bay of Kangosima. Kioosioo is separated from Sitkokf by the Boongo Channel, and from Nipon by the Suwo Sound and the Strait of Simonoseki. Sitkokf may be 150 miles long, with an average breadth of 70 miles; it probably contains more than 10,000 square miles, and is much larger than the island of Corsica. The long strait which divides it from Nipon on the north is in some places hardly more than a mile wide; but about the middle a large bay enters deeply into the island of Sitkokf. The eastern extremity of this island is separated from Nipon by the Bay of Osacca, which contains the island of Avasi. Nipon, the largest and the principal of the Japanese islands, has the form of a curve, or, as Kämpfer says, of a jawbone. Its length, measured along the middle of the island, exceeds 900 miles, and its average width may be estimated at more than 100 miles: its surface may therefore cover an area of about 100,000 square miles, or considerably more than that of Great Britain. Its largest bays are along the southern coast, as Osacca Bay, Mia Bay, and Yedo Bay.

The dependent countries are the large island of Yeso, with some of the Kurile Islands and the southern districts of Tarakai. Yeso has a very irregular form. Its length, from west-south-west to east-north-east, is more than 250 miles, and its average width perhaps does not fall short of 100 miles. This gives a surface of 25,000 square miles, or somewhat less than that of Ireland. Only the two southernmost of the larger Kurile Islands, Kunashir and Uturup, are occupied by the Japanese: the others belong to the Russian empire. The island of Tarakai, whose southern portion is called Tshoka, is divided from Yeso by the Strait of Perouse. It is certain that the Japanese have formed some settlements here, but it is not known how far they extend northward. According to this rough estimate, and excluding the settlements on the island of Tarakai, the Japanese empire contains about 160,000 square miles.

All these islands are very imperfectly known: not even the coasts are laid down with any degree of correctness. This arises partly from natural and partly from political causes. Nearly all the coasts are very difficult of access, being surrounded by numerous rocks and islands, and by a very shallow sea. This shallowness is most remarkable in the numerous inlets and bays with which the southern coast is indented. The harbour of Yedo, for instance, is so shallow that even small boats cannot approach the beach: the larger Japanese vessels keep far out to sea, and a European ship would be obliged to anchor at five leagues' distance. The harbour of Osacca is not much better. This circumstance accounts for the smallness of all Japanese vessels, and their unfitness to keep the sea in a gale. They can only be employed in the coasting trade. The sea, besides containing numerous rocks, has some very dangerous whirlpools, two of which especially have been noticed by navigators, one near the island of Amakoosa, at the entrance of the Bay of Simabara, and the other near the southern extremity of Nipon, between the bays of Osacca and of Mia. To this must be added, that no part of the ocean is subject to heavier gales than the sea which surrounds Japan: they frequently blow with the fury of hurricanes. The government also and the laws of the Japanese are less favourable to intercourse with foreigners than those of any other country on the globe, China not expected. If foreigners who arrive at the ports, after a delay of many days and even weeks, are at last permitted to set foot on shore, a small spot of ground is assigned to them, which has previously been enclosed with strong palisadoes. Under such circumstances our knowledge of the country must be very scanty, and we owe such as we have nearly exclusively to the circumstance that the Dutch, who are permitted to trade in the harbour of Nagasaki, are obliged to send annually an embassy to Yedo, which gives them an opportunity of examining, though very imperfectly, the southern coast of Nipon between Simonoseki and Yedo.

Some of these travellers, Thunberg for instance, assert that the whole surface of these islands is only a succession of mountains, hills, and valleys; but Kämpfer expressly says that he passed through several plains of considerable extent, as that which runs from the town of Osacca to Meaco, a distance of about twenty miles, and a similar plain west of Yedo, and extending to that town. A large plain occurs also along the northern shores of the bay of Mia, and numerous smaller plains are noticed by Kämpfer. But generally the hills run down close to the sea, or leave only a narrow strip of level ground between them and the seashore. Though Japan is doubtless a very hilly country, it can hardly be said to be mountainous, as by far the greatest number of the eminences are cultivated to the very top, and those few which are not cultivated are left in their natural state on account of the sterility of the soil. The Dutch have observed only one single peak of great elevation, the Fudsi Jamma, not far from the bay of Tomina, west of the bay of Yedo. They compare it in shape with the Peak of Teneriffe, and observe that the snow seldom melts on its top. According to the accounts of navigators however, it would seem that the northern part of Nipon is traversed by a continuous chain of mountains with several peaks. Volcanoes, either in an active state or extinct, are numerous, to the latter class the Fudsi Jamma seems to belong. Some active volcanoes occur on the islands scattered in the strait of Corea, as the Sulphur Island, noticed by Captain B. Hall.

From the peculiar form of these islands it may be presumed that they have no large rivers; and the rapidity with which they run down shows that the country in the interior rises to a considerable height. Many of them are so rapid that no bridges can be built over them, and they are not passed without danger. Several others are less rapid, and though they cannot be navigated, timber and wood are floated down them. A considerable number however seem to be navigable for small river-boats to a distance of some miles from the sea. The most considerable and important of those which are known is the river Yedogawa, in Nipon, which rises in the lake of Oitz, a sheet of water sixty miles in length but of inconsiderable width. After leaving this lake it traverses the fine plain which extends from its shores to the harbour of Osacca, and in all this course it is navigated by river-barges.

We are of course very imperfectly acquainted with the climate of Japan, the meteorological observation made by Thunberg at Nagasaki only extending over one year. The southern part seems to resemble in many points the climate of England. In winter it does not freeze and snow every year, though this is generally the case: the frost and snow, when there is any, last only a few days. In January, 1776, the thermometer descended at Nagasaki to 35° Fahr., but it was considered a very mild winter; in August it rose to 98°, and that was considered as the average heat of the season. The heat would consequently be very great but for the refreshing breeze which blows during the day from the south, and during the night from the east. The weather is extremely changeable, and rains are abundant all the year round; but they are more heavy and frequent during the *satkasi*, or rainy season, which occurs in June and July. Storms and hurricanes seem to occur frequently, and the descriptions of them in Kämpfer and Langsdorf are truly terrific. Thunder-storms are also common, and earthquakes have successively destroyed a great part of the most populous towns. Only a few spots appear to be exempt from these terrible phenomena. It is observed by Kämpfer that water-spouts are nowhere of such frequent occurrence as in the seas enclosing Japan.

In no part of the world is agriculture carried to a higher degree of perfection than in Japan. All the declivities of the hills to the top, except those which are too steep, are formed into terraces or beds of different width, according to the slope, and these terraces are cultivated with the utmost care. Here, as in China, the greatest attention is paid to the collection of manure. The raising of rice is the principal object, but wheat, barley, and rye are also cultivated, though to a much smaller extent. Indian corn is not enumerated by Thunberg among the grain-crops of Japan. As the Japanese use no butter nor tallow, they cultivate *Rhus succedaneum*, *Sesamum*, and *Brassica orientalis;* the oil from the two last serves for dressing victuals, and that of the first is used for their lamps. The seeds of *Panicum verticillatum*, *Holcus sorghum*, or millet, *Panicum Corvi*, and *Cynosurus Coracanus*, are much used as food for man and beast, and cultivated extensively in some districts. Of esculent roots chiefly batatas and potatoes are raised. Other vegetables are turnips, cabbages, carrots, radishes, lettuces, melons, pumpkins, cucumbers, and gourds. Different kinds of beans and peas are raised in astonishing abundance, and several provinces have obtained a name from producing them in superior quality. Among the beans are the daidsu beans (*Dolichos Soja*), from which the Japanese make that liquid which is known in England under the name of soy. The plantations of the tea shrub are extensive in some districts, but their produce is inferior to that of China, and does not make an article for exportation. Ginger is cultivated, and the pepper shrub is planted for the consumption of the country. Their orchards are stocked with the fruit-trees of southern Europe, as oranges, lemons, medlars, figs, grapes, pomegranates; and they produce also chesnuts, walnuts, pears, peaches, and cherries; apples are not mentioned by Thunberg. The raising of cotton and silk are objects of great importance, and the *Broussonetia papyrifera* is planted extensively, its bark being used for making cloth and paper. Hemp is also much cultivated, but only employed in making cloth; the cordage is made from different kinds of nettles. Besides these different plants they plant the varnish-tree (*Rhus vernix*), from which they make the excellent varnish for their furniture, the cedar (*Cupressus Japonica*), the bamboo-cane, and the camphor-tree (*Laurus camphora*), though all these trees are also found in a wild state. They extract a blue dye-stuff from three kinds of *Polygonum, chinense, barbatum*, and *aviculare*. The authority for this account of the botany of Japan is Thunberg, from whom we have also taken the technical botanical names.

The horses are of a middling size, but strong. The number is small, as horses are only used for the saddle and by the princes. Thunberg is of opinion that there are not as many horses kept in the whole empire as in one single town in Sweden. Horned cattle are still less numerous. The Japanese do not use either their flesh or their milk, and they are only kept for drawing carts or for ploughing such fields as lie almost constantly under water. Buffaloes are found only in some districts. Neither asses nor mules are mentioned by Thunberg, but he expressly observes that sheep and goats are not kept. Swine are only found at Nagasaki, where they have probably been introduced by the Chinese, as the Japanese do not eat them. Fowls, ducks, and geese are plentiful, but principally valued for their eggs, of which the Japanese are very fond. Of wild animals only hares are mentioned by Thunberg, but he states, on the information obtained from the natives, that deer, bears, and other animals occur in the eastern and northern part of Nipon. Though the Japanese do not make much use of the flesh of domestic animals as food, they derive abundant provisions from the sea. Fish is extremely plentiful, and numerous villages are only inhabited by fishermen. Their rocky coasts are covered with oysters and several other kinds of shell-fish, and many families live exclusively on them. Even the flesh of the whale, of which some kinds are rather numerous along these coasts, is eaten.

Japan abounds in mineral wealth. Gold seems to be very plentiful in several provinces, but is not worked everywhere. The government seems to use corrective means to prevent such undertakings. Silver is not abundant; but copper, which contains a good deal of gold, is extensively worked, and supplies the most important article of export. Iron is said not to be common, but still there is enough for the consumption of the country. Some tin-mines are also stated to be worked. Salt in great quantity is made in several districts along the southern coast, where there exist salt-lagunes. Of other minerals only fine clay is mentioned, which is used in the manufacture of china; the porcelain is equal, if not superior, to that of China. The sea gives pearls and ambergris.

All travellers speak of the populousness of the country and the extent of the villages, which frequently occupy two English miles and more in length. In some more fertile districts they are so close to one another as to form nearly one contiguous street; as, for instance, in the plain which extends from the harbour of Osacca to Meaco. The smaller towns commonly contain five hundred houses, and the larger two thousand and upwards, and though they have generally only two stories they are occupied by a comparatively large number of persons.

1. The island of Kioosioo is extremely well cultivated, and generally fertile, with the exception of its eastern coast bordering on the Boongo Channel, which is mountainous, barren, and comparatively thinly inhabited. In several places there are considerable manufactures of cotton cloth, silk goods, and paper. The best known towns of importance are Nagasaki, Sanga, and Kokoora.

Nagasaki, sometimes pronounced Nangasaki, the only place open to foreigners, lies on a peninsula formed by the deep bay of Omoora, in 32° 45′ N. lat. and 129° 15′ E. long. Its harbour is spacious and deep, extending in length about 4 miles, with an average width of more than a mile. At its entrance is the small island of Papenberg, where the water is 22 fathoms deep, but it grows shallower as it proceeds inward, so that opposite to the town it has only a depth of 4 fathoms; so far it runs north-east, it then turns north, and has less depth. The town is built on its eastern shores, in a narrow valley which runs eastward. It is three-quarters of a mile long and almost as broad, and enclosed by steep though not high hills. There are some good buildings in the town, as the palaces of the two governors, and those of some princes and noblemen of the empire, but especially the temples, which were 62 in number, within and without the town, in the time of Kämpfer (1692). There are some manufactures of gold and silver. The population may amount to 15,000 or 18,000 souls. It is one of the five imperial towns of the empire.

Sanga, situated on a fine and well watered plain at the northern extremity of the large bay of Simabarra, the capital of the fertile province of Fisen, is a very large and populous town, with canals and rivers running through its wide and regular streets. It has considerable manufactures.

Kokoora, built near the entrance of the Strait of Simonoseki, has a shallow harbour, but carries on a considerable trade. The town, which in the time of Kämpfer had much decreased, was found in a thriving state in 1775, by Thunberg.

II. The island of Sitkokf has not been visited by Europeans. According to a Japanese geographer, cited by Kämpfer, it contains many mountainous and barren districts, and less fertile tracts than the other large islands.

III. Nipon, or Nifon, which constitutes the main body and strength of the empire, is, as far as it has been seen by Europeans, well cultivated and fertile, with the exception of a few barren tracts of moderate extent. It contains the largest towns, and the manufactured articles produced in this island are considered the best. The most important towns visited by Europeans, along its southern side, are—

Simonoseki, built at the foot of a mountain, on the shore of the narrow strait which bears its name, and which is only one mile and a half wide. It is not very large, but it carries on a very active coasting trade with all the districts to the east of it.

Muru, opposite to the north-eastern coast of Sitkokf, is not large, consisting only of about 600 houses; but its harbour is very safe, being well defended by a mountain running out westward from the mainland, for which reason it is resorted to by the coasting vessels, of which frequently more than 100 are anchored there. It is noted for its tanneries, where horse-hides are tanned in the manner of the Russian leather.

Osacca, one of the five imperial towns, and the most commercial place in the empire, is situated in the northern angle of the Gulf of Osacca, on the banks of the river Yedogawa, which, near the town, divides into three branches, and, before it falls into the sea, into several more. The middle or principal branch of the river, though narrow, is deep and navigable. From its mouths, as far up as the town and higher, there are seldom less than a thousand barges going up and down. Several navigable canals, which derive their water from the river, traverse the principal streets of the town, and serve as means for conveyance of goods. The banks of the river and of the canals are of freestone, coarsely hewn, and formed into ten or more steps, so as to resemble one continued staircase. Numerous bridges, built of cedar-wood, are laid over the river and canals; some of them are of large dimensions, and beautifully ornamented. The streets are narrow but regular, and cut each other at right angles; though not paved, they are very clean. A narrow pavement of flat stones runs along the houses for the convenience of foot-passengers. The houses are not above two stories high, and built of wood, lime, and clay. At the north-eastern extremity of the city is a large castle. The population is very great. According to the exaggerated accounts of the Japanese an army of 80,000 men may be raised from among its inhabitants. Many of the residents are very wealthy men, especially the merchants, artists, and manufacturers. The Japanese themselves call Osacca the universal theatre of pleasure and diversion; and plays are daily exhibited in public and private houses. In its neighbourhood the best saki, a kind of strong beer obtained from rice, is made, and exported into the other provinces.

South of Osacca, on the shores of the same gulf, is the town of Sakai, an imperial town, which however has never been visited by Europeans.

Meaco, or Kio, the residence of the ecclesiastical emperor, or Daïri, is about 20 miles from Osacca, and contained, in the time of Kämpfer, according to a census, more than 500,000 inhabitants, besides the numerous court of the Daïri. It is nearly four miles long and three wide. The Daïri resides on the northern side of the city, in a particular ward, consisting of 12 or 13 streets, and separated from the city by walls and ditches. On the western part of the town is a strong castle, built of freestone, where the Kubo, or secular emperor, resides when he comes to visit the Daïri. The streets are narrow, but regular, and always greatly crowded. The houses are like those at Osacca. Meaco is the principal manufacturing town of the empire, where every kind of manufacture is carried to the greatest perfection. Nearly every house has a shop, and the quantity of goods which they contain is astonishing; at the same time it is the centre of science and literature, and the principal place where books are printed; it is also the residence of the lord-chief-justice of the empire, who is invested by the emperor with supreme authority over all officers of government. The town is united by a wide canal to the river Yedogawa, which flows not far from its walls.

Kwano and Mia are two very considerable and thriving towns on the Gulf of Mia, each containing 2000 or 3000 houses, and carrying on a considerable trade with the neighbouring districts.

Yedo, the capital of the empire, is situated at the northern extremity of the gulf of the same name, in an extensive plain. According to the Japanese it is about ten miles long, seven wide, and is nearly 30 miles in circuit. All travellers agree that it is the largest and most populous town in the empire, but no one of them ventures to state the probable number of its inhabitants. A large river runs through the town and sends off a considerable arm, which encloses the imperial palace, or that of the Kubo, or secular emperor. There are several good bridges over the river. The principal is called Niponbas, or the Bridge of Japan, and from it the mile-stones are counted, which are erected along the principal roads that traverse the empire. Yedo is not so regularly built as Meaco, and the private houses do not differ from those of Osacca; but as the families of all the hereditary princes, lords, and noblemen are obliged to reside at the court the whole year round, the town contains a great number of fine palaces, though they are not above one story high. Rows of trees are planted along the numerous canals which traverse the town, to prevent the fires from spreading, which are very common. Yedo is not less famous for its manufactured goods than Meaco. The palace of the Kubo is built in the middle of the town. It consists of five palaces or castles, and some large gardens behind it, and is more than eight miles in circumference.

IV. The island of Yeso is very imperfectly known. On its western coast are high mountains. Its eastern and southern coast seem to be very thickly inhabited. Near the Strait of Sangar are two considerable towns, Kokodade and Matsmaï. The latter is the capital, and the residence of the governor.

The Japanese are not so strong as Europeans; but they are well made and have stout limbs. Their eyes show their Mongol origin, not being round, but oblong, small, and deeply sunk in the head. Their hair is black, thick, and shining, and their noses, although not flat, are rather thick and short. Their complexion is yellowish. They seem to resemble most the inhabitants of Corea, and the Ainos on the island of Tarakai; but, according to appearances, they have derived their civilization from China. In manufacturing industry and in scientific knowledge they seem to be nearly equal to the Chinese, and in some articles the Japanese are superior. The Chinese themselves value the real Japan ware above their own inferior manufactures in lacker. Their manufactures in metals, silk, cotton, china, glass, and paper, and their cabinet-work, are highly esteemed. They also make excellent watches and clocks, and a late traveller (Meylan) mentions telescopes and thermometers. The fine arts are much admired, but the Japanese taste differs from ours, and is like that of the Chinese. The most antient religion is that of the Sinto, who was the offspring of the sun, the founder of the antient royal family and of the empire. But the greater part of the inhabitants have embraced Buddhism, which seems to have been introduced from Corea at a very remote epoch. Besides these two religions, a considerable number adhere to the doctrines of Confucius, the Chinese philosopher, and are called Syooto. In the seventeenth century the Roman Catholic religion was introduced by the Portuguese, and made great progress, but it was eradicated by a civil war and great persecutions, and entirely forbidden. All travellers who have been acquainted with both nations prefer the Japanese to the Chinese. They find them less cowardly, proud, cunning, and deceitful, and of a more manly and open character. In cleanliness and industry both nations are equal. The Japanese show a great desire for knowledge, and their institutions for instructing the lower classes seem not to be inferior to any on the globe. Indigence and pauperism are said to be almost unknown.

The government is despotic, but the emperor himself is considered as subject to the laws, which are of long standing and cannot easily be changed. Formerly, the Daïri Soma, the head of the Sinto religion, was the only sovereign of the empire; but as the public offices are hereditary, the chief general acquired gradually such an authority, that in 1585 he deprived the Daïri of his influence, leaving him only the supreme administration of ecclesiastical affairs; still however no enactment has legal force without having been previously sanctioned by the signature of the Daïri. The descendants of the chief general now govern the empire under the title of Kubo Soma. The constitution of the Japanese empire is materially different from that of the Chinese in its hereditary nobility, dignitaries, and officers. The government of the provinces resembles in some respect the antient feudal system of Europe. The nobility, or hereditary governors of the provinces and districts, are called *Daimio*, or High-named, and *Siomio*, or Well-named. The first-mentioned govern the provinces, and the Siomio govern the districts. Six months of the year these noblemen are in their provinces to watch over their government, and six others they must pass at Yedo, but their families must remain in that town the whole year round as a security for the loyal conduct of the governors. According to Meylan, the population of the country is divided into eight classes—the princes or governors, the nobility, priests, military, civil officers, merchants, artisans, and labourers, by which we suppose agriculturists are meant. All these dignities, offices, and employments are hereditary; a circumstance which tends to keep society quiet, though it may also prevent some improvement.

The Japanese females have almost as much liberty as European females; most of them can play on a musical instrument which is like a guitar.

The inland trade is very considerable. The coasting trade is much favoured by the great number of small harbours, and the interior communication by well-planned and well-maintained roads, which are always thronged with carriages and people. Most of the roads are wide, and ornamented with lines of trees. The foreign commerce is limited to the Dutch and Chinese. The Dutch have a factory on the island of Desima, which is connected with the town of Nagasaki by a bridge. To prevent all communication with the inhabitants, it is planked on all sides, and has only two gates, one towards the town and the other towards the harbour. These gates are strictly guarded during the day, and locked at night. In this inclosure are the storehouses, the hospital, and some houses built of wood and clay and covered with tiles. Only one ship is at present annually sent from the island of Java; it arrives in June and returns toward the end of the year. The Japanese export principally copper, camphor, and lacquered wood-work; with some china, silk-stuffs, rice, saki, and soy. The principal articles of importation are sugar, elephants' tusks, tin and lead, bar-iron, fine chintzes, Dutch cloths, shalloons, silks, cloves, and tortoiseshell; with some saffron, Venice treacle, Spanish liquorice, watches, spectacles, and looking-glasses. The Japanese copper does not reach the European market, being disposed of on the coast of Coromandel to great advantage.

The Chinese, like the Dutch, are shut up in a small island, but they are permitted to visit a temple in the town of Nagasaki; their trade is much more extensive. About seventy junks arrive annually from the ports of Amoy, Ningpo, and Shanghae, but as the Chinese have no factory they cannot remain during the winter in the harbour of Nagasaki. The Chinese junks arrive at three different times in summer

In the time of Kämpfer there was still some trade carried on with Corea and the Lew-Chew Islands, but this trade had ceased at the time of Thunberg (1775), and Siebold (1830) confirms this fact.

(*Ambassades Memorables*, &c., by Jacob van Meurs; Kämpfer's *History of Japan;* Charlevoix, *Histoire et Description générale du Japan;* Thunberg's *Travels in Europe, Africa, and Asia; Adventures of Captain Golownin;* Siebold's *Japan;* Extracts from Fischer and Meylan; *Journal of Education*, vols. vi., p. 370, x., p. 184.)

JAPANNING. Japanning is the art of producing a highly varnished surface on wood, metal, or other hard substance, sometimes of one colour only, but more commonly figured and ornamented. The process has received its name from that of the island of Japan, whence articles so varnished were first brought to Europe; though the manufacture is also extensively practised by the Chinese, Siamese, Burmese, and other nations of the extreme east of Asia, among whom it was suggested most probably by the possession of a tree, which affords with little preparation a beautiful varnish, exceedingly well adapted for the purpose, and which hardens better than those prepared in Europe.

The appearance of japanned work is as various as the taste and fancy of the artists employed in it. Sometimes it is a plain black or red, with a gilded or painted border; or it is an imitation of marble, of fine grained or rare wood, or of tortoiseshell; sometimes a drawing, in which high finish, brilliant colour, and showy patterns are more sought than good design; and occasionally fine copperplate engravings are applied to a japanned surface with good effect. In all cases the work is highly polished and varnished.

Japanning is applied to ladies' work-boxes and work-tables, to toilet-boxes, cabinets, tea-caddies, fire-screens, tea-trays, bread-baskets, snuffers and trays, candlesticks, and a variety of other articles. A good deal of common wood-painting is also called japanning, which differs from the more ordinary painter's work chiefly by using turpentine instead of oil to mix the colours with. Bedsteads, dressing-tables, wash-hand-stands, bed-room chairs, and similar articles of furniture are done in this way.

Three processes are usually required in japanning; laying the ground, painting, and finishing. In addition to these processes, whenever the matter to be japanned is not sufficiently smooth to receive the varnish, or when it is too soft or coarse, it is sometimes prepared or primed before any of the proper japanning processes are applied. It must here be observed, that almost every workman has his own peculiar modes of working, and his own receipts for making and mixing his varnishes; and that consequently only a very general idea can be given of the way in which the various operations are performed.

The preparatory mixture or priming is composed of size and chalk; the size is usually made of the ordinary carpenter's glue, which is well mixed up with as much chalk or whiting as will serve to give it a body sufficient to cover the colour and grain of the wood on which it is laid; it is put on with a brush like paint, and when perfectly dry, which will require a day or two, according to the state of the atmosphere, it must be brought to an even surface by rubbing with rushes, and then be smoothed by a wet rag. The best japanners disapprove of the use of priming, because its brittleness is very detrimental to the firmness of the varnishes laid over it; they use no substances which are of themselves unfit for receiving a varnish, or which they are unable to bring to a sufficiently smooth surface. For wood hard and fine enough to receive a varnish without priming, and for metals, paper, and leather, the only preparation necessary is a coat or two of varnish. In all these processes it is a rule to allow a day or two to intervene after every operation, that the work may be thoroughly dry.

When the work is prepared, the ground must be laid on; this is either all of one colour, or marbled, or done in imitation of tortoiseshell. The grounds are the ordinary pigments mixed with varnish, which are laid on smoothly with a brush: when thoroughly dry they are varnished, and afterwards polished by rubbing with a rag and tripoli or rotten stone; and, if the ground be white, with putty or starch and oil. The varnish used is either copal, or else it is composed of seed lac, or of gums animi and mastic; the lac varnish is considered by many workmen the best and hardest, but it is unfortunately too highly coloured for some of the more delicate grounds, to which it communicates a yellowish tinge; from this defect the gum varnish is free, but it is deficient in hardness; occasionally a mixture of the two is used, and some workmen prefer copal varnish to either gum or lac.

The mode of laying the grounds varies greatly; the old works on japanning are tediously minute in describing the various processes to be followed, detailing the number of times each coat should be laid on, and how long an interval should be allowed to elapse after each; and different proportions of colour and varnish are fixed as necessary to be used in each different operation. The mode now generally followed is to lay on one or two thick coats of colour mixed with varnish, then to varnish three or four times, and afterwards to dry the work thoroughly in a stove. The colours are flake-white or white-lead, Prussian-blue, vermillion, Indian-red, king's-yellow, verdigris, and lamp-black; intermediate tints are made by mixtures of these: an imitation of tortoiseshell is produced by vermillion, and a varnish of linseed-oil and umber. When a particularly gorgeous appearance is desired, the ground may be laid entirely in gold. This is produced by going over the work with japanner's gold size, which, when dry enough to bear touching with the finger, but still soft and clammy, is covered with gold-dust, applied on a piece of soft wash-leather. Any other metallic dust may be laid on in the same way. Many receipts are given for preparing the japanner's gold size, but nearly all agree in making linseed-oil and gum animi the basis of the composition. A curious and very striking mode of laying the ground, called the dip, was formerly much practised; it was done by dropping small quantities of coloured varnish in a trough of water, over the surface of which it immediately spread in curious and often beautiful ramifications; into these the article was dipped; the colour was thus transferred to the work, and when dried was varnished and polished in the usual manner.

The work when thoroughly dry will now be ready for painting. The performer of this part of the process is rather an artist than a workman, though, as before stated, showyness and brilliancy are chiefly required in japanning, and bright colours with gold and bronze dust are largely employed. The colours are tempered with oil or varnish, and the metallic powders laid on with gold size. Copper-plate engravings or wood-cuts may also be executed in japan work; in this process the engraving is first printed off upon fine paper which has been previously prepared by a thick coat of isinglass or gum-water: when the print is perfectly dry, it is applied with its face downwards upon the japan ground covered with a thin coat of copal varnish; the paper is then moistened on the back with a sponge dipped in warm water, which in a few minutes dissolves the isinglass or gum, and the paper which is thus loosened is gently taken away, leaving the print on the work. Indian ink or other drawings upon paper may be transferred to the japanned ground in the same way. A more expeditious and very effectual mode of transferring an engraving is to print upon a smooth thick layer of a composition of glue, treacle, and whiting, which will receive an impression as perfectly as a sheet of paper: the composition, which is elastic and very flexible, may be immediately laid down upon the japanned surface, which will thus receive as good an impression as if it could have been itself applied to the engraving.

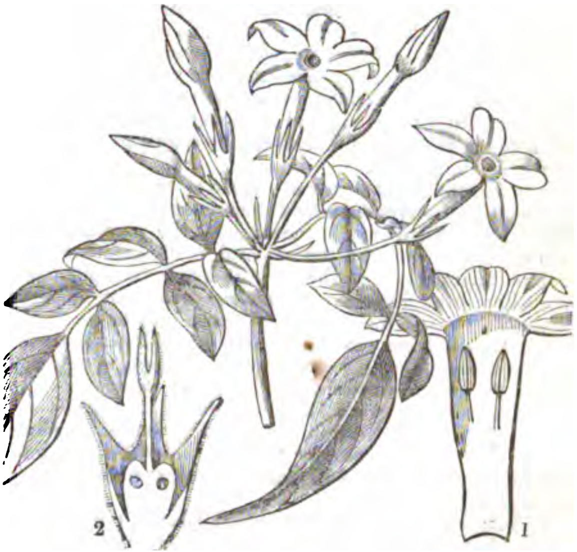
In whatever manner the work has been painted or printed, or if all addition to the plain colour of the ground has been dispensed with, nothing now remains but the finishing. This is a very simple process: the workman chooses one of the before-named varnishes, and passes it over the work with a brush several times, until he judges the coating to be thick enough to bear the polish. It is an important precaution not to begin the varnishing until the preceding work is thoroughly dry, and to dry perfectly each coat before laying on a succeeding one. A hot stove is used in the best establishments to aid in drying the work. When thick enough, the varnish is polished by rubbing it with a rag dipped in finely-powdered tripoli or rotten-stone; towards the end of the operation a little oil is also applied to the rag, and the work is completed by rubbing with oil alone, to clear off the powder or any other impurity.

JAROSLAW. [Yaroslaw.]

JASHER, BOOK OF (סֵפֶר הַיָּשָׁר), or 'the book of the upright,' is twice referred to in the Old Testament as a work of authority. (*Josh*. x. 13; 2 *Sam*. i. 18.) Many conjectures have been formed concerning the author and contents of this book; but we have no means of arriving at any satisfactory determination on the subject, since the work appears to have been lost before the time of the *Babylonish* captivity. Some critics have imagined it to be the same work as the book of Judges, which is evidently incorrect from the quotation in the book of Samuel; others, such as Bishop Lowth and Gesenius, have maintained that it was a collection of national songs.

In the year 1751, a printer of the name of Ilive published a pretended translation of the book of Jasher, which was said to have been translated from the original Hebrew by Alcuin of Britain. This work was republished at Bristol in 1829. An interesting account of this literary forgery is given in Horne's 'Introduction to the Scriptures,' vol. ii., part ii., pp. 132-138.

JASMINA'CEÆ, a natural order of Monopetalous exogens, deriving its name from the Jasminum, which forms one of its genera. It is one of the very few orders of that class with regular diandrous flowers, and is only to be mistaken for Oleaceæ, which have a valvate corolla, and which otherwise are scarcely different. Only four genera of this order have yet been discovered, the principal being Jasminum itself, which consists of a larger number of species, sometimes fragrant, sometimes scentless, erect or twining, inhabiting the hot or temperate regions of Europe, Africa, and Asia, including New Holland, but hardly known in America. The order is characterized by having opposite or alternate, simple or compound, exstipulate leaves; monopetalous flowers, the segments of whose corolla are imbricated, and seldom correspond with those of the calyx; 2 stamens, and a superior 2-celled few-seeded ovary. The species are chiefly valued for their fragrance; a few species have been regarded as bitter and astringent.



Jasminum officinale.

1, a longitudinal section of the corolla; 2, a longitudinal section of the ovary and calyx.

JASON. [Argonauts.]

JASON. [Thessaly.]

JASPER. [Silicium.]

JASSA, a genus of Amphipodous Crustaceans, established by Dr. Leach.

The general characters resemble those of *Corophium*, Latr.; but differ from them as well as from those of *Podocerus*, Leach, in the considerable size of the *hands* of the four first feet, which are oval; those of the second pair being the greatest, and armed with teeth more or less numerous on the internal border. *Eyes* not projecting.

Dr. Leach records two species, one, *Jassa pulchella*, from the south coast of Cornwall, where it was found in the middle of sea-weed; the other, *Jassa pelagica*, found near the Bell Rock, Scotland.

JASSY. [Moldavia.]

JA'TROPHA, a genus of plants inhabiting the tropical parts of the world and belonging to the natural order Euphorbiaceæ. It contains among its numerous species the Jatropha or Janipha Manihot, a Brazilian and Guayana plant, whose fæcula forms a well known nutritious substance, called *Cassava*, when prepared in one manner, and *Tapioca* in another state. This secretion is analogous to the meal in the Potato, the Yam, and the Batatas, but it is mixed naturally with a highly dangerous juice, which it is necessary to remove by washing and evaporating before the fæcula is fit for food. When properly prepared, this substance is extremely nutritious, and forms the principal part of the vegetable diet of the poorer classes in South America.

JAUM GHAUT. [Hindustan, p. 212.]

JAUNDICE (from *jaune*, yellow) is the name given to those diseases in which the excretion of the bile being prevented, it is retained in the blood, or reabsorbed, and being diffused throughout the system, gives a yellow colour to the skin, and all the other tissues and secretions.

The name is however very indefinite, because the cases in which the separation of the bile is prevented are various. Everything, for example, which obstructs the main trunk of the bile-ducts, as gall-stones [Calculus, Biliary] or other foreign bodies filling its canal, certain morbid alterations of the liver or duodenum [Intestines], or of the duct itself, tumours and enlargements of adjacent organs, will alike mechanically produce jaundice, though their other symptoms differ widely. Again, it is often a symptom of inflammation of the liver, as especially in yellow fever, and of inflammation of the duodenum. But the most frequent cases are those which do not appear to be the consequence of any organic disease, but are accompanied by the symptoms of general disorder of the digestive organs, as nausea or vomiting, thirst, and loss of appetite, confined or irregular condition of the bowels, headache, and general uneasiness. These cases generally come on suddenly, as a sequel of common diarrhœa, or in the dyspeptic and those of a sedentary habit, or whose bowels have been long inactive. It is often difficult to say what prevents the excretion of the bile; sometimes it is separated from the blood in too viscid a form; sometimes mucus appears to obstruct the duct; in many cases there is probably spasm of the duct, as in those which occur after violent fits of anger or other mental affection; and in some a larger quantity of bile appears to be formed than can be conveyed away with proportionate rapidity.

It is impossible that any one mode of treatment should be adopted for a symptom depending on such varied causes. Where the obstruction is mechanical, the jaundice is of course curable only by the removal of its evident cause; and in inflammation of the liver it is but a symptom of a more important disease, to which the treatment must be directed. In the more common cases, which, as distinguished from these, are sometimes called functional, the treatment should consist chiefly of small doses of mercury, and active purgatives containing calomel or neutral salts. Warm baths and opium should be used, if there be any spasmodic pain of the right side; and leeches or bleeding, if any inflammatory pain or tenderness be felt. A mild diet and the avoidance of all stimulant drinks or food should be carefully enjoined.

JAVA, one of the Greater Sunda Islands, the third in extent, but the first in importance, is situated between 5° 52′ and 8° 4′ S. lat., and between 105° 11′ and 114° 13′ E. long. On the south and west it is bounded by the Indian Ocean. The north-western corner of the island forms with the most southern extremity of the island of Sumatra the Straits of Sunda, which at one place are only fourteen miles across, and unite the Indian Ocean with the Java Sea. The last-mentioned part of the Indian Ocean washes the northern shores of Java, and at the south-eastern extremity of the island it is again united with the ocean by the Strait of Bali, which in the narrowest part is only two miles wide. The length of Java from Java Head on the west to East Point (Oost Hoek) is 666 miles; its breadth varies from 56 to 135 miles. The area is estimated at 50,000 square miles, or about that of England.

The island of Madura is commonly included in Java, from the north-eastern part of which it is divided by the Strait of Madura, which in one part is only one mile broad. Madura is 91 miles long, and 31 miles wide in the widest part.

Surface and Soil.—The southern coast in its whole extent is high and steep, rising in many places perpendicularly to an elevation of 80 or 100 feet, and in some places much higher. It runs in a continuous line, with few indentations, and those not deep. Consequently there are few places which have good anchorage, and as it is exposed to the open ocean, and to a high swell or surf, it is not much visited by shipping. Still a few good harbours occur; the best are Chelachap, about 109° E. long., and Pachitan, about 111° E. long.

The hilly country which is contiguous to the southern coast rises rapidly as we advance inland, and probably attains towards the middle of the island a mean elevation of more than 1000 feet, where it extends in elevated plains with an uneven or hilly surface. This hilly country does not extend over the whole breadth of the island, except at the western extremity as far east as Bantam, and in the peninsula, which comprehends the most eastern districts east of 112° 30′. This elevated region is traversed by numerous ridges of hills, probably rising to 2000 or 2500 feet above the sea-level, and running mostly in the direction of the island's length. On these ridges a considerable number of peaks rise to a great elevation. It is stated by Raffles that there are thirty-eight of such peaks. They have all a broad base, and gradually diminish in size to the summit, which has always the form of a cone. They are all volcanic. Indications and products of their former eruptions are numerous and unequivocal. The craters of several are completely obliterated; those of others contain small apertures which continually discharge vapours and smoke. Many of them have had eruptions during the present century, which have caused great loss of property and life.

The highest and most remarkable of these volcanic peaks are the Pangerango, south of Buitenzorg, more than 8000 feet high; Mount Gede, south-east of the former, rising to 9888 feet; the Dshirmai, south-south-west of Cheribon, more than 8000 feet high; the Gede Tegal, near 109° long., which probably attains between 11,000 and 12,000 feet; and Mounts Sindoro and Sumbing, called the Two Brothers, near 110° long. Three large volcanoes, called Ung'árang, Merbidu, and Merápá, lie in a direction almost south and north across the hilly region near 110° 30′ E. long. Near the eastern peninsula is the Arjúna, 10,614 feet high, and south-east of it, not far from the Indian Ocean, the Smeero, or Semiru, probably the most elevated of these peaks. At the north-eastern extremity of the island near Cape Sedano is the elevated volcano of Telágawurung.

The hilly region contains some extensive plains and valleys of great fertility, enclosed by the ridges of hills which connect the peaks. The largest of these elevated plains is that of Bandung, which seems to occupy nearly the whole tract from Mount Gede on the west to Mount Gede Tegal on the east. It is of great fertility, though somewhat inferior to the two valleys which lie contiguous to it on the east—the Vale of Banyumas, traversed by the beautiful river of Serayu, and the Vale of Kedù, on the banks of the river Elo. East of the last-mentioned vale is the elevated plain of Solo, which extends round the town of Sura-kerta, and exhibits a great degree of fertility. The elevated plain of Kediri, traversed by 112° long., is equally extensive and fertile. The eastern peninsula, whose surface is mostly occupied by peaks and high ridges connecting them, has only narrow and close valleys.

The elevated and hilly region terminates to the north in rather a steep slope, and between it and the Java Sea extends a flat country which descends imperceptibly from the foot of the hills to the very shores, where it terminates in some places in swamps. This low tract, which is mostly alluvial, is widest towards the west, and occupies nearly one-fourth of the width of the island, or about 40 miles, between Bantam on the west and Cheribon on the east. Between Cheribon and Samárang it is hardly more than 10 miles wide. This portion of the low lands is not equal in fertility to the inland districts. In Samárang are the flats of Demák, which extend between the elevated region and the mountains of Japára; they were once an extensive swamp, and are hardly inferior in fertility to any part of the island. East of these flats and between the same mountains are the low lands of Jipang and Surabáya, which terminate on the strait and gulf of Madura with the delta of the Surabaya river; the delta is also distinguished by its fertility. The low lands of Demak, Jipang, and Surabaya divide the mountains of Japara and some lower ridges from the elevated regions. The mountains of Japara, which contain a peak of considerable elevation, occupy the peninsula of Japara, on which the low coast-tract is very narrow. This isolated mountain-system is separated by a deep valley, covered with alluvial soil, from a low ridge which occupies the whole tract of the coast between Cape Lerang and Cape Panha, and perhaps 10 or 15 miles inland.

The northern coast is lined by numerous small islands, and is marked by many projecting points and headlands. Accordingly the harbours are numerous. But the whole coastline affords anchorage at nearly all seasons of the year, and vessels of any burden can approach all the principal stations at a convenient distance for the exchange of their merchandise. The sea being generally smooth and the weather moderate, the native vessels and small craft always find sufficient shelter at the change of the monsoon by running under some island, or passing up the rivers, which though in general difficult of entrance on account of their bars, are for the most part navigable for such vessels as far up as the maritime towns.

The soil of Java is generally deep and rich. The best soils are the alluvial soils along the beds of the rivers, and on the slopes of the largest mountains; the worst are on the declivities of the lower ranges. But though there are these varieties, the general character of the soil is that of extraordinary fertility. The eastern districts however are superior to the western. The neighbouring countries, especially Sumatra and the Malayan peninsula, cannot be compared with Java in this respect. The best soils annually produce two crops without manure; and even the poorest remunerate the labour of the husbandman.

Rivers.—Java is watered by numerous rivers, but few of them have a considerable course on account of the comparative narrowness of the island. There may probably be fifty streams, which in the wet season bear down rafts loaded with timber and other rough produce of the country. Five or six are navigable at all times to a distance of some miles from the coast. The rest, in number many hundreds, if not thousands, are used to irrigate the fields.

The Solo River rises with many branches near the southern coast in the mountains of Damong, and runs northward to Sura-kerta, where it is a stream of considerable depth and breadth; it afterwards turns to the east, and at Awi it is joined by the Madion. From this point to its mouth its course is calm, regular, and steady. It enters the Strait of Madura by two mouths at Gresek and Sidayu. From Sura-kerta to Gresek it is stated to run 356 miles, measured along the windings of the river, though in a straight line the distance is only 140 miles. In this part of its course there is no impediment to navigation. During the rainy season it is navigated by boats of considerable size, and except in August, September, and October, and in seasons uncommonly dry, it floats down boats of middling or small size during the whole year, from a considerable distance above Sura-kerta.

The Kediri or Surabaya River forms nearly a circle, and its source and mouth are situated almost in the same latitude. It rises at the base of the volcano Arjúna, winds round Mount Kawi, and is a large river at Kediri. From this place its course is no longer interrupted by any impediment, and it bears boats of a very considerable size to its outlets in the Strait of Madura. Its mouths are five in number, and they include a pretty extensive and very fertile delta.

There are no lakes in Java, but some low lands are converted into temporary swamps during the rains. Two of these swamps are of considerable extent; one called the Binnen See, at the foot of the Japára Mountains, and another not far from Samárang.

Climate.—In Java, as in other countries between the tropics, the year is divided into a wet and a dry season, and these seasons depend on the periodical winds. The setting-in of these winds is not determined within a few weeks; but generally the westerly winds, which are always attended with rain, commence in October, become more steady in November and December, and gradually abate, till in March or April they are succeeded by the easterly winds and fair weather, which continue for the remaining half year. The heaviest rains fall in December and January, and the driest weather is in July and August. Yet even during the rainy season there are many days without showers; and although the rains sometimes continue for several days, and frequently fall in torrents, they are not marked by that decided character, either of permanence or violence, which distinguishes the periodical rains on the continent of India. The same may be said of the dry season. Even in July and August the atmosphere is refreshed by occasional showers. The degree of heat varies considerably in the low lands and the hilly region. On the low northern shores at Batavia, Samárang, and Surabaya, the mean annual heat is 78°; but in the dry season the thermometer rises as high as 90°, and even higher about three o'clock in the afternoon. Usually however it ranges between 70° and 74° in the evenings and mornings, and attains 83° or 85° in the afternoon. The elevation of the interior offers the rare advantage that, from the sea-shore to the top of the mountains, there is almost, from one end of the island to the other, a regular diminution of temperature, at the rate of two or three degrees of Fahrenheit for every ten miles. The mean heat on the elevated plains probably does not exceed 66° or 68°, and the thermometer rarely rises there to 72°. On the summits of the peaks it sinks below the freezing-point: ice as thick as a Spanish dollar has been found, and hoar-frost, called by the natives 'the poisonous dew,' has been observed on the trees and vegetation of the higher regions. Hurricanes are unknown. With the exception of a few days at the change of the monsoons, or when the westerly winds are at their height, vessels of any description may ride in safety in most of the bays along the northern coast; and on shore the wind is never so violent as to do damage. Thunder-storms are frequent and destructive. Earthquakes are common in the vicinity of the volcanoes, but the European towns have not suffered from them. Java was formerly considered one of the most unhealthy countries of the globe, and this character is certainly due to the greatest portion of the low coast along the Java Sea; but on examination it has been found that by far the greatest part of the island, in point of salubrity, is equal, if not superior, to any other tropical country.

Productions; Vegetables.—Though not equal to the Hindus in agriculture, the Javanese are far superior to their immediate neighbours of the other islands. They are well acquainted with the cultivation of rice and other grains on the slopes of the mountains and hills, which are formed into terraces. They know likewise the advantages of a careful irrigation, and in some parts they grow, in the wet part of the year, a crop of rice, and in the dry part some species of pulse, farinaceous root, or cotton. In the richer lands however it is usual to take from them without interruption a double harvest during every twelve months. Rice is here, as in India, the principal object of the husbandman, and its produce determines the value of the land. Maize, or Indian corn, is not very extensively grown, but of late years its cultivation has much increased. In rich lands it returns four or five hundred-fold; and even in poor lands it yields sixty or seventy fold. Wheat has been introduced by the Dutch, and is cultivated on the more elevated lands, but its produce is in small quantity and of inferior quality. Millet is grown in some places on a limited scale. Among the many esculent roots cultivated the principal are the yam, the sweet potato, the Java potato, arrowroot, and the common potato. The last is only grown in the more elevated and colder districts, where also artichokes, cabbages, and peas succeed, but carrots not so well. The Javanese also cultivate cucumbers, onions, and capsicums. As they do not use butter, they consume a great quantity of different kinds of oil, made from the fruit of the cocoa-nut tree, the ground-nut (*Arachis hypogæa*), the Palma Christi, and the Sesamum, all of which are cultivated with considerable care. They also plant the Areca palm, on account of its nuts, and the Gomuto palm, partly on account of the toddy, or palm-wine, obtained from it, and partly on account of a substance resembling black horse-hair, which forms between the trunk and branches, and is used for every kind of cordage, domestic and naval: of late years it has been much used in European vessels. From its pith a kind of flour may be made, not unlike sago, but of inferior quality. There are also extensive plantations of the betel and of tobacco; and of fruit-trees especially the following are cultivated: the plantain or banana (*Musa Paradisiaca*), the bread-fruit tree (*Artocarpus incisa*), the jack-tree (*Artocarpus integrifolia*), the mangustin (*Garcinia mangostana*), the durian (*Durio Zibethinus*), the mango (*Mangifera Indica*), different kinds of the orange and lemon tribe, especially the shaddock (*Citrus decumana*), the pine-apple (*Bromelia ananas*), the Jamba (*Eugenia*), the Guava (*Psidium pomiferum*), the papaya (*Carica papaja*), the custard-apple (*Anona squamosa* and *reticulata*), and the cashew-nut (*Anacardium occidentale*). Besides these the pomegranate (*Punica granatum*) and the tamarind (*Tamarindus Indica*) are grown. European fruit-trees have not succeeded: the grape is cultivated in several places; but it is seldom of a good quality. The culture of the pear, the apple, and the peach has been still more unsuccessful.

The plants which afford articles for foreign exportation are the coffee-tree, the sugar-cane, the pepper-vine (*Piper nigrum*), the cardamom (*Amomum cardamomum*), ginger, the sandal-tree (*Santalum*), and the cotton-plant. The forests, which cover a part of the elevated region, especially in the eastern districts, contain a great number of teak-trees, whose timber is considered inferior to that of Malabar, but superior to that of the Birman empire. Ebony-wood is also found, and among their creeping plants are the rattan (*Calamus Rotang*, L.), and two species of caoutchouc trees.

As dye-stuffs there are cultivated indigo (*Indigofera tinctoria*), safflower (*Carthamus tinctorius*), arnotto (*Bixa orellana*), and turmeric (*Curcuma longa*, L.). Several fruit-trees produce dye-woods, as the sappan (*Cæsalpinia sappan*), the mangkuda (*Morinda*), and the ubar, similar to the logwood of Honduras.

There are two trees in this island from which poison is extracted, the *antjar* and the *chetik*. The antjar, also called the *Bopon upas* (or the poisonous tree), is a high forest-tree, from whose outer bark poison is extracted in the form of a milk-white sap. But its exhalations are not poisonous, nor is it, as was formerly supposed, hurtful to plants around it, creepers and parasitical plants being found winding in abundance about its trunks and branches. (Crawfurd.)

Animals.—There are no elephants, camels, or asses. The horses are of a small breed, but strong, fleet, and well made. Buffaloes are numerous, and of greater use in agriculture than any other animal. Black cattle are common, but much more so in the central and eastern districts than in the western. Goats are abundant, but sheep are scarce; both are of small size. The hog is reared chiefly by the Chinese.

Of beasts of prey there are the tiger, the leopard, the tiger-cat, and the jackal. Other wild animals are the rhinoceros, the wild Java ox, the wild hog, and the stag, as Raffles calls it, which is perhaps the axis deer.

Of domestic birds there are turkeys, geese near the settlements of the Europeans, ducks, fowls, and pigeons. Among the wild birds the most remarkable is the *hirundo esculenta*, whose nests are eaten, and exported in large quantities to the Chinese market. They are called Salanganests.

The cayman is abundant in the rivers of Java, but, according to Raffles, the animal much more resembles the crocodile of Egypt than the alligator of America. This crocodile is mentioned by Thunberg and by Mandelslo, the latter of whom says that it was eaten by the natives. Of serpents there are said to be several poisonous varieties. Turtle and fish are abundant. Honey and wax are also obtained. Silkworms were once introduced by the Dutch, but this branch of industry did not extend among the natives.

Minerals.—Few minerals are known to exist in Java. Iron is said to be found in small quantity, and indications of gold have been observed at several places. Salt is made of sea-water in some parts of the northern coast. Saltpetre is extracted from the earth of some caves, and sulphur is found near the volcanoes.

Political Divisions, Towns, &c.—The greatest part of the island is in possession of the Dutch. The districts situated on both extremities of the island, as well as the whole of the northern coast, are immediately subject to them. But the southern coast and the adjacent countries, between 108° 30′ and 112° 20′ E. long., with the exception of the small district of Pachitan, which has been recently ceded to the European government, is subject to two native princes, the Susuhúnan, or emperor, and the sultan. Their dominions extend more than 250 miles along the southern coast, and form about one-fourth of the whole island.

1. The Dutch possessions are divided into 17 provinces. The country west of 108° 30′ comprehends five of them, Bantam, Batavia, Buitenzorg, the Preanger districts, and Cheribon. The low and alluvial parts along the coast are of considerable fertility, but large tracts in the mountain-ranges still remain in a state of nature, and where the ground has been cleared of forests they are now overgrown with long and rank grass. The elevated plain of Bandung however is well cultivated and peopled. The Preanger districts are governed by native hereditary princes, who pay a tribute to the Dutch. The most considerable and remarkable towns in this country are on or near the northern shores. Sirang, or Ceram, where the governor of Bantam resides, is a thriving place some miles inland, and distant from the antient town of Bantam, which has been abandoned. Batavia, which once had a population of 160,000 souls, contained in 1834 not more than 53,861 inhabitants, having been partly abandoned on account of its unhealthiness. [Batavia.] But its suburbs, situated at some distance and on a higher level, have received a great part of the population. Of these suburbs Molenvliet is built in the Dutch fashion along a wide canal, and is mostly inhabited by Europeans; Ryswick, the seat of the general governor, contains a fine palace and beautiful square, called the Royal Place; Weltefreden, is the central point of the military force, with extensive barracks; and Noordwyck is inhabited by the merchants and people in trade. Cheribon is a thriving town, with a good roadstead and 10,000 inhabitants; it contains a beautiful mosque. In the interior of the country is Buitenzorg, a thriving and well-built village, 40 miles from Batavia and at the foot of the volcano of Pangerango. It contains the summer palace of the governor-general and many fine country-houses. A navigable canal unites it to the harbour of Batavia. The most considerable town in the Preanger districts is Chanjur.

The Dutch possessions east of 108° 30′ to the Strait of Madura contain the nine provinces of Tegal and Brebes, Pakalongan, Kedú, Samárang, Japara, Rembang, Gresek, and Surabaya. They constitute the most fertile part of the Dutch dominions, and contain the Vale of Kedú, the flats of Demák, and the Plain of Surabaya. The chief towns from west to east are the following:—Samárang, with more than 30,000 inhabitants, has an extensive commerce. Foreign vessels are permitted to trade to it. There is a military academy. Rembang has 8000 inhabitants and some trade. Surabaya is situated on the Straits of Madura, which form an excellent and spacious harbour with good anchorage, and secure against the violence of the sea and wind. It is the most populous and thriving town of Java, and its population exceeded 80,000 souls in 1815. Its harbour is open to foreign vessels. In the interior, in the Vale of Kedú, are the extensive and admired ruins of the temples of Boro Bodor.

The eastern peninsula, which extends to the Strait of Bali, is less fertile than any part of the island, being almost entirely occupied by mountains. It contains three provinces, Passaruan, Besuki, and Banyuwangi, of which the last is noted for its coffee, which is stated to be superior to that of Mocha, and for the great quantity of sulphur which abounds here. Passaruan is a small town on the sea-coast.

2. The dominions of the Susuhúnan, which contain a population of nearly one million, consist of two separate tracts. The largest lies between 108° 30′ and 110° E. long., and contains the fertile vale of Banyumas, with the town of the same name, which has 8000 inhabitants. From this the smaller portion is separated by the Vale of Kedú and some territories of the Sultan. It lies in the interior of the island, between 110° 30′ and 111° 20′ E. long., and contains the residence of the Susuhúnan, called Sura-kerta, on the Solo River, which has a population of 105,000 souls.

3. The territories of the Sultan extend between 110° and 112° 20′ E. long., and contain nearly 700,000 inhabitants. In their eastern districts is the fertile plain of Kediri. The capital is Yugya-kerta, a town with 90,000 inhabitants. In its vicinity are the ruins of Brambanan, called Chandi Sewu, or the Thousand Temples. [Brambanan.]

Inhabitants.—The natives of Java belong to the widely spread race of the Malays. They are short, thick-set, and robust. Crawfurd thinks that their medium height is about four inches less than the average stature of Europeans. Their lower limbs are rather large and heavy, but not ill formed; their arms are rather fleshy than muscular. The face is of a round form, the mouth wide, the teeth remarkably fine, the chin rather of a square form, the cheek-bones are high and the cheek consequently rather hollow. The nose is short and small, never prominent, but never flat; the eyes are small and always black. The complexion is generally brown, and darker than in the neighbouring islands. The hair is long, lank, harsh, and always black. They have very little beard. The Javanese are Mohammedans, but the creed of the Arabian prophet, which was introduced among them in the fourteenth century, has been much modified by the doctrines and ceremonies of Buddhism. Three different dialects of the Malay language are spoken on the island, but they have also an antient sacred language called Kawi, which contains a great number of Sanscrit words. The Javanese have a native literature, which however is not rich. They have also translations from the Sanscrit and Arabic; the latter are small in number and solely on subjects of religion and jurisprudence. In civilization the Javanese are much superior to all other nations who inhabit the Indian Archipelago. This is evidently shown by the state of their agriculture, though it cannot be compared with that of the Hindus or Chinese. In the art of fishing they are very expert, like all the other nations of this part of Asia. They do not eat their fish in a fresh state; it is almost always salted or dried. A peculiar preparation, called by the Malays *blachang*, and by the Javanese *trasi*, is a mass composed of small fish, chiefly prawns, which is fermented and dried in the sun. It is used as a universal sauce, more generally than soy with the Japanese; and as soon as Europeans have overcome their repugnance to it, they become as partial to it as the natives. In no kind of manufacture are the Javanese distinguished, except in working gold. Their cotton-cloth is coarse, but of a substantial and durable texture; a small quantity is exported. The raw silk, imported from China, is manufactured into a rich thick tissue, more distinguished however by the quantity of material which it contains, than by the beauty of the workmanship. The Javanese show also considerable skill in the construction of their vessels and boats, of which there is a great variety.

The whole population of Java in 1815 consisted of 4,520,829 natives, and about 100,000 foreigners settled on the island. The foreigners are Chinese, Malays, Hindus, Arabian merchants, and slaves brought by the Europeans and Chinese from Bali and Celebes.

Commerce.—Java is extremely well adapted for an extensive commerce. The island itself is rich in productions, and its northern coasts, which are accessible to vessels all the year round, lie opposite the richest countries of Asia. Besides this, the Dutch government has made it the centre of all the trade which Holland carries on with its extensive settlements in the Indian Archipelago. All the goods destined for consumption in the Moluccas, Celebes, Borneo, and the eastern coast of Sumatra, are sent to Batavia, and forwarded thence to the places of consumption. The exports of these countries, intended for the European and American market, are likewise sent to Java and thence to Europe. The trade of the island was always open to the independent Asiatic nations, and since its re-occupation by the Dutch the vessels of all European nations are admitted into the ports of Batavia, Samárang, and Surabáya.

The Dutch and other Europeans and the North Americans export from Java chiefly coffee, sugar, rice, pepper, and arrack; minor articles are, long pepper, cubeb pepper, ginger, turmeric, cajeput oil, tamarinds from Madura, sapan, rattans, and some hides and horns of buffaloes and oxen; also vessels built of teak, and teak timber. The imports are cotton fabrics, especially chintzes, white cottons, handkerchiefs, and velvets; woollen broad-cloth; iron, unwrought, Swedish and British; Swedish steel; some cutlery, nails, and small anchors; wrought copper, the unwrought copper being imported from Japan; some fire-arms and ammunition; glassware and earthenware; opium from Malwa and Turkey.

The Chinese chiefly visit the harbours of Batavia and Samárang, and their junks depart from the harbours of the provinces of Quantun, or Canton, Fokian, and Chekiang, especially Canton, Amoy, Changlin, Tyanchin, Ningpo and Shanghae. Their importations, in the order of value, are black tea, coarse porcelain, wrought iron, principally in the form of pans for the sugar-houses, and other culinary vessels, cotton-cloth, raw and wrought silk, especially satins of various colours, with a few velvets and brocades, brass ware, paper, books, paint, shoes, fans, umbrellas, and toys. They take in return black pepper, long pepper, sandal wood, mostly imported from the island of Timor, betel-nut, bees'-wax, cotton, edible birds' nests, sharks' fins, rhinoceros horns and hides, ox and buffalo hides and horns, European woollens and cottons.

The inhabitants of the other islands of the Indian Archipelago carry on an active commerce with Java by means of the Bugis, or inhabitants of Boni, in Celebes. These active navigators and adventurers leave their country in the beginning of the eastern monsoon, and carry on a trading voyage as they proceed westward, until they reach the limit of their navigation at Malacca, Penang, and Achin, and prepare to return with the change of the monsoon. The commodities which they export from their own country and the islands which they visit before they arrive at Java are, the excellent and durable cotton-cloth of their native country, gold-dust, nutmegs, Spanish dollars, camphor, frankincense, and tortoiseshell. They take in return birds' nests, European and Indian cotton goods, unwrought iron, salt, rice, different kinds of pulse, and tobacco.

The inhabitants of Coromandel and Malabar bring to Java blue cotton-cloth, cotton chintzes, and tobacco; and take in return betel-nut, bees'-wax, black pepper, nutmegs, and mace, brought from the Moluccas, ivory and damar from Borneo and Sumatra, and tin from Banca.

A few vessels from Mocha in Arabia annually visit Java. They first go to Malabar and import cotton-cloths, fruits, and bullion; and take in return cloves and nutmeg, black pepper, betel-nut, rice, and sugar.

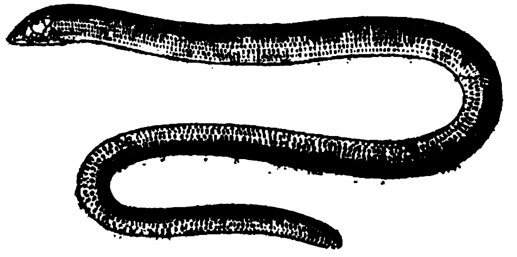
It is stated, that in 1825 the imports into Java amounted to about 1,140,000*l.*, and the exports to about 1,430,000*l.* The Dutch imported to the amount of about 200,000*l.*, and exported to the amount of about 688,000*l.* The British imported, partly from Bengal, to the amount of 155,000*l.*, and exported to the amount of 35,000*l.* Hamburg imported to the amount of 11,000*l.* The French imported to the amount of 14,000*l.*, and exported to the amount of 16,000*l.* Sweden imported to the amount of 1000*l.*, and exported to the amount of 9000*l.* The North Americans imported to the amount of 190,000*l.*, and exported to the amount of 34,400*l.* Merchandise to the amount of 4000*l.* was sent to Mocha in Arabia. The exports to China were estimated at 113,600*l.*, and the imports at a similar sum. From Java were sent to the other islands of the Indian Archipelago goods amounting to 379,000*l.*, and from these islands were imported others amounting to 344,000*l.*

History.—The Portuguese reached Java in 1511, and soon after began to form small settlements. The Dutch established themselves at Bantam in 1595, and in 1602 the English erected a factory at the same place, which was the first possession of the English in the East Indies. But the English as well as the Portuguese were soon obliged to give way to the Dutch, who built the town of Batavia, and by degrees enlarged their dominion, until they succeeded, about the middle of the last century, in dividing the empire of the Susuhúnan into two parts, and appropriating the greater portion of it to themselves. The two sovereigns became at the same time dependent on the Dutch government, and have since been obliged to sell to them, at fixed and low prices, considerable quantities of rice, pepper, sugar, and coffee. The Dutch also claim the right of confirming the successors of the sultans. When Holland was united to the empire of Bonaparte, the British took possession of the island in 1811, but restored it to the Dutch after the fall of Bonaparte in 1816.

(Stavorinus, *Voyages to the East Indies*; Raffles's *History of Java*; Crawfurd's *History of the Indian Archipelago*; Count Hogendorp's *Coup d'Œil sur Java, &c.*; *Description Géogr., Histor. et Commerciale, de Java et des autres Isles de l'Archipel Indien.*; *Ueber die Kawi Sprache auf der Insel Java*, &c., von W. von Humboldt, Berlin, 1836.)

JAVELIN SNAKE. [ACONTIAS; BLIND-WORM, vol. iv., p. 529.]

The cut which illustrates *Acontias* appears to have been taken from Cuvier's reference (*Règne Animal*) to Seba, ii., xxi., 1, which is erroneous. In the plate of Seba quoted, No. 4 may pass for an *Acontias*, but No. 1 represents a totally different form.



Acontias Meleagris.

JAXT (now often written Jagst), one of the four circles into which the kingdom of Würtemberg is divided. It borders on the north-west on Baden, and on the north and east on Bavaria. It has an area of 2104 square miles, and a population of 355,691 inhabitants. It is divided into 14 high bailiwicks. The chief town is Ellwangen. The principal rivers are the Jaxt, from which it has its name, the Kocher, and the Rems. The greater part of the possessions of the princes of the House of Hohenlohe is situated in this circle. This ancient House is descended from Eberhard, duke of Franconia, who died in 918, and was brother to King Conrad, and is named from the castle of Hohenlohe (Hollach, Hollo), the ruins of which are still to be seen at the village of Hollach near Uffenheim in Bavaria. The princes of Hohenlohe lost their sovereign rights on the dissolution of the German Empire and the formation of the Rhenish Confederation, and were declared vassals of the kings of Würtemberg and Bavaria. The House now consists of two principal lines, Hohenlohe Neuenstein and Hohenlohe Waldenburg. The first, which is Protestant, is divided into three branches: H. Langenburg, with a territory of 95 square miles and 16,800 inhabitants; 2. H. Oeringen (formerly Ingelfingen), with a territory of 130 square miles and 24,870 inh.; 3. H. Langenburg-Kirchberg, with a territory of 84 square miles and 15,400 inh. The second main line, which is of the Roman Catholic religion, is likewise divided into three branches: Hohenlohe Waldenburg and Bartenstein, with a territory of 148 square miles and 23,000 inh.; 2. H. Bartenstein-Jaxtberg, with a territory of 135 square miles and 10,800 inh.; 3. H. Waldenburg-Schillingsfurst, with a territory of 125 square miles and 17,500 inhabitants.

JAY. [Corvidæ, vol. viii., p. 69.]

JAYADE'VA, a celebrated Hindu poet. We possess hardly any particulars respecting the circumstances of his life. It appears from a passage in his poems that he was born at Kenduli; but the position of this town is very doubtful. Some commentators place it in Kalinga, others in Burdwan; but according to the popular tradition of the Vaishnavas, it was situate near the Ganges. (Wilson, in *As. Res.* xvi. 52.) If the verse at the end of the 'Gîta Govinda' is genuine, the name of Jayadeva's father was Bhojadeva, and that of his mother Râmâdevî. According to Sir William Jones, Jayadeva lived before Câlidâsâ (*As. Res.* iii. 183); but this is exceedingly improbable, both from the artificial construction of the verse and the whole tenor of the poem. Professor Wilson places Jayadeva in the 15th century of the Christian æra (*As. Res.* xvi. 37); but Lassen, with greater probability, supposes that he lived in the middle of the 12th century. (*Prolegomena* to the 'Gîta Govinda,' pp. iv. v.)

The only poem by Jayadeva which is extant is entitled 'Gîta Govinda;' that is, 'the poem in honour of Govinda,' one of the names of Krishna, the eighth *avatar*, or incarnation, of Vishnu. The poem is a kind of pastoral drama, in which the loves of Krishna and Râdha are described in a glowing and voluptuous manner. This poem has always been greatly admired among the Hindus; and the majority of Hindu commentators contend that it is not to be understood in a literal, but in a figurative and allegorical sense, and that the loves of Krishna and Râdha describe the 'reciprocal attraction between the divine goodness and the human soul.' Among the Europeans, Sir William Jones and Colebrooke admit this allegorical mode of interpretation (*As. Res.* iii. 183; x. 419); but we are inclined to believe that the 'Gîta Govinda,' like the poems of Hafiz, is in reality what it professes to be, merely an amatory poem; and that the allegorical mode of interpretation is the invention of commentators and scholiasts. The question has been very ably discussed by Lassen in his Prolegomena.

An English translation of the 'Gîta Govinda' was published by Sir William Jones in the third volume of the *As. Res.* The original text was printed very inaccurately at Calcutta in 1808; a new and very accurate edition, with notes, and a Latin translation, edited by Lassen, was published at Bonn, 1836.

JEAN I., a posthumous son of Louis X. *Hutin*, was born in 1316, and lived only eight days, but is numbered in the chronological order of kings. At his death his uncle and egent Philippe le Long assumed the title of Philippe V.

JEAN II., son of Philippe de Valois and of Jeanne of Burgundy, ascended the throne upon his father's death in 1350. At the beginning of his reign he caused Raoul, high constable of France, to be beheaded without trial, on a suspicion of treason, and he afterwards invited King Charles of Navarre, with whom he had some differences, to an interview at Rouen, and there arrested him and put to death several lords of his suite. The brother of the King of Navarre and the relatives of the murdered lords applied to Edward III. of England for assistance. In 1355, Edward sent his son the Black Prince into France at the head of an army. After ravaging several provinces the Black Prince was met by King Jean near Poitiers, who with 80,000 men attacked the English, 10,000 in number, on the 19th September, 1356: the French were completely defeated, and Jean, after displaying much personal bravery and being wounded, was taken prisoner and conducted to London, where he was received by King Edward with great honour. Negotiations followed: Edward offered to renounce his assumed claim to the French crown on condition of being acknowledged as absolute sovereign of Normandy, Guienne, Calais, and other lands which had been held in fief by the former kings of England. Jean wanted to gain time, but meanwhile his own country fell into a state of horrible anarchy. The citizens of Paris revolted against the Dauphin Charles, and drove him out of Paris, and soon after the peasants or serfs, so long oppressed and brutalized by the feudal nobility, broke out into insurrection, plundered and burnt the castles of the nobles, and massacred all within them, men, women and children, with circumstances of frightful atrocity. This servile war, called La Jacquerie, from Jacques Bon-homme, the nickname given in derision to the French peasantry, lasted during the years 1357 and 1358, until the Dauphin and other great lords, having collected their forces, fell upon the peasants and massacred them by thousands, without giving any quarter. In May, 1360, peace was concluded at Bretigny between France and England, Edward giving up his claims to Normandy and France, and assuming the title of sovereign Lord of Aquitaine, with the consent of the Dauphin, who promised to pay a large ransom for his father. Jean was then restored to liberty, but he found so great an opposition among his nobles to the fulfilment of the conditions of the treaty, and was perhaps also made so uncomfortable by the confusion and wretchedness which prevailed in France, that he resolved, to the great astonishment of his courtiers, to return to England, to confer with Edward upon what was to be done. On arriving in London he took up his old quarters in the Savoy, and was received in the most friendly manner by Edward. He soon after fell dangerously ill, and died in London, in April, 1364. He was succeeded in France by his son Charles V.

JEAN SANS PEUR. [Bourgogne.]

JEAN DE MONTFORT. [Bretagne.]

JEAN D'ANGELY, ST., a town in the west of France, capital of an arrondissement in the department of Charente Inférieure, in 45° 57′ N. lat. and 0° 31′ W. long.; 240 miles in a straight line south-west of Paris, or 288 miles by the road through Orléans, Tours, Poitiers and Niort.

This town is on the right bank of the Boutonne, an affluent of the Charente, which here becomes navigable. In the dark ages succeeding the downfal of the Western Empire, St. Jean d'Angély, called in the barbarous Latin of the time Angeriacum, was the residence of the Dukes of Aquitaine, who had a castle here. In the place of this castle, Pepin le Bref built a Benedictine monastery. In the religious wars of the sixteenth century, the town, then of considerable importance, was besieged by the Huguenots under Count La Rouchefoucauld, A.D. 1562; but though the majority of the inhabitants were of the Reformed faith, the siege was not successful. It fell however into the hands of the Huguenots some time after; and though retaken, A.D. 1570, by the Catholic army under the Duke of Anjou (afterwards Henri III.), came again into the hands of the Huguenots. In A.D. 1621 it was taken from them by Louis XIII., who demolished the walls, and deprived the townsmen of their municipal privileges.

This town appears to be declining. At the commencement of the present century the commune had 8000 inhabitants: in 1831 it had 6031 (of whom 5326 were in the town), and in 1836, 5915. The chief trade is in timber and brandy. There are a college, or high school, a seminary for the priesthood, an agricultural society, a theatre, and baths.

JEDBURGH. [Roxburghshire.]

JEDO, or JEDDO. [Japan.]

JEFFERSON, THOMAS. From the American Revolution of 1776 we may date the commencement of that struggle which has agitated and still agitates Europe and the two Americas. By whatever words the character of this struggle may be expressed,—whether under the name of popular rights against exclusive privileges, or self-government or the government of the people, against absolute government or the government of a few, or by any other terms more or less appropriate,—the contest is still going on, openly and actively in those called free governments, silently and languidly in those where the sovereign power is opposed to the extension or introduction of the new doctrines. The contest is between progress (not here considered whether as right or wrong) and standing still; between change, without which there cannot be improvement, and a desire to resist all change, which can hardly end in keeping things stationary, but almost necessarily leads to a backward movement. The contest is not only for the practical application of principles in government, which are vigorously maintained by the one party, and either not denied or faintly opposed by the arguments of the other; but also for the free expression and publication of all opinions on all subjects affecting the moral and political condition of society.

There is no individual, either in America or in Europe, who by his actions and opinions has had a greater influence on this contest than Thomas Jefferson. During a long and laborious life, both in official situations, which gave him opportunities that his activity never let slip, and in private life, in his extensive correspondence and intercourse with persons of all countries, he constantly, perseveringly, and honestly maintained what he conceived to be the principles of pure republican institutions. In the ardour of youth, his zeal and energy mainly contributed to animate his countrymen to declare their independence on a foreign power. In his maturer age, when a member of the General Administration, he struggled, and he struggled at one time almost alone, against a monarchical and aristocratical faction, to maintain the great principles of the Revolution, and develop the doctrines of a pure unmixed popular government. His influence gave to these doctrines a consistency, and a form, and a distinctness, which the mass of the nation could easily seize and retain. He thus became the head of a party in the United States, which, whether always rightly appealing to his doctrines or not for the vindication of their acts, still regards him as the father of their school and the expounder of their principles. By his plain and unaffected manners, and the freedom with which he expressed his opinions on all subjects, he gave a practical example of that republican simplicity which he cultivated, and of that free inquiry which he urged upon all. Such a man must always have many friends and many enemies. From his friends and admirers he has received, perhaps, not more praise than those who believe in the truth of his doctrines and the purity of his conduct are bound to bestow; by his enemies, both at home and abroad, he has been blackened by every term of abuse that bigotry, malice, and falsehood can invent.

Thomas Jefferson was born April 2, 1743, at Shadwell, now in the county of Albemarle, in Virginia. He was educated at the College of William and Mary, at Williamsburg, then the capital of the colony, where, under Dr. Small, a native of Scotland, who was professor of mathematics in the college, he studied mathematics, ethics, and other branches of knowledge. His education, owing to the care of this excellent instructor and his own industry, must have been of a superior kind. In addition to his general acquirements, he made himself well acquainted with the best Greek and Latin writers, and to the end of his long life retained his ability to read them. Mr. Jefferson studied law under Mr. Wythe, then a lawyer of eminence. He made his first appearance at the bar of the General Court in 1767, at the age of twenty-four, about two years after the misunderstanding between Great Britain and the Colonies had commenced. He practised for seven or eight years in the General Court, and was gradually rising to the first rank as an accurate and able lawyer, when he was called away to more important duties by the political events that preceded the American Revolution. In 1769 he was elected a member of the House of Burgesses for the county of Albemarle. In the session of this spring the House unanimously came to resolutions in opposition to those which had been lately passed in England by both houses of parliament on the affairs of Massachusetts. This measure, which was accompanied with the declaration that the right of laying taxes in Virginia was exclusively vested in its own legislature, and others of a like tendency, induced the governor, Lord Botetourt, abruptly to dissolve the Assembly. The next day the members met at the Raleigh Tavern, and entered into articles of agreement, by which they bound themselves not to import or purchase certain specified kinds of British merchandise, till the act of parliament for raising a revenue in America was repealed; and they recommended this agreement to be adopted by their constituents. Eighty-eight members signed the agreement, among whom were George Washington, Thomas Jefferson, and others, who afterwards took a distinguished part in public affairs.

In 1773, on the meeting of the Virginia Assembly in the spring, Mr. Jefferson was an active member in organizing the Standing Committee of Correspondence and Inquiry, the main objects of which were to procure early intelligence of the proceedings of the British parliament, and to maintain a constant communication among all the Colonies. On the dissolution of the Assembly, in May, 1774, by the governor, Lord Dunmore, eighty-nine members met at the Raleigh Tavern, and, among other things, recommended the Committee of Correspondence to communicate with the Committees in the other colonies 'on the expediency of appointing deputies for the several colonies of British America, to meet in General Congress, at such place annually as should be thought most convenient,' to consult on their common interests. It was also forthwith agreed that the members who might be elected under the writs at that time issuing in the colony of Virginia should meet in Convention at Williamsburg on the 1st of August following, in order to appoint delegates to the Congress, if such General Congress should be approved by the other colonies. The Convention did meet, and thus formed the first popular assembly in Virginia uncontrolled by governor or council. Mr. Jefferson, who was one of the deputies, prepared instructions for the delegates who might be sent to the Congress. Being prevented by illness from attending on this occasion, his instructions were laid on the table for perusal, and were generally approved, but thought too bold in the existing state of affairs. Still the Convention printed them, in the form of a pamphlet, under the title of 'A Summary View of the Rights of British America.' The Convention drew up another set of instructions, which, though not so strong as Mr. Jefferson's, expressed with great clearness the points at issue between the colonies and the mother-country, and the grievances of which the colonies had to complain. The General Congress, consisting of fifty-five members, met at Philadelphia, September 4, 1774. The disputes which had broken out between Lord Dunmore and the Assembly of Virginia were continually increased by fresh causes of mutual irritation; and the governor at last thought it prudent to remove himself and his family into a British ship of war which was lying at York in York River. His whole conduct during this period was feeble and contemptible. His last acts from his head-quarters at Norfolk were to annoy the inhabitants on the rivers and bays by a predatory kind of warfare, to proclaim martial law in the colony, and to give freedom to such of the slaves as would bear arms against their masters. At last, after setting fire to Norfolk, he was obliged to take refuge in his ships, and soon after to leave the country. Thus ended the colonial government in Virginia.

On the 21st June, 1775, Mr. Jefferson took his seat in the General Congress, as one of the delegates from Virginia, and was appointed one of a committee for preparing a declaration of the cause of taking up arms. A part of the address which he drew up was finally adopted, and no doubt greatly contributed to bring about the more decisive declaration of the following year. In 1776, Mr. Jefferson was again a delegate to Congress, and one of a committee appointed to draw up a declaration of independence. The committee was chosen in the usual way, by ballot, and as Mr. Jefferson had received the greatest number of votes, he was deputed by the other members to make the draught. Before it was shown to the committee, a few verbal alterations were made in it by Dr. Franklin and Mr. (afterwards President) Adams. After being curtailed about one-third, and receiving some slight alterations in the part retained, it was agreed to by the House, July 4, and signed by all the members present, except one. This instrument is too well known to require any remarks. It has both merits and defects; but it served the purpose for which it was intended, and its author had the satisfaction of seeing the mighty question between the mother-country and the colonies referred to the decision of the sword, the only alternative then left except unconditional submission.

Before their adjournment the Virginia Convention, July 5, had elected Mr. Jefferson a delegate to Congress for another year; but he declined the honour on various grounds, among which was his desire to assist in reforming the laws of Virginia, under the new constitution, which had just been adopted. Congress also marked their sense of his services by appointing him joint envoy to France, with Dr Franklin and Silas Deane; but domestic considerations induced him to decline this honour also.

From this time Mr. Jefferson's public life is interwoven with the history of his native State, and with that of the United States. During the war he took no part in military movements. He was governor of Virginia in part of 1779, 1780, and part of 1781, in which year the state suffered considerably from the incursions of Lord Cornwallis; and at the close of his period of office he narrowly escaped being taken prisoner by Colonel Tarleton in his own house at Monticello.

In May, 1784, Mr. Jefferson was appointed by Congress minister to France, where he remained five years, during which he was actively employed in promoting the general interests of his country, and in keeping up an extensive correspondence. His industry and methodical habits enabled him to devote a great deal of his time to the examination of everything that could in any way prove beneficial to his countrymen. His correspondence during this period shows the variety of his pursuits, his unwearied industry, and his unbounded zeal for every improvement that could benefit the social condition of man. His remarks on the political troubles of France, of which he witnessed the beginning, are characterized by his usual closeness of observation, and by his sanguine anticipations of the benefit that would result from the people being called to participate in the exercise of the sovereign power. After all that has been written on the subject, they will still be read with interest.

He returned to America at the close of 1789, and early in the next year he was appointed secretary of state by the president, General Washington. He held this office till the end of 1793, when he resigned. From 1793 to 1797 he lived in retirement. In 1797 he was elected vice-president of the United States; and in 1801 was chosen president in place of Mr. Adams, by the House of Representatives, on whom the election devolved in consequence of the equal division of the electors' votes between Mr. Jefferson and Colonel Burr. He was elected a second time, and after fulfilling his term of eight years retired to his favourite residence at Monticello, near the centre of the state of Virginia.

On Mr. Jefferson's retirement from the presidency of the United States he received, in the form of a farewell address, the thanks of the General Assembly of his native State, February 9th, 1809. After briefly recapitulating the leading measures of his administration, most of which faction itself must allow were eminently calculated to promote the happiness of the nation and secure those republican principles on which the constitution was founded, the General Assembly conclude with bearing testimony to his unvarying singleness of purpose, from the days of his youth, when he resisted the governor Dunmore, to his retirement from the highest honours which the united nation could bestow. This address, which, in point of style, is more free from objection than most American productions of the same class, is such as few men on retiring from power have received, and it was offered for services which few have performed.

In this document, among the advantages for which the nation was indebted to Mr. Jefferson's administration, the acquisition of Louisiana, and with it the free navigation of the Mississippi, are not forgotten. Mr. Jefferson early saw the importance of the United States possessing this great outlet for the commerce of the Western states, and strongly urged it while he was secretary of state under General Washington. The object was accomplished in 1803, when Louisiana was purchased from the French for 15,000,000 dollars.

Mr. Jefferson himself thought that the most important service which he ever rendered to his country was his opposition to the federal party during the presidency of Mr. Adams, while he was himself vice-president of the United States. Himself in the Senate and Mr. Gallatin in the House of Representatives had alone to sustain the brunt of the battle, and to keep the republican party together. The re-action that ensued drove Mr. Adams from his office, and placed Mr. Jefferson there. Mr. Jefferson's administration was characterized by a zealous and unwearied activity in the promotion of all those measures which he believed to be for the general welfare. He never allowed considerations of relationship or friendship to bias him in the selection of proper persons for offices; he always found, as he says, that there were better men for every place than any of his own connexions.

The last years of his life, though spent in retirement, were not wasted in inactivity. He continued his habits of early rising and constant occupation; he maintained a very extensive correspondence with all parts of the world; received at his table a great number of visitors, and was actively engaged in the foundation and direction of the University of Virginia, which was established by the state of Virginia near the village of Charlottesville, a few miles from Monticello.

No person but Mr. Jefferson could have had influence enough to induce the legislature of Virginia to grant the necessary funds for the endowment of this university. Though often baffled, he finally succeeded, by the help of his friends in that body, in obtaining ample grants for the buildings, library, and the salaries of the professors. He planned the buildings himself, and superintended their erection; drew up with his own hand a well digested and copious catalogue of books for a library, a large part of which were purchased in Europe and ready for use when the university opened in 1825; and he went so far as to prevail with the visitors of the institution to send an agent to Europe to select four of the professors. This last circumstance would show that Mr. Jefferson did not cherish such an unreasonable hostility to Great Britain as his enemies have charged him with.

The last letter in Mr. Jefferson's published correspondence, and it is probably the last that he wrote, is in reply to Mr. Weightman of Washington on behalf of the citizens of Washington, who had invited Mr. Jefferson to the celebration of the fiftieth anniversary of American independence. His health would not permit him to accept the invitation. His reply is characteristic. The zeal for republican institutions which had animated him during a long life still glows warm and fresh in the letter of a man of the age of fourscore and three, suffering under a painful malady. His firm conviction in the truth of those principles which he had maintained through life appears stronger as he approaches the termination of his career. He died July 4th, 1826, the day of the celebration, just half a century after that on which the Declaration of Independence was signed. Mr. Adams died on the same day. Mr. Jefferson is buried in the grounds near his own house. A simple inscription, which was found among his papers after his death, recording him as the author of the Declaration of American Independence, of the Statute of Virginia for Religious Freedom, and Father of the University of Virginia, is placed on his tomb. The fact of his having been president of the United States is not mentioned.

The latter days of Mr. Jefferson were embittered by pecuniary difficulties, which were owing in some measure to the neglect of his estates during his long absence on the public service; and in a great degree to an obligation which he incurred to pay a friend's debts (see an excellent letter to Mr. Madison, February 17th, 1826).

In the 4th vol. of his Memoirs, &c., p. 439, are printed his 'Thoughts on Lotteries,' which were written at the time when he was making his application to the legislature of Virginia for permission to sell his property by lottery, in order to pay his debts and make some provision for his family. The general arguments in defence of lotteries are characterized by Mr. Jefferson's usual felicity of expression and ingenuity, and they are also in like manner pervaded by the fallacies which are involved in many of his political and moral speculations. But this paper has merits which entitle it to particular attention. It contains a brief recapitulation of his services; and is in fact the epitome of the life of a man who for sixty years was actively and usefully employed for his country. 'I came,' he says, 'of age in 1764, and was soon put into the nomination of justices of the county in which I live, and at the first election following I became one of its representatives in the legislature; I was thence sent to the old Congress; then employed two years with Mr. Pendleton and Wythe on the revisal and reduction to a single code of the whole body of the British Statutes, the acts of our Assembly, and certain parts of the common law; then elected governor; next to the legislature, and to Congress again; sent to Europe as minister plenipotentiary; appointed secretary of state to the new government; elected vice-president and president; and lastly, a visitor and rector of the university of Virginia. In these different offices, with scarcely any interval between them, I have been in the public service now sixty-one years, and during the far greater part of that time in foreign countries or in other states.'

This is the outline of Mr. Jefferson's public life; to fill it up would be to write the history of the United States, from the troubles which preceded the Declaration of Independence to Mr. Jefferson's retirement from the presidency in 1809.

The paper from which we have already made one extract presents us with his services in another point of view, still more interesting. It is an epitome of those great measures which were due mainly or entirely to his firm resolution, unwearied industry, and singleness of mind, in his pursuit of objects which he believed essential to the stability and happiness of his country.

'If legislative services are worth mentioning, and the stamp of liberality and equality, which was necessary to be impressed on our laws in the first crisis of our birth as a nation, was of any value, they will find that the leading and most important laws of that day were prepared by myself, and carried chiefly by my efforts; supported, indeed by able and faithful coadjutors from the ranks of the House, very effective as seconds, but who would not have taken the field as leaders.

'The prohibition of the further importation of slaves was the first of these measures in time.

'This was followed by the abolition of entails, which broke up the hereditary and high-handed aristocracy, which, by accumulating immense masses of property in single lines of families, had divided our country into two distinct orders of nobles and plebeians.

'But further to complete the equality among our citizens, so essential to the maintenance of republican government, it was necessary to abolish the principle of primogeniture. I drew the law of descents, giving equal inheritance to sons and daughters, which made a part of the revised code.

'The attack on the establishment of a dominant religion was first made by myself. It could be carried at first only by a suspension of salaries for one year, by battling it again at the next session for another year, and so from year to year, until the public mind was ripened for the bill for establishing religious freedom, which I had prepared for the revised code also. This was at length established permanently, and by the efforts of Mr. Madison, being myself in Europe at the time that work was brought forward.

'To these particular services I think I might add the establishment of our university, as principally my work, acknowledging at the same time, as I do, the great assistance received from my able colleagues of the visitation. But my residence in the vicinity threw of course on me the chief burden of the enterprise, as well of the buildings as of the general organization and care of the whole. The effect of this institution on the future fame, fortune, and prosperity of our country can as yet be seen but at a distance. That institution is now qualified to raise its youth to an order of science unequalled in any other state; and this superiority will be the greater from the free range of mind encouraged there, and the restraint imposed at other seminaries by the shackles of a domineering hierarchy and a bigoted adhesion to antient habits.'

When Mr. Jefferson was a member of the colonial legislature, he made an effort for the emancipation of slaves; but all proposals of that kind, as well as for stopping the importation of slaves, were discouraged during the colonial government. The importation of slaves into Virginia, whether by sea or land, was stopped in 1778, in the third year of the Commonwealth, by a bill brought in by Mr. Jefferson, which passed without opposition, and, as Mr. Jefferson observes, 'stopped the increase of the evil by importation, leaving to future efforts its final eradication.'[*] The Act for the Abolition of Entails was not carried without some opposition, and that for the abolition of the Established Anglican Church was not finally carried till 1786, though before the Revolution the majority, or at least a large number, of the people had become dissenters from the church. The reason of the difficulty lay in the majority of the legislature being churchmen.

Mr. Jefferson married, in 1772, Martha Skelton, the widow of Bathurst Skelton. She died ten years after their marriage. One daughter, and a numerous family of grandchildren and great grandchildren, survived him.

He was the author of 'Notes on Virginia,' which have been several times printed; but his reputation as a writer rests on his official papers and correspondence, of which latter, we believe, that which is published forms only a part of what he left behind him. 'His letters,' as his biographer remarks, 'especially those of his latter years, are written with great elegance and felicity. They have all the ease of Addison, with far greater precision. His style is always natural, flowing, and perspicuous; rarely imaginative and never declamatory. It was occasionally marked by neologisms where he thought there were no apt words already in use. It was neither diffuse nor concise, but more inclined to the former.' 'As an author, he has left no memorial that is worthy of his genius; for the public papers drawn by him are admired rather for the patriotic spirit which dictated them than for the intellectual power which they exhibit. They presented no occasion for novelty of thought or argument or diction. His purpose was only to make a judicious and felicitous use of that which everybody knew and would assent to; and this object he has eminently fulfilled.' But one of his letters (Tucker's *Life of Jefferson*, ii., p. 384) is of itself enough to exalt him to the rank of a first-rate writer. In a few words, he has sketched the character of General Washington—with a fidelity which belongs only to intimate knowledge, with a sincerity and love of truth which ennoble himself no less than the subject of his eulogy, with a precision and a force unrivalled by any literary essay of this kind, and with that profound but well-tempered admiration and respect which are due to the memory of so wise, so good, and so great a man. Much has been said and conjectured as to the religious opinions of Mr. Jefferson, and his supposed infidelity has been the ground of much bitter attack on his character. In the latter part of his life he used to call himself a Unitarian, when questioned on the subject by any of his friends. Perhaps his published correspondence presents the best means of judging of his religious opinions. Though decidedly approving of the morality which the Gospel inculcates, it does not appear that he can be ranked among any particular class of believers. (Tucker's *Life of Jefferson*, 2 vols. London, 1837; Jefferson's *Memoirs, Correspondence*, &c., London, 1829; *Journal of Education*, No. VII., *On the University of Virginia*, by Professor Tucker. This notice is reprinted from the 'Gallery of Portraits,' with a few alterations and additions.)

JEFFERSONITE, a variety of Pyroxene. [PYROXENE.]

JEJU'NUM. [INTESTINES.]

JELLY. [FOOD.]

JENA, a town in the Grand-Duchy of Saxe-Weimar, is situated in a romantic valley, partly surrounded by steep naked mountains, at the conflux of the Leutra with the Saale, over which there is a stone bridge of nine arches: 50° 56′ N. lat., 11° 37′ E. long. It consists of the town, through which the Leutra flows, and of the suburbs. The ramparts and moats which formerly surrounded the town have nearly disappeared. Jena is the seat of the supreme court of appeal for the Saxon Duchies and the principality of Reuss, and of several learned societies. It is however chiefly celebrated for its university, which was founded at the suggestion of the Elector John Frederick, who passing through Jena in 1547, as a prisoner of the emperor Charles V. after the battle of Mühlberg, advised his three sons to make Jena the nurse of the sciences, and the preserver of the pure Protestant faith, instead of Wittenberg, of which he had been deprived. The advice was followed, and when the elector, having recovered his liberty, returned in 1552, a considerable number of students went out to meet him. It was not till after long negotiations that it obtained from the emperor Ferdinand I. all the rights and privileges of a university, and was solemnly opened as such on the 2nd of February, 1558. It has always been its chief boast that it has zealously endeavoured to take advantage of the new views which have been opened from time to time, especially in philosophy. This tendency is evident in the two literary journals, one established in 1785 by Schütz, and one in 1805 by Eichstädt. The celebration of the festival on the Wartburg, the foundation of the Burschenschaft, and the circumstance that Sand, the assassin of Kotzebue, had resided last at Jena, did much injury to the university. These matters have in time been looked upon in a less unfavourable light, and the prohibition to Prussian subjects to study at Jena, issued in 1819, was revoked in 1825. The princes of Saxe-Weimar have always encouraged the university, and in our times it has been much benefited by a reform of the statutes, both of the university and the several faculties, by new laws for the students, and a considerable addition to its funds. The salaries of the professors have been increased, and a philological, theological, and homiletic seminary founded. The university has a large library, and there are in connection with it a botanic garden, a veterinary school, a school of midwifery, an anatomical theatre, a clinical institution, a collection of physical and mathematical instruments, a cabinet of minerals, an observatory, &c. There are 18 regular and 15 extraordinary professors, and several private teachers, making in all above 50. The number of students in 1837 was 569. The population of the town, exclusive of the university, is 5792. Jena has acquired additional celebrity in our times from the disastrous battle fought in its vicinity on the 14th of October, 1806, between the Prussian army under the Duke of Brunswick, and the French under Napoleon, in which the former was totally defeated and the duke mortally wounded. The consequences of the battle were even more fatal to Prussia than the battle itself, and ended in the complete subjugation and humiliation of the kingdom. Jena and its environs suffered considerably, and what is now called the Eichenplatz was the site of 28 houses which were burnt on that occasion.

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[*] Act in Hening's 'Statutes at Large,' vol. ix., p. 471. Act declaring tenants of lands, or slaves in taille, to hold the same in fee simple. Hening, ix., p. 226.

JENESEI. [SIBERIA.]

JENISEISK. [SIBERIA.]

JENNER, EDWARD, M.D., was born in 1749, at Berkeley, in Gloucestershire, of which his father was vicar. He was educated at Cirencester, and apprenticed to Mr. Ludlow, a surgeon at Sudbury. At the conclusion of his apprenticeship he went to London, and became a pupil of John Hunter, with whom he resided for two years while studying medicine at St. George's Hospital, and with whom his philosophical habits of mind and his love of natural history procured him an intimate and lasting friendship. In 1773 he returned to his native village, and practised as a surgeon and apothecary till 1792, when he determined to confine himself to medicine, and obtained the degree of M.D. at St. Andrew's University.

But the history of Jenner's professional life is embodied in that of vaccination. While at Sudbury he was surprised one day at hearing a countrywoman say that she could not take the smallpox because she had had cowpox; and upon inquiry he learned that it was a popular notion in that district, that milkers who had been infected with a peculiar eruption which sometimes occurred on the udder of the cow were completely secure against the smallpox. The medical men of the district told him that the security which it gave was not perfect; they had long known the opinion, and it had been communicated to Sir George Baker, but he neglected it as a popular error. Jenner during his pupilage repeatedly mentioned the facts, which had from the first made a deep impression on him, to John Hunter, but even he disregarded them; and all to whom the subject was broached either slighted or ridiculed it. Jenner however still pursued it; he found, when in practice at Berkeley, that there were some persons to whom it was impossible to give smallpox by inoculation, and that all these had had cowpox; but that there were others who had had cowpox, and who yet received smallpox. This, after much labour, led him to the discovery that the cow was subject to a variety of eruptions, of which one only had the power of guarding from smallpox, and that this (which he called the true cowpox) could be effectually communicated to the milkers at only one period of its course.

It was about 1780 that the idea first struck him that it might be possible to propagate the cowpox, and with it the security from smallpox, first from the cow to the human body, and thence from one person to another. In 1788 he carried a drawing of the casual disease, as seen on the hands of milkers, to London, and showed it to Hunter, Cline, and others; but still none would either assist or encourage him; scepticism or ridicule met him everywhere, and it was not till 1796 that he made the decisive experiment. On the 14th of May (a day still commemorated by an annual festival at Berlin) a boy aged eight years was vaccinated with matter taken from the hands of a milkmaid; he passed through the disorder in a satisfactory manner, and was inoculated for smallpox on the 1st of July following without the least effect. Jenner then entered on an extensive series of experiments of the same kind, and in 1798 published his first memoir, 'An Enquiry into the Causes and Effects of the Variolæ Vaccinæ.' It excited the greatest interest, for the evidence in it seemed conclusive; yet the practice met with opposition as severe as it was unfair, and its success seemed uncertain till a year had passed, when upwards of seventy of the principal physicians and surgeons in London signed a declaration of their entire confidence in it. An attempt was then made to deprive Jenner of the merit of his discovery, but it signally failed, and scientific honours were bestowed upon him from all quarters. Nothing however could induce him to leave his native village, and all his correspondence shows that the purest benevolence, rather than ambition, had been the motive which actuated all his labours. 'Shall I,' he says in a letter to a friend, 'who, even in the morning of my life, sought the lowly and sequestered paths of life, the valley and not the mountain—shall I, now my evening is fast approaching, hold myself up as an object for fortune and for fame? My fortune, with what flows in from my profession, is amply sufficient to gratify my wishes.' Till the last day of his life, which terminated suddenly in 1823, he was occupied in the most anxious labours to diffuse the advantages of his discovery both at home and abroad; and he had the satisfaction of knowing that vaccination had even then shed its blessings over every civilized nation of the world, prolonging life, and preventing the ravages of the most terrible scourge to which the human race was subject.

Jenner's other works all evince the same patient and philosophical spirit which led him to his great discovery. The chief of them was a paper 'On the Natural History of the Cuckoo,' in which he first described that bird's habit of laying its eggs singly in the nests of smaller species, to whom it leaves the office of incubation and of rearing the young one, which, when a few days old, acquires the sole possession of the nest by the expulsion of its rightful occupants. Indeed he gained so much credit by this paper, that he was recommended not to send his account of vaccination to the same Society, lest it should injure the scientific reputation which he had already obtained.

The life of Jenner has been written by his friend Dr. Baron of Gloucester, in 2 vols. 8vo. Five medals have been struck in his honour, of which three were produced in Germany, and a statue is erected to him in his native county. But it is remarkable that the only public testimonials awarded by his country to the man whose unaided intellect and industry have added more years to the lives of men than the united labours of any century, were grants of 10,000*l.* and 20,000*l.*, which were voted to him by the House of Commons in 1802 and 1807.

JENYE. [HINDUSTAN, p. 216.]

JENYNS, SOAME, born 1704, died 1787, enjoyed a considerable reputation in his lifetime from the happy accident of uniting good birth and fortune with a creditable share of literary accomplishment and success. His family property was at Bottisham, near Cambridge; he was educated at St. John's College; elected M.P. for the county in 1741; for the borough of Dunwich in 1754; for the town of Cambridge in 1761, which last he represented until his withdrawal from public life. In 1755 he was made a lord of trade, and he held that office in spite of political changes until its abolition in 1780, being a steady supporter of all existing administrations. As a versifier he is elegant and sprightly; sometimes rather free: his poems, which consist of 'The Art of Dancing,' 1728, and 'Miscellanies,' 1770, have found admission into the 2nd and 3rd editions of Johnson's Poets. His prose works are:—1. 'A free Inquiry into the Nature and Origin of Evil,' 1756. This unsatisfactory attempt to solve one of the most difficult of moral problems was very ably and severely criticised by Dr. Johnson in the 'Literary Magazine,' and this rebuke Jenyns seems never to have forgiven. (See Boswell's *Life*, under the above year.) 2. 'View of the Internal Evidence of the Christian Religion,' 1776, for the divine origin of which he argues from its utter variance with the principles of human reason. This was a curious ground for a friend to take; and though the book obtained much praise, there were many also who regarded it as the work of a disguised enemy. This does not seem to have been the case; Jenyns, though once a sceptic, was in the latter part of his life a professed, and, as Boswell, who was no friend to him, believed, a sincere Christian. 3. Dissertations on various subjects, 1782. These are political and religious. His prose writings have obtained much praise for elegance of style, art, shrewdness of remark, and aptness of illustration; but his talent was better suited for the lighter and more showy parts of literature than for metaphysics and controversial theology. He published some pieces not here mentioned. His Works are collected in 4 vols. 8vo., 1790-3, with a Life, by Mr. Cole.

JER-FALCON, or GYR-FALCON, the English name of the *Falco Islandicus* of Latham, *Gerfaut* of the French, *Hebog chwyldro* of the Antient British. [FALCONIDÆ, vol. x., p. 182.]

JERBOA. [MURIDÆ.]

JEREMIAH (Heb. יִרְמְיָהוּ; LXX. 'Ιερεμίας), one of the prophets of Judah, the writer of the greater part of the book in the Hebrew canon which bears his name, and of the whole of the book, succeeding it in that canon, called 'The Lamentations.'

He was of the sacerdotal family, being the son of Hilkiah, a priest, whose residence was at Anathoth in the land of Benjamin, about three miles north of Jerusalem. This we learn from the general title to his book of Prophecies (chap. i., ver. 1), and that title sets distinctly before us the period through which he flourished. He was called to the prophetic office, being then in his youth, in the thirteenth year of King Josiah, which, according to the received chronology, was 629 years before the Christian æra commences. He continued in the prophetic office till the eleventh year of King Zedekiah, that is, till 588 B.C. Nearly all the prophecies collected in this book were delivered by him in those reigns, and in the intermediate reigns of Jehoahaz, Jehoiakim, and Jehoiachin, the unhappy family of Josiah. He consequently witnessed the death of Josiah, who was slain in battle by the king of Egypt, the deposition of Jehoahaz, and the two great invasions of the kingdom of Judah by Nebuchadnezzar, king of Babylon, who in the first carried away Jehoiachin and many of the people captive, and in the second carried away still more, with Zedekiah the king, whose eyes he caused to be put out when he had slain his sons and many of his nobles in his presence. Then it was that ensued the burning of the king's palace and of the temple which had been erected by Solomon, and of the whole city of Jerusalem, in that fatal fifth month and seventh day of the month which was long remembered in the calendar of Jewish calamities.

These things saw Jeremiah; and in the midst of all this scene of misery his voice was often raised, as one of the prophets of Jehovah, to deplore the calamities which fell upon his country, or with the voice of warning to call his countrymen to depart from the offences which had provoked those sufferings, and to turn themselves to God, both in outward observances and in inward purity and conformity of heart.

His contemporaries in the prophetic office were in the earlier periods Zephaniah and Habakkuk, and in the latter his æra approaches near to that of Ezekiel and Daniel.

The book entitled his Prophecies is a collection of such prophecies or exhortations as he delivered at various times, mingled with relations of historical events. The last chapter, the fifty-second, is wholly historical, and is supposed to have been written by some other person, not improbably Ezra, and to be intended as a kind of introduction to the book of Lamentations which follows it. But the most remarkable circumstance relating to the composition of the book is this, that the various prophecies are put together without any regard to the order of time in which they were delivered. At the beginning indeed we have the account of his call to the prophetic office, but as we proceed we soon find that we have prophecies delivered in the reign of Jehoiakim following others which were delivered many years after in the reign of Zedekiah.

However, this does not lead to any serious inconvenience or occasion any important difficulty, as we are generally informed in whose reign and at what time the several distinct prophecies were delivered. They are very easily distributed in the chronological order by any one who is desirous to do so, and thus to obtain a more distinct idea of the object of the prophet, and the relation of these compositions to the time at which he lived; and on this account we omit the chronological arrangement of the several prophecies, either as following Dr. Blayney, or the German critic Rosenmüller, or proposing any other of our own. Those who desire to read the Scriptures with understanding can have no more agreeable and profitable exercise than thus to refer the writings of the prophets to the period of Jewish history to which they belong, and to observe how suitable they are to the then state of the people of God, and to the character which the prophets sustained among them.

The tone in which Jeremiah addressed the people was frequently disapproved by the political authorities of the time. He appears to have been an ever-faithful witness to the Most High, and to have sought to support his honour as well in the good days of King Josiah as in the evil days of his degenerate sons. In the later reigns it was said that he dispirited the people, and that they were rendered by him less energetic in the resistance which they offered to the armies of Chaldæa. This led to his being placed under restraint and punished.

Hitherto our remarks have been confined to the first forty-two chapters and to the fifty-second, the last. But when we arrive at the forty-third chapter we find a new and very important circumstance in the life of Jeremiah. In neither the first nor the second captivity was Jeremiah carried away with his countrymen and king to Babylon: he still remained in Judæa, lamenting her fallen and desolate state, and exhorting and encouraging the remnant of the people to continue in the land till they should be forcibly expelled. This was distasteful to a powerful party, who thought they saw in Egypt a safe place of retreat from the power of the king of Babylon, and who finally led the people that remained into that country, carrying Jeremiah with them. They settled at a place called Taphanhes, which is probably the Daphnæ of the Greek geographers. The forty-fourth chapter is an exhortation which he delivered to his countrymen in Egypt. But in the forty-fifth chapter we are carried back to the times of King Jehoiakim; so little of order and regularity is there in the making up of this book. After this there follow various predictive discourses delivered by Jeremiah at various and uncertain periods concerning other nations, the Egyptians, Philistines, Moabites, Ammonites, Edomites, and others, ending with an awful denunciation against Babylon, in which the utter desolation of that great and flourishing city is predicted, and the return of the people from their long captivity. The prophecy of the utter abolition of Babylon, so that its site should become a place for the abode of wild beasts of the desert, is very remarkable.

The sacred books contain no later information concerning the prophet than that he was among those who went to Taphanhes. But some of the early Christian writers relate of him that he was stoned to death by his countrymen in Egypt for preaching against their idolatry.

Two very different accounts are given of the occasion on which he wrote the book of Lamentations. The old opinion, after Josephus, was that it was written on the death of King Josiah: but the later and more probable opinion is that it is a bewailing of the lost state of Judæa when it had suffered so dreadfully from the armies of Nebuchadnezzar. It is a very tender and pathetic poem, consisting of five portions, or, as they may be considered, distinct elegies. The structure is very artificial, the successive stanzas in each of the elegies beginning with the letters of the alphabet taken in order. Some of the Psalms are also in their structure of this form.

Some persons have imagined that they see in the style of Jeremiah proofs of original rusticity. There are not the dignity and splendour of Isaiah, but there are great beauties peculiar to this prophet, whose province appears rather to be the expression of grief and concern than of glowing indignation.

JERICHO. [Syria.]

JERICHO, ROSE OF, is the popular name of a plant called by botanists Anastatica Hierochuntica. It is a native of Palestine and other parts of the East, and, when alive, is a small inconspicuous annual, with branches regularly spreading round the centre. When it dies, these branches curl up so as to form a sort of ball, and, the root decaying, are blown about in the dry weather which succeeds their short-lived growing season. If at that time they are placed in a wet situation, their hygrometrical properties cause them to unfold, and to assume something the appearance of a rose, a simple phenomenon to which the people of the East have attached the fable that the plant first blossomed at the moment when our Saviour was born, and that now, if put into water when labour commences, it will indicate by its expansion the progress of parturition, and will finally expand when the child is born. The Jews call it Kaf Maryam, or St. Mary's Flower.

JEROME, SAINT, one of the Fathers of the Church, and accounted the most learned of all the Latin Fathers. He was well acquainted with both the Greek and Hebrew languages.

His æra was from A.D. 340, about which time he was born, to A.D. 420, in which year he died. He was a native of Pannonia, but came early to Rome, where he studied under the grammarian Donatus. When he had received baptism in token of his professing the Christian faith, he entered upon a long course of travel. He visited Gaul, where he remained some time, and afterwards travelled in Thrace, Pontus, Bithynia, Galatia, and Cappadocia. When he was about thirty he began to be noted for his theological knowledge. In a retirement which he had chosen for himself in Syria he was disturbed on a suspicion of the want of perfect soundness in the faith. This determined him to go to Jerusalem, and there apply himself to the study of the Hebrew language as the best means of enabling him to understand the Scriptures rightly, not only of the Old, but also of the New Testament. In A.D. 382 he returned to Rome, having spent some time at Constantinople on his way, where at that time lived St. Gregory of Nazianzus, a celebrated preacher. At Rome he became secretary to Pope Damasus. There appear to be circumstances in the life of Jerome at this period which are not cleared up. It is however certain that Sericius, the successor of Damasus, had not the same esteem for him which Damasus had, and that Jerome left Rome and returned to the neighbourhood of Jerusalem. There he took up his abode in a monastery at Bethlehem.

In this retirement he employed himself in writing on the questions which then divided the opinions of Christians, and here it is believed he died, at the age of eighty years.

Many of the writings of Jerome are come down to us. Several of them are merely controversial; but there are others of a more sterling and lasting value. These are, his treatise on the Lives and Writings of the elder Christian Fathers, and his Commentaries on the Prophetical Books of the Old Testament, on the Gospel of St. Matthew, and several of St. Paul's Epistles. But what may be regarded as his greatest work is a translation of the books of both the Old and New Testament into Latin, which translation has been always highly valued in the Latin Church, and which is that known in the Church by the name of the Vulgate. It is a question amongst the learned how far, and whether at all, he embodied an older Italic version in his translation. If it was the first effort at bringing the Scriptures within the reach of the great multitude who knew no other language but the Latin, it was a great and noble work, which ought to place its author high amongst the benefactors of mankind. Bishop Warburton says of Jerome, that 'he is the only father that can be called a critic on the sacred writings, or who followed a just or reasonable method of criticising.' A treatise of his was one of the first books printed in England. The best edition of his works is that of Vallarsius, in 10 folio volumes, printed at Verona, 1734—40.

JEROME OF PRAGUE. [Huss.]

JERSEY, an island in the English Channel, about 18 miles south-east of Guernsey, measuring in a straight line between the nearest points of the two islands; between 49° 9′ and 49° 16′ N. lat., and 1° 58′ and 2° 14′ W. long. Its form approximates to a quadrangle, having its sides facing the four cardinal points. Its greatest length from east to west is about 12 miles; its greatest breadth from north to south about 7 miles. Of its area we have no account: the population in 1831 was 36,582.

The surface of the island has a gradual slope from north to south. On the north side the coast is abrupt, rising to the height commonly of 100, sometimes of 200 feet, and broken by a succession of small bays and coves, one of which, Bouley or Boulay bay, has been several times surveyed, in order to the formation of a naval station, for which its easy access and good anchorage seemed to offer considerable facilities. A pier on a limited scale has been erected here by the States of Jersey. On the east side of the island are two bays, St. Catherine on the north-east, where the coast is abrupt; and Grouville on the south-east, with a low shelving beach. On the west side is the wide shallow bay of St. Ouen, with a shelving sandy beach, skirted in nearly all its extent by ledges of rocks. On the south side of the island the character of the coast is less uniform: at the bottom of the deep bays of St. Aubin and St. Brelade it is low and shelving, with a broad belt of sand nearly a mile wide in St. Aubin's bay, and dry at lowwater. The headlands at the south-west point of the island, and between the before-mentioned bays, are lofty and abrupt; between St. Aubin's bay and the south-east point of the island the coast is low, but skirted by extensive ridges of rocks. St. Aubin's bay, on which stand the towns of St. Helier and St. Aubin, is the most frequented; but most of the bays afford anchorage.

Groups of rocks surround the island at various distances from it; there are also many banks and shoals.

The surface of the island is everywhere undulating. The valleys generally run from north to south; they are narrow at the north end, where the high ground forms an almost unbroken hill, and grow wider as they approach the southern coast, where they expand into several flats of good pasture land. A few valleys open to the eastern and western sides of the island. The principal water-courses flow from north to south; they are more considerable than from the size of the island would be supposed, and serve to give motion to several mills. The valleys watered by these streams are 'as rife in beauty as wood, pasturage, orchard, a tinkling stream, and glimpses of the sea can make them.' (Inglis's *Channel Islands.*)

The high land in the northern part of the island consists for the most part of granitic rocks; the southern part of a mass of schistose rocks incumbent upon them. The high rocks which stretch away to sea all round Jersey seem to be of granitic formation. The rocks along the northern coast consist for the most part of sienite; they present perpendicular faces to the sea, and are everywhere intersected by perpendicular veins running north and south, which have formed many remarkable caverns where they have been exposed to the action of the sea. The sienite is quarried on the northern coast; part of the stone is used on the island, part is exported to Guernsey and England, and, in time of peace, to France. No metallic traces, except of iron, have been observed in Jersey; the schistose rocks have not afforded any slates for economical purposes; nor does the island yield any lime. Jersey was until of late years ill provided with roads, for the old roads, though numerous, are narrow and inconvenient. The new roads, which are also numerous, are wide and well constructed, and traverse the island in many directions.

The climate of Jersey, from its insular situation, is milder than that of other places under the same latitude, and the mean annual temperature is higher than that of any part of England. Snow and continued frost are rare, but there is much rain, and the dews are very heavy. High winds are prevalent and violent; gales frequently blow, especially from the west; a perfectly calm day even in summer is rare. The predominant diseases are rheumatism, chiefly chronic, liver complaints, indigestion, dropsy, hypochondriasis, and remittent, typhoid, and intermittent fevers. Rheumatism, the most prevalent disease, is ascribed to the humidity of the atmosphere.

The state of agriculture in Jersey is backward, which is partly owing to the minute subdivision of property, arising from the custom of gavelkind. Rents are about 4*l.* 10*s.* per English acre for the average of good land, and above 5*l.* for the best. The expenses of the farmer are however light, and the productiveness of the soil great. Wheat is the principal grain crop; barley is grown, and some oats; parsnips are extensively grown and used for fattening hogs and bullocks. Potatoes for exportation are widely and increasingly cultivated. Lucerne is one of the most valued crops. A considerable portion of the land is laid out in orchards: the apples are converted into cider, which constitutes the most important produce of the island; then follow potatoes, lucerne, and wheat. The principal manure is vraic or sea-weed, either fresh, or after it has been burnt for fuel; fresh vraic is preferred for grass land, vraic ashes for other crops. Fallows are seldom seen. The wheat harvest commences about the beginning of August. The common English fruits are raised in Jersey, and the melon and the grape grow in the open air.

The cow is an object of great attention in Jersey. The breed is one variety of that known in England as the Alderney, but is considered to be deteriorating. Jersey butter is in high esteem; and great quantities, fresh and salt, are exported. A few sheep are kept only by the poorer classes who have right of common. Little attention is paid to horses: the breed was crossed with the Cossack horses during the stay of some Russian troops in the island in the year 1800. Of game there are the hare and the rabbit, and the red-legged partridge. Toads are numerous, as well as snakes and lizards. The fish caught in the island are similar to those of Guernsey. [Guernsey.]

Jersey is divided into twelve parishes. The parishes are subdivided into 'vintaines' ('scores'), supposed to be so called from having originally contained twenty houses. Of these vintaines there are from two to six in each parish, and in all fifty-two.

There are three towns in the island, St. Helier and St. Aubin [Aubin, St.], both on the Bay of St. Aubin, and Gorey, on the east coast. St. Helier is toward the south-east point of the bay, and fronts the sea. In external appearance it is much on a level with English country towns of the same size; except that the ramparts of Fort Regent, overtopping the buildings, give to the place the appearance of a continental town. The houses in the more central parts of the town are chiefly inhabited by the shopkeepers; those in the outskirts, extending to the foot and up the slopes of the surrounding heights, are tenanted by the more opulent merchants, and by the numerous English residents, of whom there are computed to be 3000 in the island, many of them half-pay officers and their families. Some of the new streets in the outskirts are regular and well built, and have open spaces and ornamented garden ground in front of them. The principal public buildings are, the old church, two of the chapels, the theatre, and the gaol; of these, only one of the chapels, built in the Gothic style, and the portico of the theatre, have any claim to architectural design. The market is almost unequalled in the season for its display of garden produce. The Royal Square is an open space, flagged with smooth stones, surrounded by the principal book-shops, newspaper offices, reading-rooms, the court-house, and one of the principal hotels. There are two fortresses: Elizabeth Castle on a rock in the bay opposite the town, which would be insulated at high water but for a narrow causeway formed by the confluence of the tides between the castle and the shore; and Fort Regent, a strong fortification, commanding the town, of considerable strength, but inadequate accommodation. The harbour is formed by two piers jutting out into the bay at the south end of the town.

Gorey is in Grouville parish, and on Grouville Bay. It is built partly close to the sea and partly on the height which rises toward Mont Orgueil Castle. The importance of Gorey depends on its oyster fishery, in which upwards of two hundred and fifty boats, half of them belonging to the island, and as many as fifteen hundred sailors, are employed, besides a thousand persons, chiefly women and boys, who are engaged in matters connected with the fishery. The larger oysters are sent to St. Helier for sale, the smaller are sold and transported to the English oyster-beds. The produce of this fishery is supposed to bring to the island 20,000*l.* or 30,000*l.* per annum. In the neighbourhood of Gorey is Mont Orgueil Castle, once the principal fortress of the island, on a headland between St. Catherine's and Grouville bays. Its commanding situation on a rocky headland jutting into the sea, and commanding a fine land and sea view, and its massive walls, in many parts yet entire and mantled with ivy to their very summits, render it a picturesque and striking object. It was the place of confinement of Prynne, and the residence of Charles II. during part of his exile.

The other places in the island are mere hamlets, grouped round the churches of the several parishes or scattered along the coast. Scattered over the island are the antient manor-houses, and there are several modern villas, especially near the towns. Every house and cottage, not in a street, has its garden. Myrtles, hydrangias, and various other plants which in England commonly require shelter, grow luxuriantly in the open air.

The churches are of various dates, but all of considerable antiquity; their situation is in general well chosen, but they present no particular architectural beauties.

Much of what has been said of the state of society and the constitution of the local government in Guernsey [GUERNSEY] will apply to Jersey. The spirit of independence is very generally diffused; industry, the love of gain, and a frugality degenerating into penuriousness, are characteristics of the island character. The common diet among the farmers and country people is 'soupe à choux,' or 'soupe à la graisse,' made by boiling together cabbage, lard, and potatoes; sometimes, but rarely, a little meat is added, and parsnips or turnips are substituted for potatoes. Cider is the common drink. This meagre diet has probably contributed to a deterioration of the inhabitants both in stature and appearance.

The states of Jersey consist of the governor and the bailly of the royal court, both appointed by the crown; the twelve judges of the royal court (the court of judicature for the island in civil and criminal cases), elected to office for life by the suffrage of the rate-payers; the rectors of the parishes, appointed to their livings by the governor; and the twelve constables elected every three years, one for each parish, by the inhabitants. The officers of the crown have seats, and can speak, but not vote. Local politics engross the greatest attention, party spirit rages furiously, and has a very unfavourable effect on the constitution of the royal court, the judges of which are appointed by popular suffrage, and generally after a vehement party struggle.

The dean of Jersey, who is appointed by the crown and is always rector of one of the twelve parishes, is at the head of the church of the island, and holds a spiritual court, from which there is an appeal to the see of Winchester. The livings are all small (the great tithes going to the crown), and there are no pluralities.

There are two antient chartered schools, with inadequate endowments; one of them, that of St. Anastase, has no scholars, and the other, that of St. Manelier, is in a languishing state. There are however a National School at St. Helier, some parish schools with slender endowments, and several private seminaries and Sunday schools. Elementary instruction is very generally diffused, and there is scarcely a child in the island who is not at school. There is an island 'hospital' or poorhouse, but without any general medical or educational departments, and every way inferior to that of Guernsey. [GUERNSEY.] There are several newspapers, some in French and others in English; they are for the most part devoted to party interests, and much seasoned with personalities.

The trade of Jersey, owing to the privileges possessed by the islanders, is very considerable. The agricultural produce of the island, potatoes, apples, cider, butter, cows, and other live stock, are sent to England; the articles required for the consumption of the island being in a considerable degree supplied from France. Foreign wheat is made into biscuit, and foreign leather into boots and shoes, and exported to the British colonies as 'Jersey manufacture;' and vessels, which are admitted to register as British, are built with foreign materials. The shipping belonging to the island has an aggregate tonnage of 21,000, beside 300 large boats.

The general history of the Channel Islands has been noticed elsewhere. [GUERNSEY.] Jersey, the Cæsarea of the Romans, is said to have been originally called Augia. In the reign of Edward III. this island was attacked by Du Guesclin, constable of France, but the arrival of succours from England prevented him from succeeding. In the war of the Roses it was attacked by a Norman baron, Pierre de Breze, avowedly for the Lancastrian party, but really for the French king. After holding part of the island for a time, he was forced to surrender. Henry VII., while earl of Richmond and an exile, and Charles II., while an exile, both before and after his father's death, found refuge in Jersey, which was held for Charles by the valour and constancy of Sir George Carteret until taken by the Parliamentarians under Admiral Blake and General Haines.

During the first American war, Jersey was thrice attacked. The first time (May, 1779) was by an armament with a land force of 5000 or 6000 men, under the prince of Nassau; but the attempts to land were repulsed. In the second attack the French fleet was attacked and destroyed by Sir James Wallace. The third attack was in December, 1780, when the Baron de Rullecourt landed with 700 men, took possession of St. Helier, and made the lieutenant-governor, Major Corbet, prisoner, and induced him to sign a capitulation. The British troops and island militia, under Major Pierson, next in command, refused to recognise the capitulation; and attacking the French, killed Rullecourt, with the greater part of his men, and obliged the rest to surrender. Major Pierson fell in the beginning of the attack.

JERSEY, NEW, one of the republics of the United States of America, extends from 38° 55′ to 41° 21′ N. lat., and from 74° to 75° 45′ W. long. Its length from south to north is 170 miles, and its mean breadth 46 miles. Its surface is estimated at 7870 square miles, which exceeds that of Wales by 400 square miles. Delaware river and bay divide it on the west from the states of Pennsylvania and Delaware, and the Hudson river on the east for a short distance from New York. An imaginary line, 45 miles long, forms its northern boundary towards New York. On the east and south it is washed by the Atlantic and Delaware Bay.

About one half of its surface, including all the country south of a line drawn from Bordentown on the Delaware river to Shrewsbury on the eastern coast, is so level that it is difficult to distinguish the watershed between the streams which fall into the ocean from those which empty themselves into Delaware Bay. All this tract is covered with a sea-sand alluvium, and parts of it are completely barren. The western shores along Delaware bay are covered with salt-marshes, which produce a coarse hay. Along its eastern shores there is a series of long, narrow, and low islands, similar to those along the coast of the two Carolinas; but the inlets by which those islands are divided are deeper and more spacious, and vessels of moderate draught can enter the ports of Great Eggharbour, Little Eggharbour, Barnegat, Tomsbay, and Shark Inlet. North of the line drawn from Bordentown to Shrewsbury the country is hilly, but the hills are of moderate elevation, and the wide valleys between them have a good loamy soil. At the eastern extremity of this tract, and immediately on the sea-shore, are the Neversink hills, which, though only 281 feet above the sea-level, are the highest eminences on the Atlantic shores from Florida Cape (25° 50′ N. lat.) to this point (40° 25′). The hilly tract covers somewhat more than one-fourth of the surface of New Jersey. The most northern portion is divided between a marshy and a mountainous tract: the former lies along the banks of the river Hudson, and extends about 10 miles from them on an average; it is of moderate fertility. The mountainous tract occupies the remainder, and contains two ridges, which traverse the north-western corner of the state in a direction south-west and north-east. The southern chain is called the Blue Ridge, and the northern the Kittatinny Mountains; in the latter is Shooley's Mountain, 1100 feet above the sea. These ridges are mostly covered with forest trees, and the country between them has a good soil.

The large rivers of this state are those which constitute its boundary, the Hudson [New York] and the Delaware [Delaware]. A canal has been cut between these two large rivers, called the Morris canal, which traverses the northern districts of the state. It leaves the Delaware at Philipburgh, opposite Easton, and runs in the valley between the Blue Ridge and the Kittatinny Mountains north-east; it is then carried through a depression of the first-mentioned ridge, and along the Passaik river eastward and southward to Newark; it then crosses that river and passes through the marshes to Jersey city, opposite New York, where it joins the Hudson. Its length is somewhat more than 100 miles. Among the minor rivers the Rariton is the largest. It traverses the hilly district and falls into Amboy Bay, which is a good harbour for vessels of middling size. The Rariton is navigable for 16 miles from its mouth. Newark Bay also receives the Hackensack and the Passaik, of which the former is navigable for 16, and the latter for about 10 miles from its mouth. The Maurice river, which empties itself into Delaware Bay not far from Cape May, the southern extremity of the state, is said to be navigable for vessels of 100 tons to a distance of 20 miles from its embouchure.

The difference in climate between the southern and northern districts is very great, and depends mainly on the difference of elevation. The level sandy plains of the southern districts approximate to the temperature of Eastern Virginia, and admit the cultivation of cotton, while the mountainous northern districts experience early and severe winters, and in this respect resemble Vermont and New Hampshire. The vegetable productions are seldom injured by drought or excess of rain.

Wheat, rye, Indian corn, oats, barley, buck-wheat, flax, and potatoes are the common crops; buck-wheat is in very general cultivation. The cotton grown in the southern district is consumed for the domestic manufactures. Apples, pears, peaches, plums, and cherries are the common fruit-trees, and they succeed exceedingly well. The Jersey cider is noted for its superior quality. In the mountainous parts and salt-marshes near the sea-coast great numbers of cattle are raised. Sheep are also kept in great numbers. The sea abounds in fish, and the inhabitants of the coast derive a great portion of their subsistence from the fisheries. The forests are composed of oak, hickery, chesnut, poplar, ash, &c. The larger wild animals have nearly disappeared, and only the racoon and the red and grey fox abound. Iron abounds in the mountainous and hilly district, and bog iron is found in the marshes along the sea. There is also copper, and, in the primitive rocks of the mountainous districts, gold, silver, and galena.

The inhabitants amounted in 1830 to 320,823. The state is divided into 14 counties and 120 townships. The principal occupation of the inhabitants is agriculture; but the surplus population has lately turned to manufacturing industry, and in some branches a considerable progress has been made, though the distress of late years has caused a depression. Besides numerous iron-works, several glass-houses, tanneries, gunpowder-mills, and cotton manufactures are established, mostly in the hilly country, which is the most populous.

Trenton, on the Delaware, the capital and the seat of government, is a small place, with about 4000 inhabitants, and some cotton manufactures. The largest towns are in the hilly district, where New Brunswick, on the river Rariton, at the head of tide-water, contains 8000 inhabitants, and has some commerce, and a college; and Newark, on the Passaik river, with about 10,000 inhabitants, carries on a considerable trade with New York, and has manufactures of carriages, shoes, and saddles. Patterson, on the Passaik, which forms near the town a cataract 70 feet high, is the principal manufacturing town of the state, and contains near 8000 inhabitants. The principal articles made here are iron and brass wire, and cotton-cloth. Perth Amboy, situated where the Rariton falls into Amboy Bay, has a harbour, but only 1000 inhabitants. It is the oldest settlement in the state. South Amboy, on the opposite side of the bay, has a population of near 4000. The towns of Shrewsbury and Freehold, both on the eastern shores, have some commerce, and each of them about 5000 inhabitants. At Princeton, between Trenton and New Brunswick, there is a college, called Nassau Hall, one of the oldest establishments in the United States, and also a theological seminary.

That none of the maritime towns of this state have risen to importance is easily accounted for by the vicinity of New York and Philadelphia, to which the produce of the country is sent. This produce consists of live cattle, fruit, iron, butter and cheese, hams, flax-seed, cider (of which that of Newark is the best), lumber, and some manufactures, especially leather, glass, cotton-cloth, and iron-ware.

Besides the canal already described, the Delaware and Rariton canal, which is 38 miles long, runs from near Trenton to New Brunswick. The Camden and Amboy railroad, which is 61 miles long, forms a line of communication between Pennsylvania and New York, passing by South Amboy. The Patterson and Hudson River railroad, which is 14 miles long, connects Patterson with Jersey city.

New Jersey was first settled by the Dutch in 1612, in those places contiguous to the Hudson river. The Swedes established themselves here in 1628, but their settlements soon fell into the possession of the Dutch, who were supplanted by the English in 1664. New Jersey was then a part of New York, from which it was definitively separated in 1736. It declared itself early against England in the revolutionary struggle, and published its present constitution on 2nd July, 1776, two days before the declaration of independence by the Continental Congress. The legislature consists of a legislative council of 14 members, and of a general assembly of 50 members. The judges hold office for a fixed number of years. New Jersey sends two members to the senate at Washington, and six to the house of representatives. (Darby's *View of the United States*, and Warden's *Account of the United States*.)

JERUSALEM, the chief city of Palestine, in Syria, situated in 31° 47′ N. lat. (according to Niebuhr), 35° 19′ E. long.; 38 miles east from the nearest point (near Ashdod) towards the Mediterranean, and 27 miles west from where the river Jordan enters the Dead Sea.

The name is written יְרוּשָׁלַםִ by the early Hebrew writers, and יְרוּשָׁלַיִם by the later; and signifies *the abode*, or (according to another derivation) *the people of peace*. At present the city is known throughout Western Asia by the Arabic name of *El-kuds*, which signifies 'holiness.' By the Greek and Latin writers it is called Hierosólyma. (Strabo, p. 760; Tacitus, *Hist.* v.)

As the capital city of the Hebrews, and the chief seat of their worship, as well as from its connection with the early history of Christianity, Jerusalem has always been held in great veneration by both Jews and Christians; and, from the same causes, even the Mahommedans regard it with interest and respect. Hence the numerous pilgrimages and travels which have in all ages been made to the holy city, and hence the various contests of the middle ages, between the European Christians and the Moslems, for its possession.

The situation of Jerusalem is rather singular, and offers many advantages, particularly in a military point of view, which were probably considered more than adequate to compensate its disadvantages as the seat of a metropolitan city, for which many think that Samaria offers a preferable situation. But whatever were its advantages or disadvantages, the metropolitan character was fixed to it beyond all possibility of alteration by the foundation there of the only temple for the formal worship of God which the whole country contained.

The site of Jerusalem may be described, with some latitude, as an elevated piece of ground within a basin of enclosing hills. The separation between this spot and the outward borders of its enclosure is well marked by ravines and valleys, except towards the north, where the natural separation of the site from the surrounding country is less noticed. The enclosed platform extends about 1800 yards from north to south, and (in the widest part) 1100 from east to west: it has a general slope from west to east, so that the town is fully displayed, like a panorama, to those who view it from the east. The surface of the platform is uneven, and ends, southward, in the elevated termination so often mentioned in Scripture by the name of Mount Zion. This part is excluded from the modern city, and the ascent to it from the town is not very considerable, although it rises high above the deep external ravine which it overlooks. The other eminences of the platform, such as Mount Moriah (on which the Temple stood), and Mount Acra, are now scarcely distinguishable as elevations, probably from the gradual filling up of the interjacent valleys. Except at Mount Zion the general level of the site is below that of the immediately surrounding country; yet considering that it is not very distant from the sea, its positive elevation above the sea-level is considerable. Of the valleys which surround the city, that to the east, through which lies the course of the torrent Kedron, is usually called the Valley of Jehoshaphat, and abounds in antient and modern sepulchres. Beyond it rises a group of hills, of which the Mount of Olives is the principal, if indeed that denomination does not include them all. The southern valley is narrower, with more abrupt cliffs, and is indeed a rocky ravine, appearing to have been antiently quarried to supply stone for the buildings of the town. Beyond this valley rises a broad and barren hill; while the western valley, which has received the Scriptural names of the Valley of Gihon and of Rephaim, is bounded by a rocky flat, which rises to the north, terminating in a considerable elevation; to this the name of Mount Gihon has been given.

As the interest of the spot arises solely from its antient history, and no remains exist of the buildings which that history mentions as belonging to the period which it embraces, we have been thus particular in noticing the natural characteristics of the place, since they are unchanged, and are often alluded to in the sacred writings and in the histories of the many sieges which Jerusalem has sustained. Some substructions, and the sepulchral excavations in the cliffs around Jerusalem, seem to be all the remains of antient Jewish works which can now be recognised, unless we be disposed to add the sculptured monuments in the valley of Jehoshaphat, which pass under the names of the tombs of Absalom and Zachariah.

In the style of building and arrangement of streets, there is little to distinguish Jerusalem from other walled and stone-built Turkish towns of the same rank. The attention of pilgrims and travellers is chiefly engaged by the sacred places concerning which numberless volumes have been written. There is scarcely any incident mentioned in Scripture, as connected with Jerusalem and its neighbourhood, of which the site is not very distinctly pointed out; but in most instances the authority of such indications cannot but be considered as extremely uncertain. Very ample accounts of all these spots may be found in the works of Cotovicus, Roger, Morison, Surius, Rochetta, and others. In our own language Maundrell supplies a very excellent account, to which the principal additions have been made by Clarke, Buckingham, and Richardson. But the most valuable and trustworthy authority for the dimensions and plan of Jerusalem is the recently published volume of Niebuhr's 'Travels,' Hamburg, 1837.

The Moslems have appropriated the site of Solomon's temple to their own worship. The renowned Sakkara, built by the Khalif Omar, is an octangular structure surmounted by a dome, and stands upon an elevated platform paved with polished marble. This is in the midst of a grand quadrangle (1489 feet by 995), which contains at its southern extremity another mosque, that of El Aksa, which was originally the church by which the Christians distinguished the site of the Jewish Temple. The entire locality is fully described by Dr. Richardson, who obtained the singular privilege of admission to the interior. But to the thousands of Christian pilgrims who yearly visit Jerusalem the great object of interest is the church which contains the alleged sepulchre of Christ, to redeem which from infidel hands was at first the real, and always the ostensible, object of the Crusades. This church was one of the numerous foundations of the empress Helena. As a whole this extensive structure takes a prolonged oblong figure, with irregular extensions in particular parts for the sake of comprehending the various spots connected with the death and burial of Christ; for this church is not only supposed to contain the sepulchre, but the scene of the Crucifixion. The probability of these identifications has however, on very sufficient grounds, been much questioned by some recent travellers. A great part of this church was destroyed by fire about thirty years ago, and has since been restored on the former place, but with inferior materials. The other public buildings of Jerusalem are not of much importance, and do not require particular notice.

Jerusalem, as a whole, is still a respectable looking town; it is of an irregular shape, approaching nearest to that of a square, and is surmounted by a high embattled wall, built of the common stone of the country—a compact limestone. It has seven gates, and is about two miles and a half in circumference. The population of the city has been so variously estimated as to show that it has only been conjectured. Some accounts rate it at 20,000, or even higher; but, from a comparison of estimates and circumstances, we should suppose the Rev. W. Jowett nearest the truth when he states, 'I should think that 15,000 was too high; and should not be very unwilling to rate it at 12,000. In this calculation of course the pilgrims are omitted, who are crowded into the convents, and fill up many spaces which are vacant nine months in the year, augmenting the population by some few thousands.' He supposes that about one-third of the whole are Jews, and that the Moslems are something more than one-third, and the Christians something less.

The history of Abraham mentions that 'Melchizedek, king of Salem,' came forth to meet him when he returned from the slaughter of the kings; and it has generally been supposed that this 'Salem' was the original of the city to which the names of Jebus and Jerusalem were afterwards given. It is more certain, that, when the Israelites entered Canaan, they found the place in the occupation of the Jebusites, a tribe descended from Jebus, a son of Canaan, whose name the city then bore. The lower city was taken and burnt by the children of Judah (*Jud.*, i. 8) after the death of Joshua; but the Jebusites had so strongly fortified themselves in the upper city, on Mount Zion, that they maintained themselves in possession of it till the time of David. That monarch, after his seven years' rule over Judah in Hebron, became king of all Israel, on which he expelled the Jebusites from Mount Zion and made Jerusalem the metropolis of his kingdom. From that time forward there is no city the history of which is more closely connected with that of the people to whom it belonged, and of the country of which it was the capital. For this reason, as well as because of the disproportionate extent which would be given to this article, we do not here notice the numerous details which its particular history embraces. The history of Jerusalem has been given in outline as a part of various works; but we know no complete and separate history besides the 'History von Jerusalem' (down to 1481) of Sebastian Brant (1518). Of the Temple there is a large but not very instructive Arabian history, lately translated into English by Mr. Reynold, under the auspices of the Oriental Translation Society. The Travels of Niebuhr, before referred to, contain a ground-plan of the present city.

JERVIS, JOHN, Earl of St. Vincent, and Admiral of the Fleet, was born at Meaford in Staffordshire, January 9, 1734, o.s.; entered the navy at ten years old; was posted into the Gosport, 40 guns, in 1760; and appointed to the Foudroyant, 80, in 1774. In this ship, which was distinguished for her discipline and effective state, he fought in Keppel's action in 1778; captured the Pégase, French 74, in 1782, for which he received the order of the Bath; and in October of the same year sailed with Lord Howe to the relief of Gibraltar. He was promoted to the rank of rear-admiral, September 24, 1787; and sat in parliament for various boroughs from 1782 until the breaking out of the French Revolutionary war, when he sailed in command of a squadron to reduce the West India Islands, and captured Martinique, Guadaloupe, and St. Lucia. At the end of 1794 sickness drove him home. He was promoted to be Admiral of the Blue, June 1, 1795, and in the autumn took command of the Mediterranean fleet, with which he performed the great exploit of his life, by intercepting and defeating the Spanish fleet off Cape St. Vincent, in February 14, 1797. The disproportion of force was greater, it is said, than any modern officer had ventured to seek an encounter with, the Spaniards having nearly double our number of ships, and more than double the number of guns and weight of metal. However, Jervis, repeating Rodney's method of breaking the line, gained a complete victory, and captured four sail of the line. In this celebrated engagement the services of Nelson were pre-eminent. The actual loss sustained by the enemy was of less importance than the lustre cast on the British arms by a victory achieved against such odds. Thanks, couched in the most flattering terms, were voted by both houses of parliament; and Sir J. Jervis was raised to the peerage by the title of Earl of St. Vincent and Baron Jervis of Meaford, and received a pension of 3000*l.* Shortly after, his presence of mind and moral courage were severely tried by the breaking out of a branch of the Channel mutiny in his fleet; which however was speedily suppressed by his judicious and decisive severity. Having suffered for some time from ill health, he returned home in 1799; but in April, 1800, took command for a short time of the Channel fleet, on the resignation of Lord Bridport. He was made first Lord of the Admiralty in February, 1801, on the formation of the Addington ministry; and having through life had a sincere dislike of peculation and jobbing, at once set vigorously to cut down extravagant expenditure and to reform abuses. This of course made him very unpopular; and he was accused of rashness, and of crippling the resources of the country by a false economy. Charges of this sort were then very sure to be made against those who exerted themselves to reform old and lucrative abuses. Mr. Pitt partook of the dissatisfaction, and at his return to office, in May, 1804, placed Viscount Melville at the head of the Admiralty. Earl St. Vincent again took command of the Channel fleet in 1806, in Fox's administration, but held it only for a year. His last appearance in parliament appears to have been in 1810, in the debate upon the king's speech, when he spoke strongly in censure of the conduct of the war by ministers. He was appointed Admiral of the Fleet on the day of George IV.th's corronation, July 19, 1821, and died March 15, 1823, in the 90th year of his age. Having no children, the earldom became extinct: but the title of Viscount, by special grant, descended to his nephew Mr. Ricketts. A public monument was erected in honour of him in St. Paul's cathedral.

Earl St. Vincent's professional characteristics were courage, coolness, and decision, amounting almost to sternness of character: these, united with great skill and indefatigable activity, rendered him an admirable officer. He was very independent; and the disposal of his patronage, in which he paid great and unusual consideration to the claims of deserving officers, did him honour.

JESUITS, SOCI'ETAS JESU, is the name of a celebrated religious order which was formed towards the middle of the sixteenth century. Ignatius or Iñigo Loyola was a Biscayan officer of noble birth, in the Spanish army at the beginning of the reign of Charles V. Being severely wounded in the defence of Pamplona, then besieged by the French and the Navarrese, he underwent a long and tedious confinement previous to his recovery. Loyola was a man of enthusiastic mind; he had been fond of the world, and devoted to gallantry and pleasure; but now, in his forced retirement, he was struck with the precariousness and futility of those pursuits, and he resolved to devote himself to a life of piety and religious labour, for the purpose of reclaiming the minds of his fellow-creatures from vanity and sin. Musing on this subject, he conceived the plan of establishing a religious order, which should be entirely devoted to the four following objects: 1. The education of youth. 2. Preaching, and otherwise instructing grown-up people. 3. Defending the Catholic faith against heretics and unbelievers. 4. Propagating Christianity among the Heathens and other infidels by means of missionaries. Ignatius, having begun to promulgate his views, and to attract attention by preaching against the loose morality of the times, fell under the suspicions of the Inquisition, and was imprisoned, but afterwards released. He then undertook several pilgrimages, and at last repaired to Paris, where he studied and took holy orders. It was at Paris in 1534 that he and six of his friends and fellow-students entered into a solemn compact to promote Loyola's object, the foundation of a new religious order. These first companions and fellow-labourers were Francis Xavier, Lainez, Salmeron, Bobadilla, Rodriguez, and Le Fevre. They were afterwards joined by three more: Lejay, Codur, and Brouet. Ignatius with his friends repaired to Rome in 1537, where he laid before Pope Paul III. an outline of the institutions and regulations of his intended order. Loyola had been a military man, and he based his rules upon the principle of a strict subordination, carried through several gradations, terminating with the præpositus generalis, or general superior, who was to have absolute sway over the whole Society, and from whose decisions there was to be no appeal. The general was to be subject to the pope only. Most of the old monastic orders had a considerable share of democracy in their institutions: they assembled in chapters and elected their local superiors, and decided upon other questions concerning their community by a majority of votes, and although they had also their respective generals residing at Rome, yet their authority over the distant convents of the various provinces was very limited. Their chapters occurred frequently, and their generals and provincials were mostly changed every three years. All this gave them something of a popular character: they had their canvassings for elections, their personal ambition, and intrigues. But Loyola's projected order was strictly monarchical, and therefore adapted to be a more effective support to the Roman see, at a time when support was most wanted in consequence of the spreading of the Reformation. Besides this, the wealthier of the monastic orders, such as the Benedictines, employed their leisure in scientific and speculative studies, living retired and knowing little of political affairs; and the mendicant orders, or friars, had degenerated from their first zeal, and had become obnoxious by the sale of indulgences, and despised for their corruption, ignorance and vulgarity. The prelates of the court of Rome, such as Bembo and Leo X. himself, spoke with open scorn of the friars, and called them hypocrites. Another advantage of the proposed constitution for the Jesuits was, that they were not bound to keep canonical hours in the choir like other monks, and therefore had more uninterrupted leisure for study or business.

Pope Paul III., after deliberating with his cardinals, some of whom were not favorable to Loyola's plan, approved of it, and it was decided that the new order should be called the Society of Jesus, that the members should wear no monkish garb, but dress in black, like the secular priests, and should in fact differ essentially from the monastic orders then existing. The bull of the pope authorizing the new Society was issued in 1540, and in it, by a remarkable privilege, the general of the Jesuits was authorized to issue such regulations as he judged fit, and to alter the existing ones according to time, place, and circumstances. The original 'Constitutiones' of Ignatius were written in Spanish, but afterwards translated into Latin. The first edition of them appeared at Rome, 'Constitutiones Societatis Jesu,' 1558, after the death of the founder, who expired on the 31st July, 1556. He left also a mystical treatise called 'Exercitia Spiritualia.' At his death the Society was already established in Italy, Spain, Portugal, and Germany, and had above one hundred schools, besides numerous missionaries in the East and in Africa and America. Ignatius was succeeded as general of the Society by James Lainez, a man of more extensive information and greater elasticity of character than his predecessor. It is to Lainez that the principal share in framing the 'Constitutiones' is attributed, and that work bears the impress of a master mind. Cardinal Richelieu said that it was a model of administrative policy. The Constitutiones are divided into ten parts, subdivided into chapters. Part i., 'De admissione ad probationem,' concerns the mode of admission of applicants for the noviciate; the qualifications required in the applicant, such as health, no grievous deformity or mutilation, or other physical imperfection; certificates of good conduct and temper, natural abilities, and fourteen years of age complete. Birth, wealth, and other accidental circumstances are to be considered as null where the physical and mental qualifications fail; but should they be united with these in the same individual, they render him more acceptable. Then comes a list of absolute impediments to admission, such as having committed murder, apostacy, and other grievous offences, having been subjected to a degrading sentence, having belonged to some monastic order, being married, and lastly, labouring under insanity or decided weakness of intellect. Defects of temper, obstinacy, injudicious enthusiasm or visionary devotion, being involved in debt and other civil ties, are not absolute impediments, but the consideration of them is left to the discretion of the general or of any of his subordinates, to whom he may give the power of admitting probationary pupils. The candidate, if approved of, is admitted to a first probation, as a sort of guest for a few weeks in one of the houses of the Society, in order that he may become acquainted with the mode of living. He afterwards assumes the dress of the order, and is examined by proper examiners upon the numerous points contained in the printed form, *Primum ac Generale Examen iis omnibus qui in Societatem Jesu admitti petunt proponendum*, Rome, 1558. Should the examination prove satisfactory, the applicant is shown the constitutions and regulations of the Society; and after confessing himself and receiving the sacrament, he signs a declaration that he will observe the rules and discipline thereof, and he is then admitted into one of the houses of second probation, or noviciate. Part ii., 'Quæ ad eos dimittendos pertinet, qui ad probationem admissi fuerunt et parum apti ad Societatem inveniuntur.' Those who during their noviciate are found, after mature experience, not to be fit subjects for the Society, on account of mental or bodily defects or vices, are to be dismissed privately, without scandal or exposure, and with kind advice and exhortations. Those who leave of their own accord are not to be sought after, unless they have qualities which make it desirable for the Society to retain them. Part iii., 'De iis conservandis et promovendis qui in probatione manent.' This part treats of the mental and moral discipline to which novices are subject; docility and obedience are to be inculcated, pride and obstinacy to be conquered: it treats also of the physical education, cleanliness, wholesome diet, proper exercise, &c. The term of probation lasts generally two years. Part iv., 'De iis qui in Societate retinentur instruendis in literis.' This part treats of the colleges and schools. The colleges have revenues derived from donations or bequests of benevolent persons; those colleges which can support twelve scholars besides teachers are not to collect alms or receive other eleemosynary offerings. After two years' probation, those who intend to enter the Society are received as scholastici in one of the colleges, and take the vows of chastity, poverty, and obedience. The courses are humanities and rhetoric, logic, natural and moral philosophy, metaphysics, and theology (both scholastic, and positive or dogmatic) and the study of the Scriptures. Besides the colleges or seminaries for the Society, there are classes and schools for lay or external pupils. Every college is under the direction of a rector, appointed by the general or by the respective provincials, and chosen from the class of coadjutors, and removable at pleasure. The Christian doctrine or Catechism is to be read and explained by the rector. Subsequent regulations were published at various times concerning the mode of instruction in the 'Ratio Studiorum' of Acquaviva, and the 'Methodus Docendi et Discendi a P. Juvencio in usum Magistrorum Societatis Jesu,' which was approved of by the 14th general congregation of the Society. Another chapter treats of the universities which belong, or may belong, to the Society; of the faculties of arts, philosophy, and theology; of the examinations and degrees, &c. The Society did not concern itself with the faculties of law and medicine. Part v., 'De iis quæ ad admittendum in corpus Societatis pertinent,' treats of the admission of scholars into the body of the Society, either as professi or coadjutors. The professi must have studied theology for four years, and be past twenty-five years of age. The formula of the profession is given. The vows taken on making profession before the reverend father-general, 'locum dei tenenti,' or any other superior appointed by him, are perpetual chastity, poverty, obedience, and a peculiar care of the education of youth; besides which the professi promise an especial obedience to the sovereign pontiff with respect to any missions which he may send them to. This last promise, or vow, is not made by the coadjutors. Part vi., 'De iis qui admissi et in corpus Societatis cooptati sunt, quod ad ipsorum personas attinet,' gives regulations for the manner of living in the professed houses, which, unlike the colleges, cannot have any property or settled income, but the inmate must live upon the alms given by the faithful. The coadjutors who are not employed in the colleges as rectors or teachers must live in the professed houses of charity, like the professi. The professi and the coadjutors must renounce all claims to hereditary succession, nor can the Society succeed to any of their claims. But there were also lay or secular coadjutors, who took the simple vows, yet continued to enjoy their property, and lived in the world at large. Part viii., 'De iis quæ pertinent ad admissos in corpus Societatis, ad proximorum utilitatem, in vineam Domini distribuendos,' treats of the various kinds of missionaries, those sent by order of the Pope, and those sent by the general of the society, and gives them directions, &c. Part viii., 'De iis quæ conferunt ad eorum qui dispersi sunt cum suo capite, et inter se, mutuam unionem,' recommends frequent reports and correspondence between the rectors and provincials and the general, and between the missionaries and other detached fathers with their respective provincials or other superior, &c. Every member of the Society is to report to his immediate superior any misconduct which he observes in any of his companions. The general receives monthly reports from the provincials, and quarterly ones from the superiors of professed houses, the rectors of colleges, &c. These reports contain notes on the disposition, capacities, and conduct of the individual members, besides news and occurrences which may affect or interest the body of the Society or any part of it. The second chapter of this part treats of the general congregations or representative assemblies of the Society; and it begins by saying, that owing to the regular and constant intercourse and correspondence kept up between the general and the local superiors, the trouble and confusion attending such general assemblies can be in great measure avoided, and they can only be necessary either for the purpose of electing a new general or for deliberating on some very weighty matter concerning the Society, such as the dissolution or transfer of its houses and colleges, &c. In the first case each province deputes its provincial and two more professed members, who are chosen by a provincial congregation, convoked for this special purpose, which provincial congregation consists of all the professi of the province who can conveniently attend, and those coadjutors who are rectors of colleges. In the second case, for purposes of deliberation, the father provincial appoints two of his subordinates, and the general may add some others, making not more than five deputies altogether, for each province. Part ix., 'De iis quæ ad caput Societatis et gubernationem ab eo descendentem pertinent,' concerns the qualifications, powers, and duties of the Præpositus Generalis. The general is for life, resides at Rome, is attended by a monitor and five assistants. From his orders there is no appeal: all are obliged to obey him unhesitatingly; he may expel members, or remove them wherever he pleases, inflict punishments, issue regulations, or alter the existing ones. His power is in fact absolute. Part x., 'De modo quo conservari et augeri totum corpus Societatis in suo bono statu possit,' contains advice to all and each of the various classes and members, recommending strict discipline, obedience, zealous teaching and preaching; not to seek after dignities or honours, and even to refuse them unless obliged by the Pope; strict morality, moderation in bodily and mental labour, brotherly charity, &c.

Lainez, being sent by the pope as his legate to the Council of Trent, was one of the chief advocates of the papal supremacy, and maintained, among other things, against the opinion of the archbishop of Granada and other Spanish prelates, that the jurisdiction of the bishops and their authority over any particular diocese is entirely derived from the pope, who is the fountain-head of all ecclesiastical authority, and that he can give it or suspend it, or transfer it when he sees fit. Lainez repaired also to the Conference of Poissy, in 1561, where he had to face Beza, and other Calvinist theologians, but his arguments, mixed with coarse vituperations against his antagonists, according to the polemics of the age, produced little effect. About the same time the Society, by the influence of the Cardinal de Lorraine, and after several years' struggle against the university of Paris and the Bishop du Belley, obtained letters patent from Francis II. to open colleges and schools in France. The Jesuits taught gratis, and the university, whose courses of lectures were paid for, was jealous of them, and attacked them repeatedly before the Parliament as an institution contrary to the laws and dangerous to the state. But this being the time of the great religious and civil war in France, the belief, says De Thou, that the Jesuits were born to conquer and destroy Protestantism, made the Parliament and the French prelates wink at their introduction into the kingdom, at least until further deliberation. William Duprat, bishop of Clermont, son of the Chancellor Duprat, gave them a house in Paris which they made into a college, called the College of Clermont, and he bequeathed them also 36,000 écus in his will.

During the war of the League the Jesuits, like the other monastic orders, with the Sorbonne, and the Parliament of Paris, showed themselves opposed to the claims of Henri IV. as being a heretic. Even after the abjuration of that prince a fanatic of low birth, called Barrière, conspired to murder him, but was discovered, and it was found that a Capuchin, a Carmelite monk, a curate, and a Jesuit rector of the college at Paris were cognizant of and accessory to the conspiracy. Soon after another fanatic, Jean Chatel, attempted his life, and actually wounded Henri. This young man had studied under the Jesuits, but it was never proved that they had instigated him to the deed. It is true that among the papers of a Jesuit called Guignard some satirical and abusive expressions against the king were found, which seemed to imply an approbation of the crime. Chatel was broken on the wheel, and Guignard was hanged; and the Parliament of Paris, already instigated against the Jesuits by the university, decreed their banishment in 1594, which sentence however did not extend to the jurisdictions of the parliaments of Bordeaux and Toulouse. But at the end of 1603 Henri IV., at the pressing request of the pope, recalled the Jesuits, saying to the president, De Harlay, who remonstrated against this measure, that 'the Jesuits ought no longer to be charged with the crimes of the League, which were the error of the times; and as every state thought them useful in the education of youth, he should not shut the door against them, especially as he would not appear to mistrust his own born subjects.' On the 2nd of January, 1604, the parliament of Paris registered the king's letters patent for the restoration of the Jesuits. From that time they remained in France, where they greatly extended the number of their colleges and pupils, though always seen with a jealous eye by many, till their final expulsion in 1764. Their disputes with the Jansenists, which were carried on with great bitterness on both sides, are mentioned in the articles Arnauld and Jansenists.

The Jesuits found their way into England under Elizabeth, in whose reign several of them were implicated in conspiracies against the queen, for which they were executed. It ought to be noticed however, that De Thou, who is no friend to the Society, states that the conspirator Parry, who is said to have been encouraged in his attempt by a Venetian Jesuit, met at Paris the Jesuit Vatz, who earnestly dissuaded him from his purpose, quoting the opinions of other learned men of the Society, who declared that no reason, political or religious, could justify an attempt against the life of a sovereign, however heretical. This and other similar instances prove that in so numerous a body as that of the Jesuits' society men of various tempers and opinions must be found, some of whom, through a strained casuistry or fanatical zeal, arrived at totally different conclusions from those of the more sober and more honest part of their community.

In the reign of James I. the Jesuit Garnet was tried for having participated in the Gunpowder Plot; and after exhibiting throughout his examination a great aptitude for equivocation, he was condemned and executed. A full investigation of this curious trial is given in vol. ii. of the 'Criminal Trials,' published by the Society for the Diffusion of Useful Knowledge.

The missions of the Jesuits form an important part of the history of their Society. The first attempts by Xavier were premature. He had more zeal than information, and the accounts of his numerous conversions ought to be received with caution. The arms of the Portuguese effected more conversions by force in India than Xavier's persuasion, who himself confesses that he could not understand nor be understood by the natives, though he could baptize them. In Japan, where he went unprotected by a Portuguese force, he failed; but he served as a pioneer to prepare the way for others better qualified for the task, and the Jesuits formed in time numerous Christian congregations in Japan. The history of the Japanese Christians, and their extermination in 1637, is found in Bartoli, *Historia della Compagnia di Gesu*, 'Il Giappone, seconda parte dell' Asia;' and it forms a narrative of considerable interest, written apparently with great simplicity. The author does not disguise the faults committed by the Christians, which contributed to their ruin.

In China the Jesuits were likewise successful, and their establishment there has been more durable. Bartoli, in another part of the same work, 'La Cina, terza parte dell' Asia,' gives an account of their settlement in that empire, and of their progress; and further information is found in the 'Lettres Edifiantes et Curieuses.' [Halde, Du.] Between the years 1581 and 1681, one hundred and twenty-six European Jesuits were employed in the missions of China, many of them men of information, to whom Europe is indebted for the first authentic information respecting the internal condition of that vast empire. The generals of the Society chose men acquainted with mathematical and mechanical sciences, which they knew were in request at Pekin, and thus they obtained a footing and an influence at the emperor's court which no other Europeans have ever acquired. Although persecutions burst out against the Christians of China, yet the Jesuits never entirely lost their hold there, and their house at Pekin has continued to exist till our own times. [Amiot, le Pere.]

From India Jesuit missionaries found their way into Abyssinia, where Portuguese travellers had penetrated many years before [Alvarez], but the Jesuits went farther into the country, especially in its southern parts, than any other Europeans, either before or after them. Paez and Lobo visited the sources of the Bahr el Azrek, or Abyssinian Nile, and Father Fernandez proceeded as far as Narea, about 8° N. lat. [Tellez.]

In Paraguay the Jesuits had an open field for the display of their abilities and principles. Their missionaries went to South America after the country had been devastated by the Spanish conquerors, who hunted the Indians like wild beasts. The Jesuits judged that the poor natives might be converted by milder means, and be made Christians and happy at the same time. They obtained from the court of Spain a declaration that all their Indian proselytes should be considered free men, and that the Jesuits should have the government of the communities of converts which they should form in the interior of the country. And the Jesuits did form a flourishing community of Indian converts on the banks of the Paraguay and the Parana, who are said to have amounted to between one and two hundred thousand, and they governed them for a century and a half in peace and happiness, keeping them in the condition of docile but contented pupils, directing their labours, and instructing them in the useful arts, but not in the refinements or luxuries of Europe. There were no taxes or law-suits in Paraguay; each able-bodied man had a moderate task to perform, and the produce of their common labour provided for the wants of all. Writers of very different opinions, Raynal, Montesquieu, Robertson, Muratori, Southey, and others, have done justice to the paternal administration of the Jesuits in Paraguay.

Other accounts of that remarkable colony are found in numerous works, in the 'Letters from Paraguay,' in the various histories of the 'Jesuits' Missions,' &c. And it is a remarkable instance of political injustice, that the very benefits which the Jesuits were imparting to mankind in South America should have been made the cause or pretext for their ruin. In 1750, Spain, by a treaty with Portugal, thought proper to give up seven districts of Paraguay to the latter power, in exchange for a territory which the Portuguese had occupied on the left bank of the river La Plata, and the Spanish government ordered the Jesuits and their Indian pupils to abandon their homes and remove to some other part of the Spanish territories. The fathers in vain remonstrated against the injustice and cruelty of expelling men from the fields which they had by their labour reclaimed from the wilderness; the harsh mandate was repeated, and the Jesuits were prepared to obey. But the natives refused to submit, and resisted the Portuguese and Spanish forces which were sent against them, and although a subsequent change in the diplomatic relations of the two countries left the Indians in possession of their country, yet the Jesuits were falsely accused of having encouraged what was styled the rebellion. The Spanish government, after mature investigation, acquitted them, but the Portuguese minister Pombal, a harsh and unprincipled man, believed or affected to believe in the rebellious spirit of the fathers, whom he wished to expel from Portugal, because he was jealous of their influence, and had found them repeatedly in the way of his plans and schemes at home. An attempt by some noblemen to murder the king, Joseph of Portugal, was charged upon the Jesuits, because Father Malagrida, one of the Society, was the confessor of some of the guilty.

As proof however could not be obtained against him, Father Malagrida was accused of heresy, on account of some ascetic visionary works which he had published, was condemned by the Inquisition, and executed; and in September, 1759, the minister, in the king's name, gave an order for the expulsion of the Society from the Portuguese territories and for the confiscation of their property. The order was executed with the greatest inhumanity both in Portugal and Brazil, the fathers being shipped off with indecent hurry, like so many cattle, on board ships bound for Italy, where they were landed in a state of utter destitution.

France followed next in the same course of proscription. The Jesuits had made themselves many enemies in that country by their long and bitter persecution of the Jansenists, and their controversies with that sect had brought much obloquy upon their institutions and moral principles. [JANSENISM.] Pascal, in his 'Lettres Provinciales,' had assailed them with ridicule, which has always proved most powerful in France. The parliament of Paris felt an old and hereditary hostility towards them: the minister Choiseul disliked them on personal and political grounds; he had felt and ascertained that their secret influence could often thwart and balance the credit of any minister; besides which, Choiseul was partial in a certain degree to some of the free-thinking philosophers of his time, who had no sympathy for the Society. To crown all, even the king's mistress, Madame de Pompadour, arrayed herself against the Jesuits. That intriguing woman wished to remain at court under some more decorous name than that of concubine to Louis XV. She solicited the appointment of lady of honour to the queen, and in order to strengthen her application she chose for her confessor Father De Sacy, a Jesuit who had a reputation for exemplary conduct. She pretended that she had dropped all intercourse with the king, and that she was really penitent. De Sacy however did not allow of any equivocation: he told the lady that if her penitence were sincere, she must quit the court altogether, as La Vallière had done under Louis XIV. The result may be easily guessed. Madame de Pompadour left the too rigid Jesuit, remained at court, and from that moment became a declared enemy to the order. Thus the strict morality of a member of that Society, which has been often charged with being too lax and accommodating, contributed to its ruin. A pretence soon occurred for effecting it. Father Lavalette, who was at the head of the missions in the French West Indies, had been speculating in colonial produce. His cargoes were seized by the English, then at war with France. Father Lavalette became a bankrupt for 3,000,000 livres. His creditors in France appealed to the parliament of Paris, which, having seen in the constitutions of the Society that no individual belonging to it could possess property on his own account, considered Father Lavalette's debt as that of the whole body, and condemned the Society to pay the creditors. An immense outcry was raised against the Jesuits, and the parliament in 1762 declared that an independent body like the Society, having peculiar laws, and being all subject to one individual residing at Rome, was an institution dangerous and unfit for any well regulated state; the other parliaments made similar declarations, and the partisans of the Jansenists, the philosophers, the courtiers, and the minister, all echoed the denunciation. At last, in 1764, by an order of the king, the Society was entirely suppressed in France, and their property was confiscated; but a small pension was given to the members, who were allowed to remain dispersed in the country, on condition of swearing to renounce the Society and its institutions.

Their fall in Spain took place three years later. Choiseul is said to have contributed to it by persuading the honest but credulous Charles III. that an insurrection which broke out at Madrid in 1766 against the minister of the day was the work of the Jesuits. D'Aranda, the president of the council of Castile, already prepossessed against the Society, was the confidant of King Charles in affecting their expulsion. The Society was feared, perhaps more than there was need, and everything was planned against them with the greatest secrecy. The king with his own hand wrote letters to all the governors of provinces throughout the Spanish monarchy in Europe and in the colonies, which were not to be opened until a specified day and in a specified place. When the appointed time came, the 31st of March, 1767, the colleges and houses of the Jesuits throughout Spain were surrounded at midnight by troops, sentinels were posted at every door, the bells were secured, and king's commissioners having roused and assembled the respective communities in the refectory, read to them aloud the royal decree which expelled them from Spain. The members, having taken their breviaries, some linen, and a few other conveniences, were placed in carriages and escorted by cavalry to the coast, where they embarked for Italy. After being refused admittance in several harbours, and kept for some months on board crowded ships, during which many of the aged and infirm died, the survivors were at last landed in Corsica.

Similar measures were executed in Spanish America, only with circumstances of still greater harshness. In Paraguay the Indians were amazed and distracted at the news, and would have opposed by force the execution of the decree, but here the fathers gave a noble example of fortitude and resignation, which was an answer to all former charges brought against their Society. These men, represented as so ambitious, so worldly, so intriguing, so refractory towards the civil power—these men, who in Paraguay at least possessed an unbounded influence over their flocks, exerted all that influence to appease the enraged Indians, and to induce them to submit quietly to the royal decree. No more than 9000 dollars, about 2000*l.* sterling, were found in their coffers.

By a compromise between the pope and the king of Spain, the latter allowed a pension of a shilling a day to the expelled fathers; but on condition that no apology of any sort should be written by any member of the order, under pain of all losing their pensions.

In the following year, 1768, the king of the two Sicilies and the duke of Parma suppressed the Jesuits' Society in their dominions. It still continued in the Sardinian and the Papal states; but in February, 1769, their supporter Clement XIII. died, and Ganganelli was elected in his stead. France, Spain, Portugal, Naples, all insisted, in very strong terms, on the final suppression of the Society by the new pope. Ganganelli proceeded with caution; he took three years to consider the matter. He appointed a congregation of five cardinals to examine the charges brought against the Society. At last, on the 21st of July, 1773, the pope issued a bull, in which, after descanting on the laudable object of the founders of the Society, and on the services it had rendered to religion, he observed that on many occasions a spirit of discord had broken out between them and the other ecclesiastical authorities, that many serious charges had been brought forward against individual members, who seemed to have deviated from the original spirit of their institutions, that, lastly, most Catholic princes had found it necessary for the peace of their dominions to expel the Jesuits therefrom, and that now, for the peace of the Christian world, and being moved by the most weighty considerations, and considering that the Society of Jesus could no longer bring forth those fruits of piety and edification for which it was intended, he declared the said Society to be suppressed and extinct, its statutes annulled, and its members who had been ordained priests to be considered as secular priests, and the rest to be entirely released from their vows. He allowed those professed members who were old and infirm, to remain in the houses of the extinct Society, but merely as guests, without interfering in their future management, which was entrusted to commissioners.

In consequence of this bull, the Jesuits were likewise suppressed in the Sardinian monarchy, in the Austrian dominions, and in every Catholic state. Two powers only, Prussia and Russia, one Protestant and the other Greek schismatic, allowed the fathers an asylum in their dominions, and continued to entrust them with the education of their Catholic subjects.

At the time of the first expulsion of the Jesuits from Portugal, in 1759, the Society reckoned altogether 22,589 members, half of whom were priests. They had 24 professed houses, 669 colleges, 176 seminaries, or boarding-houses, 61 noviciate houses, 335 residences, and 273 missions. Their principal professed house, in which the general resided, was a vast building attached to the splendid church of the Gesù at Rome. They had besides the Roman college and church of St. Ignatius in the same capital, several other colleges and seminaries for boarders of various nations, a noviciate house on the Quirinal, a seminary and college at Frascati, a house at Tivoli, and numerous other colleges and schools in the Papal states. All these, after the suppression of the Society, were entrusted to secular priests and professors, but still the method and the discipline of the Society were in most instances continued, being found too useful to be abrogated.

The general of the Society, Father Ricci, was confined in the castle of St. Angelo, being suspected of still assuming in secret his former authority over the dispersed Jesuits, and also, but apparently without foundation, of having concealed sums belonging to the Society. Nothing however having transpired against him, he was treated with some courtesy and attention, but was kept in confinement till his death, in November, 1775. On his death-bed, before receiving the sacrament, he signed a solemn though mild protest on behalf of the extinct Society, the conduct of which, he said, to the best of his knowledge, had not afforded grounds for its suppression, nor had he himself given any reason for his imprisonment: he ended by forgiving sincerely all those who had contributed to both. His remains were buried with all due honour in the church of the Gesù, among those of his predecessors.

After the Society had been suppressed for about 30 years, several attempts were made at the beginning of the present century to re-establish it. Many persons in high stations, frightened at the convulsions which agitated the world, imagined that had the Jesuits continued they might have proved a powerful means for maintaining order and preventing revolutions by the moral influence which they had over youth. In 1801, Pius VII. issued a brief, allowing the Jesuits of Russia to live as a Society, and to have colleges and schools. Another brief, dated 30th July, 1804, allowed, at the request of king Ferdinand of Naples, the opening of schools and colleges by the Jesuits in the kingdom of the Two Sicilies. Lastly, after his restoration, Pius VII. issued a bull, in August, 1814, solemnly re-establishing the Society as a religious order, under the constitutions of St. Ignatius, and under obedience to the general chosen by it, to be employed in educating youth in any country of which the sovereign shall have previously recalled or consented to receive them; and Pius began by restoring to them their house of the Gesù, and afterwards the Roman college. The Jesuits have colleges now also in the Sardinian states, in Modena, and in the kingdom of the Two Sicilies, and likewise at Freyburg in Switzerland, where they have a fine college, attended by pupils from France and other countries. In France they had re-introduced themselves in a kind of clandestine manner after the Restoration, upon which a great outcry was raised, and they were finally expelled in 1830. Both the expectations of their friends and the fears of their enemies appear to have been exaggerated, as circumstances have changed too much in Europe to allow the Jesuits to resume anything like their former influence. In Spain Ferdinand restored them, but after his death the populace of Madrid, excited by the declamations of the ultra-liberals against the monks, took it into their heads, during the prevalence of the cholera, that the Jesuits and other monks had poisoned the springs. Under the influence of this delusion they repaired to the convents, and particularly to that of the Jesuits, and murdered the inmates in their cells. Since that time the legislature has suppressed all monastic institutions in Spain.

In Russia the Jesuits were expelled by a ukase of the emperor Alexander, in June, 1817, upon the charge of intriguing and of making proselytes among the members of the established Greek church.

The act of the 10th Geo. IV., c. 7, which is entitled 'An Act for the Relief of his Majesty's Roman Catholic subjects,' forbids Jesuits, or members of other religious orders, communities, or societies of the Church of Rome, bound by monastic or religious vows, from coming into the realm, under pain of being banished from it for life; except natural born subjects, who were out of the realm at the time of the passing of the act. Such religious persons may however enter the United Kingdom on obtaining a licence in writing from one of the principal secretaries of state, who is a Protestant, and may stay such time as such secretary shall permit, not exceeding six months, unless the licence is revoked before the end of the six months. The act also makes it a misdemeanor in any Jesuit, or member of other religious body described in the act, to admit, or to aid in or consent to the admission of, any person within the United Kingdom to be a member of such body; and any person admitted or becoming a Jesuit, or member of other such body within the United Kingdom, shall, upon conviction, be banished from the United Kingdom for life. It is however provided that nothing in this act shall affect any religious order, community, or establishment consisting of females bound by religious or monastic vows.

Of the bitter polemics and the multifarious charges against the Jesuits we have not space here to speak at any length, but we will refer our readers to the principal works among a most voluminous mass of writings, both in attack and defence of the Society. The polemical works on this subject are innumerable, but a good history of the Jesuits is still wanted. The 'Histoire Générale des Jésuites,' by La Coudrette, is a work of considerable research and extensive information, but the author was a party writer against the Society; and his own assertions, whenever they are not supported by authentic proofs, must not be implicitly trusted. 2. The famous 'Lettres Provinciales,' by Pascal, had great success at the time, but the charges which he brought against the Jesuits, though founded upon the notions of some individual casuists belonging to the order, cannot in fairness bear against the body of the Society, which did not countenance their extravagant doctrines. Voltaire himself, no friend to the Jesuits, acknowledged this; and Father Daniel, in his 'Entretiens de Cléandre et d'Eudoxe,' has refuted most of Pascal's arguments. 3. Arnauld, a polemical writer of the Jansenists' party, wrote 'La Morale Pratique des Jésuites,' in which also charges against individuals are construed into general charges against the whole Society, and some real facts and documents are mixed up with party bitterness and exaggeration. 4. 'Extrait des Assertions dangereuses et pernicieuses en tout genre que les soidisant Jésuites ont, dans tous les tems, perseveramment soutenues, enseignées, et publiées dans leurs livres, avec approbation des Supérieurs et Généraux.' This book seems to come directly to the purpose by appealing to numerous passages extracted from Jesuit writers. But then there is a 'Réponse aux Assertions,' in 3 vols. 4to., 1763, in which the author of the previous work is charged with no less than 758 falsifications and alterations of the texts quoted by him, and the advocate of the Jesuits produces in every instance the original text and confronts it with the corresponding one in the assertions. In order to judge correctly one ought to refer to the original works. These are the most weighty authorities against the Jesuits. Among the defenders of the Society must be mentioned 'Apologie de l'Institut des Jésuites,' 2 vols. 8vo., which is a standard work in their defence. Numerous declamatory works and satirical pamphlets have been published against the Society, most of which are contemptible in point of argument. The famous 'Monita Secreta,' or pretended private instructions given to the higher and most tried members of the order, are now generally acknowledged to be spurious. The more substantial charges brought against the Society may be classed under the following heads:—1. Antisocial and immoral principles found in some works of Jesuit casuists, such as Escobar, Mariana, Sanchez, Bauny, Busenbaum, &c. It does not appear however that the Jesuits in general, either individually or as a body, acted upon these obnoxious principles, which, on the contrary, were censured and repudiated by the Society. The doctrines of their most illustrious moralists, of Father Bourdaloue, of Cardinal Sforza Pallavicino, of Bellarmino, and others, are free from such stains. 2. General latitudinarianism in the ethics and moral practice of the Jesuits, not so much with regard to their own conduct, which, with very few individual exceptions, is acknowledged to have been pure and freer from scandal than that of most other monastic orders, but with regard to the lay persons whose consciences they directed, or to their proselytes in distant countries, such as China, where they are accused of winking at several superstitious and idolatrous practices among the new converts, and for which they were in fact censured by the pope himself. [Clement XI.] Their doctrine of probabilism, their attaching too great an importance to the merit of good works, and their bias towards casuistry and equivocation, have been often animadverted upon. 3. Great ambition of ruling over the consciences of the people. The institutions and practice of the Society certainly tended to keep the world in subjection, by means of early discipline and persuasion, to the spiritual authority of the Roman Catholic church, and to the temporal authority of the respective sovereigns. That this should have excited the animosity of those who dissented from that church, of which the Jesuits were the firmest support—that the Protestants for instance should have had no friendly feeling for their most formidable enemies, is nothing surprising or unreasonable; that the free-thinking philosophers of the eighteenth century, who railed at Christianity altogether, should have railed at the Jesuits, was a thing to be expected, as well as that persons of democratic feelings, or who wished to introduce the popular element into the constitutions of the European states, and who advocated an individual liberty of thought and action, should have rejoiced at the fall of the Society; and lastly, that the Jansenists, whose principles of ethics and whose notions of ecclesiastical discipline differed totally from those of the Jesuits, should have had frequent and bitter quarrels with the latter, is not surprising,—but that sincere Roman Catholics, priests, monks, bishops, and cardinals, and, lastly, a pope himself, should have aimed at and effected the destruction of an order which asserted the duty of subjection to the pope; that absolute Catholic monarchs should have proscribed the Jesuits, whose precepts tended to keep the people docile and obedient to the temporal power,—this is a singularity which must strike every dispassionate observer of the events of the eighteenth century, and which can only be accounted for by the agency of a variety of remote or hidden causes, and of personal passions and momentary interests which often prevail in the councils of princes. The Jesuits made proselytes; but this was in conformity to the spirit and received practice of their church: they preached perfect obedience to the decisions of that church and of its head the pope; but in doing this they followed the established Roman Catholic doctrine. Bossuet, who was no Jesuit, defines 'a heretic to be one who has his own opinion, and follows *his* own judgment and sentiment in matters of religion; while a Catholic, on the contrary, adopts without hesitation the opinion of the church.' And the Jesuits acted and taught in conformity with this principle.

It is true that the Jesuits' notions of papal authority went farther than those of the Gallican church, but it is also true that the provincials of the Jesuits in France and all their subordinates in that kingdom recognised in solemn instruments the civil independence of the sovereign, and that the four articles of the Gallican church were taught in all the schools of the French Jesuits; and in the year 1761 the French Jesuits signed and transmitted to the chancellor Lamoignon a declaration to the effect—'1. That they held and professed that in no circumstance or place, under no pretence of tyranny or vexation, on no account of religion, is it lawful for any person, whatever be his state or condition, to make any attempt, directly or indirectly, against the person of sovereigns, or to insinuate or favour any act that can tend to endanger their safety, and that they condemn and detest as execrable any doctrine to the contrary which may be found in any works that may have been composed, either by any member of the Society, or by any other person. 2. They hold and profess the doctrine of the clergy of France declared in their Assembly of 1682, and that consequently they will always teach that the power given to St. Peter, to his successors, and to the church itself, is purely spiritual, and that they have no power over anything that concerns temporals. 3. That they will always be subject to the laws, ordinances, regulations, and usages of the kingdom, in the same manner as all other subjects of the king; and that they will not attempt anything contrary to the rights of the bishops, curates, and universities, or make any use of any privilege, whatever it may be, except in so far as it is conformable to the import of the laws and maxims of the kingdom. 4. That if it should happen (which may God forbid) that they should be ordered by their general, or by any other person invested with any authority, to do anything contrary to the laws of the church or the state, to their duty to their sovereigns, or to the public welfare or tranquillity, they declare that they hold and ever will hold such decrees or orders to be null, and consider themselves obliged to disobey them.' (*Réponse aux Assertions*, vol. iii., p. 597.) Still as these were not the original principles of the Society, nor conformable to the spirit of its constitutions, and as it could not be expected that they would be assented to by the Society at large, the suspicions engendered in the minds of sovereigns and their ministers certainly contributed to the downfall of the Jesuits. Their devotion to the pope injured them with the sovereigns, and then the sovereigns induced a pope to forsake them also. The other monastic orders were jealous of them, and the bishops and parochial clergy disliked them as too independent a body. It ought also to be observed that the Jesuits, though professing to be devoted subjects to the Roman see, were not always very manageable subjects, and that several popes, Clement XI., Innocent XI., Innocent XIII., and Benedict XIII. found them at times refractory. They were in reality too powerful even for the pope to meddle with.

A fresh charge against the Jesuits was their accumulating riches, and such suspicion probably stimulated the zeal of several ministers and courtiers against them; but the fact is, that at the suppression of their order, after the most minute inquisition, no treasures were found, no hoarded funds: several of the houses and colleges were encumbered with debts, and the expelled members of the Society lived the rest of their days in a state bordering upon indigence.

During two centuries and a quarter which elapsed from their foundation to their suppression, the Jesuits rendered great services to education, literature, and the sciences. Throughout all Roman Catholic states they may be said to have established the first rational system of college education. Other orders, such as the Fathers of the Christian Doctrine, instituted in 1571, the Clerici Scholarum Piarum, in 1617, and the Brothers of the Christian Schools, or Ignorantins, in 1679, applied themselves more especially to the elementary education of children, though the Jesuits also did not altogether neglect this branch. The colleges of the Jesuits were equally open to the noble and the plebeian, the wealthy and the poor: all were subject to the same discipline, received the same instruction, partook of the same plain but wholesome diet, might attain the same rewards, and were subject to the same punishments. In the school, the refectory, or the play-garden of a Jesuit's college, no one could have distinguished the son of a duke from the son of a peasant. The manners of the Jesuits were singularly pleasing, urbane, and courteous, far removed from pedantry, moroseness, or affectation. Their pupils, generally speaking, contracted a lasting attachment for their masters. At the time of their suppression the grief of the youths of the various colleges at separating from their teachers was universal and truly affecting. Most of the distinguished men of the eighteenth century, even those who afterwards turned free-thinkers, and railed at the Jesuits as a society, had received their first education from them; and some of them have had the frankness to acknowledge the merits of their instructors. The sceptical Lalande paid them an honest tribute of esteem and of regret at their fall: even Voltaire spoke in their defence. Gresset addressed to them a most pathetic valedictory poem, 'Les Adieux.' The bishop De Bausset, in his 'Vie de Fénélon,' has inserted a most eloquent account of the Institution of the Jesuits, of their mode of instruction, and of the influence which they had, especially in the towns of France, in preserving social and domestic peace and harmony. For the Jesuits did not exclusively apply themselves to the instruction of youth; grown-up people voluntarily sought their advice concerning their own affairs and pursuits in life, which they always freely bestowed; they encouraged the timid and weak, they directed the disheartened and the forsaken towards new paths for which they saw that they were qualified; and whenever they perceived abilities, good will, and honesty, they were sure to lend a helping hand. The doors of the cells of the older professed fathers were often tapped at by trembling hands, and admittance was never refused to the unfortunate. In private life at least, whatever may have been the case in courtly politics, their advice was generally most disinterested. It has been said that they excelled in the art of taming man, which they effected, not by violence, not by force, but by persuasion, by kindness, and by appealing to the feelings of their pupils. If ever mankind could be happy in a state of mental subordination and tutelage under kind and considerate guardians, the Jesuits were the men to produce this result; but they ultimately failed. The human mind is in its nature aspiring, and cannot be permanently controlled; it cannot be fashioned to one universal measure; and sooner or later it will elude the grasp of any system, whether military or political, ecclesiastical or philosophical, and will seek, at any cost, to gratify its instinctive desire for freedom.

Among the members of their own society the Jesuits have had distinguished men in almost every branch of learning. In the mathematical sciences we may mention, among others, Jacquier, Le Sueur, Boscovich, and Le Maire; in classical literature, Petau, Sirmond, Jouvency, Lagomarsino, Tursellini, &c.; in general literature, Possevin, Bettinelli, Tiraboschi; in ecclesiastical learning and sacred oratory, Bellarmino, Pallavicino, Segneri, Bourdaloue; in

Oriental philology, Kircher, Ignazio Rossi, Amiot, Gaubil, &c. The 'Fasti Societatis Jesu,' the 'Acta Sanctorum S. J.,' the numerous letters and memoirs of the various missions, may be consulted in order to judge of the value of Jesuit learning and labour.

JESUITS' BARK. [Cinchona.]

JESSULMER. [Hindustan, p. 221.]

JESUS. [Christ.]

JESUS, son of Sirach, was a learned Jew of Jerusalem, who employed himself in collecting sayings of wise men, from which, with additions of his own, he formed the book of Ecclesiasticus. (*Ecclesiasticus*, ch. l., ver. 27.) We know little of him but what we can gather from that book. According to Bretschneider, he composed it about 180 B.C.; a date which is rendered probable by the fact that, in enumerating the illustrious men of the Hebrew nation, the last he mentions is the high-priest Simon, the son of Onias, of whom he speaks in terms which make it probable that he had seen him; while he does not mention the Maccabees.

Another Jesus, a grandson of the former, and whose father's name is also supposed to have been Sirach, translated the book of Ecclesiasticus into Greek, probably about 130 B.C.; for he states in his prologue to the book that he went into Egypt in the reign of Euergetes (Ptolemy VII., Euergetes II.), and there executed the translation.

This is the general opinion; but Jahn thinks it probable that Jesus composed the book of Ecclesiasticus about B.C. 292—280; that the Simon, son of Onias, whom he praises, was the first of that name, not the second; and that his grandson executed the translation under Ptolemy Euergetes I., who reigned B.C. 247—222. He founds this opinion chiefly on the character of Simon I. agreeing with the eulogy of the writer better than that of Simon II.

(Bretschneider, *Liber Jesu Siracidæ;* Horne's *Introduction*, vol. iv.; Jahn, *Introd. in Lib. Sac. Vet. Fœd.*)

JESUS COLLEGE, CAMBRIDGE, was founded in 1496, by John Alcock, bishop of Ely, who had obtained from King Henry VII. a grant of the nunnery of St. Radegund, then lately suppressed; all the lands which had been bestowed upon that monastery were given as an endowment, and the buildings were converted into a college. It has sixteen foundation fellowships, open to natives of England and Wales, without any restriction or appropriation whatsoever; five of the original foundation, four founded by Dr. Fuller, master of the College, and the rest by various benefactors. Six of the fellows are required to be in priests' orders. On every vacancy of a fellowship the master and fellows nominate two candidates, of whom the bishop of Ely elects one. There is one fellowship, founded by James Stanley, bishop of Ely, to which the bishop has an exclusive right both to nominate and appoint. The mastership of this College is in the absolute appointment of the bishop of Ely. Various scholarships, exhibitions, and smaller foundations, of different annual values, from 70*l.* to 3*l.* 6*s.* 8*d.*, have been bestowed on this College from time to time by different benefactors. It has also some annual prizes of value. The total number of members upon the boards of this College, on March 12, 1838, amounted to 179. Its patronage consists in the rectories of Graveley and Harlton in Cambridgeshire, of Stanley Regius in Gloucestershire, Tewing in Herts, and Cavendish and Whatfield in Suffolk; and in the vicarages of All Saints and St. Clement's in Cambridge, those of Comberton, Fordham, Guilden Morden, Hinxton, Swavesey, and Whittlesford, in Cambridgeshire; of Elmstead in Essex, and of Hundon in Suffolk. (Lysons's *Cambridgeshire*, pp. 118, 119; *Camb. Univ. Calendar* for 1838.)

JESUS COLLEGE, OXFORD, owes its foundation to the zeal of Hugh ap Rice, or Price, a native of Brecknock, who, when far advanced in life, meditated the establishment of a college which should extend the benefits of learning to the natives of Wales, an advantage which, previous to his time, had not been provided for at Oxford. With this intention he petitioned Queen Elizabeth that she would be pleased to found a college on which he might bestow a certain property. Her Majesty accordingly granted a charter of foundation, dated June 27, 1571, prescribing that the college should be erected by the name of 'Jesus College, within the City and University of Oxford, of Queen Elizabeth's foundation;' the Society to consist of a principal, eight fellows, and eight scholars; and for their maintenance Dr. Price (for he had now become a Doctor of Civil Law) was permitted to settle estates to the yearly value of 160*l.* To this the queen added a quantity of timber from her forests of Shotover and Stow. The founder's estates, which he conveyed June 30, lay in Brecknockshire; and he bestowed upwards of 1500*l.* upon the building, leaving besides some money, which was suffered to accumulate, and which, in the beginning of the seventeenth century, amounted to 700*l.* Hugh Price, who was a prebendary of Rochester and treasurer of St. David's, died in August, 1574. In 1589 the Society procured another charter of the queen, empowering them to hold possessions to the value of 200*l.* per annum, and to appoint commissioners for the drawing up of statutes.

King Charles I. in 1636 founded a fellowship to be held by a native of Guernsey or Jersey; Bishop Westphaling and Sir John Walter founded one for a native of England; Bishop Rowlands, Dr. Francis Mansell, Dr. Thomas Gwynne, and others, added fellowships and scholarships for natives of different districts of Wales, or for schools in the principality; and Sir Leoline Jenkins, who was almost a second founder, bequeathed to the College divers lands and tenements for augmenting the then sixteen fellowships and sixteen scholarships, and for founding two additional fellowships and scholarships. One fellowship was afterwards added, by a decree in chancery, out of the residue of Sir Leoline's personal estate. So that the Society at present consists of a principal, nineteen fellows, and eighteen scholars.

Several exhibitions have likewise been founded by different benefactors, of which twenty-four are for natives of North Wales, by the Rev. Edmund Meyrick, M.A., treasurer of St. David's; three for Caermarthenshire, by Bloom; two for Brecknockshire, or Radnorshire, by Powell; one for a native of Ruthin, or diocese of St. Asaph, by Bishop Parry; one for Caernarvonshire, by subscription, to be called Mr. Assheton Smith's; two by Le Hunt; four by the Grocers' Company; two by the Salters' Company; and some connected with the Cowbridge School foundation by Sir Leoline Jenkins.

The patronage of this College consists in the rectories of Longworth and Remenham in Berks; of Ashton Clinton in Buckinghamshire; of Bagendon, or Badgington, in Gloucestershire; Scarthe in Lincolnshire; Brandeston and Furthoo in Northamptonshire; Rotherfield Pipard and Wigginton in Oxfordshire; Nutfield in Surrey; Tudington in Worcestershire; Llandyssil in Cardiganshire; Clynnog Vawr and Llan Wuda in Caernarvonshire; and Llandon in Glamorganshire; with the vicarages of Shipston-cum-Tidmington in Worcestershire, and Holywell in Flintshire; the impropriation of Badgworth, and the chapelry of Charlton Kings, in Gloucestershire; and the impropriations of Holyhead, Bodedern, and Llandrygarn with Bodwrog, in Anglesey.

The present number of members upon the books of this College is 149.

(Gutch's *Colleges and Halls;* Chalmers's *Hist. of the Univ.; Oxford Calendar*, 1838.)

JET, a variety of coal, which occurs sometimes in elongated reniform masses, and sometimes in the form of branches, with a woody structure; fracture conchoidal; soft and brittle; sp. gr. but little greater than that of water; lustre brilliant and resinous; colour velvet black; opaque. It is found in Saxony, and also in the Prussian amber-mines, in detached fragments. The finer sorts are used for the manufacture of ornaments and trinkets, and the coarser kinds as fuel; it burns with a greenish flame and a strong bituminous smell, and leaves a yellowish ash.

JETHOU. [Guernsey.]

JETSAM. [Flotsam.]

JEWELL, JOHN (born 1522, died 1571), one of the fathers of the English Protestant church. He was born in Devonshire, and educated in grammar-schools in that county, till at the age of thirteen he was sent to Oxford, where he was entered at Merton College, under the tuition of John Parkhurst, who was afterwards the Protestant bishop of Norwich. When eighteen, he was admitted B.A.; and at that early age he became a college tutor. Henry VIII. was still upon the throne, and it was hazardous for any one to make himself conspicuous either as an opposer of the principles of the Reformation or as an advocate of them. Jewell therefore kept himself quiet, contenting himself with inculcating Reformation principles privately in his lectures to his pupils; but when King Henry was dead, and the ecclesiastical policy of the country became more decidedly

Protestant under his successor, Jewell declared himself openly a zealous Protestant; and when Peter Martyr, one of the foreign reformers, visited Oxford, and there held a public disputation (as was the manner of those times) with certain learned Catholic divines, Jewell acted as his notary. From this time he became a zealous promoter of the Reformation, both at the university and as a preacher and catechiser in the country about Abingdon, where he had a living.

Times however changed; King Edward died, and a new policy was adopted. It was sought to undo what had been done. Jewell, it seems, for a short time somewhat temporized; but he very soon recovered himself, and sought shelter in a foreign land from the severity of the storm which fell upon those who, in the preceding reign, had been zealous for the Reformation. He joined the English exiles at Frankfort, and afterwards at Strasburg, where he again met with Peter Martyr, whom he assisted in the composition of some of his works. The reign however of Mary was short, and with the accession of Elizabeth came brighter prospects to the friends of reform. Jewell returned home, and was almost immediately made bishop of Salisbury. His zeal was not relaxed. He continued both by his preaching and his writing to promote the doctrines of the Reformation, and to endeavour to extinguish whatever attachment there might still remain, especially in any part of his own diocese, to the older system. He died, in the course of one of his preaching tours, at the little village of Monkton Farleigh, in an obscure corner of his diocese, in the fiftieth year of his age. Camden, whose testimony is worth more than that of any party writer on either side, bears to him this testimony, that he was a man of singular ingenuity, of vast erudition in theology, and of eminent piety.

The writings of Jewell are chiefly controversial, the most remarkable of them being his 'Apology for the Church of England,' and his various Defenses of that Apology. These are together considered one of the ablest defences of the Protestant Church of England that appeared, and were translated into many languages for the purpose of circulation abroad. His writings were collected in a large folio volume in 1609. Copies of this volume were placed in many of the English churches for the common use of the parishioners, and may sometimes even now be found fastened by a chain to a reading-desk. This honour it has shared with Fox's 'Acts and Monuments of the Church,' and some of the theological writings of Erasmus.

The writings of Jewell are still greatly valued, and are much used in two departments of ecclesiastical controversy, the question between the Church of England and the Church of Rome, and the question respecting the doctrinal sentiments of the fathers of the Protestant Church of England. Lists of his writings may be seen in the 'Athenæ Oxonienses' of Anthony Wood, where is an outline of his life, the particulars of which have been written more in detail by many persons.

JEWELLING OF WATCHES is the art of setting diamonds, rubies, sapphires, chrysolites, or other hard stones, in the frame-plates and other parts of watches, in such a manner that the pivots of the watch may act in holes made in these stones. There are two kinds of jewelled holes necessary in watches, one of which is merely a perforation through the stone; the other consists of a perforated piece, and a piece called an end-piece. The latter mode of jewelling is adopted where it is necessary that the end of the pivot, and not the shoulder, should sustain the weight of the wheel whenever by a change of place it is brought into a vertical position, which is important in those cases where the pivot has a rapid motion and considerable weight to sustain, as the pivots at each end of the axis of the balance.

The province of the watch-jeweller is to select the stones, and, except in the case of diamonds, to grind, polish, turn, drill, and set them into the frames or other parts of the watch in such a manner that the holes in the stones may correspond exactly in position with holes previously made by the watch-finisher or escapement-maker. Jewelling is an operation which when well performed adds materially to the durability, and not a little to the elegance of the machine. A hole without an end-piece is thus made: the hole in any piece to be jewelled having been made in its proper place by the finisher, the piece is so fixed in a lathe by the jeweller that the hole shall be perfectly concentric to the centre of motion; this hole is then enlarged by turning, and afterwards so formed that a small circle of brass which contains the stone, and which is called the setting, may have a cavity to rest in, without the possibility of its going through the plate, or piece in which the hole has been made. After the setting has been fitted to the cavity, and adjusted so as to be flush with the plate, two screws are inserted in the plate so near to the cavity which contains the setting that the edges of the screw-heads project a small distance over the edge of the setting, and thereby secure it in its place. When a hole with an end-piece is required, the same process is adopted, but two stones are required for each hole instead of one, and the first or perforated stone with its setting is sunk into the cavity already described a sufficient distance below the surface of the plate to allow of the reception of a second setting, containing a stone which resembles in form a small slice cut from a sphere about the size of a shot, its form being plano-convex. The edge of this second setting is left flush with the plate or piece in which the cavity is made, and two screws being inserted, as in the former case, the two settings are secured at once. It must be remembered that the stone last inserted has no hole through it. The mode of forming the stones, &c. will be presently described, but it will be as well to observe here, that in the holes already described the stones are secured in their brass settings in a manner somewhat similar to that in which opticians set many of their glasses in telescopes, namely, by turning a place to receive the stone, and leaving a fine edge of brass, which is subsequently rubbed over the edge of the stone with a burnisher. Jewelling has sometimes to be performed in situations where there would not be room to insert the fastening screws without weakening the part, as in the foot of a watch potence. In this case the first stone is inserted with its setting into a cavity as already described, with the surface of the setting flush with the surface of the part into which it is placed, but the surface of the stone is so much lower than that of the setting as to allow of a dovetailed notch or slit being cut through it, and along the surface of that part which receives the setting, so that a small brass dovetail pushed tight into this groove or slit secures the setting in its place; and at that part of the dovetail which immediately covers the hole in the stone is inserted another small piece of stone, which forms an end-piece to the hole. When a diamond end-piece is used, it is usually set in steel, into which it is brazed, the diamond being a stone which will allow of heat sufficient for that purpose. After brazing, the steel is turned into shape, polished, and blued.

The apparatus necessary for the jeweller to carry on his business are a small lathe, the action of which in its collar should be as light as possible; small gravers for turning brass and steel; a quantity of rough diamond in fragments, technically termed *bort;* small mills or circular disks of metal (usually copper) for grinding the stones into shape; diamond-powder of various degrees of fineness for polishing; and turning tools made by cementing small pieces of bort into a notch made in the end of small brass wires and fixed in proper handles. In the preparation of a stone for a jewel-hole, it is necessary first to charge a copper disk about the size of a penny piece, and out of which it is frequently made with bort, which is done by strewing a quantity of it upon the copper, and by strokes and pressure from a hammer embedding it into the surface; the mill thus prepared is fixed unto the mandrel of the lathe, which is put in motion by a band from a rather large foot-wheel, the mill making from 6000 or 7000 to more than 20,000 revolutions in a minute, the latter velocity being given only in the act of polishing. The stone to be formed is then taken on the end of one of the fingers of the right hand and applied to the surface of the bort-mill, which is kept constantly wet with water applied by the fingers of the left hand, and in a few seconds a flat surface is produced on a stone of the most irregular form; the flat surface is then placed next the finger, and a similar surface is produced parallel to the former, until the stone is of such a thickness as is required; it is then placed, by means of cement, on a small chuck in the lathe, and with one of the before-mentioned bort tools turned into the proper shape for setting; the hole is also drilled either with a steel drill and diamond-powder and oil, or with a drill made of bort or small fragments of diamond. In drilling the hole it is necessary to drill the stone about half way through, after which the stone is reversed, and the drilling commenced on the opposite side, to prevent the fracture which would be likely to take place if the drilling was continued through to the opposite surface. The piece of stone, or hole, as it is called, is also turned with a hollow or countersink to receive the oil necessary for the lubrication of the pivot. A piece of brass, one end of which is shaped to fit the hollow, is charged with fine diamond-powder, the finger being applied to the other end, and by pressing it against the stone, and at the same time by a motion of the finger giving every possible change of position to the brass which is compatible with keeping it in the hollow of the stone, from which it should not be suffered to slip, the stone is beautifully polished. The stone is afterwards detached from the lathe, and its flat or parallel surfaces polished by rubbing it with all the rapidity of which the hand is capable on a piece of plate-glass, previously charged with a small quantity of diamond-powder and oil. When an end-piece is required the same process is gone through, except that the drilling is omitted, and the spherical side of the stone is polished by using a piece of brass with a hollow end to suit the convexity of the stone. The jeweller also makes use of a small spirit-lamp to heat the cement when he applies it for the purpose of securing the stones upon the chucks in the lathe, and after one side of a stone has been made true by turning, and the hole drilled partly through the stone as before stated, it is reversed, and fixed perfectly true on the chuck by keeping the cement so warm that the stone may be moved by the pressure of a piece of wood or metal, which the workman makes use of for that purpose, by applying it to the edge or surface of the stone, as required, while the lathe is in motion. Another and very ingenious mode of changing the surface of the stone for the purpose of completing the operation of drilling without detaching it from the cement is the following:—A hollow chuck is made to fit upon the lathe, into the exterior edge, of which a groove is turned to receive a lid or cover, which is turned true, and so formed upon the edge that it will snap tight into the before-named groove with either of its sides outwards, a small piece being taken out of its edge to allow of the insertion of any small tool to remove the cover in the same way as the cover is removed from a watch-barrel. A small hole is made in the centre of this cover, over which the stone is cemented, and when the drilling on one side is completed, the cover, and with it the stone, is removed, and by snapping in the cover the contrary side outwards the other surface of the stone is presented to the operator, and the act of drilling is repeated; for the cover and groove being turned perfectly true, the centre of motion of the stone is not affected by the reversing of the cover.

The end-pieces, when real diamonds are used, are what are called rose diamonds, and are procured from Holland, where they are cut.

JEW'S-HARP, a musical instrument of the simplest and rudest kind, consisting of an iron frame, resembling in form the handle part of an old-fashioned corkscrew, in the centre of the upper and wide part of which is riveted at one end an elastic steel tongue, the extremity of which, at the free end, is bent outwards to a right angle, so as to allow the finger easily to strike it when the instrument is placed to the mouth and firmly supported by the pressure of the parallel extremities of the frame against the teeth.

Professor C. Wheatstone has shown that the sounds of the Jew's-harp mainly depend on the reciprocation of columns of air in the mouth of the performer, and that these sounds are perfectly identical with the multiples of the original vibrations of the instrument. Hence its scale must necessarily be very incomplete; but by employing two or more instruments, the deficiencies are supplied. A few years ago, an ingenious foreigner, M. Eulenstein, exhibited in London, at the Royal Institution, his very extraordinary talent on the Jew's-harp. He used sixteen instruments of different sizes, and was thus enabled to modulate into every key, and to produce effects not only original, but musical and agreeable.

JEWS (**Ἰουδαῖοι** and **JUDÆI** in Greek and in Latin), in its widest acceptation, is used as synonymous with Hebrews, or Israelites, but in a more restricted sense it means the inhabitants of the kingdom of Judæa as it existed in the time of Jesus Christ, and whose descendants are now scattered over all the world. The history of this people previous to the time of Christ is contained in the Old Testament and in Josephus. Their great ancestor Abraham, called 'the Hebrew' (*Genesis*, xiv. 13), by birth a Chaldæan, emigrated, about 1921 years B.C., with his wife Sarai, his nephew Lot, and his numerous servants and flocks, into the land of Canaan, the modern Palestine, where he settled. [ABRAHAM.] At an advanced age his wife bore him a son, Isaac, from whom the Hebrews are descended. Abraham's elder son Ishmael, whose mother was an Egyptian and a slave, settled in the wilderness of Arabia. Isaac married Rebecca, by whom he had two sons, Esau and Jacob, the former of whom was a hunter, and gave up his birthright to his younger brother Jacob. Jacob, surnamed Israel, or 'the strong' (*Genesis*, xxxii. 28), had twelve sons, namely Reuben, Simeon, Levi, Judah, Dan, Naphtali, Gad, Asher, Issachar, Zabulon, Joseph, and Benjamin. From these were descended the twelve tribes of Israel, or of the Hebrew nation. One of Jacob's sons, Joseph, came by a singular course of vicissitudes to be first minister to one of the Pharaoh kings of Egypt, and he settled his brethren in a fertile district of that country, where his and their descendants throve and multiplied so as to form in the course of about two centuries after Joseph's time a very numerous colony subject to the Egyptians, by whom they were disliked as aliens, and treated with great harshness. Being driven to despair, they found a leader in one of their countrymen, Moses, who, acting under the special direction of God, led them out of the land of Egypt, to return to that of their ancestors, Canaan, the possession of which God had promised to the posterity of Abraham. The number of the Israelites at their departure from Egypt is stated in *Exodus* (xii. 37) at six hundred thousand men, besides women and children, with their flocks and herds of cattle. Being pursued by the Egyptians, they crossed on dry land the northern extremity of the western of the two great gulfs in which the Red Sea terminates, now called the gulf of Suez, and entered the peninsula of Sinai, in Arabia. The waters of the sea, which, at the command of the Lord, had divided and made a passage for the children of Israel on dry land, returned at the same command, and overwhelmed their pursuers.

The departure of the Israelites from Egypt took place, according to most chronologists, in 1491 B.C. [EXODUS.] On Mount Sinai Moses received from God the law of the Ten Commandments, and from that time the Israelites were taught to consider themselves as being under the immediate government of the deity, who, from time to time, made known his will to them through their leader Moses. The books of Moses called *Exodus* and *Leviticus* contain the civil laws and social regulations, as well as the rites and religious ceremonies. Other laws which were successively promulgated are found in the following books of *Numbers* and *Deuteronomy*, so as to form a complete body of institutions for the Hebrew community. Of these laws some were temporary directions suited only to the nomadic state in which the Israelites spent many years in the wilderness; others are enactments intended for an agricultural people with settled habitations, and for the time when they should become possessed of the promised land of Canaan. Sanitary regulations concerning diet, cleanliness, and decency form an important part of the code, and are admirably adapted to the people, country, and climate for which they were intended. The political system was founded upon equality, without any distinction of castes; the whole nation was to be one great body of husbandmen cultivating their own property. The land could not be alienated in perpetuity; every fiftieth year a jubilee was to take place, when all estates which had been alienated were to revert to their original owners, and all burthens, debts, and other engagements were to cease.

One tribe, the descendants of Levi, was set apart for religious service: they had no tract of country assigned to them, but were to dwell by themselves in separate towns or villages, scattered through the territory of the other tribes. Out of this class the officiating priesthood was chosen, as well as the scribes and keepers of records, the judges, and perhaps also the physicians. They were in fact the learned class of the nation; they read the law to the people, and they attended by rotation on the officiating priests in the Tabernacle. One-tenth of the whole produce of the land possessed by the other tribes was assigned to the Levites for their maintenance. Each tribe had its own chieftain or prince, and the heads or elders of each family constituted the provincial assembly. On occasions of great emergency, national assemblies were held, probably consisting of delegates from each tribe, and their resolutions were ratified by the general voice of the people expressed by acclamation. This took place repeatedly during their encampment in the desert. All who could bear arms were bound to fight in the common defence. The penal laws were severe, but considerate; punishments were fixed for every offence; nothing was left to caprice. Parental authority was enforced, but the law prevented its abuse; the father had no power of death over his children, and he could not disinherit them; the first-born received two portions, and the rest shared equally. No Hebrew could be sold or sell himself as a bondsman for life; he might hire himself as a servant for a period, but at the end of six years he became free again, unless he chose to renew his term for another six years. Foreign slaves however, whether captives or purchased, were held in perpetual bondage, both they and their children; but the law provided for their protection: they were entitled to rest on the Sabbath, and on the great festivals they partook of the common feasts and rejoicings. The condition of a slave among the Hebrews was better than that of a slave among the Romans and most other nations of antiquity. For further details concerning the constitution of the Hebrews the reader is referred to the 'Pentateuch,' especially to the books of *Leviticus* and *Deuteronomy*.

The office of high-priest was bestowed upon Aaron, the brother of Moses, and his descendants in perpetuity. This dignity was quite distinct from that of civil leader or judge, though in course of time some high-priests occasionally united both offices in their persons. The high-priest was the means of communication between God and the people: he alone could enter the recess of the sanctuary; in important cases there was a final appeal to him; and he was also consulted upon great national affairs. He had the charge of the tabernacle or sanctuary, which was the great bond of union among the tribes of Israel.

After remaining about a year encamped at the foot of Mount Sinai, the Israelites marched towards the land of Canaan, and arrived at Kadesh Barnea on its southern frontier, whence they sent spies to explore the interior. After forty days the spies returned with the information that the country was rich and fertile, but the people fierce, numerous, and strong, and likely to make a stout resistance. The Israelites, long accustomed to bondage, were frightened, and they loudly demanded to be led back to Egypt. Moses saw that the people were as yet unfit for a war of conquest, and on the authority of God he gave the order for retreat, not however for Egypt, but back into the peninsula of Sinai, where they encamped and settled with their flocks and cattle after the fashion of the Beduin Arabs. In this wilderness they remained for thirty-eight years, the period assigned for their nomade life, until the first generation which had come out of Egypt had gradually sunk into the grave, and a new race had sprung up in the free air of the desert, trained to the bold and hardy habits of the wandering Arab, but with much of the arts, knowledge, and discipline derived from Egypt. At the expiration of this time, they again moved forward to Kadesh, but Moses perceiving that part of the country to be mountainous and well defended, led them round the eastern shore of the Dead Sea through the land of Edom and Moab. He crossed the Jabbok, defeated the Amorites and the king of Bashan, and encamped in a plain near the left bank of the Jordan above its influx into the Dead Sea, nearly opposite to Jericho. Here, after defeating the Midianites and giving the conquered territory on the west of Jordan to the tribes of Reuben, Gad, and half the tribe of Manasseh, he prepared to lead the Israelites across the river. But before this was effected Moses died, after bestowing his last advice and blessing on the people, assembled for this solemn purpose, and appointing Joshua, a man already tried for his bravery and skill, to be his successor. Joshua crossed the Jordan and took Jericho, and gradually conquered the greater part of Canaan, exterminating or driving away the former inhabitants. The events of the conquest are related in the book of *Joshua*. The country was then divided among the twelve tribes, substituting for those of Levi and Joseph the respective descendants of the two sons of the latter, Manasseh and Ephraim. For the limits of these tribes see PALESTINE.

In this manner the Hebrews became a settled agricultural people, though often at war with their neighbours the Philistines, the Moabites, the Midianites, the Ammonites, and other tribes. Even the whole land of Canaan was not subdued till a much later period, and the Canaanites remained in strength both in the north and the south, and repeatedly harassed the Hebrew colonists, as we observe in the invasion of Sisera (*Judges*, iv.). On these occasions gallant leaders arose among the Hebrews, styled Sophetim in the Scripture, generally translated Judges, who assumed a sort of dictatorial authority, and rescued the nation from danger; each tribe however retained its internal form of government, and often engaged in petty warfare with its neighbours on its own account. This period of the history of the Jews, which is called the period of the Judges, and which lasted about four centuries, may be considered as the heroic age of the nation, which still retained a primitive simplicity of manner, beautifully portrayed in the tale of Ruth. Samuel was the last of the Judges: he drove away the Philistines who had occupied a great part of the country, but the people growing tired of these frequent invasions, which they had not discipline or union enough among themselves to guard against, wished for a more settled form of government, and demanded of Samuel a king to rule over them. Samuel remonstrated on the dangers of despotism, but the people were determined in favour of the change, and Samuel appointed a youth named Saul, of the tribe of Benjamin, and anointing him, solemnly gave up the authority into his hands. The reign of Saul was long and agitated; he quarrelled with Samuel, and committed various acts of tyranny. Samuel then foretold the downfal of the house of Saul, and he secretly anointed as his successor a youth of the tribe of Judah, called David, who was distinguished for his bravery as well as for the comeliness of his person. Saul having discovered that his successor was already appointed, persecuted David, whose adventures constitute a narrative of romantic interest in the book of *Samuel*. Saul fell in battle against the Philistines, and David succeeded him, about 1056 B.C. The reign of David, which lasted forty years, forms a splendid epoch in Jewish history. He was victorious over all his neighbours. He reduced not only the whole of Canaan, but took possession of the country of Edom as far as the Red Sea, of Moab, of part of Syria, and formed alliances with the kings of Hamath and of Tyre. His power extended from the borders of Damascus to the Elanitic or eastern branch of the Red Sea, and from the coast of the Philistines to near the Euphrates.

David took Jerusalem, which was a town and fort of the Jebusites, a Canaanitish tribe till then unconquered, and made it the capital of the kingdom. He died at an old age, leaving to his son and successor Solomon a flourishing and secure kingdom, a full treasury, and a well disciplined militia. The reign of Solomon was long and peaceful. He raised the famous temple on Mount Moriah, on the east side of Jerusalem, and employed Tyrian and other foreign artificers for the purpose. Solomon was a very wealthy prince: he encouraged commerce, and had ships on the Red Sea manned by Tyrians, which traded with Ophir. His close alliance with the Phœnicians was of great advantage to him; he supplied them with corn, and received timber from Lebanon and other goods in exchange. The Phœnician caravans to Arabia and to Persia passed through his dominions. His own subjects carried on a trade with Egypt, with which country Solomon was on friendly terms, and he married a daughter of one of the Pharaohs. He is said to have built Tadmor or Palmyra, and Baalbek; but his great expenditure, and the taxes by which he supplied his wants, made the people dissatisfied, whilst his own example encouraged them in their licentiousness and effeminacy. He died after forty years' reign, and his son Rehoboam was only able to retain possession of the southern part of the country, comprising the territory of Judah and Benjamin, which then assumed the name of the kingdom of Judah, while the other ten tribes elected Jeroboam as their king, and retained the name of the kingdom of Israel, which had first Sichem, and afterwards Samaria, for its capital. This division took place about 975 B.C. The kingdom of Israel lasted 250 years, through a succession of stormy and blood-stained reigns, and was in the end overthrown by the Assyrians, who carried the inhabitants into captivity, from which they never returned, nor has the existence of their progeny ever been ascertained. The kingdom of Judah lasted above a century and a half longer under the dynasty of the house of David, until Nebuchadnezzar, king of Babylon, after repeated invasions, destroyed Jerusalem, 588 B.C., and carried its inhabitants into captivity. Thus the Jewish monarchy terminated after a period of about five centuries from its first institution, the stirring events of which period are related in the books of *Kings* and *Chronicles*. During this time flourished the prophets Isaiah, Jeremiah, Amos, Hosea, Joel, Micah, Nahum, Zephaniah, Jeremiah, and Habakkuk. Daniel and Ezekiel belong to the period of the Captivity.

The captivity of Judah lasted seventy years, after which Cyrus, having conquered Babylon, allowed the Jews to return to their own country. They assembled for that purpose to the number of 42,360, under Zerubbabel, a descendant of their kings, and on arriving in Judæa were joined by those of the common people and cultivators of the soil who had remained in their native country. They began rebuilding Jerusalem and the Temple, and their neighbours the Samaritans, who inhabited part of the territory of the former kingdom of Israel, offered to join them in the furtherance of the great national work; an offer however which was contemptuously rejected by the Jews, who looked upon the Samaritans as alien colonists, although the Samaritans themselves asserted their descent from the tribes of Ephraim and Manasseh. When the Assyrians led the ten tribes into captivity, they probably took away only the higher class of people, as the Babylonians did with those of Judæa, and did not depopulate the whole country; besides which, during the course of more than two centuries, and particularly after the subversion of the Assyrian empire, many exiles or descendants of exiles may have found their way back to their native land. The fact that the Samaritans have preserved the 'Pentateuch' in the original characters, while the Jews on their return from Babylon adopted the Chaldæan form of letters, is strongly in favour of their Israelitish descent, though they may have been mixed by alliance with Assyrian and other colonists. The Jews however always showed a deadly animosity against the Samaritans, whom they insisted on considering as aliens and idolaters, although they in reality acknowledged the law of Moses.

The character of the Jews themselves had undergone a considerable change during their Babylonish captivity. They had become more exclusively attached to their country and their laws, and we hear no more of their proneness to idolatry after that epoch, as in former times. They strictly avoided intermarriage with foreigners, and assumed in every respect that unsocial spirit towards all except their own community for which they have been so often reproached. Adversity had soured their minds, while the expectations of a Messiah who was announced by their prophets roused the national pride. The doctrine of the immortality of the soul, which is not mentioned in the Mosaic law, was also introduced, especially among the great sect of the Chasadim, or Pharisees.

Under the mild rule of the Persian kings the Jews enjoyed many of the advantages of independence united with security. They were allowed the management of their internal affairs, and the high-priest was their chief magistrate. In this manner they lived quietly and unnoticed, but yet thriving, for about two centuries, till the year 333 B.C., when Alexander, after gaining the battle of Issus, appeared in Syria. Jerusalem made its submission, and was spared by the conqueror. After Alexander's death, Judæa fell under the dominion of the Ptolemies, who showed favour to the Jews, and planted colonies of them in their capital Alexandria, and at Cyrene. The high-priests continued to have the direction of the internal administration of the country. From the Ptolemies Judæa passed under the rule of the kings of Syria, under the reign of Antiochus the Great, 198 B.C. Antiochus visited Jerusalem, and confirmed the privileges which the Jews had enjoyed under the Ptolemies; but under the reign of his second son Antiochus Epiphanes, owing to the intrigues of several aspirants to the high-priesthood, an insurrection broke out in Jerusalem, which was put down by Antiochus with great slaughter of the inhabitants. Antiochus now attempted what no one had attempted before him, to force the Jews to renounce their God and worship Jupiter of Olympus, whose statue was erected on the altar of the Temple. The Jews generally refused. Great cruelties were committed by the officers of Antiochus against the recusants in every part of Judæa, until a spirited resistance begun by Mattathias, and continued under his son Judas, styled Maccabee, had the effect of delivering the country from the hateful oppression of the Syrians. [MACCABEES.] The Maccabees were a family of heroes. After the death of Judas and two of his brothers who fell in battle, Jonathan, another brother, continued the struggle, and having formed an alliance with Rome, was left at last in quiet possession of Judæa. A revolution in the kingdom of Syria added to his strength and importance. Alexander Balas, who claimed the crown of Syria, offered Jonathan the high-priesthood and exemption from all tribute and taxes, besides other advantages, if he would support him against his rival Demetrius. Jonathan assented, and Balas having seated himself on the throne, 150 B.C., presented Jonathan with a purple robe, and appointed him meridarch of Judæa, a title which, under his successors, was changed into that of king. With Jonathan begins the dynasty of the Asmonæans, or 'Illustrious,' which ruled Judæa for about a century, and under which the country resumed a degree of independence and splendour, which it had not experienced since the reigns of David and of Solomon. [ASMONÆANS.]

The last of the Asmonæan dynasty were put to death by Herod son of Antipater the Idumæan, who, with the support of the Romans, became king of Judæa, 38 B.C. [HEROD THE GREAT.] He died in the same year that Christ was born, although in the common chronology the birth of Christ is placed four years later. With Herod the independence of Judæa may be said to have expired. His son Archelaus was appointed ethnarch of Judæa Proper, Idumæa, and Samaria; his brother Herod Antipas had Galilee and Peræa; to Herod Philip were given the provinces of Trachonitis, Batanæa, and Gaulonitis, east of the Jordan, and another Philip had Ituræa. Thus the dominions of Herod were dismembered between four of his sons, who are accordingly styled Tetrarchs in the New Testament. Archelaus was summoned to Rome after a reign of nine years, to answer certain charges brought against him by his subjects, and was banished by Augustus to Vienne in Gaul. Judæa thus became a Roman province, or rather a district dependent on the great province or prefecture of Syria, though administered by a special governor, a man usually of the Equestrian order. This is the state to which Judæa was reduced in the time of our Saviour. The Jews however continued to enjoy the exercise of their religious and municipal liberties.

Under the reign of Claudius, Herod Agrippa, grandson of Herod the Great, who had been already appointed by Caligula ethnarch of Galilee, was appointed king of Judæa and all the former dominions of his grandfather, but he died three years after, at Cæsarea in Palestine, A.D. 44: this is the Herod mentioned in chapter xii. of the *Acts*. His son, called likewise Herod Agrippa, was then a minor, and Judæa relapsed into a Roman province. In A.D. 53 Claudius gave to Agrippa the provinces east of Jordan, which had belonged to Philip the Tetrarch, and Nero added to them part of Galilee. But Judæa and Samaria continued to be administered by Roman procurators. Herod however was entrusted by the emperor with the superintendence of the Temple and the right of appointing and deposing the high-priest at Jerusalem, and he occasionally resided in that city, while the Roman governor generally resided at Cæsarea. This second Herod Agrippa is the one mentioned in *Acts*, xxv., xxvi., there styled King Agrippa, whom St. Paul addressed in so impressive a manner in his defence. Agrippa was present at the final catastrophe of Jerusalem.

A succession of more than usually rapacious Roman governors, Felix, Albinus, and Florus, had driven the Jews to the verge of despair. A tumult, which broke out at Cæsarea between the Greeks and the Jews, followed by fresh exactions and cruelties of Florus, who seemed to wish to drive the people into insurrection, led the way to an open revolt against the Romans. Agrippa, who, with his sister Berenice, happened to be at Jerusalem, remonstrated with the people on the rashness of the attempt, but in vain, and he withdrew to his own dominions. A party called the Zealots, or fanatics, now obtained the ascendency over the minds of the people, and the feeble Roman garrison was overpowered and massacred. At the same time the Greeks of Cæsarea massacred all the Jews in that city, and the Roman governor Florus took no notice of the transaction.

Other cities of Palestine and Syria followed the example of Cæsarea by a wholesale butchery of the Jews. The Jews retaliated in those towns of Palestine where they were the majority by murdering the Syrians and Greeks. Cestius Gallus, the prefect of Syria, who had winked at the exactions of Florus, now advanced against Jerusalem with one legion and many auxiliaries, but he was obliged to retire, and was completely defeated by the insurgents in his retreat, with the loss of nearly 6000 men. The revolt now became universal throughout Judæa and Galilee. Nero, who received the news in Achaia, sent for Vespasian, an officer of tried abilities, and gave him the command of Syria, A.D. 66-7. Vespasian assembled his forces at Ptolemais, where he was joined by Agrippa and by his own son Titus. His army, including auxiliaries, amounted to 60,000 men. For one year he employed himself in scouring the country and reducing the strongholds of the Jews. In the following year, A.D. 68, he was advancing to form the siege of Jerusalem, when he received the news of Nero's death, followed by the rapid succession of Galba, Otho, and Vitellius. Vespasian kept his troops ready for a more important enterprise than the taking of Jerusalem. That city had in consequence a respite of nearly two years, during which however the inhabitants destroyed each other through intestine factions. At last Vespasian was proclaimed emperor, and having defeated Vitellius and entered Rome, he sent his son Titus to complete the subjugation of Palestine. The regular siege began in the spring of A.D. 70, and it lasted till the following September, when Jerusalem was finally taken and totally destroyed, with its temple: the inhabitants were killed or sold as slaves. The fearful events of that siege are narrated by Josephus. The Arch of Titus at Rome is a standing record of the conquest. The landed property of the country was put up to sale. Still the Jewish population was by no means extirpated from the country, and we find them rising in vast numbers in the reign of Hadrian, and again engaging the Roman legions commanded by Severus. They were however overpowered with immense slaughter, and the second desolation of Judæa took place. [BARCOCHEBA; HADRIAN.]

Hadrian issued an edict forbidding circumcision, the reading of the Mosaic law, and the observance of the Sabbath.

The dispersion of the Jews over the world, which is commonly dated from the destruction of Jerusalem, had in reality begun long before. The Ptolemies had transplanted large colonies of them into Egypt, Cyrene, and Cyprus; and Antiochus the Great settled great numbers in the towns of Asia. In the time of Cicero (*Pro Flacco*) there was a wealthy Jewish community in Italy. A passage of Philo, in his letter of Agrippa, enumerates the countries in which the Jews were settled in the time of Caligula: Egypt, Syria, Pamphylia, Cilicia, the greatest part of Asia Minor as far as Bithynia, the shores of the Euxine, Macedonia, Thessaly, Ætolia, Attica, the Peloponnesus, Cyprus, and Crete, besides the countries beyond the Euphrates; for at the end of the Babylonish captivity many Jews voluntarily remained in Mesopotamia, where they continued to form for several centuries a considerable community, alternately under the Parthian and Roman dominion. After the final destruction of Jerusalem, the Mesopotamian Jews acknowledged an hereditary chief, who was called 'the prince of captivity,' while the western Jews, who were scattered all over the Roman empire, had their spiritual head in the patriarch of Tiberias. The civil condition of the Jews throughout the Roman empire has been not unaptly compared with that of the Greeks under the Turks.

Under the Antonines and other succeeding emperors the harsh provisions of the edict of Hadrian were either revoked or allowed to lie dormant, and the Jews were left to follow their old usages and rites, being only prohibited from making proselytes. New synagogues were erected by them, and schools opened in the principal cities of the empire. The Jews by means of their commercial industry acquired considerable wealth, many of them obtained the rank of Roman citizens, and at the same time exemption from military service. During this period of peace, Rabbi Jehuda, one of the patriarchs of Tiberias, composed the 'Mischna,' or code of traditional law, in which he embodied all the authorized interpretations of the Mosaic law, the traditions, the decisions of the learned, and the precedents of the courts or schools. At a later period Rabbi Ascha, a learned Mesopotamian Jew, with the assistance of his disciples, compiled the 'Gemara,' which, with the 'Mischna,' forms the 'Babylonian Talmud,' a work in which the most absurd traditions are mixed up with wise precepts, profound allegories, and pleasing moral apologues.

Constantine made several laws concerning the Jews, one forbidding them to endanger the lives of Christian converts, another prohibiting Christians from embracing Judaism, and a third prohibiting Jews from possessing Christian slaves. Under his successor Constantius an insurrection which broke out in Judæa, and another tumult at Alexandria, in which the Jews were deeply implicated, gave occasion to fresh enactments against them: they were heavily taxed, were forbidden to marry Christian women, and the edict of Hadrian, which prohibited their approaching near to Jerusalem, was formally renewed.

Julian favoured the Jews and proposed to restore their temple. Some extraordinary appearances which are related by Ammianus Marcellinus frightened the workmen who were employed in the restoration, and the death of Julian put an end to the design. Under the following emperors the Jews were protected by the state, though often annoyed by the intemperate zeal of the more violent Christian churchmen. Laws were passed by Theodosius, and confirmed by Arcadius and Honorius, recognising the power of the Jewish patriarch to punish the refractory members of their own community, and the prefects were forbidden from interfering with his judicial authority. In disputes with Christians both parties appeared before the ordinary tribunals. Under Theodosius II. the Jews were forbidden from publicly celebrating certain festivals which occasioned collisions between them and the Christians.

Theodoric and the other Gothic kings of Italy protected the Jews. During the frequent wars and invasions of that period the Jews had the slave-trade of Europe in great measure in their hands; and several councils and Pope Gregory I. interfered to prevent their abusing the power which they had thus acquired over the persons of Christians. That wise and humane pope, in his pastoral letters, bewails and denounces this traffic, which was carried on in Italy, Sicily, Sardinia, and France; he directs the bishops to interfere so as to prevent Jews from retaining Christian slaves when a proper price was offered for them. On another occasion he directs that those Christian slaves who had been long in possession of Jewish landed proprietors should be considered as villains attached to the soil, and should not be transplanted or sold away; he also entreated the Frankish kings to banish the traffic in slaves from their dominions.

Justinian was one of the first who enacted really oppressive and intolerant laws against the Jews. In litigations between Christians and Jews, or between Christians only, the testimony of a Jew or Samaritan was to be rejected; in the litigations of Jews among each other, the Jew's testimony was admitted, but that of a Samaritan or a Manichæan was of no value. By another law, all unbelievers, heathens, Jews, and Samaritans could neither be judges, nor prefects, nor fill any other dignity in the state. Justinian also enacted that in mixed marriages between Jews and Christians the chief authority over the children should rest with the Christian parent. A Jew parent could not disinherit his Christian child. But the Samaritans were treated more harshly: they were entirely deprived of the right of bequeathing or conveying their property to unbelievers. Those of their children who embraced Christianity inherited to the exclusion of the rest. Samaritans could not sue in courts of law. Their synagogues were ordered to be destroyed. By a subsequent edict, and on the humane interposition of Sergius, bishop of Cæsarea, Justinian somewhat mitigated the rigour of these enactments against the Samaritans, but his son Justin again enforced the original statutes against them. The effect of this persecution seems to have been to extinguish gradually that once flourishing community, the members of which probably embraced Christianity for the preservation of their property. In subsequent history the Samaritans no longer appear as a separate people. In the seventeenth century however a small community of them was discovered in the neighbourhood of their holy Mount Gerizim, who still possessed the law in the old Samaritan character, and their descendants exist to this day.

The Jews however were too numerous and strong to be annihilated, like the Samaritans, by imperial edicts: they had even the power of revenge. When Chosroes II. invaded Syria, the Jews of Palestine rose to join the Persians, with whom they entered Jerusalem, then a Christian city, and perpetrated a dreadful slaughter of the Christian inhabitants. They are said to have purchased at a cheap price the captives of their allies the Persians, for the sake of murdering them. The victories of Heraclius however soon put an end to their momentary triumph.

The rise of Mohammedanism brought an unfavourable change to the Eastern Jews; Mohammed endeavoured at first to win them over, but the Jews would not acknowledge a descendant of Hagar the bondwoman as the greatest of prophets, and Mohammed treated them without mercy in Arabia, where they were at that time numerous. But under the Caliphs his successors they were protected on the easy terms of paying tribute, and as they made no resistance, they experienced not only protection but even encouragement from their new masters, whom they followed through their tide of conquest along the coast of Northern Africa. They also contributed materially to the triumph of the Crescent in the Spanish Peninsula.

In Spain, under the Gothic kings, the Jews had experienced the first of those sweeping proscriptions, which they were doomed to suffer in every country of Christian Europe. A series of oppressive laws was passed against them under the significant title of 'Statutes against Jewish Wickedness, and for the General Extirpation of Jewish Errors.' At last King Sisebut commanded them either to forsake their religion or to leave the country. Many fled, others were thrown into prison, and 90,000 are said to have received baptism. The fourth council of Toledo mitigated the rigour of the laws against the Jews by declaring 'that men ought not to be compelled to believe by force, although all who had once embraced the faith must be constrained to adhere to it.' But the eighth council of Toledo, A.D. 653, reinforced the former statutes against the Jews, and following councils enacted more rigorous laws. One hundred lashes on the naked body, chains, mutilation, banishment, and confiscation, were the punishment of those who observed Jewish practices and rites. All converted Jews were put under the strictest surveillance. The acts of the twelfth council of Toledo concerning the Jews are a complete model of ecclesiastical intolerance and refinement in persecution. Under King Egica, while the Saracens were spreading along the shore of Africa opposite to Spain, a general conspiracy of the Jews was reported, and another council passed a decree to disperse the whole race as slaves, confiscate their property, and seize all their children under seventeen years of age, to be brought up as Christians. Many escaped to return with the Saracen invaders, and the munificence of the Mohammedan princes towards them indicates that by their knowledge of the country the Jews had been highly instrumental in advancing the conquest. In Moorish Spain the Jews had really a golden age, which lasted for centuries. There they cultivated science and learning; and the names of Benjamin of Tudela, Isaac of Cordova, Hasdai, the confidant of Abderrahman, and a host of others, attest their proficiency. Rodriguez de Castro (*Bibliotheca Española*) and Vicente Ximeno (*Escritores del Reyno de Valencia*) give notices of the writings of the Spanish Jews. At the same time they were thriving in the East under the caliphs of Bagdad, whose favour they enjoyed, at least till towards the end of the tenth century.

Charlemagne protected the Jews like his other subjects: they filled municipal offices; they were physicians and bankers; and Isaac, a Jew, was chosen by that emperor as his ambassador to Harun al Rashid, caliph of Bagdad, a mission which was considered of the greatest importance at the time. The Jews enjoyed the same or even greater influence under Louis le Debonnaire and Charles the Bald, but towards the end of the latter reign the clergy began afresh to show their hostility. The Council of Meaux re-enacted the exclusion of the Jews from all civil offices; but it was under the third or Capet dynasty that the Jews suffered real persecution in France. Philippe Auguste, pressed by the wants of an empty exchequer, and perhaps also by the reports of fanatics, who charged the Jews with all sorts of crimes, banished, A.D. 1180, all the Jews from his dominions, confiscated their property, and declared all debts due to them to be annulled. About twenty years afterwards the Jews were allowed to re-enter France, which they did in great numbers. This was the beginning of a series of alternate proscriptions and relaxations, continued under the following reigns for about two centuries, until they were finally expelled under Charles VI.

In Germany about the same age they suffered under sudden bursts of popular fanaticism. They were massacred at the cry of 'Hep,' 'Hep,' the initials of the words 'Hierosolyma est perdita.' St. Bernard and Pope Eugenius III. loudly reprobated these atrocities. In Italy the Jews seem to have enjoyed greater, though not always uninterrupted security, but their safest asylum was Poland, where Casimir the Great allowed them considerable privileges, and where they formed the only middle order between the nobles and the serfs. It was in Spain and Portugal, after the expulsion of the Moors, that the proscription of the Jews was most sweeping and effectual. The regular Inquisition established under Ferdinand and Isabella undertook the task of punishing all relapsed converts. As for the unconverted Jews, the edict of 1492, made at the instigation of the Inquisitor Torquemada, banished them all from the kingdom. The number of Jews thus expelled from Spain has been vaguely estimated at half a million, and even 800,000. They were allowed to carry away or sell only their moveables. Few of them consented to embrace Christianity in order to remain. Soon afterwards they were driven away from Portugal also with circumstances of still greater barbarity. Many perished, and others took refuge on the African coast. The expulsion of the Jews and that of the Moors or Moriscoes drained Spain of its most useful subjects.

Throughout the dominions of the Sultan the Jews were allowed to settle and follow their trades, though looked upon with scorn by the Osmanlees. In the regencies of Barbary they settled likewise in great numbers.

During the eighteenth century a milder spirit of toleration manifested itself towards the Jews in several countries of Europe. Maria Theresa and Joseph I. gave them equal rights and subjected them to the same laws with the Christians. Frederic, called the Great, was not so liberal towards them, for he laid them under peculiar restrictions and disqualifications. In Holland they have long formed a highly flourishing, numerous, honourable, and intelligent community.

Napoleon in 1806 assembled a sanhedrim at Paris, and submitted to them twelve questions concerning the moral and social doctrines and discipline of the Jews. Their answers being found satisfactory, an ordinance was issued giving the Jews a regular organization throughout France, and placing them on the same footing as other Frenchmen. This system has remained unaltered. The king of Prussia and other German powers have followed the example. In Russia the Jews are subject to many restrictions, and especially the Rabbins.

The Jews in France are reckoned at 50,000; in Italy about 36,000; in the Austrian empire 520,000; in Prussia 135,000, in the rest of Germany 138,000; in Holland and and Belgium 80,000; in Great Britain 30,000; in Russia and Poland 658,000; in the Turkish dominions they have been vaguely estimated at 800,000; in Persia they are few and oppressed. There are communities of them at Bokhara and other parts of Tartary, in India, and even in China. In the United States they are reckoned at about 5000.

(Jost, *Allgemeine Geschichte des Israelitischen Volkes;* Millman, *History of the Jews;* Josephus; Basnage; Beer, *Geschichte aller Bestandenen und noch Bestehenden Religiösen Sekten der Juden;* Beugnot, *Les Juifs d'Occident.* Lindo's *Jewish Calendar* contains a Chronological Table, in which some of the dates differ from some of those given in this article.)

It does not appear at what time the Jews found their way to this island, but they were settled here in the Saxon period, and as early as A.D. 750. From the time of the Conquest the Jews in England rapidly increased in number. Under the first three Norman kings they lived undisturbed, so far as we are informed, and apparently acquired great wealth. But under Stephen and his successors they suffered grievously from the rapacity of the kings and the bigoted intolerance of the people. The cruel persecutions which they experienced from all persons, both lay and ecclesiastic, poor and rich, are fully attested, not by their own writers, but by the evidence of their enemies. Finally, in the reign of Edward I., about A.D. 1290, all the Jews were banished from the kingdom. Their numbers at that time are conjectured (but on what grounds we are not aware) to have been between 15,000 and 16,000. It was not till after the Restoration, A.D. 1660, that the Jews again settled in England; and though under the Protectorate they had entered into negotiations with Cromwell to obtain permission to enter the island, nothing seems to have been done in the matter, and those who have investigated the subject bring forward no proof of leave being formally granted to them to return. After the Restoration it seems probable that they came in gradually without either permission or opposition, and since that time foreign Jews have been on the same footing as other aliens with respect to entering the country. In the year 1753 an act was passed to enable foreign Jews to be naturalized without taking the sacrament; but the act was repealed in the following session, under the influence of the popular feeling, which was most strongly opposed to the measure of 1753. Since this year no legislative act has passed with special reference to the Jews, and they have lived in the United Kingdom unmolested. It is said that the number of Jews in London alone is about 18,000, and in the rest of England about 9000. The number in Scotland and Ireland is probably small, but we are not aware that there is any good estimate as to their numbers in these parts of the United Kingdom.

During their residence in England, up to their banishment in the time of Edward I., the Jews were considered as the villains and bondsmen of the king, a relation which seems to explain the power over their persons and property which was assumed and exercised by the king in the most oppressive manner. They however could purchase and hold land, subject only to the right of the king, whatever it might be, to levy heavy taxes on them and seize their lands if they were not paid. By the act of the 55th of Henry III. the Jews were declared incapable of purchasing or taking a freehold interest in land, but might hold, as in time past they were accustomed to hold, houses in the cities, boroughs, and towns where they resided. Another act, 3 Edward I., forbade Jews from alienating in fee, either to Jew or Christian, any houses, rents, or tenements which they then had, or disposing of them in any way without the king's consent; they were permitted to purchase houses and curtilages in the cities and boroughs where they then resided, provided they held them in chief of the king; and they were further permitted to take lands to farm for any term not exceeding ten years; such permission however was not to continue in force for more than fifteen years from the date of the act. Since the time of their banishment no statute has been passed which in direct terms affects the right of the Jews to hold real estates in England; and it has been a matter of dispute whether they can now legally hold such estate. It has been contended that the act called the 55th Henry III. is not an act of parliament, but only an ordinance of the king, which however, to say the least, seems a very questionable proposition. Some Jews, we believe, do hold real estate, and it is contended by some that they are legally entitled to do so. It is out of the place here to discuss this question, and the reader is referred to the authorities at the end of the article.

The Jews are still incapacitated from being members of parliament and filling various offices in this country. The act of the 9th Geo. IV., c. 17, substitutes for the sacramental test a form of declaration to be made by every person, within one calendar month next before or upon his admission into any of the corporate offices mentioned in that act, or within six calendar months after his appointment to any place mentioned in the fifth section of that act. As this declaration contains the words 'upon the true faith of a Christian,' it has the effect of excluding Jews from corporate offices, and, in connection with the Abjuration Act, from places under government, so far as they are not relieved by the Annual Indemnity Act. The abjuration oath, which contains the same words, has the effect of excluding the Jews from parliament. (1 Geo. I., st. ii., c. 13; 6 Geo. III., c. 53.) Several attempts have been made, but hitherto unsuccessfully, to remove these impediments to the Jews being on the same footing as other British subjects.

It seems to be the general opinion that the Jews are within the benefit of the Toleration Act of the 1 William and Mary, as extended by the 53 George III., c. 160. The following disability is a singular one. It has been decided that a legacy given for the instruction of Jews in their religion is not one which will be supported by the Court of Chancery, though any other kind of charitable bequest for the benefit of Jews is valid. It is a vulgar error, still entertained by some people, that Jews, even if born in this country, are aliens. Perhaps it is hardly necessary to remark that they are British subjects, like any other persons who are born here.

(Blunt's *History of the Establishment and Residence of the Jews in England, with an Enquiry into their Civil Disabilities*, London, 1830; Goldsmid's *Remarks on the Civil Disabilities of British Jews*, London, 1830.)

JIDDA. [ARABIA.]

JIG, or GIGUE, an animated quick dance-tune, in six-eight time, to be found in the sonatas of Corelli, Handel, and other composers, till towards the middle of the eighteenth century. The *jig*, or at least the name, is unknown in modern music; though in a French work, of quite recent date, we are told that it is still in use in England.

JOAN, POPE, a supposed individual of the female sex, who is placed by several chroniclers in the series of popes between Leo IV. and Benedict III. about A.D. 853-5. The first who mentions the story is Marianus Scotus, a monk of the abbey of Fulda, who died at Mainz, A.D. 1086, and who says in his chronicle, under the year 853, the 13th year of the reign of the emperor Lotharius, that Leo IV. died on the 1st of August, and that to him succeeded Joan, a woman, whose pontificate lasted two years, five months, and four days, after which Benedict III. was made pope. But Anastasius, who lived at the time of the supposed Pope Joan, and who wrote the lives of the popes down to Nicholas I. who succeeded Benedict III., says, that fifteen days after Leo IV.'s death Benedict III. succeeded him. It is true that some manuscript copies of Anastasius, among others one in the king's library at Paris, contain the story of Joan, but this has been ascertained to be an interpolation of later copyists, who have inserted the tale in the very words of Martinus Polonus, a Cistercian monk and confessor to Gregory X., who wrote the lives of the popes, in which, after Leo IV., he places 'John an Englishman,' and then adds, 'Hic, *ut asseritur*, fœmina fuit:' he then goes on to say that this Joan when a young woman left her home in man's disguise, with her lover, a very learned man, and went to Athens, where she made great progress in profane law; afterwards she went to Rome, where she became equally proficient in sacred learning, for which her reputation became so great that at the death of Leo she was unanimously elected as his successor, under the general belief of her male sex. She however became pregnant, and one day as she was proceeding to the Lateran Basilica, she was seized in child-labour on the road between the Colosseum and the Church of St. Clement, and there she died and was buried without any honours, after a pontificate of two years, five months, and four days. The story was generally copied from Martinus by subsequent writers, and Platina himself, in his 'Lives of the Popes,' repeats it on the authority of Martinus, adding various other reports concerning the 'sella stercoraria,' &c., and concluding with these words: 'The things I have above stated are current in vulgar report, but are taken from uncertain and obscure authorities, and I have inserted them briefly and simply, not to be taxed with obstinacy.' Panvinius, Platina's continuator, subjoins a very critical note, in which he shows the absurdity of the tale, and proves it to have been an invention. But the best dissertation on the subject is that of David Blondel, a Protestant, who completely refutes the story in his *Familier Eclaircissement de la question si une Femme a été assise au Siège Papal entre Leon IV. et Benoit III.*, Amsterdam, 1649. There are critics who contend that it is only the later MSS. of the 'Lives of the Popes' by Martinus Polonus which contain the tale of Pope Joan, and that those MSS. which were written during the life or soon after the death of Martinus do not contain it. It is evident however that the story was in circulation already in the 12th century, long before the time of Martinus, as Etienne de Bourbon de Belleville, a companion of St. Dominic, in his treatise 'De Septem Donis Spiritus Sancti,' under the head of 'Prudentia,' relates from 'the Chronicles' the story of Pope Joan, but places it about the year 1100, and says that on the discovery of her sex she was stoned to death by the people. These authorities prove at all events that the Protestants did not invent the tale of Pope Joan, as they have been accused of having done.

JOAN I. of Naples, daughter of King Robert of Naples, of the Anjou dynasty, succeeded her father in 1343. She was then only sixteen years of age, handsome, and accomplished. She had been married already some time to her cousin Andreas of Hungary, but their tempers and tastes did not sympathise together. Andreas claimed to be crowned king and to share his wife's authority, which, by the will of her father, had been left solely to her. His coarse and haughty manners offended the proud native barons, and the Hungarian guards which attended him excited their jealousy. A conspiracy was formed, and one night, while the court was at Aversa, the conspirators, who were of the nobles near his person, seized and strangled him, and threw his body out of a window of the castle. There seems little or no doubt that Joan knew of the plot, and that she did nothing to prevent the crime. As soon as it was perpetrated she repaired to Naples, and thence issued orders for the apprehension of the murderers. Torture was employed to find out the conspirators, but the result of the interrogatories was kept secret. Many persons, high and low, were put to a cruel death, but public opinion still implicated the queen herself in the conspiracy. The same year Joan married her relative Louis, prince of Tarentum. Louis, king of Hungary, and brother of Andreas, came with an army to avenge his brother's death. He defeated the queen's troops, entered Naples, and Joan took refuge in her hereditary principality of Provence. She repaired to Avignon, and there, before Pope Clement VI., she protested her innocence and demanded a trial. The pope and his cardinals acquitted Joan, who, from gratitude, gave up to the papal see the town and county of Avignon. A pestilence in the mean time had frightened away the Hungarians from Naples, and Joan, returning to her kingdom, was solemnly crowned with her husband in 1351. Joan reigned many years in peace over her fine dominions. Having lost her second husband in 1362, she married a prince of Majorca, and on his death she married, in 1376, Otho, duke of Brunswick; but having no children by any of her husbands, she gave her niece Margaret in marriage to Charles, duke of Durazzo, who was himself related to the royal dynasty of Anjou, and appointed him her successor. Soon afterwards the schism between Urban VI. and Clement VII. broke out, and Joan took the part of the latter. Urban excommunicated her, and gave the investiture of the kingdom to Charles Durazzo, who, with the darkest ingratitude, revolted against his sovereign and benefactress: with the assistance of the pope he raised troops, defeated the queen, and took her prisoner. He tried to induce Joan to abdicate in his favour, but the queen firmly refused, and named as her successor Louis of Anjou, brother of Charles V., king of France. Charles then transferred Joan to the castle of Muro, in Basilicata, where he caused her to be strangled or smothered in her prison, in 1382, thirty-seven years after the death of her first husband Andreas.

JOAN II., daughter of Charles Durazzo, and sister of Ladislaus, king of Naples, succeeded the latter after his death in 1414. She was then forty-four years of age, and already noted for licentiousness and weakness of character. After her exaltation to the throne she continued in the same course, only with more barefaced effrontery. She however married, from political motives, James, count de la Marche, who was allied to the royal family of France; but the match, as might be expected, proved most unhappy. James was obliged to run away in despair from Naples, and retired to France, where it is said that he ended his days in a convent. Meantime unworthy favourites ruled in succession at the court of Joan. One of them, Ser Gianni Caracciolo, of a noble family, saw his influence disputed by the famous condottiere Sforza Attendolo, who, together with many barons that were jealous of Caracciolo, took the part of Louis of Anjou, a grandson of that Louis to whom Joan I. had bequeathed the crown. The queen sought for support in Alfonso of Aragon, king of Sicily, whom she adopted, and appointed her successor. Alfonso came to Naples, but the fickle Joan having made her peace with Sforza, revoked her adoption of Alfonso, and appointed Louis of Anjou as her successor. Alfonso was accordingly obliged to return to Sicily. The favorite Caracciolo was soon after murdered in consequence of court jealousy and intrigue. Louis of Anjou died also, and was followed to the grave by Joan herself, who, on her death, appointed René of Anjou as her successor. She died in 1435, leaving her kingdom in great disorder, and with the prospect of a disputed succession and a civil war. [ALFONSO V. of Aragon.]

JOAN OF ARC. [ARC, JOAN OF.]

JOA'NNINA, or YA'NINA, a city of Albania, situated in a valley in the heart of that province, on the south-western bank of a lake, from which a subterraneous stream flows into the Kalamá, the Thyamis (*Θύαμις*) of the antient Greeks. Joannina is in 39° 47′ N. lat., 20° 53′ E. long., according to the map prefixed to Colonel Leake's 'Travels in Northern Greece' (London 1835). Its site is about 1000 feet above the level of the sea.

The origin and early history of this town are very obscure. In the later period of the Lower or Byzantine Empire it gradually rose to be the chief city of that part of Greece which lay to the west of Mount Pindus. It is probably not very far from the site of the antient Dodona. In the seventh and following centuries, to the eleventh, the country around became a field of contention between the Byzantine Greeks and the Wallachians and Sclavonians, large colonies of whom settled in the district; but Joannina seems to have continued in the hands of the Greeks till the year 1082, when it was taken by the Normans under Bohemond (son of Robert Guiscard), who defeated the emperor Alexius Comnenus under the walls of the town. In the wars which subsequently desolated Western Greece it passed into the hands of the Frankish princes of the Ionian Islands, and in A.D. 1431 or 1432 into those of the Turks. In A.D. 1611 an unsuccessful attempt of the Albanian Greeks to throw off the Turkish yoke occasioned the expulsion of all Greeks from the old town, now termed the Castron (*Κάστρον*), or fortified part of Joannina. This led to the extension of the city along the banks of the lake on each side of the Castron, and subsequent tranquillity tended so far to its increase, that under the sway of the late Ali Pasha it contained a population of more than 40,000 inhabitants, chiefly Greeks, the remainder Moslems and Jews. It had two citadels (the Castron and the fortress of Litarítza), three palaces, nineteen mosques, five tekés, or Turkish monasteries, six Greek churches, one of them metropolitan, and two Jews' synagogues. There were an hosiptal, capable of receiving 150 patients, a prison, and two endowed colleges or schools, one of 300 scholars and one of 100, at which the antient languages were taught, and to which excellent libraries were attached. There were several smaller schools. The Greek spoken at Joannina was purer than in Greece Proper. The town was commercial rather than manufacturing: the chief commerce was carried on with Constantinople, Russia, Venice and Malta, and with the smaller towns and villages of Epirus, of which Joannina was the mart. The place was well supplied with turkeys and fowls, turtle-doves and beccaficos; fish and wild-fowl from the lake, and game from the neighbouring mountains. Little animal food was consumed, and ducks and geese were scarce. The climate is variable, and fevers, especially nervous, are common. The plain round Joannina yields fruit and grain of most kinds in vast abundance.

The lake of Joannina is in its greatest length twelve or fourteen miles measured from north-west to south-east; the greatest breadth is about five miles, the least about half a mile to a mile. It is bounded on the north-east by the Mitzikéli mountains (a branch of Pindus), which rise with very steep ascent to the height of 2500 feet above the lake; on the south-east by a rocky mountain of moderate height crowned with the extensive ruins of an antient Epirote city, which Colonel Leake considers it probable was the antient Dodona. On the south-west side of the lake is the plain of Joannina, and beyond that a range of low vine-covered hills. Opposite the town of Joannina is a small island on which is a fishing village, containing, in Ali's time, about two hundred houses: on this island were several convents, frequently used as state prisons; Ali, who had a house on it, kept a herd of red deer. The lake abounds with fish, among them are pike, perch, carp, tench and eels: some of them are of great size, sometimes weighing 24 or 25 lbs. avoirdupois; the eels are very fine, and sometimes of six or seven lbs. weight. Myriads of wild-fowl breed in the covert of the lofty reeds which surround the lake.

The lake is very commonly represented as divided into two parts, the north-western part being called the Lake of Lapsista, the south-eastern that of Joannina. But the middle part is rather a marsh than a lake, and is traversed by two long channels which connect the two portions of the lake. The Lake of Lapsista is much reduced in its dimensions in summer, and maize is grown on the desiccated ground. The waters of both lakes are absorbed by subterranean channels; that which communicates with the river Kalamá is in the Lake of Lapsista.

JOB, the Book of, is one of the poetical books of the Old Testament. Its title is taken from the patriarch Job (אִיּוֹב) whose story it relates. Some critics have supposed, from the nature of the exordium, that Job was not a real person, and that the narrative in the book is fictitious. He appears however to be referred to as a real person by *Ezekiel* (ch. xiv., ver. 16), and *James* (ch. v., ver. 11); and the style of the book has all the circumstantiality of a real narrative. It has been inferred from his longevity (chap. xlii., 16), his holding the office of priest in his own family (chap. i., 5), his allusion to no other species of idolatry than the worship of the heavenly bodies (chap. xxxi. 26-28), the silence of the book respecting the history of the Israelites and the Mosaic laws, and several incidental allusions to patriarchal customs, that Job lived in the patriarchal age. Dr. Hales has attempted, by astronomical calculations, to fix the exact time of Job's trial at 184 years before the birth of Abraham. (Hales's *Chronology*, vol. ii., pp. 55-7, 2nd edit.) There is a genealogy of Job at the end of the Septuagint version of this book, which makes him the fifth in descent from Abraham. Some critics have discovered what they consider proofs of a much later date in the book itself.

The scene of the poem is laid in the 'land of Uz' (עוּץ), which, as Bishop Lowth has shown, is probably Idumæa.

The language is Hebrew, with a considerable admixture of Arabic, or, as others contend, of Aramaïc.

The author is unknown. The arguments already stated with respect to the age at which Job lived are considered by most critics to prove the very high antiquity of the book. Lightfoot and others have supposed that Elihu was the author. This idea is founded chiefly on a translation of ch. xxxii., 16-17, the correctness of which is very doubtful. A very general opinion among critics ascribes it to Moses. Dr. Mason Good has concluded, from the character of the book, that the writer must have possessed certain qualifications of style, knowledge, country, and age, which are to be found in Moses alone. The same writer has collected a number of passages in which he sees a resemblance to the sentiments and style of Moses (Good's *Book of Job, Prelim. Disc.*, p. lvii., &c.) On the other hand Bishop Lowth remarks, that the style of Job differs widely from the poetical style of Moses, being much more concise, and more accurate in the poetical conformation of sentences. Several critics, among whom is Eichhorn, assign to the book a date earlier than the time of Moses. Schultens, Lowth, and others suppose Job himself, or some contemporary, to have been the author, and that the book fell into the hands of Moses while he lived in Idumæa, and was used by him to teach the Israelites patience and submission to the will of God, either during their bondage in Egypt, or in their subsequent wanderings. It is alleged that this hypothesis solves all the difficulties arising out of the internal character of the book, and accounts for its admission into the canon of the Hebrew Scriptures. Other critics assign a much later date to the book; several have ascribed it to Solomon, chiefly on the ground of a resemblance between certain passages in it and in the 'Proverbs.' Umbreit places it at the time of the Babylonish captivity (Umbreit's *Version of the Book of Job*, in the *Biblical Cabinet*, Introduction).

The canonical authority of the Book of Job is fully established by frequent quotations from it, both in the Old and New Testament. Several examples are pointed out in the notes to Good's version.

The design of this book appears to be to teach patience under suffering from the doctrine of a Divine Providence governing all things. It consists of a controversy between Job and three friends who came to visit him in his distress, on the question whether men enjoy prosperity or suffer adversity in this life according as their actions are good or wicked. At ch. xxxii. a new disputant is introduced in the person of Elihu, who reproves both parties for the sentiments they had expressed; and at length the dispute is decided by the interposition of God himself. The integrity of Job, which his friends had called in question on account of his calamities, is vindicated; and he is restored to possessions twice as great as he had before his trial. (Compare *James*, v., 10, 11.)

(The *Introductions* of Eichhorn, Jahn, De Wette, and Horne; Dr. Mason Good's *Translation of the Book of Job*; Lowth's *Lectures on the Sacred Poetry of the Hebrews*, lectures xxxii., xxxiii. For a list of Commentators see Watt's *Bibliotheca Britannica*.)

JOEL (יוֹאֵל, Ιωηλ), one of the twelve minor Hebrew prophets. In the first verse of the first chapter of his prophecy we are told that he was the son of Pethuel. Beyond this we have no certain information respecting him. The pseudo-Epiphanius states that he was born at Beth-horon, on the confines of Judah and Benjamin. He prophesied in the kingdom of Judah, but in what reign is uncertain. The most probable opinion is that which places his prophecy in the reign of Uzziah, contemporary with Amos and Hosea, between 800 and 780 B.C. He appears to refer to the same events as Amos (compare *Joel*, ch. i. with *Amos*, ch. iv., 6-9, and *Joel*, ii., 4-6 with *Amos*, i., 9, 10); and he does not mention the Assyrians or the Babylonians among the enemies of Judah, but only Egypt and Edom (ch. iii., 19). Other opinions have referred him to the reign of Joram (B.C. 895—883), and to that of Manasseh (B.C. 697—642).

The prophecy of Joel may be divided into two parts. In the first he describes a famine caused by the ravages of insects, and exhorts the people to repentance; denouncing still greater judgments if they continue impenitent, and promising the return of prosperity and plenty if they attend to his warning. The second part, beginning at ch. ii., ver. 28, alludes to events much more remote. The prophetic passage in ch. ii., ver. 28-32, is quoted by the apostle Peter as accomplished by the miraculous gift of tongues on the day of Pentecost (*Acts*, ii. 17-21). The remainder of the prophecy is supposed to be at present unfulfilled.

The canonical authority of this book has never been disputed. It is established by other quotations in addition to the remarkable one just mentioned.

Bishop Lowth (*Prælect.*, xxi.) remarks on the style of Joel: 'He is elegant, perspicuous, copious, and fluent; he is also sublime, animated, and energetic. In the first and second chapters he displays the full force of the prophetic poetry, and shows how naturally it inclines to the use of metaphors, allegories, and comparisons. But while we allow this just commendation to his perspicuity both in language and arrangement, we must not deny that there is sometimes great obscurity observable in his subject, and particularly in the latter part of the prophecy.'

(Rosenmüller's *Scholia*; Horne's *Introduction*; and list of commentators in Watt's *Bibliotheca Britannica*.)

JOHANNA. [ANZUAN.]

JOHANNISBERG. [NASSAU.]

JOHN, SAINT, THE BAPTIST, son of Zachariah, a Jewish priest, and Elizabeth his wife, who was a near relation of Mary the mother of Jesus Christ, was born to them in their old age. The sacred office was assigned to him of being the precursor or herald of the Messiah. The history of the public ministry of Jesus begins with the acts of John the Baptist, whom we find withdrawing himself from the ordinary affairs of life and retiring to the desert country watered by the Jordan, where he preached in a fearless manner against the vices of the age, urged an immediate repentance, enforcing his exhortations by the announcement that the Kingdom of Heaven was at hand, and requiring of those who professed to receive him as their instructor that they should submit to the rite of baptism.

Amongst those who came to him and were baptized by him was Jesus Christ, who at his baptism was announced, both by the Baptist himself and by a voice from heaven, to be the Son of God, the Messiah.

From this time we hear little more of John till we find him in prison. He had ventured publicly to reprove Herod the king for an act of great immorality. Herod had married Herodias who was the wife of Philip, tetrarch of Idumæa, his own brother. The Baptist's reproof was resented more violently by Herodias than by Herod. The history is related by the Evangelists with all particulars. Salome, the daughter of Herodias, had so pleased Herod with her dancing at a public entertainment given by him, that he in an Oriental affluence of professed obligation said publicly, that he would give her whatever she would ask, even to the half of his kingdom. The little girl, for she was then extremely young, instructed by her wicked mother, asked the head of John the Baptist. Persons were immediately sent to the prison in which John was confined, who beheaded him, and delivered the head to the young princess, who carried it in a dish to her mother.

JOHN, SAINT, THE APOSTLE AND EVANGELIST. Among the persons who at the commencement of his ministry joined themselves to our Saviour were two brothers, named James and John, the sons of Zebedee. They were both admitted by him into the number of his Twelve Apostles, and John was throughout distinguished by him with peculiar marks of regard. He speaks of himself, in the account which he left of the ministry of Jesus, as the disciple whom Jesus loved: and whenever a very few only of the apostles were to be employed by Jesus, or to accompany him, John was always one of the number, James and Peter being usually the others.

At the Last Supper we find him leaning on the bosom of Jesus. He attended Jesus in the garden and in the hall of the high-priest. He accompanied him to Calvary, and when Jesus was hanging on the cross John drew near, and while the miraculous darkness struck fear into the hearts of those who were employed in the work of death, he entered into conversation with Jesus, who commended to him the care of his mother Mary. This dying request of our Lord the apostle seems to have regarded as a sacred injunction, for he took her from that time to his own house.

After the resurrection of Jesus he was again distinguished by his notice: and when Jesus had ascended to heaven, and the interests of the Gospel were committed especially to those who had been chosen by him out of the world, John became one of the leading persons in the church; acting in concert with the other apostles, and especially Peter and James, till the history in the 'Acts of the Apostles' ceases to notice what was done by the other apostles, and is confined to the travels and labours of Saint Paul.

Saint John's labours in the church were chiefly among the inhabitants of Syria and Asia Minor, and no doubt he had a large share in planting Christianity in those provinces, where for a time it flourished greatly. But Christian antiquity does not present to us many particulars of the labours of the apostles, and we learn from it respecting John little more on which dependence may be safely placed, than that he resided at Ephesus in the latter part of his life, and died in extreme old age.

Two pleasing stories are related of him by early Christian writers, deserving of regard: one, that when too feeble to do more, he was wont to be carried into the assemblies of Christians at Ephesus, saying, as he went along, 'My little children, love one another.' The other respects his conduct to a young man who had joined a party of banditti. But when we read in those writers that he was thrown into a cauldron of boiling oil and came out unhurt, distrust arises, and we question the sufficiency of the evidence.

There is however little reason to doubt that he was at one period of his life banished to the island of Patmos, and that there he wrote the book called the 'Apocalypse,' or 'Revelation.'

There are also preserved three Epistles of his: but the most valuable of his writings which have descended to our time is the 'Gospel according to Saint John.' This Gospel is unlike the other three in several respects, and is supposed by those who have considered it to have been written with some especial purpose, either as a kind of supplement to the other Evangelists, which was the opinion of Eusebius, or with a view to the refutation of certain erroneous notions respecting our Saviour which had begun to prevail before the long life of Saint John was brought to a close. But with whatever design it was composed, it must ever be regarded as amongst the most valuable testimonies to the life, character, and doctrine of Jesus.

JOHN, king of England, surnamed Sansterre, or Lackland, a common appellation of younger sons whose age prevented them from holding fiefs, was the youngest of the five sons of Henry II. by his queen Eleanor of Guienne, and was born in the King's Manor House at Oxford, 24th December, 1166. In his youth he was created by his father earl of Montague in Normandy; and in 1176 he was contracted in marriage to Johanna (or Hadwisa, as she is called by some authorities), the youngest daughter of William earl of Gloucester (son of the great Earl Robert, natural son of Henry I.), who thereupon made Johanna his sole heir. The marriage was actually celebrated, 29th August, 1189. Henry, having after his conquest of Ireland obtained a bull from the pope authorising him to invest any one of his sons with the lordship of that country, conferred the dignity upon John in a great council held at Oxford in 1178. In March, 1185, John went over to take into his own hands the government of his dominions; but the insolent demeanor of the prince and his attendants so disgusted and irritated the Irish of all classes, that his father found it necessary to recal him in the following December. John however was his father's favourite son, in part perhaps from the circumstance that his youth had prevented him from joining in any of the repeated rebellions of his brothers; and it is said, that a suspicion began to be at last entertained by Richard, when, of the five brothers, he and John alone survived, that Henry intended to settle the crown of England upon the latter. According to this story, it was chiefly to prevent such an arrangement that Richard, joining Philip of France, flew to arms in January, 1189; but if so, it is difficult to account for the fact that John himself was found to be upon this occasion in confederacy with his elder brother, a discovery which was only made by their heart broken father upon his deathbed. [Henry II.]

No opposition was offered by John to the accession of Richard, who endeavoured to attach him by the gift of such honours and possessions as amounted almost to sharing the kingdom with him. In addition to his Norman earldom of Montague, and that of Gloucester, which he acquired by his marriage, those of Cornwall, Dorset, Somerset, Nottingham, Derby, and Lancaster were bestowed upon him, so that there was thus placed under his immediate jurisdiction nearly a third of England. Richard however had not been long absent when his ambitious brother proceeded to take his measures for at least securing the crown to himself in case of the king's death, if not for an earlier seizure of it. The person next in the regular line of succession was Arthur, duke of Brittany, the son of John's elder brother Geoffrey, an infant of little more than two years old at the accession of Richard, who however recognised him as his heir, and had desired that his rights should be maintained by William de Longchamp, the bishop of Ely, whom during his absence he left in charge of the government. John accordingly directed his first efforts to the removal of the bishop, which, having obtained the co-operation of a strong party of the barons, he at length accomplished by actual force, in October, 1191. When the intelligence of Richard's captivity arrived in 1193, John at once openly took steps for the immediate usurpation of the throne. Repairing in haste to Paris, he secured the aid of Philip Augustus by the surrender of part of Normandy, and then, returning to England, proceeded to collect an army for the maintenance of his pretensions. In this attempt however he was successfully resisted by the loyal part of the nobility; and he also failed in his endeavours to induce the emperor, by the promise of a large bribe, to retain his brother in prison. On the return of Richard to England, in March, 1194, John's castles and estates were seized by the crown, and he and his chief adviser, Hugh, bishop of Coventry, were charged with high treason. John fled to Normandy, whither he was followed by the king at the head of an army; but the traitor made his peace by an abject submission, and, his mother seconding his supplications for pardon, he was allowed to retain his life and his liberty, and even restored to some measure of favour, though the restitution of his castles and territorial possessions was for a time firmly refused. Even that however was at length granted to his importunities and those of his mother; and it is further said, that Richard, when on his deathbed, was induced to declare John his successor.

John was present when Richard expired at Chaluz, 6th April, 1199, and before visiting England he hastened to secure the submission of the various continental territories of the crown. Upon repairing to Anjou, and the other original possessions of the Plantagenets, he found the prevalent feeling strongly in favour of his nephew Arthur; but both in Normandy, and also in Poitou and Aquitaine, where his mother's influence was predominant, his pretensions were readily acknowledged. Meanwhile in England, by the activity of the justiciary Fitz-Peter, a unanimous resolution to receive him as king had been obtained from a great council held at Northampton. Soon after this John made his appearance in person; and he was solemnly crowned at Westminster, on the 26th of May, the festival of the Ascension. The years of his reign are reckoned from Ascension-day to Ascension-day.

Philip Augustus having, for his own purposes, espoused the cause of Arthur, whom he had got into his possession, soon overran both Normandy and Anjou; but in May, 1200, John purchased a peace by a heavy pecuniary payment and the cession of several towns and other territories to the French king, who on his part relinquished such of his conquests as were not thus permanently made over to him, and also compelled Arthur to do homage to his uncle for Brittany. The next year John, having become tired of his wife, or never having been attached to her, procured a divorce on the plea of consanguinity, and married Isabella, daughter of Aymar count of Angoulême, who had already been betrothed, and even privately espoused, to Hugh count of La Marche. The complaints of the count in consequence of this injury gave Philip such a pretence as he wanted for renewing the war: he immediately took Arthur again by the hand, and putting him forward as the legitimate lord of the old fiefs of the Plantagenets, rapidly obtained possession of all the most important towns and places of strength in those countries. Arthur however, while he was besieging the castle of Mirabeau in Poitou, which was held by John's mother, Queen Eleanor, was taken captive by his uncle (1st August, 1202): the unfortunate young prince was immediately consigned to close custody in the castle of Falaise, from which he was soon after removed to Rouen, and having never been seen more, was universally believed to have been there put out of existence by his uncle's order. Indeed, it was generally said that he had been murdered by John's own hand, an imputation which the latter never took the trouble to deny. Arthur's sister Eleanor, to whom devolved his claim to the inheritance of the English crown, was carried over to England, and confined in the castle of Bristol, in which prison she remained till her death in 1241. Notwithstanding the capture of Arthur however, the war in France went wholly against John; and before the end of the year 1204 Normandy, Anjou, Maine, and Touraine were rent from the crown of England, and re-annexed to that of France, from which they had been separated for nearly three centuries. Two years afterwards John made an unsuccessful attempt to recover what he had thus lost.

While still at war with France, John became involved in another contest at home, which was eventually attended with still more fatal results. By insisting upon the right of the crown to nominate the archbishop of Canterbury, on that see becoming vacant in July, 1205, he drew upon himself the formidable hostility of the whole body of the national clergy, and also of the able and imperious pontiff who then presided over the Western Church. [INNOCENT III.] John paid little regard either to the interdict under which his kingdom was laid in 1208, or to the bull of excommunication issued against him the following year, or even to that deposing him and absolving his subjects from their allegiance, which Innocent launched at him in 1212. In the midst of all this ecclesiastical thunder he chastised the Scottish king William, compelling him, in 1209, to avert further hostilities by the payment of a large sum of money, and the delivery of his two daughters, with other hostages, as pledges for his observance of his engagements; he passed over to Ireland in 1210, and reduced a rebellion of the English chieftains there; and in 1212 he marched into Wales, and compelled Llewellyn, the prince of that country, to make his submission. In the last-mentioned year he also put down a confederacy of certain of his barons, which had been formed with the object of seizing his person.

At last however Innocent had recourse to more effective arms than his apostolic artillery. At the instigation of the pope, Philip Augustus prepared to invade England; and though John at first attempted to meet this threatening danger with some spirit, by conducting an army to France in April, 1213, he soon returned home without having done anything; and in the despair produced by the universal hatred in which he found himself to be held by his subjects, whom his lawless and oppressive government had long alienated and disgusted, he consented, at Dover, 13th May, 1213, in an interview with Pandulf, the papal legate, to submit to all the demands of the holy see, of which the admission of the pope's nominee, Stephen de Langton, to the archbishopric of Canterbury, was the first. Two days after he made over to the pope the kingdoms of England and Ireland, to be held of him and of the Roman Church in fee, and took to his holiness the ordinary oath taken by vassals to their lords. It was now agreed that there should be an oblivion of the past on both sides, that the bull of excommunication should be revoked by the pope, and that of John's disaffected English subjects those who were in confinement should be liberated, and those who had fled or been banished beyond seas should be permitted to return home. Philip, whose ambition was mortified by this pacification, would have persisted in his project of invasion, even in opposition to the express commands of the pope, but he was compelled to disband his army by the result of a battle fought in June, between the English and French fleets, in the harbour of Damme, the first great victory in the naval annals of England, in which 300 of his vessels were captured, above 100 burned, and all his military stores and provisions, as well as his means of conveyance, taken from him.

One effect of this victory however was immediately to beget in John a hope of being able to extricate himself from his late engagement in favour of the exiles and outlaws, and perhaps also from the vassalage in which he had bound himself and his kingdom to the pope. In this view he at first attempted to raise an army with which to invade France, before doing anything in fulfilment of his promises either to the barons or the Church; but finding that the opposition of these united powers was too strong for him, he changed his course of proceeding, and temporised with both, until, by further submissions to the new papal legate, the Cardinal Nicholas, who arrived in England in the end of September, if he did not gain over the national clergy, he at least converted the pope himself, from being the head of the confederacy against him, into his friend and supporter. The Primate Langton however, greatly to his honour, still continued to make common cause with the barons. Langton had already, in a meeting held at St. Alban's, 25th August, proposed to the barons to rally round the charter of Henry I., and had solemnly sworn them to hazard their lives in the maintenance of the rights and liberties therein recognised. For a short time the commencing strife was appeased by an award of the pope; soon after which, in June, 1214, John hastened over to France, where however the great victory of Bouvines, gained by Philip, 27th July, over the allied army of the English under John's bastard brother, the earl of Salisbury, the forces of the emperor, of the earl of Flanders, and of the earl of Boulogne, compelled the English king to sue for a cessation of hostilities. On the 19th October a truce was arranged between the two kingdoms, to last for five years. But the depressed state of John's affairs now presented to his barons an opportunity for the renewal of their demands, of which they hastened to avail themselves. Their first memorable assemblage, in which they concerted their plans, was held, under pretence of celebrating the festival of the Saint, in the abbey of St. Edmund at Edmondsbury, on the 20th of November. Before they separated they advanced one by one to the high altar, and laying their hands upon it, took a solemn oath to withdraw their fealty, and levy war upon John, if he should refuse their demands, and never to lay down their arms till they had obtained from him a charter confirming the national liberties. Their petition was formally presented to John in the Temple, at London, on the feast of the Epiphany, the 6th of January following. On its rejection, both parties, after an appeal to the pope, who at once took the part of John, prepared for war. In the beginning of May, 1215, the barons having mustered their forces, which they put under the command of Robert Fitzwalter, and designated by the title of the army of God and of his Holy Church, proceeded to lay siege to the castle of Northampton. After wasting a fortnight however they were obliged to retire from this fortress; but having then marched to London, they were gladly received by the citizens, 17th May, and immediately took possession of the town. On this John consented to a conference, and the celebrated meeting on the plain of Runnymead, which lay about half-way between London and Odiham, in Hampshire, whither John had retired, was held in consequence on Trinity Monday, the 15th June. The result was, the concession and signature by John of the Great Charter, embodying all the barons' demands. [MAGNA CHARTA.]

Scarcely however had the charter been thus extorted, when John set himself to work to endeavour to escape from its obligations. The suspicions excited by his general conduct, and especially by his introduction into the kingdom of numerous bodies of foreign troops, again called up the barons in arms by the following October. At first this new contest ran strongly in favour of the king; William D'Albiney, who, by the direction of the insurgent leaders, had thrown himself into the castle of Rochester, was, after sustaining a siege of seven weeks, compelled to surrender at discretion: news soon after arrived that the pope, as requested by John, had annulled the charter; this intelligence was followed by other papal bulls suspending Archbishop Langton, excommunicating the chiefs of the barons by name, and laying the city of London under an interdict; and John was soon enabled to wreak his vengeance on his enemies almost without encountering any resistance. While one part of his army, under the command of the earl of Salisbury, wasted the counties around the metropolis, where the chief strength of the barons lay, he himself, with another force, proceeded to the north, where he drove back their ally, Alexander, the young king of Scotland, pursuing him as far as Edinburgh, and reducing to ashes every town, village, and castle, on both sides of the border, that fell within the range of his furious progress. In these disastrous circumstances, the barons congregated in London resolved, after much debate, upon the desperate expedient of offering the crown to Louis, the dauphin of France, as the only chance left to them of preserving any part of the national liberties. Accepting the invitation, Louis set sail from Calais with a fleet of six hundred and eighty sail, and, on the 30th of May, 1216, landed at Sandwich. John retired to the west at his approach, and the French prince, after attacking and easily reducing the castle of Rochester, immediately marched to the capital. The fortune of the contest now turned. The people in all parts of the country eagerly rallied around Louis; even his foreign auxiliaries, most of whom were Frenchmen, began to quit the standard of the English king, and either to join that of the invader or to return home. At this critical moment arrived the news of the death of John's powerful friend Pope Innocent III. (16th July). Still however most of the places of strength were in his hands; and some months were spent to little purpose by the adverse party in attempts to reduce Dover, Windsor, and other castles which were occupied by his garrisons. Meanwhile, in the disappointment produced by the protraction of the war, jealousy of their foreign allies was beginning to spread among the insurgents; and it is very doubtful what the issue of the struggle might have been if the life of John had been prolonged. But on the 14th of October, as he was attempting to ford the Wash at low-water, from Cross-keys to the Foss-dyke, and had already got across himself with the greater part of his army, the return of the tide suddenly swept away the carriages and horses that conveyed all his baggage and treasures; on which, in an agony of vexation, he proceeded to the Cistercian convent of Swineshead, and was that same night seized with a violent fever, the consequence probably of irritation and fatigue, but which one account attributes to an imprudent indulgence at supper in fruit and new cider; another to poison administered to him by one of the monks. Although very ill, he was conveyed the next day in a litter to the castle of Sleaford, and thence on the 16th to the castle of Newark, where he expired on the 18th, in the forty-ninth year of his age, and the seventeenth of his reign.

All our historians paint the character of John in the darkest colours; and the history of his reign seems to prove that to his full share of the ferocity of his race he conjoined an unsteadiness and volatility, a susceptibility of being suddenly depressed by evil fortune and elated beyond the bounds of moderation and prudence by its opposite, which give a littleness to his character not belonging to that of any of his royal ancestors. He is charged in addition with a savage cruelty of disposition, and with the most unbounded licentiousness: while on the other hand so many vices are not allowed to have been relieved by a single good quality. It ought to be remembered however that John has had no historian; his cause expired with himself, and every writer of his story has told it in the spirit of the opposite and victorious party. In regard to what has generally been accounted the act most decisive of the baseness of his character, his surrender of his kingdom in vassalage to the pope, we may observe that Dr. Lingard has lately advanced some considerations tending to show that it does not deserve to be viewed in the light in which it has been usually regarded.

The children of John by his queen Isabella of Angoulême were:—1. Henry, who succeeded him as Henry III.; 2. Richard, born January 5, 1208, created earl of Cornwall 1226, elected king of the Romans 1257, died 2nd April, 1272; 3. Joan, married June 25, 1221, to Alexander II. of Scotland, died March 4, 1238; 4. Eleanor, married, first, 1235, to William Marshall, earl of Pembroke, secondly, 1238, to Simon Montfort, earl of Leicester; and 5. Isabella, born 1214, married 20th July, 1235, to Frederic II., emperor of Germany, died 1st December, 1241. Several natural children are also assigned to him, none of whose names however make any figure in our history.

JOHN OF GAUNT. [EDWARD III.; HENRY IV.]

JOHN, Kings of Portugal. [PORTUGAL.]

JOHN OF SALISBURY finds a place, and very deservedly, in every catalogue of learned Englishmen. His æra was the reign of King Henry II., which, according to a very common but an incorrect mode of speaking, is called a dark age; for an age cannot possibly be dark which had such men living in it as this John, Peter of Blois, Thomas à Becket, and many others, especially historians, whose writings still remain to show what kind of men they were, and to attest the great extent of their reading and the general intellectual power which they had acquired. John had studied at Oxford, but he visited also the universities of France and Italy. In fine, if we may trust Leland, an excellent authority, he was intimately acquainted with the Latin and Greek writers; he had some knowledge of Hebrew; he was skilled in the mathematics and every branch of natural philosophy, as he was also in theology and morals; he was an eloquent orator and an eminent poet. Leland further says of him that he was possessed of the most amiable dispositions, ever cheerful, innocent, and good.

He was much connected with Becket, archbishop of Canterbury, the murder of whom is one of the dark stains on the reign of Henry II. Peter of Blois, in the twenty-second of his Epistles, which are collected and printed, calls John the eye and hand of the archbishop. John became himself bishop of Chartres in 1164. He died in 1182.

His principal historical writings were Lives of two archbishops of Canterbury, Anselm and Thomas à Becket. But the work by which he is best known to scholars, for the curious matter which it contains can scarcely be said to have found its way into the vernacular literature of his own or any other country, is entitled 'Polycraticon, de Nugis Curialibus et Vestigiis Philosophorum,' in which he describes the manners of the great, speaking not unfrequently in the style of sharp satire. There is an edition of it at Paris, 1513, and another at London, 1595. A large catalogue of his writings may be seen in Pitz and other writers of that class.

Mr. Berington has devoted several pages to John of Salisbury in his 'Literary History of the Middle Ages,' 1810, pp. 315-320.

JOHN HYRCA'NUS. [HYRCANUS, JOHN.]

JOHN I., a native of Tuscany, succeeded Hormisdas in the see of Rome, A.D. 523. He was employed by King Theodoric on a mission to the Emperor Justin of Constantinople; but after his return, from some unknown cause, he incurred the displeasure of Theodoric, and was put in prison, where he died, A.D. 526.

JOHN II. succeeded Boniface II. A.D. 532, being elected by the clergy and the people of Rome, and confirmed by King Athalaric, for which confirmation a certain payment was fixed by an edict of the same king. He died in 535.

JOHN III., a native of Rome, was elected to succeed Pelagius I. in the year 560, and was confirmed by the exarch of Ravenna in the name of the Emperor Justinian. Two French bishops, of Embrun and of Gap, having been deposed by local councils, appealed to John, who ordered their restoration, which Gontram, the Burgundian king, enforced in opposition to the French clergy, who asserted their independence of the Roman see. (Dupin, *De Antiqua Eccles. Discipl.*) John died in 574.

JOHN IV., a native of Dalmatia, succeeded Severinus in 640. He condemned the heresy of the Monothelites [EUTYCHIANS], and died in 642.

JOHN V., a native of Syria, succeeded Benedict II. in 686, and died after a few months.

JOHN VI., a native of Greece, succeeded Sergius I. in 702. In a council which he held at Rome he acquitted Wilfred, archbishop of York, of several charges brought against him by the English clergy. He died in 705.

JOHN VII., also a Greek, succeeded John VI., and died in 707.

JOHN VIII., who has been styled the IX. by those who believed in the story of Pope Joan, whom they style John VIII. [JOAN, POPE], succeeded Adrian II. in 872. He crowned Charles the Bald emperor, and after him also Charles the Fat. He confirmed the exaltation of Photius to the see of Constantinople. He had disputes with the marquises of Tuscany and the dukes of Spoleto, and died in 882, after a busy pontificate.

JOHN IX. was elected in 898, held two councils at Rome and Ravenna, and died about the year 900.

JOHN X. succeeded Lando in 915. He crowned Berengarius as king of Italy and emperor. The Saracens from Africa, who had landed in Italy and fortified themselves near the banks of the Liris, made frequent irruptions into the Roman territory. John, united with Berengarius and the dukes of Benevento and Naples, marched in person against them, and completely routed and exterminated them. The famous Marozia, a Roman lady of very loose conduct, and her husband, Guido, duke of Tuscany, ruled at Rome by force and intrigue. John, having had repeated disputes with them, was at length seized by their satellites in his palace of the Lateran, and thrown into prison, where he was put to death, according to report, A.D. 927.

JOHN XI., son of Marozia, succeeded Stephen VIII. in 931. His brother Alberico headed a revolt of the Romans against his mother, who was secured in prison, and her new husband King Hugo was driven away from the city. John himself was closely watched by his brother, and died in the year 936, not without suspicion of violence.

JOHN XII., originally called Octavianus, son of Alberico and grandson of Marozia, succeeded Agapitus in 956, while he was only in his 19th year. In 960 he crowned at Rome Otho I. of Germany as emperor and king of Italy. But some time after the complaints against his licentious conduct became so loud, that the emperor returned to Rome, and there in an assembly of the clergy caused John to be deposed and Leo VIII. to be elected in his stead, in 963. In the following year however John re-entered Rome at the head of numerous partisans, drove out Leo, and committed many acts of cruelty. Otho, who was then in the north of Italy, was preparing to return to Rome at the head of his troops, when John fell suddenly ill, and died in 964. Panvinius, in a note to Platina's account of Pope Joan, suggests that the licentiousness of John XII., who among his numerous mistresses had one called Joan who exercised the chief influence at Rome during his pontificate, may have given rise to the story of 'Pope Joan.'

JOHN XIII., bishop of Narni, succeeded Benedict V. in 965, with the approbation of the emperor Otho, but soon after the Romans revolted and imprisoned John. Otho however marched to Rome, reinstated John, and hanged thirteen of the leaders of the revolt. John crowned at Rome Otho II., son and successor of Otho I., and died in 972.

JOHN XIV., bishop of Pavia and chancellor to Otho II., succeeded Benedict VII. in the see of Rome in 983. Boniface VII., an intruder, entered Rome soon after, and put John in prison, where he died of violence, after a pontificate of only nine months.

JOHN XV. (styled XVI. by some who place before him another John, who is said to have lived only a few days after his election) was elected in 985. The disturbances of the patrician or consul Crescentius began in his pontificate. John however remained at Rome, and kept on good terms with Crescentius. He died in 996.

JOHN XVII., a Calabrian and bishop of Piacenza, was appointed pope in 997 by Crescentius, in opposition to Gregory V., but Otho III. came to Rome, imprisoned and mutilated John, and put to death Crescentius and his partisans. [GREGORY V.] John however is generally numbered in the series of the Popes.

JOHN XVIII. succeeded Sylvester II. in 1003, and died four months after his election.

JOHN XIX. succeeded the preceding, and died about 1009. The history of the popes during this period is very obscure, and the chronology confused.

JOHN XX., son of Count Gregory of Tuscany, succeeded his brother Benedict VIII. in the year 1024. He crowned the Emperor Conrad, and died in 1034.

JOHN XXI., a native of Lisbon, succeeded Adrian V. in 1277, and died about three months after.

JOHN XXII., James of Cahors in France, succeeded Clement V. in 1316, and, like him, took up his residence at Avignon. He was a man of considerable abilities, but he has been taxed with avarice and worldliness. The crown of Germany was then contested between Louis of Bavaria and Frederic of Austria, and John, assuming the right of deciding, excommunicated Louis. But this measure produced little effect in Germany; the diet of Frankfort declared that the imperial authority depended upon God alone, and that the pope had no temporal authority, direct or indirect, within the empire. In Italy however John met with greater success; his ally, Robert, king of Naples, defeated the Guibelines, and the pope excommunicated Matteo Visconti, the great leader of that party, and likewise Frederic, king of Sicily. Between Guelphs and Guibelines, Italy was at that time in a dreadful state of confusion. The pope preached a crusade against Visconti, Cane della Scala, and the Este, as heretics. Robert, with the assistance of the pope, aspired to the dominion of all Italy, and the pope sent a legate, who, at the head of an army, assisted Robert and the other Guelphs against the Guibelines of Lombardy. But the Guibelines had clever leaders; Castruccio Castracani, Cane della Scala, and the Visconti kept the fate of the war in suspense, and Louis of Bavaria sent troops to their assistance. Louis came himself to Italy in 1327, and after being crowned at Milan with the iron crown, he proceeded to Rome, where the Colonna and other Guibelines roused the people in his favour, and drove away the papal legate. Louis was crowned emperor in St. Peter's by the bishops of Venice and of Aleria, after which he held an assembly in the square before the church, in which he summoned James of Cahors (meaning the pope) to appear to answer the charges of heresy and high treason against him. After this mock citation, the emperor proceeded to depose the pope and to appoint in his stead Peter de Corvara, a monk of Abruzzo, who assumed the name of Nicholas V. Louis also proclaimed a law, which was sanctioned by the people of Rome, to the effect that the pope should reside at Rome, and if absent for more than three months, should be considered as deposed. Louis now returned to the north of Italy, and thence to Germany. Castruccio and Cane della Scala died, and the Guelphs and the papal legate began to resume the preponderance. In 1334 John XXII. died at Avignon, leaving the affairs of Italy as embroiled as ever, and 18 millions of golden florins in his coffers, besides jewels. It was under his pontificate that the clergy and people of the towns were deprived of the right of electing their bishops, which right he reserved to himself, on payment of certain fees by the person elected. He was also the inventor of the ANNATES, or FIRST FRUITS.

JOHN XXIII., Cardinal Cossa, succeeded Alexander V in 1410. He supported the claims of Louis of Anjou against Ladislaus, king of Naples; but the latter, having defeated his rival in battle, advanced to Rome, and obliged the pope to escape to Florence. John preached a crusade against Ladislaus, which gave occasion to denunciations and invectives from John Huss. Meantime the great schism continued, and Gregory, styled XII., and Benedict, antipope, divided with John the homage of the Christian states. John in his exile, wishing to secure the favour of the Emperor Sigismund, proposed to him the convocation of a general council to restore peace to the church, and Sigismund fixed on the city of Constance as the place of assembly. On hearing of the death of Ladislaus, by which event Rome became again open to him, John repented of what he had proposed, but was obliged to comply with the general wish by repairing to Constance. The fathers of the council decided that John, as well as his two rivals, should renounce their claims to the papacy as the only means of restoring peace. John signed the form of renunciation, but soon after, by the assistance of Frederic of Austria, he was conveyed out of the city, and resumed his authority by ordering the council to dissolve. But the council, in its fourth and fifth sessions, decided by a solemn decree that the general council once assembled is superior to the pope, and can receive no orders from him. A formal process being instituted against John, sixty charges were laid against him, of which only part were made public. Witnesses being heard, a solemn deposition was pronounced on the 29th May, 1415, to which John submitted, and was then given into the custody of the elector palatine. After the election of Martin V. and the termination of the council of Constance, John, now again Balthazar Cossa, escaped from Germany, and made his submission to the new pope, who treated him kindly and gave him the first rank among the cardinals. He died soon after.

JOHN'S COLLEGE, ST., OXFORD, was founded by Sir Thomas White, Knt., alderman of London, in 1557. It consists of a president, fifty fellows and scholars, one chaplain, an organist, six singing-men, six choristers, and two bible-clerks. All the fellows, except six of the founder's kindred, and two from Coventry, two from Bristol, two from Reading, and one from Tunbridge schools, are elected from Merchant Taylors' School, London.

The older buildings of St. John's College are those of St. Bernard's College, founded in the time of Henry VI., by Archbishop Chichele, for scholars of the Cistercian order. King Henry VIII. had granted these premises to Christ Church, Oxford, from which college Sir Thomas White purchased them, under a licence from the crown, in 1555. The second quadrangle of St. John's was entirely built at the expense of Archbishop Laud. It was begun in 1631, and completed in 1635, from a design furnished by Inigo Jones.

Among the greater benefactors to this College, after the founder, were Dr. John Buckeridge, bishop of Ely, and the Archbishops Laud and Juxon, all of whom were presidents, and the last two successively; Dr. Richard Rawlinson, and Dr. William Holmes, the last of whom was also president from 1728 to 1748, from whom and from whose widow, who followed up her husband's intentions, the College received no less a sum than 15,000*l.*

Among the more eminent members of this College, beside those already mentioned, were Archbishop Tobie Matthew, and Peter Mews, afterwards bishop of Winchester, who were also presidents; Sir William Dawes, afterwards archbishop of York; Campian, the celebrated Jesuit; Sir James Whitelocke; Shirley, the dramatist; Sir Bulstrode Whitelocke; Sir John Marsham, the chronologist; Dr. Edward Bernard; Sherrard and Dillenius, the botanists; and Dr. Tucker, dean of Gloucester.

From the founder's endowment, and by means of other benefactions, this College is possessed of the following livings:—the *rectories* of Aston-le-Wall, Creek, and East Farndon, in Northamptonshire; Baynton in Yorkshire; Bardwell in Suffolk; Barfreston in Kent; Belbroughton in Worcestershire; Cheam in Surrey; Codford St. Mary in Wilts; Handborough and Tackley in Oxfordshire; Kingston Bagpuze in Berks; Sutton in Bedfordshire; Leckford and South Warnborough in Hampshire; Winterburne in Gloucestershire; and Cranham in Essex; the *vicarages* of Chalfont St. Peter in Buckinghamshire; Charlbury and Kirtlington in Oxfordshire; St. Giles's in the suburbs of Oxford; Fyfield and St. Lawrence Reading in Berkshire; St. Sepulchre's, London; Linton in Herefordshire; and Stoughton Magna in Huntingdonshire; and the *curacies* of Frenchay in Gloucestershire, and Summer-town Chapel in the suburbs of Oxford.

The present number of members of this College, dependent and independent, is 226, exclusive of the choir.

(Gutch's *Colleges and Halls of Oxford;* Chalmers's *Hist. of the Univ.; Oxford Univ. Calendar* for 1838.)

JOHN'S COLLEGE, ST., CAMBRIDGE, was projected and begun by Margaret countess of Richmond, a short time before her death, which happened in 1509. It was completed by her executors, under the authority of a papal bull and the royal mandates of her son and grandson King Henry VII. and King Henry VIII., which gave them the power of suppressing a decayed hospital dedicated to St. John, at that time existing on the same site. The College, then consisting only of the present first court, was four years in building: the fabric is said to have cost between four and five thousand pounds. The statutes of the College were given by Henry VIII.; but these having become confused and ambiguous, owing to various changes, erasures, and marginal notes, Queen Elizabeth gave the College a new set of statutes.

The original endowment was for fifty fellows; but part of the foundation-estates having been seized by King Henry VIII., the funds were found to be sufficient for thirty-two only. These fellowships are (by letters patent from Geo. IV. on the petition of the college, and in pursuance of a power to that effect said to be reserved to the crown by the statutes of Henry and Elizabeth) now open to natives of England and Wales, without any restriction or appropriation whatsoever, one only excepted, which is in the appointment of the bishop of Ely; but the bishop is required, agreeably to an arrangement between James Stanley bishop of Ely, and the executors of the countess of Richmond, to elect according to the statutes in every respect.

There are also twenty-one fellowships founded by different benefactors, which have all the privileges of the former, and give an equal claim to the college patronage.

Besides these there are numerous scholarships, exhibitions, &c. belonging to this college: the former amount to no fewer than 114.

The present buildings consist of the first court, a second court of large dimensions, and a third, which contains the library. A handsome new court has recently been built by Rickman on the opposite side of the river Cam, and is connected with the old buildings by a bridge.

This being a divinity college, all the fellows are obliged to take priest's orders within six years from the degree of M.A., except four, who are allowed by the master and seniors to remain laymen; two for the practice of physic, and two for law. The rest must proceed to the degree of B.D. at the regular time. The electors to fellowships are the master and eight senior resident fellows. The visitor is the bishop of Ely. The number of persons on the boards of this college, March 12th, 1838, was 1096. The schools of Pocklington and Sedburgh in Yorkshire, Shrewsbury in Salop, Rivington in Lancashire, Stamford in Lincolnshire, and Aldenham in Herts, are in the patronage of this college: the benefices in the gift of this college are the rectories of Houghton Conquest with Houghton Gildaple, Marston Mortaine, and Mapershall, in Bedfordshire; the vicarages of Aldworth and Sunninghill, in Berks; the rectories of Brinkley and Fulbourn, and the chapel of Horningsea, in Cambridgeshire; the rectory of Aberdaron in Caernarvonshire; those of Morton in Derbyshire and Marwood in Devonshire; of Fratring cum Thorington, Lawford, Morton, Oakley Magna, and Warley Magna, in Essex; the vicarage of Hormead Magna, and the rectories of Hormead Parva and Lilly, in Herts; of Freshwater in Hants; the vicarages of Higham and Ospringe, and the rectories of Murston and Staplehurst, in Kent; the vicarage of Barrow on Soar, and the rectory of Medbourn cum Holt, in Leicestershire; the vicarage of Minting, in Lincolnshire; the rectories of Thurston cum Snoring, Holt, Ditchingham, Fornset, Sterston, South, and Aldburgh, and the vicarage of Cherry Marham, in Norfolk; the rectory of Ufford cum Bainton, in Northamptonshire; the vicarage of North Stoke, and the rectory of Souldern, in Oxfordshire; the rectories of St. Florence, in Pembrokeshire; of Barrow, Cockfield, and Leyham, in Suffolk; of Wootton Rivers, in Wilts; of Brandeston, and Holme including the vicarage of Holme in Spalding-Moor, and the vicarage of Marton cum Grafton, in Yorkshire. (Lysons's *Magna Britan.*, 'Cambr.,' and the *Cambr. Univ. Calendar* for 1838.)

JOHN'S, ST. [NEWFOUNDLAND.]

JOHN'S, ST. [NEW BRUNSWICK.]

JOHN'S, ST., RIVER. [MAINE.]

JOHNSON, SAMUEL, the son of Michael Johnson, a bookseller at Lichfield, and Sarah, his wife, was born at Lichfield on the 18th of September, 1709. As a child he was afflicted with the king's evil, which disfigured his face and impaired his eyesight, and he was taken to Queen Anne to be touched. His education was commenced at Lichfield, whence he was removed to a school at Stourbridge; and in 1728, two years after he had left Stourbridge, he was placed at Pembroke College, Oxford. Young Johnson had early shown a vigorous understanding and an eagerness for knowledge: though he had poverty to contend with and a natural indolence, and was also subject to periodical attacks of morbid melancholy, he acquired a large fund of information at the university. Necessity compelled him to abandon the hope of taking a degree; his debts, though small, were increasing; remittances from Lichfield could no longer be supplied; and he quitted college and returned to his father's house. In the December following (1731) his father died in such pecuniary distress, that Johnson was soon afterwards glad to become usher of a school at Market Bosworth, in Leicestershire, to which, it appears from his diary, that he went on foot: 'Julii 16,' he writes, 'Bosvortiam pedes petii.' But finding the drudgery of this employment intolerable, he sought other means of obtaining his bread, and procured temporary employment in translating for a bookseller in Birmingham. During his residence in this town he became intimate with the family of a mercer named Porter, whose widow he subsequently married (1736). Mrs. Porter was more than twenty years older than himself, but he was fondly attached to her, and she added to other powers of increasing his happiness the possession of 800*l.* With this capital he established a school, but his advertisements produced few scholars, the scheme failed, and he left Staffordshire with his pupil Garrick to seek his fortune in the metropolis. His prospects must have been very gloomy: he had nothing but literature to trust to for subsistence, and those were times when the condition of literary men was most miserable and degraded. In the reigns of William, of Anne, and George I., successful writers were rewarded by private munificence and public situations. But such patronage was now at an end; and the year in which Johnson left his home formed part of an interval which elapsed before a new source of remuneration arose—before the number of readers became large. Of readers there were still but few; the prices therefore that booksellers could afford to pay to authors were necessarily small, and an author, whatever were his talents or his industry, had great difficulty in keeping a shilling in his purse. The poverty and neglected condition of his friend and brother author Savage were the causes of Johnson's writing his 'London,' an imitation of the third satire of Juvenal, for which Mr. Dodsley gave him ten guineas, and by which he obtained a certain degree of reputation. We are told that when Pope read it he said, 'The author, whoever he is, will not be long concealed.' No great advantage however immediately accrued to him. Again he sought to be a schoolmaster, again his scheme miscarried, and he returned to his drudgery in the service of Cave the bookseller, who was his only patron. His pen was continually at work, and his pamphlets, prefaces, epitaphs, essays, and biographical memoirs, were continually published by Cave, either by themselves or in his periodical the 'Gentleman's Magazine.' For many years his bread continued to be earned by literary slavery; by slow degrees only did his great talents become known, and the trust reposed in him by publishers increase. In 1740, and for more than two years afterwards, he wrote the parliamentary speeches in the 'Gentleman's Magazine.' In 1744 he published his 'Life of Savage;' in the following year some observations on Shakspeare, whose plays he proposed to edit; and in 1747 he commenced his 'English Dictionary,' which he engaged to complete in three years for 1575*l.*, a small sum if we consider that the author agreed to bear the heavy expenses necessary for preparing a work of such magnitude and importance. In 1749 appeared 'The Vanity of Human Wishes,' an imitation of the tenth satire of Juvenal; and in the following year was printed the first paper of the 'Rambler.' These are some of his most remarkable publications, for a complete list of which, and the dates at which they were published, we must refer to Boswell's 'Life.' For 'The Vanity of Human Wishes' 15 guineas only were received from Mr. Dodsley. We mention this because the frame and condition of Johnson's mind and temper, his views of things and persons, were influenced in no small degree by the deficiency of his means. He was now engaged in a steady course of occupation sufficient to employ his time for several years; and so assiduous were his labours, that at his residence in Gough Square he had an upper room fitted up like a counting-house, in which several copyists sat, whom he supplied with continual employment. The efforts of his mind were the utmost it could bear; and when it was subdued by grief at the death of his wife (1752), he relinquished the 'Rambler.' Bad as his circumstances were, still they were somewhat more easy than they had been: the number of his acquaintances had increased; the Dictionary, which occupied eight instead of the promised three years, was nearly complete; and he found leisure (in 1754) to make an excursion to Oxford for the purpose of consulting its libraries. This was his first emancipation from necessary labour. He soon returned to London to increase the number of reviews and essays, which flowed continually from his pen. Thus occupied, an offer of a living was made to him if he would take orders: but though he was a firm believer in revelation, and a somewhat rigid moralist, he could not overcome his scruples respecting the fitness of his temper and habits for the duties that would be required of him, and the offer was rejected. He continued therefore to write for his bread; and it was not until he was fifty-three years old, and had for thirty years been toiling with his pen, that any certain source of income was opened to him. In May, 1762, George III., through his minister Lord Bute, granted Johnson a pension of 300*l.* a year, and the days of his penury were at an end. Happy, in a state of independence, he enjoyed the society of a weekly club, of which Burke, Goldsmith, and Sir Joshua Reynolds were also members. He was introduced in the following year to his biographer Boswell, and we have from this date (1763) as full and minute account of him as has ever been written of any individual. From this time we are made as familiar as it is in the power of writing to make us with the character, the habits, and the appearance of Johnson, and the persons and things with which he was connected. 'Everything about him' (says the *Edinburgh Review*, vol. liii., p. 20), 'his coat, his wig, his figure, his face, his scrofula, his St. Vitus's dance, his rolling walk, his blinking eye, the outward signs which too clearly marked the approbation of his dinner, his insatiable appetite for fish-sauce and veal-pie with plums, his inextinguishable thirst for tea, his trick of touching the posts as he walked, his mysterious practice of treasuring up scraps of orange-peel, his morning slumbers, his midnight disputations, his contortions, his mutterings, his gruntings, his puffings; his vigorous, acute, and ready eloquence; his sarcastic wit, his vehemence, his insolence, his fits of tempestuous rage, his queer inmates—old Mr. Levett and blind Mrs. Williams, the cat Hodge, and the negro Frank—all are as familiar to us as the objects by which we have been surrounded from childhood.'

In 1765 the university of Dublin sent over a diploma creating him a doctor of laws, but he did not assume the title of doctor until eight or ten years afterwards, when the university of Oxford conferred the same honour upon him.

In 1766 his constitution seemed to be rapidly giving way, and he was depressed with a deep and gloomy melancholy. In this condition his friend Mr. Thrale received him into his house at Streatham; an apartment was fitted up for him, companions were invited from London, and he became a constant resident in the family. His celebrity attracted the notice of the king, to whom he was introduced by the librarian of Buckingham House. We are not told that politics had in any way led to this introduction, but it is not impossible that the opinions that Johnson entertained upon the principal questions of the day might have reached the king's ears. For several years he occasionally published political pamphlets. In the autumn of 1773 he made a tour, in company with Mr. Boswell, to the Western Islands of Scotland, of which he published an account. Two years afterwards he made a short excursion to Paris. The last of his literary labours was 'The Lives of the Poets,' which were completed in 1781. We now take leave of him as an author, and have only to record the few domestic occurrences which took place before the close of his long life. These are for the most part melancholy. His friends Mr. Thrale and Mrs. Williams preceded him to the grave. In June, 1783, he had a paralytic stroke, and in the following November was greatly swollen with the dropsy. During a journey to Derbyshire he felt a temporary relief; but in 1784 he suffered both from dropsy and from asthma. His diseases were evidently irremediable; the thought of death preyed upon his mind, and the history of his death-bed is painful. On Monday, the 13th of December, 1784, he expired in his house in Bolt-court; on the 20th of the month his remains with due solemnity and a numerous attendance of his friends were buried in Westminster Abbey, near the foot of Shakspeare's monument, and close to the grave of Mr. Garrick.

'The characteristic peculiarity of Johnson's intellect was the union of great powers with low prejudices. If we judged of him by the best parts of his mind we should place him almost as high as he was placed by the idolatry of Boswell; if by the worst parts of his mind, we should place him even below Boswell himself.' (*Edin. Review*, vol. liii., p. 27.)

Though poverty made him a pensioner and a ministerial partisan, he had great independence of character, and his Tory opinions are to be attributed to disinterested conviction, and were in harmony with his general spirit. He was steady and inflexible in maintaining the obligations of religion, a sincere and zealous Christian, and, as such, benevolent. Besides these great qualities he possessed others of a most humiliating littleness. In many respects he seemed a different person at different times. He was intolerant of particular principles, which he would not allow to be discussed within his hearing; of particular nations, and particular individuals. He was superstitious; and his mind was at an early period narrowed upon many questions religious and political. He was often the first to practise what he had censured in others, and this not from a passionate want of control, but from an ignorance of himself. 'He was no master of the great science of human nature; he had studied not the *genus* man, but the *species* Londoner.' He was open to flattery, hard to please, easy to offend, impetuous and irritable. These were the principal blots upon his character, but his great qualities predominated, and he has left more to admire and revere than to censure and condemn.

His reasoning was sound, dextrous, and acute; he was seldom imposed upon either by fallacies or exaggerated statements; his perception was quick; his thoughts striking and original, and his imagination vivid. In conversation his style was keen and pointed, and his language appropriate; he had also a remarkable facility of illustration from familiar objects. His wit may be described as logical, and chiefly consisted in dextrously convicting his opponent of absurdity. Conscious of his power, he was fond of dispute, and used to argue for victory. Scarcely any of his contemporaries except Burke was a match for him in such discussions. His written style was eminently periodic; and in order to construct every sentence into a balanced period he frequently introduced superfluous and high-sounding expressions; hence his general style was pompous, heavy, bombastic, and diffuse. He was also fond of words of Latin derivation, to the exclusion of more familiar words of Saxon origin. A good burlesque of his style may be seen in the 'Rejected Addresses.'

Johnson's strong and penetrating intellect did not fit him for poetry. His 'Irene' is deservedly forgotten. His 'Imitation of the Third Satire of Juvenal' contains some nervous thoughts expressed in harmonious verse. His 'Imitation of the Tenth Satire of Juvenal' is a fine poetical declamation, though deformed by occasional tautology. Among his smaller pieces the two most remarkable are his verses on the opening of Drury-Lane Theatre in 1747, 1747, and the stanzas on the death of Mr. Levett; the latter of which is, in our opinion, the most poetical of Johnson's productions. His tale of 'Rasselas' holds an intermediate place between his poetry and his prose. It is characterized by a tone of pleasing melancholy, and the style, though somewhat artificial, is elegant and harmonious.

His prose works consist of short pieces, his Dictionary excepted. His 'English Dictionary' was a work of great labour, and the quotations are chosen with so much ingenuity, that, though necessarily mere fragments, they are amusing to read. Dr. Robertson, the historian, said that he had read Johnson's Dictionary from beginning to end. It is however in some respects a very defective work. Johnson had scarcely any knowledge of the Anglo-Saxon, and no knowledge of any of the cognate Teutonic dialects; accordingly the etymological part is not of much value; the etymologies being blindly copied chiefly from Skinner and Junius. His definitions are constructed without sufficient consideration, and without any systematic plan. He also frequently errs in tracing the successive significations of a word. Between 1750 and 1760 he published the 'Rambler' and the 'Idler,' periodical essays in the style of the 'Spectator.' Johnson was as little fitted for this species of composition as for poetry; his serious essays generally consist of trite morality, and his attempts at facetiousness are ponderous and clumsy. His edition of Shakspeare was published in 1765; the preface is one of his ablest productions, particularly that part which relates to the unities and dramatic illusion. He had not sufficient antiquarian knowledge or poetical feeling for commenting on Shakspeare; his notes are not numerous, and though marked with his strong sense are only occasionally valuable. In 1775 he published the account of his journey in the Hebrides, an entertaining and even an instructive work, though it discusses with needless solemnity subjects familiar to every inhabitant of the country, but strange to a townsman like Johnson. His 'Lives of the Poets,' published in 1781, are a useful and interesting contribution to English biography and criticism, and are too well known to require specific notice.' The criticisms in this work are sometimes biased by political, religious, and even personal antipathies, as may be seen in his unfavourable judgment of Milton's poetry, dictated by his dislike for the republican and non-conformist; and his captious censure of Gray, which evidently proceeded from his jealousy of a successful contemporary. His judgments of the general character of a poet are however more frequently correct than his criticisms upon particular passages and expressions. His verbal criticisms on poetry are for the most part the mere cavillings of a prosaic grammarian.

A complete list of Johnson's works is prefixed to Boswell's 'Life;' but from what has been stated, it sufficiently appears that his intellectual efforts were desultory and unconnected, and took the form of Essays, Lives, Critical Notices, Prefaces, &c. He had no comprehensive or profound acquaintance with any department of human knowledge; he did not attempt any systematic investigation of any considerable branch of metaphysical, ethical, political, or æsthetical science. Even as a grammarian, his acquirements were shallow and limited, of physical and mathematical science he was quite ignorant. It may however be remarked that he had adopted that theory of ethics which is now commonly known by the name of *utilitarian*, as may be seen from his review of Soame Jenyns's 'Inquiry into the Origin of Evil,' his ablest speculative production. Johnson here says of this theory, that it affords 'a criterion of action on account of virtue and vice, for which he has often contended, and which must be embraced by all who are willing to know why they act or why they forbear, to give any reason of their conduct to themselves or others.'

From his habit of writing for the booksellers, he had acquired a power of treating the most heterogeneous subjects with scarcely any preparatory knowledge; witness his papers on the construction of Blackfriars Bridge, and his argument, dictated to Boswell, on a question of Scotch law. In English literature his reading was extensive, particularly in the writers of the seventeenth and eighteenth centuries; but he seems to have known little about the writers of the age of Elizabeth: his 'Lives of the Poets' begin with Cowley. He had not studied attentively the works of any of the chief English philosophers, as Bacon, Hobbes, Locke; his theological learning was scanty; nor was he well versed in the political history or laws of his country. He had a fair acquaintance with the ordinary Latin classics; of Greek he knew but little. He could read French and Italian; but he seems to have been nearly ignorant of the modern literature of foreign countries.

Johnson's opinions were regarded by many of his contemporaries with a sort of superstitious reverence, and even his style was considered worthy of imitation. In the present generation his credit has perhaps fallen lower than it deserves. Many of his works will long continue to be read, if not for their intrinsic value, at least from the vigour of thought which they display.

(Murphy's *Life*, in preface to Works; Boswell's *Life*, Croker's edit., including two curious vols. of 'Johnsoniana;' *Memoir* by Walter Scott, Prose Works, vol. iii.; *Edin. Review*, vol. liii. A brief but elaborate and able character of Dr. Johnson has been written by Sir James Mackintosh, and will be found in his *Life*, vol. ii., p. 166.)

JOINT. [ARTICULATION.] Everything that need be here said on Joints is contained in the article referred to.

JOINT STOCK COMPANIES [BANK, BANKER, BANKING; PARTNERSHIP.]

JOINT TENANCY signifies joint ownership of two or more persons in land, or other property, as goods and chattels. It differs from Tenancy in Common [COMMON, TENANCY IN] and Coparcenership [PARCENERS] in the following essentials: joint tenants are severally seised or possessed of the undivided whole of the land or other property in which they have a joint interest, and also of their several shares, which shares are always equal shares, inasmuch as joint tenants take by purchase only, and by a joint title: the estate or interest must be limited to the several persons by the same deed or instrument, and such estate or interest must vest in them at the same time, except (according to the more common opinion) the estate be limited to take effect under the Statute of Uses or by devise, in which cases the contemporaneous vesting of the several parts is not necessary: the whole estate or property will go to the survivors and survivor of the joint tenants, if the jointure continue until such survivorship; which is the important characteristic of a joint tenancy. It is a consequence of the mode in which joint tenants are legally considered to be seised or possessed, and of the right to the whole which accrues to the survivors and survivor, if no separation of the joint tenancy has been made before such survivorship takes place—that they cannot grant, or bargain and sell, or surrender or devise to each other; they cannot exchange with each other, nor can one make a feoffment to another. But any joint tenant may transfer his interest to any one of his companions by release, or rather he can by such instrument put an end to his interest; and any joint tenant may convey his share to a stranger by grant; or he may compel his companions to make a partition, by statute. Every person to whom the interest of a joint tenant is transferred becomes, as to such share, a tenant in common with the remaining joint tenants.

A joint tenant cannot dispose of either the whole or the part of the property in which he is jointly interested consistently with the proper notion of a joint tenancy, by a will made during the continuance of the joint tenancy, even though he should happen to be the survivor; because until he has survived he has nothing to dispose of by will. But by severing the joint tenancy he acquires the power of disposing of his share by will. By a recent act (1 Vict., c. 26), a person may by a will, made according to the provisions of that act, dispose of all real and personal estate to which he shall have a legal or equitable title at the time of his death, and which, if not disposed of by will, would go to his heir, or the heir of his ancestor, or to his personal representatives. But this act gives no power of disposal over the unsevered interest of a joint tenant.

As to the written instruments and words by which a joint tenancy may be created, and the various rights and remedies which belong to a joint tenant, it is not necessary to dwell at any length here. The discussion of them belongs to special treatises on law. As an example of words which would create a joint tenancy, we may take the case of a feoffment to two or more persons and their heirs, which would make the feoffees joint tenants in fee simple, so that the survivors would always succeed, and the last survivor would take the whole in fee, unless any one of the joint tenants had in his lifetime conveyed his share. And generally, when there is a gift of real or personal estate to several persons, and nothing more is said, these words make them joint tenants, even in the case of pecuniary legacies and residuary bequests. To create a tenancy in common, it is not necessary, either in a deed or will, to declare that the parties to whom the gift or devise is made shall take it as tenants in common, and not as joint tenants. Any words which undoubtedly convey this meaning are sufficient for the purpose; but less exact or definite words are required for this purpose in a will than in a deed. Where an estate is given to two persons and the heirs of their bodies, if the two persons are such as cannot have common heirs of their bodies (as two men or two women, or a man and a woman who cannot legally intermarry), then such persons are joint tenants for life, but have separate inheritances, or are tenants in common in remainder in tail. But if the gift be to a man and his wife and the heirs of their bodies, or to a man and woman who may marry and the heirs of their bodies, the parties are joint tenants of the inheritance; and if they be husband and wife they take by intireties. The tenancy by intireties is a consequence of the legal unity of husband and wife. Such tenancy exists when real estate is limited by deed or will to husband and wife jointly during their marriage for an estate of inheritance or freehold: the husband and wife possess the lands intirely as one individual; on the death of either of them they go to the survivor, and there is no power of alienation or forfeiture of either alone which can prejudice the right of the other.

Partners in trade are joint tenants of the partnership stock which is of a moveable kind, but on the death of a partner his personal representatives become tenants in common in equity, with the surviving partners; and it was at one time considered that they acquired a legal tenancy in common, with the survivor. In equity there is no survivorship in lands which partners have held for the purposes of trade.

If money is jointly advanced by two or more persons on a mortgage security, there is in equity no benefit of survivorship among them.

A joint tenant, like a tenant in common, cannot maintain an action of trover against his companion for goods which are in his companion's possession; for according to the English doctrine of possession, possession by one joint tenant, tenant in common, or parcener, is generally the possession of all. The doctrine of possession by joint tenants, tenants in common, and parceners, is materially altered as to lands and rents by 3 and 4 Will. IV., c. 27, sec. 12, and in another case by sec. 13.

JOINTURE. This legal term was originally used to denote the interest of joint tenants, which interest was called an estate *in jointure*. Before the statute of 27 Henry VIII., c. 10 (of Uses), lands conveyed to uses were not subject to dower; and as such conveyances were frequent, it became usual to stipulate, upon a treaty for a marriage, that the intended husband should convey an adequate portion of his lands to the use of himself and wife *in jointure*, i.e. as joint tenants for their lives, whereby a provision would be secured to the wife, if she survived, commensurate in point of duration with the dower which the common law would have given her, if the system of uses had remained unknown. When the Statute of Uses was passed for transferring the legal estate to the *cestui que use*, it was considered unreasonable that wives should by means of the destruction of uses be entitled to claim dower in their husbands' lands, and should at the same time enjoy a provision made for them in consideration that they were not so entitled. The sixth section of this statute therefore provided that women having provisions in the nature of jointures should not be entitled to claim dower of the residue of their husbands' lands. [DOWER.]

An estate limited to a woman must, in order to be deemed a good jointure and a bar to dower under this statute, commence and take effect in possession or in profit immediately on the death of the husband. It must also be for the life of the wife, or for some greater estate. It must be in satisfaction of the whole dower, and not of a part only. It must be made before the marriage; for by the ninth section, if the jointure be made during the marriage, the wife is at liberty after the death of her husband to refuse the jointure and demand her dower. If however the widow once accept such jointure, she is perpetually bound, even though the estate in jointure created during the marriage be made subject to a condition, and is in that respect less beneficial than dower.

A woman, though under age at the time of her marriage, is bound by an antenuptial jointure, inasmuch as the bar of dower arising out of the limitation of a jointure is not a matter of contract (by which minors are not bound), but proceeds upon the ground of the substitution of a new provision made by the husband, or on his behalf, under the authority of an act of parliament. It was formerly considered that the estate must be directly limited to the wife herself, and not conveyed to others in trust for her; but it is now settled that a trust estate is a good equitable jointure in bar of dower.

Where an estate tail is limited to a woman for her jointure, she is restricted from alienation or discontinuance by 11 Henry VII., c. 20, and 32 Henry VIII., c. 36; on the other hand, if she be lawfully evicted from the whole or part of the jointure lands, she will be entitled to be endowed of the residue of the lands of which, but for such jointure, she would have been dowable, to the value of the lands of which she has been deprived by such eviction.

In consequence of the practical inconveniences attending a limitation of land by way of jointure, it has become usual to create a rent-charge (*i.e.* an annuity charged upon land with a power of distress) for the life of the wife, with the power of distress, and also a power of entry, that is, the right of entering upon the land charged and retaining the possession until the annuity is paid, and further protected by a demise of the land to a trustee for a term of years. Such annuity ought in strictness to be charged upon the land which would otherwise be liable to dower, or upon some part of it.

This arrangement is equally beneficial to the widow and to the heir or devisee of the husband. A more certain income is provided for the widow, and the heir or devisee may enter into the immediate possession and take upon himself the management of the whole estate. This substituted provision by way of annuity is frequently called the wife's jointure. (*Co.-Litt.* and Hargrave's *Notes;* Cruise's *Dig.;* Bacon's *Abr.*)

JOINVILLE, JEAN, SIRE or LORD DE, born of a noble family of Champagne, was brought up in the court of Thibaut, king of Navarre and count of Champagne, then one of the most polished courts in Europe. Joinville followed Louis IX. in his first crusade in 1248 with a body of several hundred armed men, which he raised among his tenants; and he was present at the taking of Damiata, and at the disastrous campaign of Massoura, in which Louis and most of his army, with Joinville among the rest, were taken prisoners. Joinville narrowly escaped being killed by the Egyptians; but the ransom being paid, he followed the king to Acre, and was present at the war which was carried on in Palestine, until he returned to France with Louis in 1254. Being a great favourite with the king, and almost constantly near his person during the six years of that crusade, his narrative of that period, written in a simple unpretending style, is extremely interesting. It is entitled 'Histoire de St. Louis, IX. du nom, Roi de France, par Jehan Sire de Joinville,' and has been often republished. One of the best editions is that by Ducange, fol., 1668, with useful notes and learned dissertations. It has been translated into English by T. Jones, 2 vols. 4to., 1807. The character of Joinville, a favourable specimen of a feudal lord in that, the golden age of chivalry, valiant, gay, witty, generous, shrewd, and yet at times careless through vivacity of temper, somewhat worldly and proud of his rank, but withal good-natured and sociable, forms a happy contrast with the piety, austenty, and simplicity of Louis, who however esteemed and loved Joinville for his sincerity and abilities, as much as Joinville cherished Louis's honesty and goodness of heart, of which he gives numerous and affecting proofs in his narrative. Joinville, after his return to his native domain, did not forsake the king, but frequently repaired to his court, and continued to enjoy Louis's confidence. When Louis, in 1269, set out on his second expedition, in which he died at Tunis, he invited Joinville to join him, but he excused himself. Joinville kept away from the corrupt court of Philip le Bel, but afterwards he is said to have joined the army which Louis X. collected at Arras against the Flemish. He died not long after; but the precise epoch of his death is not known. Joinville and his predecessor Villehardouin are among the oldest of the French chroniclers who wrote in the vernacular tongue.

JOLIBA. [Quorra.]

JOMELLI, NICOLO, one of the few celebrated composers of the early part of the last century, whose works justify the encomiums bestowed on them, was born in 1714, at Aversa, according to Mattei—at Avellino, says Burney—both places being near Naples. He was initiated in music by the Canon Muzzillo, and afterwards studied at one of the Neapolitan conservatories, first under Feo, then as the pupil of Leo, confessing himself chiefly indebted to the latter for having inspired him with a true feeling for the art. Subsequently however, when he turned his attention to sacred music, he derived considerable improvement in the more elaborate branches of composition by his intercourse with the learned Padre Martini.

Jomelli produced his first opera at Naples, being then only twenty-three years of age, and so speedily acquired fame, that in 1740 he was summoned to Rome, where he composed two operas, and was warmly patronized by the Cardinal Duke of York. Next year he proceeded to Bologna, and brought out his 'Ezio.' He then returned to the papal capital, and produced one of his finest works, 'Didone.' This led to his being invited to Venice, at that time the great theatre for the display of musical excellence, where his 'Merope' for the *Teatro Fenice*, and a 'Laudate' for the church of Santo Marco, well sustained his reputation. The failure of his 'Armida,' in the following year, at Rome, determined him to visit Germany, and at Vienna he formed an acquaintance with Metastasio, which ripened into a friendship of the closest kind, that death only terminated. To the enlightened conversation and judicious criticisms of the Imperial poet he always confessed his obligations, and to which he ascribed much of the success of his later productions. He set the 'Achille in Sciro,' and got up afresh the 'Didone,' of his illustrious friend, both of which were received by the Germans with enthusiasm.

Metastasio, speaking of Jomelli, in several letters, says, 'He is of a spherical figure, pacific disposition, with an engaging countenance, most pleasing manners, and excellent morals. . . . . He is the best composer for words of whom I have any knowledge. . . . . If ever you should see him, you will be attached to him; he is certainly the most amiable *gourmand* that ever existed.'

At Vienna Jomelli remained two years, where he devoted no inconsiderable portion of his time to the beautiful and accomplished empress Maria Theresa, to whom he gave instructions in music. He was afterwards recalled to Rome, and there produced several operas, also his famous oratorio 'La Passione.' The duke of Würtemberg now prevailed on him to visit Stuttgard, in which city he resided nearly twenty years, and composed an incredible number of Italian operas, most of them however now forgotten; but his 'Missa pro Defunctis,' or 'Requiem,' there produced, will always be known and remain as a monument of his genius. When the duke of Würtemberg was obliged to reduce his establishment, Jomelli went to Naples, where the ill success of two new operas operated so powerfully on his sensitive mind, that an attack of paralysis was the consequence. From this however he sufficiently recovered to compose a Cantata and a 'Miserere,' the latter being by many considered the finest of his works. He died at Naples, in 1774.

Jomelli has been not unaptly called the 'Glück of Italy.' He possessed the deep feeling and vigour that characterized the German composer, and is nearly as rich in accompaniments. Indeed in his admirable, his marvellously affecting scena, 'Berenice, ove sei?' in the serious opera of 'Lucio Vero,' he not only left at an unmeasurable distance all former and contemporary composers, but gave birth to a work which has never yet been surpassed, if ever equalled, and which must transmit his name to posterity, so long as a taste for what very nearly approaches the sublime in music shall exist. We hardly need mention his 'Chaconne,' it is familiar to all; and though not of so high an order of composition as some of the above-named works, yet its great and long-continued popularity is an incontestable proof of its originality and other sterling merits.

JONAH (יוֹנָה, Ιωνας), was one of the twelve minor Hebrew prophets. He is mentioned in 2 *Kings*, xiv. 25, where we are told that Jeroboam II. 'restored the coast of Israel from the entering of Hamath unto the Sea of the plain, according to the word of the Lord God of Israel, which he spake by the hand of his servant Jonah, the son of Amittai, the prophet, which was of Gath-hepher,' or Gittah-hepher (*Joshua*, xix. 13), a city near the eastern boundary of the tribe of Zebulun, which formed a part of the kingdom of Israel, and afterwards of Galilee. From this passage most critics have supposed that Jonah lived under Jeroboam II., who reigned from 823 to 782 B.C. Bishop Lloyd places him near the close of Jehu's reign, or the beginning of that of Jehoahaz. The book of Jonah, with the exception of the highly poetical prayer in chap. iii., is entirely narrative. It may be divided into two parts. The first (chaps. i. and ii.) relates the attempt of Jonah to evade God's command to preach to the people of Nineveh by fleeing to Joppa, and there embarking in a ship sailing for Tarshish; his being thrown into the sea and swallowed by a fish, in the belly of which he remained three days and three nights; and his deliverance from the fish, which at the command of the Lord vomited him out upon the dry land. The second part gives an account of his second commission to Nineveh, where the king and people repented at his preaching (chap. iii.); his anger because God, upon the people's repentance, did not execute the judgments which the prophet had predicted, and the striking reproof which Jonah received (chap. iv.). The history of Jonah is referred to in several passages of the New Testament (*Matt.* xii. 39-41; xvi. 4; *Luke*, xi. 29, 30, 32), from which it appears improbable that the book of Jonah is to be considered merely a parabolic story, as some have supposed. The canonical authority of the book is generally admitted.

Bochart supposes that the fish which swallowed Jonah was a species of shark (Bocharti *Opera*, tom. iii., p. 742), and Townsend endeavours to identify it with the idol-fish worshipped at Ascalon under the name Derceto.

(The *Introductions* of Horne and Jahn; Calmet's *Dictionary*; Townsend's *Old Testament arranged in Chronological Order*; Rosenmüller's *Scholia*; and list of commentators in Watt's *Bibliotheca Britannica*.)

JONATHAN APPHUS was the youngest brother of Judas Maccabæus, on whose death he was chosen commander of the Jewish forces. After carrying on the war with some success for a few years, he made peace with Bacchides, the general of Demetrius Soter. At the commencement of Alexander's insurrection [Alexander Balas], Jonathan's alliance was warmly courted both by Demetrius and by Alexander. He joined the latter, by whom he was appointed high-priest (B.C. 153). He continued in great favour with Alexander during that king's life, and defeated Apollonius, the governor of Cœle-Syria, who had espoused the cause of Demetrius Nicator. He also laid siege to the Syrian garrison in the castle on Mount Zion. On the accession of Demetrius Nicator, Jonathan succeeded in obtaining the confirmation of his power; but, disgusted by the faithless treatment he afterwards received from Demetrius, he joined the insurrection of Trypho in favour of Antiochus Theos, whose cause he supported with great success. He also confirmed the alliance made by Judas with the Romans. Trypho had put Antiochus on the throne with the purpose of afterwards usurping it himself. Dreading the powerful opposition of Jonathan, he took him by treachery and put him to death, in B.C. 144.

(1 *Maccabees*, chaps. ix.-xii.; Josephus, *Antiquities of the Jews*, book xiii., chaps. i.-vi; Jahn's *Hebrew Commonwealth*, vol. i.)

JONES, INIGO, who has been styled the English Palladio, and who forms an epoch in the history of architecture in this country, was born in the neighbourhood of St. Paul's in London, where his father was a respectable cloth-worker. Of his youth and education very little is known,—perhaps quite as much as was to be known,—except that by his talent for drawing he attracted the notice of William earl of Pembroke, by whom he was sent abroad, where he spent three or four years studying with his pencil, measuring and examining various remains of antiquity, as well as modern buildings. At that period such task required much greater application and diligence than at present, when almost every ancient building has been shown in engravings, and when the student has been previously familiarised at home with specimens of almost every style, including those of edifices avowedly Italian in their design. Jones, on the contrary, found himself in an entirely new world of art, for the ancient orders were then utterly unknown in England, nor were the Italian orders known, except as exhibited in diminutive columns, pilasters, entablatures, and pediments, applied merely as adscititious ornaments patched upon a degenerate Tudor style. So far the times were eminently propitious to Jones, nothing more being required than for him to transplant the full-grown Italian style, as he found it in the works of Palladio and that school, in order at once to obtain the celebrity of an originator. It was not however until many years after his first visit to Italy that he fully adopted the 'classic' taste.

About the year 1604 he was invited from Italy to Denmark by Christian IV., for whom he is said to have designed part of the buildings of the royal château of Frederiksborg, and also the palace of Rosenborg. Fortunately this is doubtful, there being nothing in the architecture of either of these that would reflect any credit on the taste of our English Palladio. Yet, whether the patronage of the Danish monarch did much for Jones or not, in itself, it promoted his interest at the English court, Christian's sister being the queen of James I. Inigo returned to England in 1605, and was immediately employed at court in devising the machinery and decorations of the costly masques and pageants then in vogue. He was appointed architect to the queen and to Prince Henry. None of his best works belong to this period, for it was not till after his second return from Italy, which he again visited in 1612, on the death of the prince, that he emancipated himself from the mesquin style that had succeeded the downfal o Tudor architecture. Without this second residence in Italy he might have designed a palace for Whitehall quite as extensive as the one he actually made, but it would, no doubt, have been very different in style. On his return he was appointed to the surveyorship-general of the royal buildings, and commenced his plans for that just mentioned. Soon after the only portion ever built of it, namely, the Banqueting House, was completed, he engaged in a task of a very different nature, that of ascertaining the origin and purpose of Stonehenge; and notwithstanding that its rude amorphous blocks—from which no lessons were to be derived, even in regard to construction—could have no attractions for the eye of a votary of Vitruvius and Palladio, and little to captivate the fancy of him who had displayed his invention in courtly pageants, he appears to have prosecuted his ungrateful researches with application that deserved a far better object. His fancy however enabled him to see much in those barbaric remains that had never existed; but as for the question, he left it, as he found it, a subject for speculation.

After the building at Whitehall, he was engaged upon the back-front of old Somerset House, and in adding a Corinthian portico to the west front of old St. Paul's. Both of them have been greatly extolled, more especially the latter, but neither of them remains; we have however another very celebrated production of Inigo's in the church of St. Paul, Covent Garden, in regard to which Quatremère de Quincy, though by no means unfavourable to him, says the most remarkable thing about it is the reputation it enjoys. York Stairs, Ashburnham House, Westminster, a house originally built for the Earl of Lindesay, on the west side of Lincoln's Inn Fields, and Surgeon's Hall, yet remain among his works in the metropolis; and when we say that the last-mentioned has been asserted by some to have been one of his best, no very flattering notion is conveyed of the taste of his admirers. In fact the Banqueting House is almost the only specimen that accounts for his reputation, and even that we suspect is now more praised as a matter of course, than really admired. The designs for the palace of Whitehall, together with many others by Jones, were published in a folio volume by Kent. To give a list of all the buildings attributed to him, or even of the principal ones in addition to those mentioned, would occupy a considerable space. He died in June, 1653, at the age of eighty.

JONES, SIR WILLIAM, was born in London, September the 28th, 1746. William Jones, his father, who was a mathematician of some eminence, was born in 1680, and died in 1749. He was the author of 'A New Compendium of Navigation,' 8vo., London, 1702; 'Synopsis Palmariorum Matheseos, or a New Introduction to the Mathematics,' 8vo., London, 1706; 'Analysis per Quantitatum Series, Fluxiones, ac Differentias,' &c., 4to., London, 1711; besides some papers in the 'Philosophical Transactions.'

William Jones having died when his son was only three years of age, the care of the child's education devolved upon his mother, who appears to have been a sensible and intelligent woman. Jones was remarkable in his early years for his progress in learning. At the age of seven he was sent to the grammar-school at Harrow, and though his classical studies were suspended for a twelvemonth when he was nine years old, in consequence of an accident which kept him from the school, he surpassed almost all his schoolfellows in learning; and so high an opinion had Dr. Thackeray, at that time head-master of the school, formed of the talents of his pupil, that he used to say that 'if Jones were left naked and friendless on Salisbury Plain, he would nevertheless find the road to fame and riches.' Dr. Thackeray was succeeded by Dr. Sumner, who had an equally high opinion of the abilities of Jones; he has been known to declare 'that Jones knew more Greek than himself, and was a greater proficient in the idiom of that language.' During the last two years of his residence at Harrow Jones did not confine himself to the study of the classical writers; he learned the Arabic characters, and made some progress in Hebrew. He devoted a considerable part of his time to composition in Latin, Greek, and English; some of his juvenile pieces have been printed in the fragment of a work which he began at school, and entitled 'Limon,' in imitation of a lost work of Cicero. During the vacations he studied the French and Italian languages.

In 1764, at the age of seventeen, he entered at University College, Oxford, where he continued to prosecute his studies with the greatest diligence. He especially directed his attention to the study of Arabic and Persian; and employed his vacations in reading the best authors in Italian, Spanish, and Portuguese. In 1765 he left Oxford, and went to reside in the family of Earl Spencer in order to superintend the education of Lord Althorp. In 1770 he resigned this situation with the intention of going to the bar, but he did not immediately commence his legal studies. During the five years that he resided in Earl Spencer's family he made great acquirements in Oriental literature, and obtained by his publications the reputation of being one of the first Oriental scholars of his age. In 1768 he was requested by the king of Denmark to translate the 'Life of Nadir Shah' from the Persian into French; this translation was published in 1770, with a treatise on Oriental poetry, also written in French, in which he has translated several of the Odes of Hafiz into French verse. In the following year he published a grammar of the Persian language, which is the best grammar of that language that has yet appeared. It has been republished of late years with many additions and improvements by Professor Lee, of Cambridge. In his twenty-first year he began his 'Commentaries on Asiatic Poetry' in imitation of Bishop Lowth's 'Prelections on the Sacred Poetry of the Hebrews.' This work, which was written in Latin, and was published in 1774 under the title of 'Poeseos Asiaticæ Commentariorum Libri Sex,' contains many excellent remarks on Oriental poetry in general, and translations from the most celebrated Hebrew, Arabic, Persian, and Turkish poets. It was republished by Eichhorn, at Leipzig, 1776. He also began, during his residence with Earl Spencer, a Dictionary of the Persian language, in which the principal words were illustrated by quotations from the most celebrated Persian authors. In 1771 he replied anonymously in French to Anquetil du Perron, who had attacked the University of Oxford and some of its learned members in his introduction to the 'Zend-Avesta.' This reply was written in such good French that Biorn Sthal, a Swedish Orientalist, says, 'that he had known many Frenchmen so far mistaken in the writer as to ascribe it to some *bel-esprit* of Paris.' For some further remarks on this subject the reader may consult the article ANQUETIL. In 1772 Mr. Jones published a small volume of poems consisting chiefly of translations from the Asiatic languages.

In 1774 Mr. Jones was called to the bar. Feeling the importance of devoting his whole time to his legal studies, he left all his Oriental books and MSS. at Oxford, and diligently attended the courts of common law. During this time he wrote an essay on the law of bailments, which has since been re-published. The work is characterized by Jones's usual perspicuity and ease of expression; so far as concerns the arrangement and matter, we are not aware that it contains anything original, and it is sufficient to read it to be convinced that the author had not a mind adapted to seize with precision the fundamental principles which form the science of law. Jones's extravagant panegyric on Blackstone is sufficient to show in what manner he had studied law.

In 1780 he became a candidate to represent the University of Oxford in parliament, but finding that he had no hope of success in consequence of his opposition to the ministers of the day, and his condemnation of the American war, he withdrew from the contest. His opinions on political subjects are given in his 'Enquiry into the Legal Mode of Suppressing Riots,' in his 'Speech to the Assembled Inhabitants of Middlesex,' &c., in his 'Plan of a National Defence,' and in his 'Principles of Government;' which are printed in the eighth volume of his works (8vo. edition). After an interval of six years, when he had acquired great reputation in his profession, he again resumed his Oriental studies, and employed the leisure hours of the winter of 1780-1 in translating some antient poems of the highest repute in Arabia, which are called *Moallakat*, or 'suspended,' because they are hung up in the Temple of Mecca. In 1783 he was appointed, through the influence of Lord Ashburton, a judge in the supreme court of judicature at Fort William in Bengal; on which occasion he was knighted. A few weeks after he married Miss Shipley, the eldest daughter of the bishop of St. Asaph.

Sir William Jones arrived at Calcutta at the close of the year; and from this time to that of his death, a period of eleven years, he devoted all his leisure time to the study of Oriental literature. Almost immediately after his arrival he induced those persons who had paid attention to Oriental literature to unite in forming a Society 'for inquiring into the history and antiquities, the arts, sciences, and literature of Asia.' To the 'Asiatic Researches,' which were published by this Society, of which Sir William Jones was the first president, Oriental scholars in Europe are indebted for much of their knowledge of the literature and antiquities of the Hindus. Sir William Jones contributed the following treatises to the first four volumes of the 'Asiatic Researches:' eleven 'Anniversary Discourses' on the different nations of Asia, &c.; 'A Dissertation on the Orthography of Asiatic Words in Roman Letters;' 'On the Gods of Greece, Italy, and India;' 'On the Chronology of the Hindus;' 'On the Antiquity of the Indian Zodiac;' 'On the Second Classical Book of the Chinese;' 'On the Musical Modes of the Hindus;' 'On the Mystical Poetry of the Persians and Hindus,' containing a translation of the Gîtagovinda by Jayadêva; 'On the Indian Game of Chess;' 'The Design of a Treatise on the Plants of India;' and many other treatises of less importance.

The study of Sanskrit principally engaged the attention of Sir William Jones during the first three or four years of his residence in Bengal. When he had attained sufficient proficiency in this language he proposed to the government to publish a copious digest of Hindu and Mohammedan law; he offered to superintend the compilation, and to translate it. This offer was willingly accepted, and Sir William Jones laboured for many years on the work. It was unfinished at the time of his death; but has since been completed under the superintendence of Mr. Colebrooke. The laws of Manu, on which the whole system of Hindu jurisprudence is founded, were translated by Sir William Jones, and published separately in 1794. Those who are interested in Hindu literature are also indebted to Sir William Jones for a translation of Sacontalâ, a dramatic poem by Câlidâsa, which appeared for the first time at Calcutta in 1789; and also for a translation of the Hitopadêsa, which appears to have been the original of the celebrated collection of Persian fables known under the name of Pilpay or Bidpai. [Bidpai.] But while he was indefatigable in the pursuit of literature, he never neglected his duties as a judge; and 'the inflexible integrity,' remarks Lord Teignmouth, 'with which he discharged the solemn duty of this station, will long be remembered in Calcutta, both by Europeans and natives.' He died at Calcutta, on the 27th of April, 1794, after a few days' illness.

A mere catalogue of the writings of Sir William Jones would show the extent and variety of his knowledge. He had a wonderful facility for the acquisition of languages; his knowledge of Latin and Greek was extensive, though not profound; his acquaintance with Arabic, Persian, and Sanskrit has seldom been equalled, and scarcely, if ever, surpassed by any European; he was familiar with Turkish and Hebrew; and had learned enough of the Chinese to enable him to translate an ode of Confucius. He was also well acquainted with most of the modern languages of Europe,—French, Italian, Spanish, Portuguese, and German; and had studied less critically numerous other languages. His knowledge of science was not so extensive or accurate: he had however made some progress in mathematics; was well acquainted with chemistry; and had studied botany during the latter years of his life with the greatest diligence. But though the attainments of Sir William Jones were so various and extensive, he does not appear to have possessed any originality. He neither discovered new truths nor placed old ones in a new light. He possessed neither the power of analyzing nor of combining and constructing. For language, as a science, he did nothing: he only collected materials for others. His writings on Oriental literature are interesting and instructive; but neither they nor any of his other works are distinguished by any originality of thought or power of expression; his style is weak, and his judgment frequently defective. His literary attainments were certainly such as few men, perhaps none, have ever made; yet with every disposition to admire and honour him for what he has done, we cannot assign him a high intellectual rank. Doubtless he weakened his powers by diffusing them over so large a surface, instead of concentrating them on a few objects. His personal character must always command our respect; he was an indefatigable scholar, an affectionate son, a faithful friend, a useful citizen, and an upright judge.

In addition to the works which have been already mentioned, Sir William Jones published a translation of Isæus; and also translations of two Mohammedan law tracts 'On the Law of Inheritance, and of Succession to Property of Intestates;' 'Tales and Fables by Nizami;' 'Two Hymns to Pracriti;' and 'Extracts from the Vedas.'

A complete edition of the works of Sir William Jones was published in 6 volumes, 4to., 1799, and in 13 volumes, 8vo., 1807, with his life by Lord Teignmouth.

JONES, JOHN PAUL, was born 6th July, 1747, according to the 'Encyclopædia Americana' at Arbingland (Arbigland?), according to other accounts in the parish of Kirkbean, in Kirkcudbright, Scotland. The name of his father, who was a gardener, was Paul; the addition of Jones was assumed by the son after he grew up in life. He went to sea at the age of twelve, and after making many voyages to America and other parts, was in 1768 made captain and supercargo of a vessel which he had shortly before brought safe into port, having, at the request of those on board, when he was sailing in her as a passenger, taken the command on the death of the captain and mate. Having in a few years made a good deal of money, he settled in Virginia in 1773, on a property which fell to him by the death of an elder brother, who had been for some years established there as a planter. After the declaration of their independence by the colonies, he offered his services in the war against his native country, in which he soon greatly distinguished himself. On being appointed to the command of the Providence, he cruised among the West India Islands, and, as it is stated, made sixteen prizes in little more than six weeks. In May, 1777, he proceeded, by order of the Congress, to France, where he was immediately appointed, by Franklin and his brother commissioners, to the command of the Ranger, in which the next year he sailed upon a cruise to the coasts of Britain, and, after making a descent by night at Whitehaven, where he spiked the guns of the forts and set fire to one or two vessels, besides plundering the house of the earl of Selkirk on the opposite coast of Scotland, returned to Brest with 200 prisoners, and the boast that he had for some time kept the north-western coast of England and southern coast of Scotland in a state of alarm with his single ship. In the autumn of 1779 he set sail again on a similar expedition for the eastern coasts of England and Scotland, in which his success and the terror he created were still greater than on the former occasion. Among other exploits, having encountered the Baltic fleet, he attacked its convoys, the Serapis frigate and the Countess of Scarborough, off Flamborough Head, on the 23rd of September, and, after a sanguinary engagement, succeeded in capturing the first-mentioned of these vessels. For this achievement he was, on his return to Paris, presented by Louis XVI. with a richly ornamented sword, bearing a flattering inscription, was invested with the military order of Merit, and received in every way the most distinguished reception both from the government, the court, and in general society. At this time it seems he wrote verses, and evinced a violent ambition to make a figure in the fashionable world; he is described by an English lady then resident at Paris as 'a smart little man of thirty-six, who speaks but little French, and appears to be an extraordinary genius—a poet as well as a hero.' On his return to America, in February, 1781, a gold medal was voted to him by Congress. He then served till the peace under the French admiral D'Estaing, after which he proceeded to Paris with the appointment of agent for prize-money. Some years afterwards he entered the Russian service with the rank of rear-admiral; but disputes in which he became involved with the Russian naval authorities soon compelled him to retire, on which he returned once more to Paris, where he lived till his death, 18th July, 1792, having, according to his American biographer, gradually sunk into poverty and neglect before he was attacked by disease. 'Jones,' concludes the writer in the 'Encyclopædia Americana,' was a man of signal talent and courage; he conducted all his operations with the most daring boldness combined with the keenest sagacity in calculating the chances of success and the consequences of defeat. He was however of an irritable impetuous disposition, which rendered him impatient of the authority of his superiors, while he was at the same time harsh in the exercise of his own; and he was deficient in that modesty which adorns great qualities and distinguished actions, while it disarms envy and conciliates jealousy. His early education was of a very limited kind. It terminated when he went to sea at the age of twelve; but he supplied its defects by subsequent study, so as to enable himself to write with fluency, strength, and clearness, and to sustain his part respectably in the polished society into which he was thrown..... His memorials, correspondence, &c., are quite voluminous.' A biographical memoir of Jones, by Mr. J. S. Sherburne, appeared, it seems, at Washington in 1828. We may add that in Scotland his name, and the impression of the dread he occasioned, are still alive in the popular memory, and universally familiar to old and young. Some account of his traditionary reputation may be found in a singular book entitled 'The Scottish Gallovidian Encyclopædia,' by John Mactaggart, 8vo., London, 1824 (pp. 373-376). According to this writer, who tells us that he has had his information about Jones 'from the lips of many who personally knew him, and all about his singular ways,' he was 'a short thick little fellow, about five feet eight in height, of a dark swarthy complexion.' 'He was,' continues the account, 'a common sailor for several years out of the port of Kirkcudbright, and was allowed to be unmatched on that coast for skill in sea matters.'

JONE'SIA, a genus of plants of the tribe Cassieæ, and of the natural family of Leguminosæ, which was named by Dr. Roxburgh in honour of Sir William Jones, who, in the midst of his numerous other avocations, found time to pay attention to Indian plants. The species are few in number, and indigenous in the islands of the Malayan Archipelago, as well as on the eastern frontier of Bengal, that is, in Silhet and lower Asam. They form trees which are highly ornamental from their handsome, shining, abruptly pinnate leaves, and from the showy nature of their crowded racemes of flowers. *J. Asoca*, the best known species, is often referred to by Hindu poets by the name which has been adopted by botanists to distinguish it as a species. Dr. Roxburgh says, and we can in a great measure coincide with him in opinion, 'When this tree is in full blossom, I do not think the whole vegetable kingdom affords a more beautiful object.' (*Fl. Ind.*, ii., p. 220.)

JONSON, BENJAMIN, was born at Westminster in the year 1574, and educated at Westminster school. While he was there his mother married a second husband, by trade a bricklayer, and when Jonson became of sufficient age to be employed, he worked at his father-in-law's business. According to Dr. Fuller, he soon left it and went to the University of Cambridge, but was obliged from necessitous circumstances speedily to return, and was employed in the new structure of Lincoln's Inn. According to Mr. Wood, some gentlemen who saw him working with his father took compassion on him, and he was sent by Camden to Sir Walter Raleigh, whose son he attended on his travels on the Continent. On his return he went to Cambridge. According to a third account, before going to Cambridge he served as a soldier in the Low Countries, and the statement seems to be confirmed by one of his own epigrams. The fact is, that the early part of his life is quite uncertain, though it is well known that on leaving Cambridge he betook himself to the stage, where he proved but an indifferent actor and at first an indifferent author. While a retainer to the stage he had the misfortune to kill a man in a duel, and was committed to prison, where the visits of a Catholic priest converted him to the Church of Rome. Twelve years afterwards he returned to the Church of England.

It was in the year 1598 that his fame rose by the production of the comedy of 'Every Man in his Humour,' at the Globe Theatre, and from this time he adopted the practice of writing a play a year, for several successive years. 'Every Man out of his Humour' was acted at the Globe; 'Cynthia's Revels,' which the author has called not a comedy, but a comical satire, was performed by the children of Queen Elizabeth's chapel, as was also another comical satire, 'The Poetaster.' This last piece was occasioned by a quarrel with Decker, who is satirized under the name of Crispinus. Decker retaliated by a play entitled 'Satiromastix,' in which Jonson appears under the title of Young Horace. Jonson's tragedy of 'Sejanus' was produced in 1603, and his noble play of 'Volpone' appeared two years afterwards. About this time he was committed to prison with Chapman and Marston, the three poets having written the comedy of 'Eastward-hoe' (printed in Dodsley's collection), which contained some reflections on the Scots. They were in danger of losing their ears and noses, but were soon pardoned and released. It is said that Jonson's mother intended to poison herself, if the punishment had been inflicted. Being much occupied with court masques, in the writing of which he had acquired great celebrity, Jonson did not produce another play (in the strict sense of the word) till 1609, when his 'Epicœne' was acted, which is regarded by Dryden as a perfect comedy. 'The Alchemist' appeared in 1610, and though more deservedly reckoned one of the best of his works, was no great favourite with the public. Its ill success is ascribed by some to a party raised against him. Dryden has supposed that the 'Alchemist' was written in imitation of a piece called 'Albumazar' (in Dodsley's collection), but the style and general conduct of the two pieces are so very different that there scarcely seems a reason for supposing any imitation other than the mere circumstance that both plays satirize pretended adepts. It is a curious fact that the fine play of 'Albumazar' likewise met with no success. In 1611 appeared the tragedy of 'Catiline,' in which the long speeches translated from Cicero and Sallust called forth animadversions, which were disregarded by the author, as he gloried in plagiarisms which served to exhibit his learning. After the production of 'Bartholomew Fair' in 1614, and 'The Devil is an Ass' in 1616, he published his works in folio, and soon after retired to live in Christ Church, Oxford, whither he had been invited by several members. In 1619 he became poet laureate, and received an annual stipend of 100*l.* and a tierce of Spanish wine. The condemnation of 'The New Inn,' which he produced in 1625, nearly disgusted him with the stage, though he afterwards wrote 'The Magnetic Lady' and 'The Tale of a Tub,' which are considered inferior productions. He appears to have suffered much from poverty in the latter part of his life. He died on the 6th August, 1637, and was buried three days afterwards in Westminster Abbey. His monument, inscribed 'O Rare Ben Jonson,' is familiar to every person who has visited the Abbey.

Jonson's plays are well adapted to the perusal of earnest students, who will find in them a mine of sterling though often rugged beauty; but those will be disappointed who look to his works for the amusement of a passing hour. In the first place it requires a suitable education to enable a person to relish his imitations of the classic authors; and in the second, his plays do not so much represent human character generally, as mankind under the particular circumstances of Jonson's own time, and many local allusions are made which cannot be understood without some knowledge of the manners and customs of the time: but Mr. Gifford's notes in his edition of Jonson are a treasure of this kind of information. The practice of exhibiting the 'humours,' that is, the peculiarities of character, obtained for Jonson the name of the 'humorous' poet, which name must be understood in a sense quite different from that in which it is used at present. The lovers of a more natural school of poetry are seldom admirers of Jonson, who finds his chief readers among those who like to observe the elaboration of dramatic art. Besides his completed dramatic works, Jonson has left two fragments, 'Mortimer's Fall,' which he intended to be a tragedy in the Greek style, and the 'Sad Shepherd,' a dramatic pastoral which is one of the gems of early English literature. He has also left a translation of Horace's 'Art of Poetry,' an 'English Grammar' of some merit, and a few poems, some of which are singularly beautiful. 'Every Man in his Humour' is the only piece that has kept possession of the stage. 'The Alchemist' has been abridged to a farce called 'The Tobacconist.'

JOPPA. [SYRIA.]

JORDAENS, JACOB, born at Antwerp in 1594, was a disciple of Adam van Oort, but was indebted to Rubens for the greater part of his knowledge in the art of painting. He was prevented from visiting Rome by an early marriage with Van Oort's daughter; but he diligently copied the best pictures of the great Italian masters to which he could procure access His pictures are distinguished by powerful, brilliant, and harmonious colouring, as well as knowledge of chiaroscuro. His composition is rich, his touch free and spirited; but he is deficient in elegance and taste; he copied nature as he found it. He painted with great facility and rapidity, and being also extremely diligent and living to a great age (he died in 1678, aged eighty-four), his works are very numerous: a great many of the churches in the Netherlands have altar-pieces by him, and his pictures are met with in most collections of any eminence.

JORDAN. [SYRIA.]

JORTIN, JOHN, D.D. (born 1698, died 1770), was of foreign extraction, his family having left France when Louis XIV. revoked the edict of Henry IV., commonly called the Edict of Nantes, for the protection of his Huguenot subjects. He was himself born in London. He had his grammar education at the Charter House, from whence he passed to Jesus College, Cambridge, of which he became in due time a Fellow.

While living at Cambridge he published a small volume of Latin poems, which are greatly admired, and allowed to possess a high rank among modern Latin verses. His College presented him to a living in Cambridgeshire, but he determined on leaving the country and residing in London, where he soon became an acceptable, or rather, in the better sense of the phrase, an admired and popular preacher. His sermons, many of which are printed, are distinguished for their excellent sense and the originality at once of thought and style. In 1751 he obtained the living of St. Dunstan in the East. His other church preferment was the living of Eastwell in Kent, presented to him by the earl of Winchelsea. This was for the greater part of his life all the preferment he enjoyed; but in 1762, when his friend Dr. Osbaldeston became bishop of London, Jortin was appointed his domestic chaplain, and was presented with a prebend in the church of Saint Paul and the living of Kensington. To these was soon added the archdeaconry of London. He fixed his residence at Kensington, and was buried in the new churchyard of that place.

The critical writings of Dr. Jortin are greatly admired by all who have a taste for curious literature. It is not merely on account of the learning which is displayed in them, and the use which is made of obscurer authors, but there is a terseness in the expression, and a light playful satire in the thoughts, which make them exceedingly entertaining. The first work of this class was published in 1731, and is entitled 'Miscellaneous Observations on Authors, antient and modern.' In 1751 the first volume appeared of his 'Remarks upon Ecclesiastical History;' and in 1758 he published his 'Life of Erasmus.

JORULLO. [MEXICO.]

JOSEPH I., of the house of Austria, emperor of Germany, succeeded his father Leopold I. in 1705. He carried on the war called that 'of the Spanish succession,' which had begun under his father, against Louis XIV. The allied armies under Eugene and Marlborough were prosperous in his reign. The battles of Ramilies, Oudenarde, and Malplaquet, the deliverance of Turin by Prince Eugene, the surrender of Naples to the Austrians, and the permanent footing obtained by the Archduke Charles in Spain, seemed to have nearly decided the question, when Joseph died of the smallpox in April, 1711, leaving his brother Charles, afterwards Charles VI., the last male heir of the house of Habsburg, to conclude the war. Joseph was a good prince; he was learned, and assiduous in the discharge of his duties, humane, and though a sincere Catholic, yet tolerant. He was one of the best of a house fertile in good and wise princes.

JOSEPH II., eldest son of Maria Theresa and of Francis of Lorraine, was elected king of the Romans in 1764, and in the following year, on the death of his father, he became emperor. As long as his mother lived he had little real power, as Maria Theresa retained the administration of her vast territories in her own hands; but on her decease, in 1780, he became possessed of all the hereditary Austrian dominions. Joseph soon displayed considerable ambition mixed with much restlessness: he was however kept in check by France and by Frederic of Prussia. After the latter died, in 1786, Joseph joined Catherine of Russia in a war against Turkey, which his general Laudon carried on with success, taking Belgrade and other fortresses in 1789. But the threatening aspect of affairs in France and Brabant arrested the progress of the Austrian armies, and Joseph himself died in 1790. The character in which Joseph is chiefly viewed is that of a reformer; in many instances a wise one, but in others rash and inconsiderate. He abolished all separate jurisdictions, and divided the Austrian monarchy into thirteen governments subdivided into circles, all under a uniform administration, civil and judicial. He abolished feudal servitudes, and substituted a fixed tax in lieu of corvées, taskworks, tithes, heriots, &c. He issued the edict of toleration, by which all Christians, of whatever denomination, were declared equally citizens, and equally eligible to all offices and dignities. Wherever there was a population of 3000 inhabitants, whether Protestants or Greeks, they were allowed to build a church for themselves, provided they established at the same time a permanent fund for the support of the minister and relief of the poor. The Jews were allowed the exercise of all trades and professions, with access to the public schools and universities He took away from the clergy the censorship of the press, and gave it to a commission of literary men resident at Vienna. He opened colleges and universities, enlarged those already existing, endowed new professorships, and collected libraries. He encouraged manufactories, but, according to the old system, he placed exorbitant duties on foreign articles. He subjected the monastic fraternities to diocesan jurisdiction; and he suppressed many convents, but he did it in a harsh manner, without regard to the necessities and feelings of the older inmates, who were turned adrift into the world with only small pensions, and in some cases even without them. He forbade pilgrimages and processions, prohibited the pomp of funeral ceremonies, declared marriage to be a purely civil contract, forbade all papal bulls to be published throughout his dominions without the permission of the government, abolished the privileges of the university of Louvain, and established a new theological seminary in its place. These innovations, in a country so strongly attached to its old institutions and religion as the Belgian provinces were, led to an insurrection, and ultimately to the separation of those fine territories from the Austrian monarchy. His scheme of establishing the German as the universal language throughout his dominions led to a revolt in Hungary, which his more temperate successor Leopold had some difficulty in pacifying. In short, the reforms of Joseph partook both of the good and the evil of that spirit of innovation which has prevailed in Europe ever since his time; for with all his liberality he was perfectly despotic in carrying his measures into effect, without regard to the feelings, prejudices, or interests of individuals. He has been quaintly, but not inappropriately, styled the imperial avant-courier of the French revolution.

JOSEPH, King of Portugal. [PORTUGAL.]

JOSE'PHUS, FLA'VIUS, the celebrated Jewish historian, was born at Jerusalem A.D. 37. His family was one of very distinguished rank; by his mother's side he was descended from the Asmonæan princes; and his father Matthias belonged to the chief sacerdotal family of the first of the twenty-four courses. Josephus was brought up at Jerusalem with his brother Matthias; and, according to his own account, he made such progress in learning that he was frequently consulted at the age of fourteen concerning difficult points in the law. At the age of sixteen he resolved to become acquainted with the opinions of the three principal Jewish sects, namely, those of the Pharisees, Sadducees, and Essenes. He accordingly studied the doctrines of each; but having heard that a celebrated Essene of the name of Banus lived in an ascectic manner in the desert, Josephus joined him in his solitary mode of life, and passed three years in his society. At the age of nineteen he again returned to Jerusalem, and embraced the opinions of the Pharisees. In his twenty-sixth year he sailed to Rome with the view of obtaining the liberation of some priests of his acquaintance, who had been seized by Felix, procurator of Judæa, and sent as captives to Rome. He had the misfortune to be shipwrecked in the Adriatic; but upon arriving at Puteoli, he became acquainted with an actor of the name of Aliturius, through whose means he was introduced to Poppæa, the wife of Nero, who procured the liberation of the priests, and bestowed many presents upon Josephus.

On his return to Jerusalem, Josephus found the greater part of his countrymen preparing for war against the Romans. Being strongly opposed to this measure, he joined himself to that party which was anxious for the preservation of peace. After the defeat of the Roman general Cestius, and the massacre of the Jews in Syria and Alexandria, all hope of peace appears to have been lost; and Josephus accordingly united himself to the war party. Being deputed, together with Joazar and Judas, to defend the province of Galilee, he made vigorous preparations against the Romans, though his plans were constantly thwarted, and his life frequently in danger from his personal and political enemies. On the approach of Vespasian's army in the following year, A.D. 67, Josephus retreated to Jotapata; and after defending the city for forty-seven days against the whole Roman army, he was taken prisoner on the capture of the town. But instead of being put to death, as was the fate of all his companions, he was received by Vespasian with distinguished honour, in consequence of his pretending to the character of a prophet, and artfully predicting that Vespasian would shortly succeed Nero in the government of the Roman empire. He was present with Titus at the siege of Jerusalem, and endeavoured to prevail upon his countrymen to submit to the Romans. After Vespasian succeeded to the purple he was treated by Titus with still greater honour than before; but by the Jews he was regarded as a renegade, and by the Roman soldiers was looked upon with suspicion. On the taking of the city, Titus offered to grant him anything he wished. He asked for the sacred books, and the lives of his brother and fifty friends. He received a large estate in Judæa; and upon going to Rome was admitted to the privileges of a Roman citizen by Vespasian, who also gave him an annual pension and apartments in his own house. After the death of Vespasian, he continued to live in Rome in high favour with Titus and Domitian. The time of his death is uncertain; he was certainly alive at the latter end of the first, and probably at the beginning of the second century.

The first work published by Josephus was the history of the 'Jewish War;' it was originally written in the Syro-Chaldaic language for the use of those Jews who lived beyond the Euphrates. He afterwards translated it into Greek for the benefit of the learned Romans. The 'Jewish War' consists of seven books, and gives an account of the history of the Jews from the taking of Jerusalem by Antiochus Epiphanes to the destruction of the city by Titus. Many years afterwards, A.D. 93, Josephus published in Greek his great work on the 'Antiquities of the Jews,' with the view of increasing the reputation of his nation with the Romans, and of refuting the many calumnies in circulation against the Jews, by giving a faithful account of their history and opinions. This work commences, in the same manner as the book of *Genesis*, with the creation of the world; and it gives a consecutive account of Jewish history from the birth of Abraham to the commencement of the war with the Romans. The early part is taken from the books of the Old Testament, with many additions and explanations; some of which were probably genuine Jewish traditions; but the greater part appear to have been only added by the historian, in order to give more importance to his nation, and a greater air of probability to the miraculous occurrences in Jewish history. The 'Antiquities of the Jews' consists of twenty books, and was dedicated to Epaphroditus, a philosopher at Rome.

Josephus also wrote 'Two Books against Apion,' in reply to those Greeks who questioned the truth of the early part of his work on the 'Antiquities of the Jews.' He likewise published an account of his own life in answer to Justus, who had written in Greek an account of the Jewish war, in which he attacked the character of Josephus.

The best editions of Josephus are by Hudson, Oxf., 1720, 2 vols. fol.; Havercamp, Amst., 2 vols. fol.; Oberthür, Leip., 3 vols. 8vo., 1782-5; and Richter, Leip., 6 vols. 12mo., 1826-7. The works of Josephus have been frequently translated into most of the modern languages of Europe: the best translations are—in French, by Gillet, Paris, 1756, 4 vols. 4to.; that in Italian, by Angiolini, Verona, 1779, 4 vols. 4to.; and in English by Whiston. There are several German translations: one by J. B. Ott, Zürich, 1736; another by J. F. Cotta, Tübingen, 1736; and the 'Jewish War,' by J. B. Frise, Altona, 1804-5, 2 vols. 8vo.

JOSHUA (יְהוֹשֻׁעַ; in the LXX., Josephus, *Acts*, vii. 45, and *Hebr.* iv. 8, he is called Ἰησοῦς), a book of the Old Testament, so called because it records the exploits of Joshua, the son of Nun, who succeeded Moses in the command of the Israelites. Joshua, whose original name was Hoshea (הוֹשֵׁעַ, *Numb.* xiii. 8, 16), accompanied his countrymen from Egypt, and distinguished himself by his courage and military talents in a war with the Amalekites (*Exod.* xvii. 9-13). He was sent, together with several others, to explore the Promised Land, and was the only one of the spies, with the exception of Caleb, who exhorted his countrymen to invade Canaan (*Numb.*, xiv. 6-9, 38). In consequence of this he received especial marks of favour from God, and was nominated by Moses, on the express order of God, to succeed him in the command of the Israelitish army (*Numb.*, xxvii. 18-23; *Deut.*, iii. 28; xxxi. 23). Joshua led the Israelites over the Jordan, B.C. 1451; and in the course of seven years conquered the greater part of Palestine, and assigned a particular part of the country to each of the tribes. He died at the age of 110, and was buried at Timnath-serath, in Mount Ephraim (*Josh.*, xxiv. 29, 30). We learn from Josephus that Joshua commanded the Israelites for twenty-five years (*Antiq.*, v. 1, sec. 29).

The author of the Book of Joshua and the time in which it was written are equally uncertain. Many critics have supposed that it was written by Joshua himself; but the entire book in its present form could not have been written by him, for many parts of the book refer to events which happened after the death of Joshua (*Josh.*, iv. 9; xv. 13-19, compared with *Judg.*, i. 10-15; *Josh.*, xvi. 10, with *Judg.*, i. 29; *Josh.*, xix. 47, with *Judg.*, xviii. 29). Many critics suppose the book to have been written by Samuel or Eleazar, whose death is recorded in the last verse of the book. Lightfoot ascribes it to Phinehas, the son of Eleazar, and De Wette to the time of the Babylonish captivity. But at whatever time it may have been written, the author appears to have compiled the greater part, if not the whole, of the work from very antient documents, some of which were probably drawn up by Joshua himself. The survey of the conquered country is expressly said to have been 'described in a book' (*Josh.*, xviii. 9); and Joshua is also said to have written 'in the book of the law of God' the renewal of the covenant between God and the people of Israel (*Josh.*, xxiv. 26). The Book of Jasher, which has long since been lost, is quoted in *Joshua* (x. 13) as a work of authority. In *Josh.*, v. 1, the author appears to quote the exact words of a document written by a person who was present at the events recorded.

The Book of Joshua is a continuation of the Book of Deuteronomy, and gives an account of Jewish history from the death of Moses to that of Joshua. It may be divided into three parts, of which the first contains the history of the conquest of the southern and northern parts of Palestine (chaps. i.-xi.), and a recapitulation of the conquests both of Moses and Joshua (ch. xii.); the second part gives a description of the whole of Palestine (ch. xiii.), and an account of the land which was allotted to Caleb and each of the tribes (chaps. xiv.-xxii); the third part contains an account of the dying address, death, and burial of Joshua (chaps. xxiii., xxiv.)

The canonical authority of this book has never been disputed. In all the MSS. of the Old Testament it immediately follows the Pentateuch.

Many Christian commentators consider Joshua to have been a type of Christ; but this opinion is not supported by any writer of the New Testament.

The Samaritans have two books which bear the name of Joshua. 1. One of these is a chronicle, consisting of forty-seven chapters, of Jewish history from a little before the death of Moses to the time of the Roman emperor Alexander Severus. It appears to have been called the Book of Joshua, because the history of Joshua occupies the greater part of the work (the first thirty-eight or thirty-nine chapters). It is written in the Arabic language, in Samaritan characters. Copies of this work are extremely scarce. The only copy in Europe, as far as we are aware, is in the University Library at Leyden, to which it was left by Joseph Scaliger. 2. The other Book of Joshua, written by one Abul-Phatah, is also a chronicle of events from the beginning of the world to A.H. 898 (A.D. 1492). There is a copy of this work in the Bodleian Library at Oxford. Schnurrer, who also possessed another copy, has given an account of the chronicle in the ninth volume of the 'Repertorium für Bibl. und Morgenl. Litt.'

(The *Introductions* of Eichhorn, Jahn, De Wette, Augusti, and Horne; Rosenmüller's *Scholia;* the best critical works on Joshua are by Masius, *Josuæ Imperatoris Historia illustrata*, Antwerp, 1574; Meyer, *Ueber die Bestandtheile und die Oekonomie des B. Josua*, with a review of the same book in Bertholdt's 'Journal der Theolog. Litt.' vol. ii., pp. 337-366; Herwerden's *Disputatio de Libro Josuæ*, Groning. 1826; Maurer's *Commentar über d. B. Josua.*)

JOUDPORE [Marwar.]

JOURNALS OF THE LORDS AND COMMONS. [Parliament.]

JOVELLA'NOS, GASPER MELCHIOR DE. This patriotic and enlightened writer and statesman, who zealously devoted his talents to the improvement of his countrymen and the defence of their liberties, was born at Gijon in the Asturias, in 1749. Although of noble lineage, being nephew to the duke of Losada, he possessed but a moderate patrimony; accordingly, as soon as he had completed his studies at the universities of Oviedo, Avila, and Alcala, he accepted the appointment of magistrate at Seville. Yet such were his economy and public spirit, that he would have declined the salary if he had not been pressed, and he appropriated a considerable portion of his emoluments to the 'Instituto Asturiano.' In 1778 he was made chief judge of the King's Court at Madrid, in which city he became acquainted with Cabarrus, Campomanes, and other eminent literary characters. He was afterwards removed, upon some futile pretexts, through the machinations of court intrigue, but was again recalled, and raised to the more important office of minister of grace, or home-secretary of state, to retain it however only for a few months, when the influence of the unprincipled Godoy expelled him. He now returned to Gijon, where his cares were directed towards the 'Instituto Asturiano,' which he had succeeded in establishing in 1794; yet he was not allowed to pursue his plans for public instruction long, since in about two years and a half afterwards he was arrested, and sent as prisoner to Majorca, where he was confined in the castle of Bellver. Even during this period, which continued upwards of seven years, he prosecuted his studies as diligently as circumstances would permit, and commenced a 'Flora Bellverica,' and collected materials for a history of the island. At length, after the downfal of Godoy, he was permitted to return by Ferdinand VII., and on that sovereign's abdication, was chosen member of the central junta. When that body was dissolved, the illustrious veteran returned to Gijon, to be shortly after driven from his home when the French invaded Asturias, in 1812. Within two months death liberated him from all his persecutors.

As a writer on subjects of political economy and legislation, Jovellanos stands foremost among his countrymen; but besides his productions of that class, he wrote numerous others, among which may be mentioned his celebrated 'Pan y Toros,' the tragedy of 'Pelayo,' the comedy of 'El Delincuente Honrado,' a translation of the first book of 'Paradise Lost,' besides several poetical pieces; an éloge on Ventura Rodriguez, the eminent architect; a dissertation on English architecture, &c. A biographical memoir of him was published by his friend Cean Bermudez (the well known author of several works on the fine arts), under the title of 'Memorias para la Vida del Exc. Sen. Don G Jovellanos, y Noticias analiticas de sus Obras.'

JOVIA'NUS, FLA'VIUS CLAU'DIUS, born A.D. 331, was the son of Veronianus, of an illustrious family of Mœsia, who had filled important offices under Constantius. Jovianus served in the army of Julian in his unlucky expedition against the Persians, and when that emperor was killed, A.D. 363, the soldiers proclaimed him his successor. His first task was to save the army, which was surrounded by the Persians, and in great distress for provisions. After repelling repeated attacks of the enemy, he willingly listened to proposals for peace, which were—that the Romans should give up the conquests of former emperors westward of the Tigris, and as far as the city of Nisibis, which was still in their hands, but was included in the territory to be surrendered up to Persia, and that moreover they should give no assistance to the king of Armenia, then at war with the Persians. These conditions, however offensive to Roman pride, Jovianus was obliged to submit to, as his soldiers were in the utmost destitution. It is a remarkable instance of the Roman notions of political honesty, that Eutropius reproaches Jovianus not so much with having given up the territory of the empire, as with having observed so humiliating a treaty after he had come out of his dangerous position, instead of renewing the war, as the Romans had constantly done on former occasions. Jovianus delivered Nisibis to the Persians, the inhabitants withdrawing to Amida, which became the chief Roman town in Mesopotamia. On his arrival at Antioch, Jovianus, who was of the Christian faith, revoked the edicts of Julian against the Christians. He also supported the orthodox or Nicene creed against the Arians, and he showed his favour to the bishops who had formerly suffered from the Arians, and especially to Athanasius, who visited him at Antioch. Having been acknowledged all over the empire, Jovianus, after staying some months at Antioch, set off during the winter to Constantinople, and, on his way, paid funeral honours to Julian's remains at Tarsus. He continued his journey in very severe cold, of which several of his attendants died. At Ancyra he assumed the consular dignity, but a few days after, being at a place called Dadastana in Galatia, he was found dead in his bed, as some say being suffocated by the vapour of the charcoal burning in his room, according to others by the steam of the plaster with which it had been newly laid, whilst others again suspected him to have been poisoned or killed by some of his guards. He died on the 16th of February, A.D. 364, being 33 years of age, after a reign of only seven months. The army proclaimed Valentinianus as his successor.

Coin of Jovianus.
British Museum. Actual Size. Gold.

JOVI'NUS, born of an illustrious family of Gaul, assumed the imperial title under the weak reign of Honorius, and placing himself at the head of a mixed army of Burgundians, Alemanni, Alani, &c., took possession of part of Gaul A.D. 411. Ataulphus, king of the Visigoths, offered to join Jovinus and share Gaul between them, but Jovinus having declined his alliance, Ataulphus made peace with Honorius, attacked and defeated Jovinus, and having taken him prisoner at Valence, delivered him to Dardanus, prefect of Gaul, who had him put to death at Narbo (Narbonne) A.D. 412.

Coin of Jovinus.
British Museum. Actual Size. Gold.

JO'VIUS, PAUL. [Giovio.]

JUAN FERNANDEZ. [Fernandez.]

JUAN DE ULLOA. [Mexico.]

JUAN DEL RIO. [Mexico.]

JUBA I., son of Hiempsal, king of Numidia, succeeded his father about the year 50 B.C. He was a warm supporter of the senatorial party and Pompey, moved, it is said, by a gross insult which in his youth he had received from Cæsar. He gained, B.C. 49, a great victory over Curio, Cæsar's lieutenant in Africa. After the battle of Pharsalia and the death of Pompey, he continued steady to his cause; and when Cæsar invaded Africa, B.C. 46, he supported Scipio and Cato with all his power, and in the first instance reduced the dictator to much difficulty. The battle of Thapsus turned the scale however in Cæsar's favour. Juba fled; and finding that his subjects refused to receive him, put an end to his life in despair. His connection with Cato has suggested the underplot of Addison's tragedy

Coin of Juba I.
British Museum. Actual Size. Silver

JUBA II., his son, was carried to Rome by Cæsar, kindly treated, and well and learnedly educated. He gained the friendship and fought in the cause of Augustus, who gave him the kingdom of Mauritania, his paternal kingdom of Numidia having been erected into a Roman province. He cultivated diligently the arts of peace, was beloved by his subjects, and had a high reputation for learning. He wrote, in Greek, of Arabia, with observations on its natural history; of Assyria; of Rome; of painting and painters; of theatres; of the qualities of animals, on the source of the Nile, &c. Juba married Cleopatra, the daughter of Antony and Cleopatra queen of Egypt. Their medal, which is here given, has IVBA REX on one side, and ΚΛΕΟΠΑΤΡΑ ΒΑϹΙΛΙϹϹΑ on the other. Strabo in his 6th book speaks of Juba as living, and in his 17th and last book as then just dead. This would probably fix his death about A.D. 17. (Clinton's *Fasti*; Dion Cass.; Cæs., *Bell. Civ.*; Pliny, *Hist. Nat.*, lib. v. 1, &c.; see the Abbé Sevin, *Sur la Vie et les Ouvrages de Juba*, in *Acad. des Inscript.*, vol. iv., p. 457.)

Coin of Juba II.
British Museum. Actual Size. Silver.

JUDAH, JUDÆA. [Jews; Palestine.]

JUDAISM includes, in its most extensive signification, not only the system of religion which is believed in by the Jews, but also all those laws, moral, civil, political, and ritual, which are contained in the five books of Moses. Some of the peculiar tenets of this religion were imparted to Abraham, the ancestor of the Jewish people; but it did not receive its full development till after the departure of the Israelites from Egypt and their arrival at Mount Sinai, where the Supreme Being imparted to Moses the whole system of the Jewish economy. After the destruction of Jerusalem by the Romans, and the dispersion of the Jews over the various countries of the world, all those laws which related to government, and which could only be enforced in a country where the Jews possessed political power, necessarily became obsolete; and the term Judaism has consequently been restricted to those religious and moral laws which are contained in the 'Pentateuch,' and which are recognised by the Jews to the present time as the rule of their faith and conduct. The peculiar characteristics of Judaism, with a history of its rise and progress, are given in the article Jews.

An interesting account of the ceremonial rites and religious and philosophical opinions of the modern Jews (that is, of those who lived during and subsequently to the time of Christ) is given in Allen's 'Modern Judaism,' London, 1816, 2nd ed. 1830.

JUDAS MACCABÆUS succeeded his father Mattathias (B.C. 166) as the leader of the Jews in their patriotic attempts to throw off the yoke of the Syrian kings (1 *Macc.* iii. 1). He greatly distinguished himself in the war by his military talents, his personal courage, and his implacable hostility to the Syrian princes. Immediately after his father's death he defeated two Syrian armies; and in the following year conquered Lysias and Gorgias, who had been sent against him with much larger forces. He afterwards took possession of Jerusalem, purified the Temple from all idolatrous pollutions, and restored the national worship. He strengthened his power by subduing the Idumæans and Ammonites and other nations bordering upon Palestine. The unexpected success of Judas greatly exasperated Antiochus, who swore that he would destroy the whole Jewish nation, but he died before he could make preparations for the conquest of the country. He was succeeded by Antiochus Eupator, who marched against Jerusalem, but was obliged to raise the siege and return to Upper Asia in consequence of a revolt of a powerful noble. Before he left Palestine he entered into an alliance with Judas. This treaty however was soon broken by the Syrian king; fresh armies were sent against Judas, which were all defeated by this intrepid warrior. Anxious to render Judæa independent, and feeling the difficulty of continuing the contest against the whole power of the Syrian empire, he sent ambassadors to Rome to solicit an alliance with the Roman people (1 *Macc.* i. 8; *Justin*, xxxvi. 3). This was readily granted by the Romans; but before Judas could receive any assistance from his new allies, Palestine was again invaded by a Syrian army of 22,000 men under the command of Bacchides. Judas had only 3000 men with him, and his number afterwards diminished to 800; but with these he ventured to attack the Syrians, and after an obstinate struggle was at length defeated, and perished in the contest (B.C. 160).

(*The First Book of the Maccabees*; Josephus's *Jewish Antiquities*; Prideaux's *Connexion*; Jahn's *Hebrew Commonwealth.*)

JUDE, THE EPISTLE OF SAINT, a book of the New Testament, was probably written by the Apostle Jude, who was surnamed Lebbæus (Λεββαῖος) and Thaddæus (Θαδδαῖος) (*Matt.*, x. 3; *Mark*, iii. 18; *John*, xix. 22). He is also called the brother of James (*Luke*, vi. 16; *Acts*, i. 13), and the brother of Christ (*Matt.*, xiii. 55). This James was probably 'James the Less,' the son of Alphæus and Mary (*Matt.*, x. 3; xxvii. 56; *Mark*, xv. 40), who was also the brother of Christ. The meaning of the 'brother of Christ' has been already discussed under James. It has however been maintained that this epistle could not have been written by the Apostle Jude, since he does not describe himself as an apostle, but, on the contrary, refers to the authority of the apostles as superior to his own (v. 17). (De Wette's *Lehrbuch*, sec. 182.)

The object of this epistle is to guard believers against the false teachers who had crept into the church, and to exhort them to persevere in their Christian profession. There is a great similarity between this epistle and the second epistle of St. Peter. Hug, in his Introduction to the New Testament, argues, that since 'the language of Jude is simple, unpremeditated, and expressive, without ornament; while that of Peter is artificial, and has the appearance of embellishment and amplification,' the epistle of Jude was written first, and was used by St. Peter in the composition of his second epistle. The epistle of Jude appears to have been written shortly before the destruction of Jerusalem.

The canonical authority of this epistle has been rejected by many, because the apocryphal books of Enoch and the Ascension of Moses are supposed to be quoted in it (v. 14, 9). It is not contained in the 'Peshito,' and is classed by Eusebius among the *Antilegomena* (*Hist. Ecc.*, ii. 23; iii. 25). Origen also expresses doubts respecting it (*Comment. in Matt.*, iii. 814); but the greater number of the fathers refer to it as a work of divine authority.

(The *Introductions* of Michaelis, Eichhorn, De Wette, Bertholdt, Hug, and Horne; and the *Commentaries* of Hänlein (1799) and Laurmann (1818).

JUDEX, JUDI'CIUM. It is of some importance to form a correct notion of the terms *judex* and *judicium* in the Roman writers. The *judicia privata* were those in which one party claimed something of or against another party, and must be distinguished from the *judicia publica*. The former had relation to *actiones*, and may be generally described as Civil actions; the latter were of the nature of Criminal prosecutions.

In the Judicia Privata the party complainant (actor) came before the prætor or other magistrate who had jurisdiction (jurisdictio), and made his claim or complaint, to which the defendant (reus) might put in a plea (exceptio). The prætor then made an order by which he referred the matter to Judices or Recuperatores, or Arbitri, whose chief office was to ascertain the facts in dispute. The formula, or order of the prætor, was of the nature of a provisional decree: it stated the matter at issue between the parties and the judgment that was to follow upon the determination of the facts. The plaintiff had to prove his case, or the defendant to prove his plea, before the judices. Sometimes there was only one judex. The speech of Cicero 'Pro Publio Quintio' was made before a single judex, aided by assessors (consilium).

The patroni or orators appeared before the judices to support the cause of their clients. The judices were sworn to act impartially. Witnesses were produced on each side and examined orally; and it is clear from the remarks of Cicero (*Pro Cæcina*, c. 10), where he is commenting on the evidence in the case of Cæcina, that he had cross-examined and put to confusion an impudent witness on the other side (see also the Oration *Pro Flacco*, c. 10). It is clear also from the oration 'Pro Cæcina,' that the inquiry before the judices was public. Written documents, such as letters and books of accounts, were produced before the judices by way of evidence. (Cicero, *Pro Q. Roscio.*) When the orators had finished their speeches, the judices decided by a majority. The sentence was, if necessary, perhaps in some cases carried into effect by the lictors of the magistrate who appointed the judices. The form in which the judices pronounced their decision was that of a judgment or decree.

The difference between the judicium and arbitrium was this: in the judicium, the claim, demand, or damages, was a sum fixed; in the arbitrium it was a sum uncertain; and this difference was attended with certain variations in the procedure. This is very clearly expressed by Cicero (*Pro Q. Roscio*, c. 4).

The judices must necessarily to some extent have settled questions of law, inasmuch as the determination of the facts sometimes involved the interpretation of the law. They were accordingly allowed to have assessors (consilium) learned in the law (juris-consulti), but the juris-consulti merely advised the judices, who alone delivered the decision. In case of doubt as to the law, the judices might consult the magistrate under whom they were acting; but as to the matters of fact, the judices were the sole judges, and could take no advice from the magistrate (*Dig.*, v. 1. 79). Gellius (xiv. 2) gives an amusing account of the difficulty which he felt on being appointed a judex, and how he got rid of the business by declaring on oath, as the judex always might do, that he could not come to any decision. The difficulty which he experienced was exactly one of those which a person not practically acquainted with legal proceedings would experience.

We may presume that the judices were generally persons qualified by a sufficient education, though they were not necessarily lawyers; but it does not appear that they were named out of any determinate class, and there is good reason for thinking that both parties generally agreed upon the judices, or at least had the power of rejecting them. It would seem as if every Roman citizen was considered competent to discharge the functions of a judex in civil actions, at least under the emperors: but this part of the subject is not free from difficulty.

Appeals from the decisions of the judices were not uncommon. (Ulpian, *Dig.*, xlix. 1, 1; Scaevola, *Dig.*, xlix. 1, 28.)

So far seems pretty well ascertained. Such being the qualifications of the judices, and the magistrates who had 'jurisdictio' being only annual functionaries, it appears that there was no class of men among the Romans, like our judges, who were the living interpreters of law for a series of years in succession. The juris-consulti seem to have kept the Roman law together as a coherent body, and it is from their writings alone that the *Digest* is compiled. [Justinian's Legislation.]

A court is often mentioned by the Roman writers, the origin and constitution of which, if they could be thoroughly ascertained, would throw great light on the Roman judicial system, and indeed on the Roman polity generally. We allude to the Judicium Centumvirale, which in the earlier times of the Republic was a court in which weighty matters of law were decided. This court gradually declined, but was restored by Augustus. The author of the dialogue 'De Causis Corruptæ Eloquentiæ' speaks of it as most flourishing in his time; but he proves its former decay by observing that there was not a single speech then extant made by any great orator before this court, except one which he mentions. Yet both L. Crassus and Q. Scaevola had pleaded before the Centumviri. (Cic., *De Orat.*, i. 39.) The origin, number, and constitution of this body are not known, though some writers say that the number was 105, three being chosen from each tribe. (Festus, *v.* 'Centumviralia.') But there were not thirty-five tribes till A.U.C. 513, and therefore it might be inferred that the Centumviral body was of comparatively recent date. However this does not necessarily follow from the words of Festus; and besides, such an explanation may be nothing more than his attempt to assign the origin of the court, without being able to trace it historically. The Centumviri were not *magistratus*, but a college of *judices*, who decided in Judicia Privata. The matters which came before them were only *actiones in rem*, or *vindicationes*, not *actiones in personam*, or actions founded on contracts or delicts: consequently the matters brought before them were actions affecting ownership, servitutes (easements), wills, and intestacies. (Cicero, *De Oratore*, i. 38, 39.) The Querela Inofficiosi Testamenti seems to have come before this court only. So far as is here stated seems to be pretty clearly made out. A valuable essay on this subject by Hollweg will give further information, and solve with some degree of probability various difficulties that may suggest themselves to the student. (Hollweg, *Ueber die Competenz des Centumviralgerichts, Zeitschrift für Geschicht. Recht.*, v., 358.) A more recent writer (Tigerström, *De Judicibus apud Romanos*) dissents altogether from Hollweg's view of the court of the Centumviri, and perhaps on some points he has shown him to be wrong. The value of Tigerström's essay however appears to lie rather in the numerous passages which he has collected from the Roman writers than in the deductions which he has made from them.

It is not our purpose to treat at length of the Judicia Publica. They were in the nature of criminal prosecutions, in which any person, not disqualified, might be the prosecutor, and in which the verdict was followed by a legal punishment. Judices were employed here also, and were a kind of assessors to the magistrate, or the Judex Quæstionis, who presided. Both the accuser and the accused, as it seems, might challenge a certain number of the judices. Witnesses were examined before them: slaves by torture, freemen orally. The judices, at least in the more important matters, voted by ballot: each judex put into the urn the tablet of Acquittal, of Condemnation, or the tablet N. L. (non liquet, 'it is not clear'), according to his pleasure. The magistrate pronounced the verdict according to the tablets which made a majority. A lively picture of the intrigues and bribery which were not unusual on such trials is given by Cicero in speaking of the affair of Clodius and the Bona Dea (*Ep. ad Attic.*, i. 13, 16). The various changes made as to the body from which the judices were chosen appear to refer only to the judicia publica. [Equites.]

There is a distinction between judicia publica, judicia popularia, judicia extraordinaria, and judicia populi.

The title 'De Officio Judicis' in the 'Institutes' (iv. 17) contains merely general directions for the conduct of the judices.

It should be observed that this subject is not free from difficulty. What is above stated must be taken only as correct in the main features. Further inquiry is still wanted on several matters connected with the functions of the judices. Enough has been said to enable the reader to compare the Roman judices with the modern jury, and to show the difference of the institutions.

(Gaius, lib. iv.; Heineccius, *Syntagma, &c.*, by Haubold; Unterholzner, *Ueber die Rede Cicero für den Schauspieler Roscius, Zeitschrift*, &c., i. 248; and his remarks on the difference between the *condictio* and the *actio in personam*, with reference to the *judices*; 'De Judiciis,' *Dig.*, v. 1; 'De Judiciis Publicis,' *Dig.*, xlviii.; *Instit.* iv., tit. 18.) [Interdict.]

Dr. Pettingall's 'Enquiry into the Use and Practice of Juries among the Greeks and Romans,' London, 1769, may be consulted as to the functions of the Roman judices in the Judicia Publica. The author's conclusions seem in the main to be correct, though his essay is an ill-arranged and unmethodical production. The 'Attische Process,' by Meier and Schömann, and the essay of Pettingall, may be consulted with reference to the functions of the Attic Dicastæ.

JUDICIARY. [Courts.]

JUDGES, THE BOOK OF (שֹׁפְטִים: *κριταί*, *Acts*, xiii. 20), a book of the Old Testament, which gives an account of the history of the Israelites from the death of Joshua to that of Samson. Joshua did not exterminate according to divine commandment all the nations of Canaan, but allowed each tribe to settle in the district of land allotted to it before the termination of the war. Since the tribes were not united by any national league, and were surrounded by powerful enemies, they were frequently conquered by the neighbouring nations and obliged to pay tribute. But they seldom remained in subjection for any length of time; they still retained much of the valour by which they were originally distinguished; and their patriotic efforts were usually directed or supported by a series of individuals, who were remarkable either for craft, bodily strength, or daring valour. These persons were called *Shophetim*, which is not very well translated by our English word 'Judges;' since, with the exception of Deborah (*Judges*, iv. 4, 5), none of them appeared to have exercised the judicial office till the time of Eli, who was also high-priest. After they had delivered their countrymen from their oppressors, they usually retired into private life (*Judges*, viii. 23, 29).

The book of Joshua consists of two distinct parts. The first, after an introduction on the state of the Israelites after the death of Joshua (ch. i., ii.), gives an account of the exploits of the different Judges from Othniel to Samson (ch. iii.-xvi.). There were thirteen Judges, excluding Abimelech, who was made king by the men of Shechem (ix. 6), namely: Othniel (iii. 9); Ehud (iii. 15); Shamgar (iii. 31); Deborah (iv. 4); Barak (iv. 6); Gideon (vi. 11); Tola (x. 1); Jair (x. 3); Jephthah (xii. 7); Ibzan (xii. 9); Elon (xii. 11); Abdon (xii. 13); Samson (xv. 20). The second part of the book (ch. xvii.-xxi.) gives an account of an idol that was worshipped first in the family of Micah (ch. xvii.), and afterwards in the tribe of Dan (ch. xviii.); and also a history of a barbarous act committed by the Benjamites of Gibeah, which led to a war between the tribe of Benjamin and all the other tribes; in which the former was nearly extirpated.

The author of the book and the time in which it was written are equally uncertain. It is commonly ascribed to Samuel, though some have argued, from *Judg.* xviii. 30, that it could not have been written till the time of the Babylonish captivity. It is probably however only a collection of different documents, composed at different periods; it does not give a continuous history of the people; and contains many things which could hardly have been written by the same individual. Many of its narratives are repeated in other books of the Old Testament; compare *Judg.* iv. 2; vi. 14; xi. 2, with 1 *Sam.* xii. 9-12; *Judg.* ix. 53, with 2 *Sam.* xi. 21; *Judg.* vii. 21, with *Is.* ix. 4; *Judg.* vii. 25, with *Ps.* lxxxiii. 11. Two or three verses in the song of Deborah are copied almost word for word in some of the Psalms; compare *Ps.* lxviii. 8, 9; xcvii. 5, with *Judg.* v. 4, 5.

The chronology of this book has occasioned considerable difficulty. The period of the Judges is usually estimated at 299 years, in consequence of a passage in the Book of Kings (1 *Kings*, vi. 1); in which it is said that 480 years elapsed from the departure of the Israelites from Egypt to the foundation of the temple by Solomon. St. Paul, on the contrary, gives 450 years as the period of the Judges (*Acts*, xiii. 20). The reader is referred for an excellent discussion of this subject to Michaelis's 'Chronologie des Buch der Richter,' in the 'Göttingisches Magazin' for 1780, p. 182; see also Michaelis's 'Orientalische Bibliothek,' b. v., p. 81.

The canonical authority of this book has never been disputed. It is placed in all the Hebrew MSS. immediately after the Book of Joshua. It is quoted by Philo and Josephus, and also by the author of the Epistle to the Hebrews (xi. 32).

(The *Introductions* of Eichhorn, Jahn, De Wette, Augusti, and Horne; Rosenmüller's *Scholia;* Serrarii *Judices et Ruth explanati*, Mainz, 1609, fol.; Schmidii *Commentar. in Jud.*, Strasb., 1684, 1706, 4to.)

JUDITH, an apocryphal book of the Old Testament, contains an account of the invasion of Syria and Judæa by Holofernes, general of Nabuchodnosor, king of the Assyrians, and particularly of the siege of Bethulia, a town in Judæa; and of the destruction of the Assyrian army, and the death of Holofernes through the courage and stratagem of Judith, the widow of Manasses, and an inhabitant of Bethulia. The historical and geographical difficulties of this book are so great, and its narrative so improbable, that a great number of critics are disposed to consider it as a religious romance, probably written in the time of the Maccabees, to encourage the Jews in their struggles against the Syrian monarchs. Grotius considers it as an allegory, written in the time of Antiochus Epiphanes; and that 'by Judith is meant Judæa; by Bethulia, the temple or house of God; and by the sword which went out from thence, the prayers of the saints; that Nabuchodnosor denotes the devil; and the kingdom of Assyria the devil's pride,' &c. Montfaucon (*La Verité de l'Histoire de Judith*), Huet (*Dem. ev. Prop.*, iv., p. 366), and Prideaux (*Connection*, vol. i., pp. 65-74), maintain, on the contrary, that it is a true history. Prideaux considers Nabuchodnosor to be the same person as Saosduchinus, the son of Esarhaddon, and grandson of Sennacherib; and Arphaxad, who is represented in Judith as the king of Media, to be only another name for Deioces. But in opposition to this it should be remarked that there are many passages in the book which refer to a time subsequent to the Babylonian captivity. Josephus also, who seldom neglects an opportunity of extolling the valour of his countrymen, takes no notice of this story.

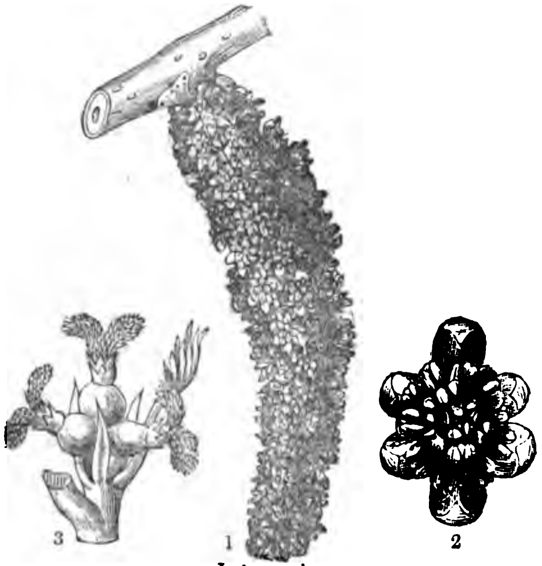
The book of Judith was originally written in Chaldee, from which it was translated into Latin by Jerome. It was also translated into Greek and Syriac. The English translation in the authorized version was made from the Greek, and differs in many respects from the translation of Jerome, which is still extant in the Latin vulgate.

There is a great similarity between the history of Judith and a tale which Quintus Curtius tells us respecting the death of Spitamenes (viii. 3).

(The *Introductions* of Eichhorn, Jahn, De Wette, Bertholdt, and Horne.)

JUGGERNAUTH. [Vishnu.]

JUGLANDA'CEÆ are a natural order of apetalous Exogenous plants, consisting of trees or shrubs having eatable nuts and somewhat resinous leaves. The former are the walnuts and hickory nuts of the markets; the first produced by the genus Juglans, the latter by that called Carya. The leaves are alternate and pinnated; the flowers usually monœcious, those which are male collected in catkins. The calyx of the latter consists of a few scales attached obliquely to a single bract, and surrounding a variable number of stamens; that of the females is superior. The ovary is one-celled, and has one solitary erect ovule, which changes into a 4-lobed seed, with crumpled cotyledons, enclosed in a two-valved nut, clothed with a fleshy epicarp. The common walnut (Juglans regia), a native of Persia, is well known for its excellent timber, from which musket-stocks (and formerly cabinet-work) are manufactured, for its agreeable wholesome nuts, and the sweet drying oil which they furnish when pressed. Carya alba, the white Hiccory, bears nuts like those of the walnut, only smaller, smoother, and with a thicker shell, and furnishes a valuable tough elastic white timber much em-



Juglans regia.

1, a catkin of male flowers; 2, a single male flower; 3, a cluster of female flowers.

ployed in the construction of carriages and other vehicles. Other species of Hickory are also eaten, especially the Peccan nut, the produce of Carya olivaformis, a small and delicate sort. Although the fruit of these plants is eaten, it contains a purgative principle, which renders some of the species cathartic, as is the case with Juglans cathartica and nigra, two North American species; and even the common walnut participates so much in this quality, when the fruit is young, that a laxative conserve well known in domestic medicine is prepared from it. Juglans nigra, the Black American Walnut, is a tree of remarkable size and beauty.

JUGULAR VEINS are the large trunks by which the greater part of the blood is returned to the heart after having circulated in the head, face, and neck. There are two on each side, an external or superficial, and an internal or deep. The external jugular lies on each side just under the skin, and extends from near the angle of the jaw to the middle of the clavicle, behind which it opens into the subclavian vein. It conveys the blood of the confluent streams from the jaws, temples, and front and sides of the neck, and of some of those from the face. The internal jugular, which is far larger than the external, lies deep in the neck, by the side of the carotid artery. It receives all the blood from the skull and the brain, from the eyes and ears, and from the scalp, face, tongue, palate, pharynx, &c. The internal jugular veins extend from the base of the skull just in front of the vertebral column, down the neck, to some depth behind the clavicles, where they unite with the subclavian veins, by which all the blood is brought from the arms and upper part of the chest and neck to form the venæ innominatæ, which by their union form the vena cava superior, which opens directly into the right auricle of the heart. [Heart.]

JUGURTHA, the illegitimate son of Manastabal, by a concubine, and grandson of Masinissa, was brought up under the care of his uncle Micipsa, king of Numidia, who sent him with an auxiliary force to join Scipio Æmilianus, in his war against Numantia in Spain. Jugurtha so distinguished himself as to become a great favourite with Scipio, who, at the conclusion of the war, sent him back to Africa with strong recommendations to Micipsa. Micipsa adopted him, and declared him joint heir with his own two sons Adherbal and Hiempsal. After Micipsa's death (B.C. 118), Jugurtha, aspiring to the undivided possession of the kingdom, effected the murder of Hiempsal, and obliged Adherbal to escape to Rome, where he appealed to the senate. Jugurtha however found means to bribe many of the senators, and a commission was sent to Africa in order to divide Numidia between Jugurtha and Adherbal. The commissioners gave the best portion to Jugurtha, who, not long after their departure, invaded the territory of his cousin, defeated him, besieged him in Cirta, and having obliged him to surrender, put him to a cruel death; and this almost under the eyes of Scaurus and others, whom the Roman senate had sent as umpires between the two rivals (B.C. 112). This news created great irritation at Rome, and in the following year, under the consulship of Scipio Nasica and Calpurnius Bestia, war was declared against Jugurtha, and an army was sent to Africa under Calpurnius, accompanied by Scaurus, with other senators as his advisers. After some fighting, Jugurtha obtained under most favourable conditions the quiet possession of the usurped kingdom. The treaty however was not ratified at Rome; and Calpurnius being recalled, the new consul Posthumius Albinus was appointed to the command in Africa. Meantime Jugurtha, being summoned, appeared at Rome; but as he then succeeded in bribing several of the senators, and also Bæbius, a tribune of the people, no judgment was given. Jugurtha, emboldened by this success, caused Massiva, son of his uncle Gulussa, whom he suspected of aiming at his kingdom, to be assassinated in the Roman capital. The crime was traced to Jugurtha, but as he was in Rome under the public guarantee, the senate, instead of bringing him to trial, ordered him to leave Rome immediately.

It was then that Jugurtha is said to have exclaimed against the venality of that city, 'which would willingly sell itself if it could find a purchaser wealthy enough to bid for it.' Posthumius was sent to Africa to prosecute the war, but he soon returned to Rome without having effected anything, leaving the army under the command of his brother Aulus Posthumius, who allowed himself to be surprised in his camp by Jugurtha, to whom he surrendered himself; and his army, having passed under the yoke, evacuated Numidia. The new consul, Metellus, arriving soon after with fresh troops, carried on the war with great vigour, and being himself above temptation, reduced Jugurtha to the last extremity. Caius Marius was serving as lieutenant to Metellus, whom in the year B.C. 107 he supplanted in the command. Jugurtha meantime having allied himself with Bocchus king of Mauritania, continued to give full employment to the Romans. Marius took the towns of Capsa and Moluca, and in a hard contested battle defeated the two kings. Bocchus made offers of peace, and Marius sent to him his quæstor Sulla, who after much negotiation induced Bocchus to give up Jugurtha into the hands of the Romans as the price of his own peace and security. Bocchus hesitated awhile, but at last, having appointed a conference, he had Jugurtha seized and delivered over to the Romans. Jugurtha followed in chains, with his sons, the triumph of Marius, after which he was thrown into the Mamertine subterraneous dungeon, the soldiers having stripped him of all his clothes, and even torn his ears for the sake of the earrings which he wore. He was starved to death in his prison; or, as some say, he was strangled. His two sons were sent to Venusia, where they lived in obscurity. The war against Jugurtha lasted five years; it ended in the year 106 B.C. (Sallustius, *De Bello Jugurthino*; Eutropius.)

JULIA'NUS, FLA'VIUS CLAU'DIUS, son of Julius Constantius, brother of Constantine the Great, was born A.D. 331. After Constantine's death, the soldiers massacred the brothers, nephews, and other relatives of that prince, in order that the empire should pass undisputed to his sons. [Constantius.] Two only escaped from this butchery, Julian, then six years old, and his half-brother Gallus, then thirteen years of age. Marcus, bishop of Arethusa, is said to have concealed them in a church. After a time Constantius exiled Gallus into Ionia, and entrusted Julian to the care of Eusebius, bishop of Nicomedia. Julian was instructed in Greek literature by Mardonius, a learned eunuch, who had been teacher to his mother Basilina. At the age of fourteen or fifteen he was sent to join his brother Gallus at Macellum, a castle in Cappadocia, where they were treated as princes, but closely watched. (Juliani *Opera*, *Epistle to the Athenians*.) The youths were taught the Scriptures, and were even ordained lecturers, and in that capacity publicly read the Bible in the church of Nicomedia. It appears that Constantius had the intention of making a priest of Julian, who had no inclination for that profession, and who is supposed to have already secretly abandoned the belief in the Christian doctrines. The death of Constans and Constantine having left Constantius sole master of the Roman world, that emperor, who was childless, sent for Gallus, in March, 351, and created him Cæsar, and he allowed Julian to return to Constantinople to finish his studies. There Julian met with the sophist Libanius, who afterwards became his friend and favourite. Constantius soon after again banished Julian to Nicomedia, where he became acquainted with some Platonist philosophers, who initiated him into their doctrines. He afterwards obtained leave to proceed to Athens, where he devoted himself entirely to study. After the tragical death of Gallus, in 355, Julian, who had again for a time awakened the jealous suspicions of his cousin, was recalled to court by the influence of the Empress Eusebia, his constant patroness, when Constantius named him Cæsar, and gave him the government of Gaul, which was then devastated by the German tribes, together with his sister Helena to wife. Julian made four campaigns against the Germans, in which he displayed great skill and valour, and freed Gaul from the barbarians, whom he pursued across the Rhine. He spent his winters at Lutetia (Paris), and became as much esteemed for his equitable and wise administration as for his military success. Constantius, always suspicious, ordered Julian to send him back some of the best legions in Gaul, to be employed against the Persians. When the time for marching came, in the year 360, Julian assembled the legions at Lutetia, and there bade them an affectionate farewell, when an insurrection broke out among the soldiers, who saluted him as Augustus. Julian immediately sent messengers to Constantius to deprecate his wrath, but the death of the emperor happening at the time left the throne open to him (A.D. 361). He proceeded to Constantinople, where, being proclaimed emperor in December, 361, he reformed the pomp and prodigality of the household, issued several wise edicts, corrected many abuses, and established a court at Chalcedon to investigate the conduct of those who had abused their influence under the preceding reign. Unfortunately some innocent men were confounded with the guilty; among others Ursulus, whose condemnation Ammianus (b. xxii.) deplores. On assuming the purple Julian had openly professed the old religion of Rome and sacrificed as high-priest to the gods, and though at the same time he had issued an edict of universal toleration, he soon showed a marked hostility to the Christians: he took the revenues from the churches, and ordered that those who had assisted in pulling down the heathen temples should rebuild them. This was a signal for a fearful re-action and persecution against the Christians in the provinces, where many were imprisoned, tormented, and even put to death. Julian restrained or punished some of these disorders, but with no very zealous hand. There was evidently a determined struggle throughout the empire between the old and the new religion, and Julian wished for the triumph of the former. He forbade the Christians to read or teach others the works of the antient classics, saying that as they rejected the gods they ought not to avail themselves of the learning and genius of those who believed in them (Juliani *Opera*, Epist. 42, Spanheim's edition). He also forbade the Christians filling any office, civil or military, and subjected them to other disabilities and humiliations. Julian has been called the Apostate, but it seems very doubtful whether at any period of his life after his boyhood he had been a Christian in his heart; the bad example of the court of Constantius, and the schisms and persecutions that broke out in the bosom of the church, may have turned him against religion itself, while his vanity, of which he had a considerable share, and which was stimulated by the praises of the sophists, made him probably consider himself as destined to revive both the old religion and the glories of the empire. That he was no believer in the vulgar mythological fables is evident from his writings, especially the piece called 'The Cæsars,' and yet he professed great zeal for the heathen divinities, and he wrote orations in praise of the mother of the gods and of the sun. Making every allowance for the difficulties of his position and the effect of early impressions, he may be fairly charged with a want of candour and of justice, and with much affectation bordering upon hypocrisy. If we choose to discard the invectives of Gregory of Nazianzus, of Cyril, and of Jerome, we may be allowed at least to judge him by the narrative of Ammianus, and by his own works, and the result is not favourable to his moral rectitude or sobriety of judgment. A learned and very temperate modern writer, Cardinal Gerdil, in his 'Considérations sur Julien,' in the 10th volume of his works, has so judged him; he has formed his opinion, not on the fathers, but upon the accounts of Julian's panegyrists, Libanius and other heathen writers.

Julian, having resolved on carrying on the war against the Persians, repaired to Antioch, where he resided for several months. His neglected attire, his uncombed beard, and the philosophical austerity of his habits, drew upon him the sarcasms of the corrupt population of Antioch. The emperor revenged himself by writing a satire against them, called 'Misopogon,' and, what was worse, by giving them a rapacious governor. He set off on his expedition with a brilliant army, reckoned at 65,000 men, crossed the Euphrates, took several fortified towns of Mesopotamia, crossed the Tigris and took Ctesiphon, but here his progress ended. The close Roman legions were harassed on all sides by the light cavalry of the Persians, and reduced to great distress for want of provisions. Still they presented a formidable front to the enemy, and Sapor, the Persian king, was inclined to come to terms, when in a skirmish between the advanced posts of both armies, Julian, who had run to head his soldiers, neglecting to put on his cuirass, received a mortal wound from a javelin which pierced his side. Being carried to his tent he expired the following night, 26th June, 363. He died with perfect calmness and composure, surrounded by his friends, conversing on philosophical subjects, and expressing his satisfaction at his own past conduct, since he had been at the head of the empire. His remains were carried to Tarsus in Cilicia, according to his directions, and his successor Jovian erected a monument to his memory.

Julian had many brilliant and some amiable qualities; his morals were pure and even austere; his faults were chiefly those of judgment, probably influenced by the impressions of early youth, an ardent and somewhat mystic imagination, and the flattery of those around him. His works consist of orations, satires, 'The Cæsars,' and about eighty letters, some of which are very interesting. His letter to Themistius contains a treatise on the duties of sovereigns. His narrative of his Gaulish and German campaigns is unfortunately lost. The last and best edition of Julian's works is by Ezech. Spanheim, Leipzig, 1696, fol.; but it does not contain all the letters. A complete edition of the letters was published by L. H. Heyler, Mainz, 1828, 8vo. There is a French translation of Julian's works by La Bletterie, and a Life of him by Tourlet.

Coins of Julianus. British Museum. Actual Size.

JULIAN PERIOD is a term of years often employed in chronology, in order to avoid the ambiguity attendant on reckoning any time antecedent to our æra. The Julian Period consists of 7980 years, and is reckoned as having begun 4713 years before our æra; so that the present year 1838 corresponds to 6551 Jul. Per. The æra of the creation, or Anno Mundi, which has been used by Christian and Jewish writers, cannot be considered a fixed point, as chronologists and controversialists are not agreed as to the precise time of its commencement, some placing the creation 4004 years B.C., others, such as the early Alexandrian Christians, 5502 B.C., and the Greeks and Russians at 5508 B.C. The Julian Period is produced by the multiplication of the lunar cycle 19, solar cycle 28, and Roman indiction 15. [PERIOD OF REVOLUTION.]

JÜLICH-CLEVE-BERG, one of the two principal subdivisions of the province of Rhenish Prussia, and formerly considered a distinct province, has an area of 3584 square miles, and a population of 1,140,435 inhabitants. It is bounded on the north-west and west by the Netherlands, on the north-east and east by Westphalia, and on the south and south-west by the second subdivision of the province, *i.e.* the Lower Rhine. The principal river is the Rhine, which is joined by the Sieg, Wipper, Erft, Ruhr, and Lippe. The Niers, which falls into the Maas, and the Alte Yssel, likewise flow through parts of this province. The canals worth notice are the Fossa Eugeniana, which has fallen nearly into ruin, and the North Canal, not yet completed. The soil cannot be called fruitful, except in the vicinity of the Rhine, and in general on the left bank of the Rhine, where there are extensive plains; in the part on the right bank of the Rhine (with the exception of the small northern tracts) it is for the most part stony and mountainous, being traversed by chains which are branches of the Westerwald. But these mountainous tracts are the seat of the most flourishing manufactures, especially the former duchy of Berg, where the manufactories in the circle of Elberfeld alone give employment to 40,000 persons. The Wipperthal (valley of the Wipper), in this part, is indisputably the seat of the most active manufacturing industry in Germany, where Elberfeld, Gemarke, Barmen, Wipperfeld, and Reitershausen now almost form one connected town; and the finest buildings and the richest manufactories spring up every year. On the Rhine, near Königswinter, rises in singular forms, with seven summits, the Siebengebirge, viz. nearest the Rhine, the steep Drachenfels, 1473 feet high; then the Wolkenberg, 1482 feet; the Stromberg, with a chapel on the top; behind these, and rather farther from the Rhine, the Löwenberg, 1896 feet high; the Nieder or Nonnen-Stromberg; the Oelberg, 1827 feet high; and the Hemmerich. Ruins of antient castles are still seen on these mountains. This main subdivision of the Rhenish province consists of—1. the government of Düsseldorf, with an area of 2064 square miles, which now (1838) has 766,837 inhabitants, or 371 to the square mile; the city of Düsseldorf has 21,858 inhabitants; 2. the government of Cologne, with an area of

1520 square miles, and a population of 426,694 inhabitants; the city of Cologne has 69,051 inhabitants.

JU'LIUS I. succeeded Marcus in the see of Rome A.D. 336. Athanasius having been driven by the Eusebian party from his see of Alexandria, it was agreed by many of the Eastern bishops that the dispute should be settled in a council to be assembled at Rome. The council was convoked A.D. 340, and Athanasius appeared, but not his adversaries, who convened another synod at Antioch, which excluded Athanasius from his see. Julian remonstrated, but in vain. [ATHANASIUS, ST.] The general council of Sardica was next convened, but a schism soon broke out in that assembly, and the parties excommunicated each other. This is the council which is said to have granted to the see of Rome the right of arbitration in cases concerning the deposition of bishops; but this is a point much controverted. Julius died in the year 352. Two letters of his to the Eusebians and the Church of Alexandria are extant. (Constant., *Epistolæ Roman. Pontif.*) Others have been falsely attributed to him, as well as ten decretals, which are spurious.

JULIUS II., Cardinal della Rovere, nephew to Pope Sixtus IV., succeeded Pius III. in the year 1503. He had distinguished himself under preceding pontificates by his haughty temper and warlike disposition, which were fitter for the sword than the crosier. After his exaltation to the papal throne he began by driving Cesare Borgia out of his ill-gotten possessions in the Romagna; but there he found another power, the Venetians, who, during the preceding troubles, had taken possession of Ravenna, Rimini, and other places. The Venetians offered to pay tribute to the see of Rome for those territories, but Julius refused, and demanded their absolute restitution to the Church. After fruitless negotiations, Julius, in 1508, made a league with Louis XII., the Emperor Maximilian, and the duke of Ferrara, against Venice. This was called the League of Cambrai, and its object was the destruction of the republic of Venice and the partition of its territories. Venice however stood firm, although its armies were defeated and its territories were ravaged by both Germans and French with their usual atrocity. At last Julius himself, having recovered the town of Romagna, perceived the impolicy of uniting with ultramontane sovereigns against the oldest Italian state, and accordingly in February, 1510, he made peace with Venice. Wishing to undo the mischief which he had done, and to drive the foreigners, whom he styled 'barbarians,' out of Italy, he first sought to arm the Germans against the French, whom he dreaded most, but not succeeding, he called to his aid the Swiss. The pope himself took the field against the French in Lombardy, and attacked and took the town of La Mirandola, entering it by a breach, in January, 1511. The next campaign was unfavourable to Julius, and he lost Bologna. But in the following October his legates succeeded in forming a league, which he called 'holy,' with Ferdinand of Spain, Henry of England, the Venetians, and the Swiss. The campaign subsequent, in 1512, was marked by the battle of Ravenna and the death of Gaston de Foix, the French commander, followed by the total expulsion of the French from Lombardy. But this was effected by the Swiss, German, and Spanish troops, and Julius merely succeeded in driving one party of foreigners out of Italy by means of other foreigners, who meantime subverted the republic of Florence, and gave it to the Medici. In the midst of these events, Julius died of an inflammatory disease, on the 21st February, 1513. He was succeeded by Leo X. Julius was fond of the fine arts; he patronized Bramante, Michel Angelo, and Raphael, and he began the structure of St. Peter's Church.

JULIUS III., Cardinal Giocci, succeeded Paul III. in 1550. He re-opened the sittings of the Council of Trent, which had been suspended under his predecessor. He quarrelled with France and with Venice, and also with Ferdinand, king of the Romans and brother to Charles V., and died in March, 1555, leaving behind him a very indifferent character marked by incapacity and misconduct.

JULY, now the seventh, was originally the fifth month of the year, and was called by the Romans, in regard to its numerical station, *Quintilis*. Mark Antony altered the name to Julius, the gentile name of Caius Cæsar, the Dictator, who was born in it. So Festus, '*Julium mensem appellarunt quod eo mense dicitur Julius natus.*'

In the old Latin or Alban calendar, Quintilis had a complement of 36 days. Romulus reduced them to 31; Numa to 30; but Julius Cæsar restored the day of which Numa had deprived it, which it has ever since retained.

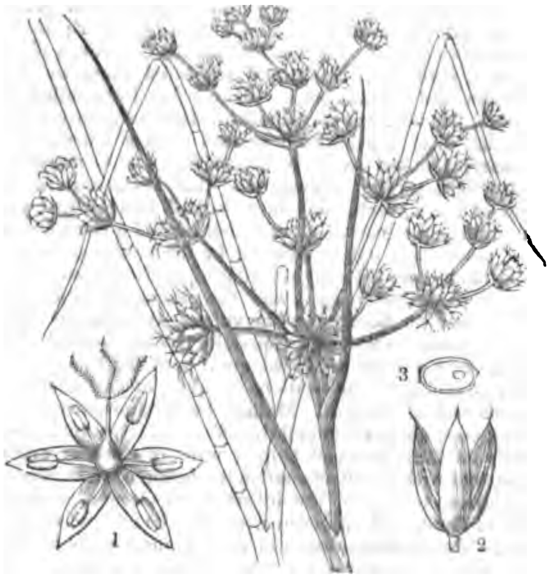
Our Anglo-Saxon ancestors called July *Mæd-monath*, 'mead month,' from the meads being then in their bloom; and *æftera-litha monath*, 'the latter mild month,' in contradistinction to June, which they considered and named as 'the former mild month.'

On the 3rd of this month the Dog-days are supposed to begin.

(Pitisci *Lexicon*, i. 985; Brady's *Clavis Calendaria*, i. 74; Bosworth's *Anglo-Saxon Dict.*, v. 'Monath.')

JUMNA. [HINDUSTAN.]

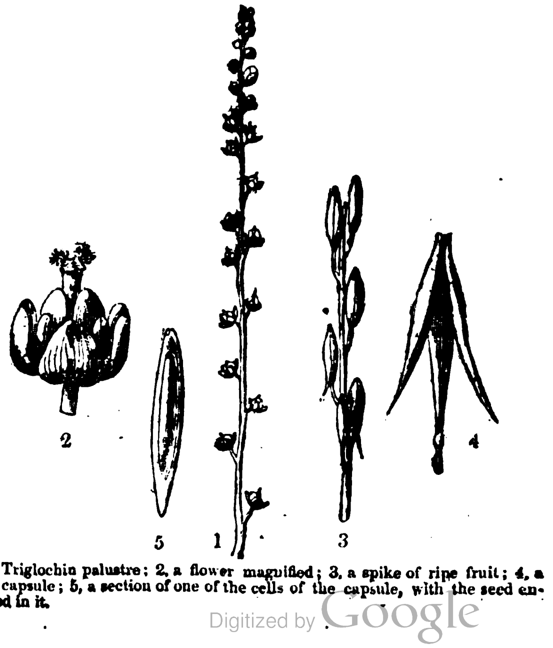
JUNCA'CEÆ, a small natural order of Endogenous plants, so named from Juncus, the rush, which is considered its type. It is principally composed of obscure herbaceous plants, with brown or green glumaceous hexandrous flowers, and would perhaps be with more propriety considered a section of Liliaceæ than a separate order. It forms one of the transitions from complete Endogens to the imperfect glumaceous form of that class.



Juncus articulatus.

1, a flower spread open; 2, a capsule; 3, a seed cut through its longer axis, showing the embryo.

JUNCAGINA'CEÆ are a small and unimportant order of Endogens, consisting of marsh plants with thin minute scaly flowers formed of 3 sepals, 3 petals, and as many stamens, which are opposite them. Their ovaries are 3 or 6 in number, contain each 1 or 2 ascending ovules, and, when ripe, form a dry fruit. The embryo has a lateral slit for the emission of the plumule, on which account they are



1, Triglochin palustre; 2, a flower magnified; 3, a spike of ripe fruit; 4, a ripe capsule; 5, a section of one of the cells of the capsule, with the seed enclosed in it.

regarded as allied to Araceæ. Triglochin is the commonest genus of the order, and inhabits the fresh or salt marshes of most parts of Europe.

JUNCUS ODORA'TUS. In old works on Materia Medica, as well as in many modern ones, we find a fragrant plant referred to under this name, and which is usually thought to be a kind of grass. Dr. Alston and some other writers gave as its synonymes Fœnum camelorum, Palea de Mecha, and more especially Schœnanthus, under which indeed it should be described, as it is with good reason thought to be Schœnus (σχοῖνος) of Dioscorides. See SCHŒNANTHUS, where also will be described the plant which appears to be the *Calamus aromaticus* of the antients, as the two are very closely allied.

JUNE, the sixth month of the year, named from the Latin Junius. Ovid, in his *Fasti* (vi. 25), makes Juno assert that the name was expressly given in honour of herself.

> 'Ne tamen ignores vulgique errore traharis,
> Junius à nostro nomine nomen habet.'

In another part of the *Fasti* (vi. 87) he gives the derivation *à junioribus;* as May had been derived from *Majores.*

> 'Junius est juvenum; qui fuit ante senum.'

Those who derive the name from Junius Brutus, who began his consulship in this month, forget that, according to tradition, it had received the appellation long before.

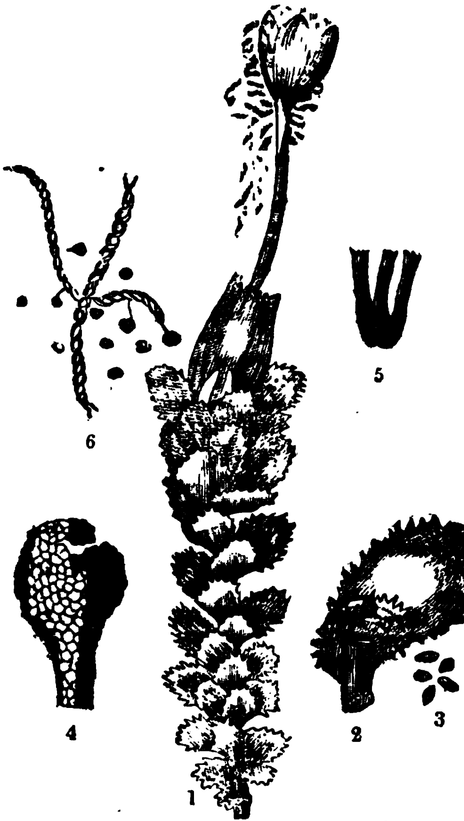
In the old Latin or Alban calendar June was the fourth month, and consisted of twenty-six days. Romulus is said to have assigned it a complement of thirty days. Numa, who made it the sixth month, deprived it of one day, which was restored by Julius Cæsar, since which time it has remained undisturbed.

The Anglo-Saxons had several names for the month of June. They called it *sear-monath*, 'dry month;' *midsumer-monath*, 'midsummer month;' and *æra-litha-monath*, 'the earlier mild month,' in contradistinction to July.

In this month is the summer solstice. Pitiscus tells us that in the Roman times the month of June was considered to be 'nuptiis aptissimus.'

(Pitisci *Lexicon*, i. 986; Brady's *Clavis Calendaria*, i. 71; Bosworth's *Anglo-Saxon Dict.*, v. 'Monath.')

JUNGERMANNIA'CEÆ, a rather extensive natural order of Cryptogamic plants, or Acrogens, resembling mosses in appearance, but very distinct from them in many points of structure. Their foliage is much more cellular, their seed-vessel, or theca, splits into 4 valves, has no operculum, and instead of a central column has a number of tubes, each furnished internally with a double elastic spiral thread, and called an *elater*, to which the spores stick, and by the aid of which they are supposed to be dispersed. The species inhabit the trunks of trees, damp earth, or even the young shoots and leaves of other plants in cool moist climates, especially such as are temperate. Some have the stem and leaf formed into a frond, or thallus, resembling that of a lichen, but more commonly the species have leaves with stipules at their base. A large number of genera has of late been formed out of the old genus Jungermannia, but the opinions of botanists are much divided as to the value of these new divisions; and they have not been generally adopted. Hooker's *Monograph of the British Jungermanniæ* gives a valuable account of the species inhabiting these islands. A more recent account of the whole European genus is to be found in Nees v. Esenbeck's *Naturgeschichte der Europäischen Lebermoose*, 2 vols. 8vo. with plates.



Jungermannia nemorosa, highly magnified.

1, A branch in fruit. 2, A leaf, with sori upon it. 3, The contents of those sori. 4, The calyptra, before it is burst by the theca. 5, Abortive thecæ, in a very young state. 6, Elaters.

JUNI'PERUS, a genus of hardy, evergreen, woody plants, belonging to the natural order Coniferæ. Its distinctive character consists in its female fructification being succulent, consolidated, and reduced in the number of its parts below what is usual in the order to which the genus belongs. Like other Coniferæ, its fruit is composed of scales representing carpels spread open, and collected in a spiral manner round a common axis. But they are not more than six in number, generally three, and when ripe are fleshy and consolidated into a body resembling a drupe. In the language of the Pharmacopœia they are *berries*, in that of botanists they are termed *Galbuli*.

About twenty species are known, the most important of which are the following:

1. *J. Communis* (Common Juniper). This is a common bush, with long, narrow, sharp-pointed leaves, which are concave and glaucous on the upper side, but convex and green on their under, and with blackish fruit. It grows wild in all the northern parts of Europe, and, as is said, in North America also and the north of India, but it is doubtful whether the plants called Juniper by travellers in the Himalaya Mountains are not some other species. Occasionally the Juniper becomes a small tree. The fruit is used in considerable quantities in the preparation of gin, and in medicine as a powerful diuretic; a kind of beer called *genèvrette* is also obtained in some parts of France by fermenting it with barley. Oil of Juniper, obtained from the Galbuli, is said to be the most powerful of all diuretics in doses of four drops.

2. *J. Sabina* (the Savin). This species is readily known from the last by its leaves being small, scale-like, and pressed close to the stem, besides which, its fruit is a light bluish green. It forms a compact gloomy-looking bush, in some cases spreading near the ground, in others acquiring the stature of a low tree. It is found wild in the middle of Europe and the west of Asia, inhabiting the most sterile soil, and is frequently met with in this country in shrubberies. Like the common Juniper, it is a diuretic and uterine stimulant, but is so powerful that its use is highly dangerous, except in the hands of regular practitioners. It is a well-known violent emmenagogue. Oil of Savin is a local irritant, producing blisters when applied to the skin; taken internally it is drastic and emetic.

3. *J. Virginiana* (the red cedar). Notwithstanding its popular name this is not generally the plant that yields the cedar wood used by cabinet-makers and pencil manufacturers, the Bermuda cedar being principally so employed; its timber however is of great excellence and durability. It is a native of North America, from Cedar Island in Lake Champlain as far as the southern side of the Gulf of Mexico, chiefly preferring the vicinity of the sea. In general it is a large bush; but in favourable situations, and in such a climate as that of Virginia and Carolina, it becomes a tree 40 feet high. The branches of this species are erect, the leaves arranged in threes, small, scale-like, and but little spreading; the fruit is deep blue, covered with a mealy resinous powder. A great many fine plants occur in this country; it is not however with us an object of any importance to the forester, except for the sake of variety.

4. *J. Bermudiana* (the Bermuda red cedar). Very little known in Great Britain, in consequence of its not bearing the climate without protection. It is a native of the Ber-

mudas, where it becomes a large tree, with a soft fragrant wood, the value of which is well known from its use in cabinet-work and the manufacture of pencils. It has, when young, long narrow spreading leaves growing in threes, but on the branches of old trees they become shorter, are placed in fours, and thus give the shoots a four-cornered appearance.

Of the other junipers, *J. excelsa* and *J. Chinensis* are handsome hardy trees; *J. Lusitanica* (the Goa cedar) is also of great beauty, because of its drooping habit and light grey branches, but it will not live long in England except in the warmest of the southern counties; and *J. Phœnicea* is a handsome bush: the others are of little moment.

JU'NIUS, FRANCISCUS. There are two learned persons of this name, father and son. The father was a Protestant minister in the Low Countries, best known by a translation of the Scriptures into the Latin tongue, in which he was assisted by Tremellius, whence it is usually called the version of Junius and Tremellius. He became professor of theology at Leyden, where he died in 1602. His son, the younger Francis Junius, of whom we are principally to speak, was born at Heidelberg in 1589, accompanied his father to Leyden, but soon relinquished study and embraced the profession of arms. On the cessation of hostilities in those countries in 1609 he gave up arms, and betook himself to literature as a profession. He came over to England in 1610, and was soon entertained as his librarian by Thomas Howard, earl of Arundel, a nobleman whose name, whenever it occurs, is found associated with some good deed connected with the higher interests of man. Junius remained 30 years in this honourable connection, during which time, having few distractions and an insatiable appetite for curious knowledge, he accumulated vast stores of information.

The more particular direction of his studies was towards the northern languages, or rather the various dialects of that great language which under the name of the Gothic or the Teutonic seems to have been spoken in the remotest ages by the people who inhabited both shores of the Baltic. We owe to him the publication of by far the most valuable relic of the literature of the people who spoke this language in what may be called its purity, a version of the gospels, commonly called Ulphilas' Version, and the manuscript which contains it, 'The Silver Codex.' This was printed with many learned notes and other illustrations in 1665. There is another work of his, published in his lifetime, on the 'Painting of the Antients,' which is a most useful book: but the work by which he is best known is a posthumous work, not printed indeed till 1743, entitled 'Etymologicum Anglicanum,' in which we have the investigation of the origin of numerous words in the English language, relics of the language spoken by our Saxon progenitors, conducted with an extraordinary apparatus of the knowledge required in such an undertaking. It was much used by Johnson.

Junius lived to his eighty-ninth year, dying in 1678, at Windsor, at the house of his nephew Isaac Vossius, another of the great names in the list of the really learned. He had formed a most valuable collection of manuscripts, which he bequeathed to the University of Oxford, and they are now among the treasures of the Bodleian Library.

JUNIUS'S LETTERS. [FRANCIS, SIR PHILIP.]

JUNO, a Roman divinity, whose attributes are nearly the same as those of the Grecian Hera. She was the daughter of Kronus and Rhea, the sister and wife of Jupiter, the goddess of marriage and childbirth, and the protectress of married women. Her worship was of very great antiquity at Argos and throughout the whole of the Peloponnesus. The Samians, as well as the Spartans, are supposed to have derived their knowledge of this deity from Argos (*Paus.*, iii. 13; vii. 4); and the same is said to have been the case with the inhabitants of Epidaurus, Ægina, and Byzantium (Müller's *Dorians*, i., p. 410, Eng. transl.). Her name also occurs in the early mythology of Corinth.

The two most celebrated temples of Juno were at Argos and Samos; the latter was the largest temple with which Herodotus was acquainted (*Herod.*, iii. 60). The Samians themselves denied that their knowledge of this deity was derived from Argos, and asserted that she was born in Samos. (*Paus.*, vii. 4.)

The marriage of Jupiter and Juno forms a prominent feature in the worship of this goddess. She was frequently represented veiled as a bride, and carried in processions, like a bride, on a car. Her favourite birds were the cuckoo and peacock.

She was worshipped at Rome with the epithets *Pronuba*, as presiding over marriage; *Lucina*, as bringing children to the light; and *Moneta*, as the warner, to whom a temple was erected on the spot where the house of Manlius Capitolinus stood (*Liv.*, vii. 28). The origin of the name *Moneta* is given by Cicero in his 'De Divinatione' (i. 45).

JUNO, the third in order of discovery of the small planets, discovered on the 1st of September, 1804, by Professor Harding, of Göttingen. This excellent astronomer, who died August 31, 1834, 'was of English extraction, and born at Lauenburg about the year 1763. He was originally educated for the Protestant Church; but having become tutor to the son of the illustrious Schröter, he was gradually attached to astronomy, and afterwards devoted himself exclusively to its practice and study. Having served for several years as assistant to Schröter, he became professor of astronomy in the university of Göttingen in 1805, and retained that chair till his demise, which catastrophe was hastened by excessive grief at the loss of his only child, a girl of fourteen years of age. The name of this amiable and active astronomer will be known through all ages as the discoverer of the planet Juno; and he compiled the most accurate celestial maps, especially of those parts where planets may be expected to appear, that are now extant. (*Royal Astron. Soc. Annual Report* for 1835.)

It was while engaged in accurate and extensive observation of stars for the purpose, as it has been expressed, of forming a zodiac for the two new planets of Piazzi and Olbers, that Harding discovered the third; and this process gives the discovery a high degree of merit. [HERSCHEL.] The planet was, as in other cases, first supposed to be a star, until observation of it on two or three successive nights pointed out its motion. The planet itself is not visible to the naked eye, and it revolves round the sun in about 1593 days. [ASTRONOMY.]

Elements of Juno's Orbit.

Epoch 1842, May, 29d 0h mean astronomical time at Greenwich.

Semiaxis major 2·668947, that of the earth being assumed as the unit.

Excentricity 0·25581182.

Inclination of the orbit to the ecliptic 13° 2′ 20″·3.

Long. of ascending node	170°	56′	21″·7	From the mean equinox of the Epoch.
Long. of perihelion .	54	12	22 ·3	
Mean longitude . .	250	50	18 ·9	

Mean daily sidereal motion 813″·76167.

JU'PITER, the supreme Roman deity, known to the Greeks as Zeus, appears to have been originally an elemental divinity, who was worshipped as the god of rain, snow, lightning, &c. The etymology of the name, independent of other considerations, would lead us to this conclusion; since Jupiter was originally called Jov-is Pater, or Dies-piter, or Diu-piter, the *Diu* becoming softened in pronunciation into *Ju*, in the same manner as the Latin word *diurnus* has become *journal*. Jupiter, or Diupiter, would therefore mean the father of day or the air; the first part of the word contains the same root as the Latin adverb *diu* and adjective *diu-rnus*. This is also probably the original meaning of the Greek Ζεύ-ς and ΔιϜ-ός; though some have conjectured with considerable probability that Jov-is and Zeus are the same both in meaning and etymology as the Latin word deus. There is also a striking similarity, though probably accidental, between the word Jov-is and the Hebrew name of the supreme deity (יְהֹוָה). If there were any doubt respecting the original meaning of Ju-piter and Jov-is it would be sufficient to refer to those numerous passages in Latin authors in which the word is used in the signification of air (for example, Horace, *Od.* i., 1-25; Cicero, *De Nat. Deor.*, i. 15).

Cicero informs us (*De Nat. Deor.*, iii. 21) that there were three deities of the name of Jupiter: one the son of Æther; the second, the son of Heaven; and the third, the son of Saturn. The last was worshipped at Rome under various names, and many temples were erected to his honour, of which the most celebrated was the one on the Capitoline Hill, where he was worshipped under the name of Jupiter Optimus Maximus.

The Roman poets attributed to Jupiter the same power and attributes with which the Greeks invested Zeus. The Grecian Zeus was, according to Homer, the son of Kronus and Rhea. In order to save her son from being destroyed by his father, Rhea concealed him soon after his birth in a cave in Crete, where he passed the first years of his life.

As Zeus grew up, Kronos called to his aid the Titans, in order to secure his dominions against his son; but they were eventually conquered, and Saturn himself dethroned by the youthful Zeus. In the Homeric poems Zeus is represented as the supreme ruler of the heavens and the earth; and though subject himself to the degrees of fate, his commands cannot be disobeyed; his wisdom is infinite, and his power irresistible. His wife was Hera (Juno), and their children Hephaestus (Vulcan) and Ares (Mars). His worship was widely diffused throughout Greece.

Jupiter was usually represented as seated on an ivory throne, with a sceptre in his left hand and a thunderbolt in his right. The eagle, his favourite bird, was generally placed by the side of the throne.

JUPITER, the name of one of the old planets, the largest of all the bodies, except the sun, in the solar system. The astronomical history of this planet (or of any other, except the newly-discovered small planets) is so completely entangled in that of the progress of astronomy in general and pure mathematics, that it would be useless to attempt any separation. In the article GRAVITATION will be found the most remarkable points of what an astronomer would call the *theory* of Jupiter, meaning the explanation of his motions by means of the law of gravitation. We shall here confine ourselves to the statement of the elements of the planet's motion, and that of the satellites. [ASTRONOMY; GALILEO.] See also Baily's 'Astronomical Tables and Formulæ,' and Sir J. Herschel's 'Astronomy.'

The figure of Jupiter is sufficiently oblate to appear of a sensibly spheroidal form in a moderate telescope; the axis of revolution being to the equatorial diameter in the proportion of 167 to 177. The apparent equatorial diameter varies between half and three-quarters of a minute, being 36″·74, when the planet is at its mean distance from the earth. The real equatorial diameter is 10·86 times that of the earth, or upwards of 86,000 miles. It is nearly 1300 times as large as the earth, and its mean density is nearly the same as that of the sun, or about one quarter of that of the earth.

The mass of Jupiter, from the time of Newton to the present, was supposed to be to that of the sun in the proportion of 2 to 2141; but the recent observations of various astronomers, concluding with those of Mr. Airy contained in the late volumes of the Memoirs of the Astronomical Society, make it somewhat greater. Mr. Airy's result is that the mass of Jupiter is to that of the sun in the proportion of 1 to 1046·77, or 2 to 2094 nearly.

The planet revolves on its axis in $9^{h}\ 55^{m}\ 49^{s}\cdot7$, and the inclination of its equator to the ecliptic is 3° 5′ 30″. Its light and heat are to those of the earth as 37 to 1000.

Elements of the Orbit of Jupiter.

Epoch 1799, December 31, 12^{h} mean astronomical time at Paris.

Semiaxis major 5·20115524, that of the earth being assumed as the unit.

Excentricity ·0481621; its secular increase (or increase in 100 years) ·0001594.

Inclination of the orbit to the ecliptic 1° 18′ 52″; its secular diminution 23″.

Longitudes from the mean equinox of the epoch (1.) of the ascending node 98° 25′ 44″·90; its secular increase (combined with the precession) 3430″; (2.) of the perihelion 11° 7′ 38″·26; its secular increase (combined with the precession) 5710″; (3.) of the planet (mean) 81° 52′ 19″·33.

Mean sidereal motion in 365¼ days 109256″·59; sidereal revolution 4332·5848212 mean solar days.

The four satellites of Jupiter appear to revolve on axes, each in the time of its revolution round the planet, in the same manner as our moon. The elements of their orbits are as follows (Baily, *Astron. Tables and Formulæ*): the units of time, length, and mass being the earth's mean solar day, the planet's equatorial semidiameter, and the planet's mass.

Sat.	Sideral Revolution.				Mean Distance.	Mass.
				More nearly.		
	d	h	m	d		
1	1	18	28	1·769137788148	6·04853	·0000173281
2	3	13	14	3·551810117849	9·62347	·0000232355
3	7	3	43	7·154552783970	15·35024	·0000884972
4	16	16	32	16·688769707084	26·99835	·0000426591

The first satellite has no sensible excentricity, and its orbit is very nearly indeed in the plane of Jupiter's equator. The second has no sensible excentricity; the inclination of its orbit to the planet's equator is under half a minute, and its nodes have a retrograde revolution of about thirty years. The third has a small but very variable excentricity, and the line of apsides has a direct but variable motion. The inclination of its orbit is under a quarter of a minute, and the nodes make a retrograde revolution in about 142 years. The fourth has a greater excentricity, and the direct mean motion of its apsides is nearly three-quarters of a degree per annum. The nodes made by its orbit with that of the planet have a direct motion of 4½ minutes per annum, and the inclination of the orbit to that of Jupiter is 3° nearly. Sir J. Herschel gives as the mean apparent diameter of the planet and satellites 38″·327, 1″·105, 0′ ·911, 1″·488, and 1″·273; and as the diameter in miles, 87,000, 2508, 2068, 3377, 2890.

In consequence of the smallness of the angle by which Jupiter's equator is inclined to the ecliptic, and of the nearness of the orbits of the satellites to the plane of the equator, all the satellites, except the fourth, which sometimes escapes, undergo one eclipse once in every revolution. Since [ECLIPSE] this is caused by the entry of the satellite into Jupiter's shadow, the eclipse is independent of the earth's position, and the observation can certainly be made, unless Jupiter be too near to the sun. It is found that an immersion or emersion is not visible, generally speaking, unless Jupiter be as much as 8° above the horizon, and the sun as much as 8° below it. It never happens that both the immersion and emersion can be observed, in the case of the first satellite, and rarely in that of the second; though it is otherwise with the third and fourth. The reason is, that the planet itself always hides a part of its own shadow, and the first satellite is so near the planet that it must either enter or leave the shadow behind the planet: which also happens, for the most part, in the case of the second satellite. Before the planet is in opposition its shadow is on the western side of the planet, and after opposition on the eastern; while before the opposition immersions only are visible, and after opposition emersions, in the case of the first and second satellites. The eclipses of the four several satellites last about 2¼, 2¾, 3½, and 4¾ hours, one time with another. For the use of these eclipses in determining LONGITUDE, see that word.

When Jupiter is in or very near opposition, the planet itself hides its own shadow entirely, so that both immersion into and emersion out of the shadow may be invisible from the interposition of the planet; so that we then have the eclipse of an eclipse. And when the satellite passes between the sun and the planet, its shadow may throw a spot on the planet into darkness, which spot will appear to pass over the disc of the planet. Lastly, a satellite may pass between the planet and the earth, in which case it is seen sometimes as a bright and sometimes as a dark spot. The times of all these appearances are predicted in the Nautical Almanac.

JURA, an island of the Hebrides, in the district of Isla and shire of Argyle, bounded on the east by the Sound of Jura, and on the west by that of Isla. Its greatest length is less than thirty miles, and its average width about seven miles, being comprised between the latitudes of 55° 50′ and 56° 10′ north, and between the longitudes 5° 45′ and 6° 5′ west. The island is a continuous mountain range, elevated towards the south into five distinct points, of which the three principal are called the Paps, and rise to the height of 1083 feet. The flat land lies wholly on the eastern side of the island, and is estimated at less than one-twentieth of the entire surface: the rest consists of tracts of mountain pasture, intersected by many mountain torrents, and scarcely inhabited. Besides the great inlet of Loch Tarbet, the coast line is indented with several bays and harbours, the chief of which are Small Isles and Lowlandman's Bay. On the western shore are found large quantities of fine sand, which is much in request in the manufacture of glass. Large flocks of sheep and goats are fed upon the mountains, where also may be seen occasionally red deer, grouse, and other game. This island, with those of Collonsay, Scarba, Oronsay, and five other isles, constitute the parish of Jura, which, in 1831, contained 1312 inhabitants, the greater part of whom were employed in fishing. (MacCulloch's *Highlands; Beauties of Scotland; Population Returns*, &c.)

JURA, a department in the eastern part of France, on the frontier toward Switzerland. It is bounded on the north by the department of Haute Saône; on the north-east by that of Doubs; on the east by Switzerland; on the south by the department of Ain; on the west by that of Saône et Loire; and on the north-west by that of Côte d'Or. The greatest length is from north to south, from the bank of the Oignon near its junction with the Saône, to that of the Ain at the junction of the Valoux, 72 miles; its greatest breadth, at right angles to the length, is from the bank of the Seille, where it touches the frontier, to the neighbourhood of Nozeroy, about 41 miles. The area of the department is estimated at 252 square French leagues, or 1927 square English miles, rather greater than that of the English county of Northumberland. The population by the census of 1831 was 312,504, by that of 1836, 315,355, showing an increase in five years of 2851; and giving (in 1836) 164 inhabitants to a square mile. In density of population the department is just equal to the average of France, and superior to the English county with which we have compared it. Lons-le-Saunier, the chief town, is in 46° 40′ N. lat. and 5° 33′ E. long., 214 miles in a straight line south-east of Paris, or 241 miles by Provins, Troyes, Dijon, and Dôle.

The southern and eastern parts of the department are mountainous; the northern and western are more level. The Jura Mountains traverse the department and form three ridges of different elevations running from north-east to south-west. The loftiest summits, lying along the Swiss frontier, have an average elevation of nearly 4000 feet, and are covered with snow six months in the year: they present no soil capable of cultivation. The second ridge, covered for the most part with forests and thickets of pine, juniper, and box, has some fertile valleys and pasture grounds. The lowest ridge is covered with soil everywhere of good quality, and increasing in depth and fertility as it approaches the plain, which occupies the rest of the department.

The department belongs entirely to the basin of the Rhône: and the principal streams are the Oignon, the Doubs, and the Seille, affluents of the Saône, which joins the Rhône at Lyon; and the Ain, which falls into the Rhône several miles above that city. The Oignon flows for a few miles along the northern boundary of the department, which it separates from that of Haute Saône. The Doubs flows through the northern part of the department in a south-west direction past Dôle.

The Seille, which rises in the lower slopes of the Jura, near the centre of the department, waters the western side. The Ain rises just in the southern part of the department amid the heights of the Jura, not far from St. Claude, and flows first north, then west, and then south into the department of Ain. None of the rivers of the department are navigable except the Ain for about seven or eight miles. There is one canal, that which unites the Rhône and the Rhine, about 25 miles of which are in the department. It passes from the Saône to the valley of the Doubs near Dôle, and follows the course of that valley into the department of Doubs.

The principal road in the department is that from Paris by Dijon to Geneva. It enters the department on the north side between Auxonne (dep. of Côte d'Or) and Dôle, passes through Dôle, Mont-sous-Vaudrey, Poligny, Montrond, Champagnole, Maison Neuve, St. Laurent, Morey, Les Rousses, and La Valtay: between these last two towns it crosses a part of Switzerland, and beyond La Valtay enters the department of Ain. A branch of this road runs to Lons-le-Saunier, and rejoins the high road at St. Laurent; other branches lead to Arbois and Salins; roads lead from Dôle and Lons-le-Saunier to other towns in this and the neighbouring departments. The aggregate length of the government roads is 206 miles, of which about two-thirds are out of repair, and one-sixth unfinished, leaving only one-sixth in a fit state for use. The Routes Départementales have an aggregate length of 338 miles, all, except seven miles of unfinished road, in good repair. The bye-roads and paths have an aggregate length of nearly 3600 miles. The department would be rather better furnished with roads than the average of the departments, if they were kept in proper repair.

The north-western portion of the department is occupied by the strata above the chalk; the rest of the department by the strata between the chalk and the new red or saliferous sandstone: the chalk formation itself does not appear to occupy any part of the surface. (*Carte Physique et Minéralogique de France; Atlas to* Malte Brun's *Précis de Géographie.*) The mineral treasures of the department are considerable. Many iron-mines are worked; lead and coal are found, but not worked, and there are some traces of gold. Various species of marble of great variety and beauty, and alabaster, are quarried; also lithographic stones. Peat is dug; and there are several brine springs: the water of the springs of Salins yields 15 per cent. in weight of salt.

The climate of the department varies materially in different parts, according to the elevation of the surface. In general the winters are long, owing to the snow which remains on the mountains till April; and the temperature, even in the plains, is colder than the latitude would lead one to expect. The spring is short, and the summer hot; the air, which in the plain is moist and close, is fresh and pure on the lower slopes, and dry and keen in the higher ridges, where the seasons are reduced to two, a winter of eight months and a summer of four.

The agricultural produce is sufficient for the consumption of the department. The harvests in the plain are very abundant, and consist of wheat, rye, buckwheat, and maize. On the lower hills they consist of barley, oats, maize; rape seed is also grown here. In the higher ridges of the mountains, where there is any cultivation, the crops are very scanty; some barley and oats, and, in favourable spots, a little wheat and hemp, are grown. The vine is cultivated on the lower slopes of the mountains, and the quantity of wine produced is greater than the consumption. It is chiefly white wine, and is of good quality; that of Arbois is creaming and sparkling, like champagne. The walnut is raised on the lower hills. The quantity of woodland is considerable: the principal forests are that of Chaux, in the northern part of the department, between the Oignon and the Loue; and the contiguous forests of Moydon, Arbois, and Poligny, in the centre of the department. The trees are chiefly the pine and the oak.

The quantity of horned cattle is great, especially of cows. The butter is very good, and much cheese is made. The number of sheep is comparatively small: the long-woolled English sheep have however been lately introduced, and with good success. Horses are tolerably numerous, and some mules are bred. Poultry and bees are objects of considerable attention, especially bees in the mountain country, where they yield excellent honey. The forests yield game and wild animals, including the wild boar, the wolf, the fallow-deer, and a few roebucks; and the rivers and lakes abound with fish, especially excellent crayfish.

The department is divided into four arrondissements, as follows:—

Arrondissement.	Situation.	Area in sq. miles.	Population in 1836.	Communes.
Lons-le-Saunier	W. & S.W.	596	107,690	207
Poligny . . .	E.	482	80,672	149
St. Claude . .	S.E.	405	52,353	82
Dôle . . .	N.	444	74,640	137
		1927	315,355	575

It is divided into thirty-two cantons, or districts under a justice of the peace.

In the arrondissement of Lons-le-Saunier are Lons-le-Saunier on the Vaille (population in 1836, 7684); Orgelet, near the Valouze (pop. 1928 town, 2367 whole commune), St. Amour, in the south-western corner of the department (pop. 1957 town, 2595 whole commune), Scellières, on the Brene, a feeder of the Seille; Bletterand, Arlay, and Château Châlon, on or near the Seille; Conliege on the Vaille; Clairvaux, on the Drouene, a feeder of the Ain; Cousance, on a small affluent of the Solnan, a tributary of the Seille belonging to the adjacent department of Saône and Loire; Gigny and St. Julien, on the Suran, a feeder of the Ain; and Arinthaux, or Arinthod, near the Valouse.

Lons-le-Saunier, the capital of the department, took its rise in the fourth century from the salt-works, which are still of great importance. It is situated at the confluence of three small streams in a fertile valley, surrounded by vineyards. The principal buildings are the church on the parade, a fine hospital, capable of accommodating a hundred and fifty patients, and the salt-works. There are neat fountains, a library, a museum, a high-school, a theatre, and an agricultural society. Lons-le-Saunier is one of the chief places of trade in the department: a considerable quantity of paper, card-board, leather, cheese, and iron is manufactured in the town or neighbourhood. At St. Amour several festivals and usages, which may be traced to the remotest antiquity, are still observed. Arinthaux is built on the site of an antient Gaulish temple. Clairvaux was formerly celebrated for its abbey. [CLAIRVAUX.] In its neighbourhood are considerable iron-works, where nails are manufactured by machinery.

In the arrondissement of Poligny are, Poligny, on the Glantine (population, in 1836, 6492), Arbois, near the source of the Vieille, a small affluent of the Cuisance (pop. 6464 town, 6741 whole commune), Salins, on the Furieuse (pop. 5759 town, 6554 whole commune), and Nozeroy, on a small feeder of the Ain.

Poligny appears to have been a place of some note in the latter period of the Roman empire, and is perhaps the Castrum-Olinum of the Notitia Imperii, the residence of the Roman governor of the province of Maxima Sequanorum. Poligny was the summer residence of the dukes of Bourgogne. This town is regularly laid out, and is adorned with several fountains, which contribute to the cleanliness of the place. The inhabitants manufacture hosiery, nails, earthenware, and turnery wares in wood and metal. The environs of the town are rich in monuments of antiquity: among them are two druidical stones, which the superstition of the surrounding peasantry still supposes to revolve on their centres at the yearly celebration of the midnight mass. There are the remains of vast Roman buildings, the purpose of which is unknown. Arbois is a handsome town, the inhabitants of which manufacture paper and porcelain. The town has many relics of Gaulish and Roman buildings, and the ruins of an antient castle of the middle ages. Large quantities of vegetables and flowers are grown round Arbois. The wine has been noticed already. It was the birthplace of Pichegru. Salins owes its name and prosperity to its brine-springs, which were well known as early as the sixth century. This town was almost entirely destroyed by fire in A.D. 1825. The hospital, the high-school, and the salt-works were almost the only buildings that escaped destruction, except in the suburbs, which were not injured. The loss in houses and furniture was estimated at 300,000*l.* Subscriptions were opened all over France, and above 80,000*l.* was promptly subscribed: the inhabitants energetically betook themselves to the rebuilding of the town; by day they worked at clearing away the ruins, and at night they assembled in one of the rooms of the high-school to receive instructions from a fellow-townsman, a soldier who had been educated in the Polytechnic school at Paris, in those principles of geometrical and mechanical science which would enable them to rebuild their houses in the easiest and most economical manner. Salins was rebuilt; a wide street, with a foot-pavement, an unusual thing in France, extends the whole length of the town, and there are fountains in the open spaces, of simple construction, but in good taste. The houses are well built. Salins is walled and defended by two forts, Fort St. André and Fort Belin.

In the arrondissement of St. Claude are St. Claude, on the Bienne (pop. in 1836, 5238), Moyrans, near the Ain, and Morez, near the Bienne, on a torrent called the Bief de la Chaille, which flows into that river. St. Claude is described elsewhere. [CLAUDE, ST.] Morez is in a long defile of the Jura, so narrow as barely to allow the requisite width for the street and the houses that skirt it on each side, behind which the mountains rise almost perpendicularly to the height of 1200 feet. Brass-wire, pins, clocks, watches, and roasting-jacks are made here.

In the arrondissement of Dôle are Dôle (pop. in 1836, 10,137), and Rochefort, on the Doubs; and Chaussin on the Dorain. Dôle is described elsewhere. [DÔLE.] The other two towns are unimportant.

The manufactures of the department are carried on with great activity. There are several iron-works. Wrought and cast iron and steel are manufactured: nails and heavy iron goods are made. Clocks and watches, spectacle-frames, and roasting-jacks are made at Motez, at Foncine le Haut, and Foncine le Bas, in the arrondissement of Poligny. In the arrondissement of St. Claude, turnery wares, and toys in ivory, bone, box, and other woods, horn, &c. are made. At Sept Moncel, in the same arrondissement, five hundred persons are engaged in the manufacture of artificial gems. The other manufactures of the department are cotton stockings, hats, coarse linens, chamois and other leather, paper, brandy, glue, mineral acids, soap, &c. The chief exports consist of the above-mentioned articles, especially iron goods, toys, and watches; wine, timber, and deals; horses for the cavalry, and horned cattle. A number of the inhabitants emigrate yearly to other parts of France, and follow the calling of lime-burners, plasterers, hemp-dressers, and curriers; returning home at the time of harvest.

This department forms the diocese of St. Claude, the bishop of which is a suffragan of the archbishop of Lyon et Vienne; it is in the jurisdiction of the Cour Royale, and the circuit of the Académie Universitaire of Besançon, and is comprehended in the sixth military division, of which the head-quarters are at Besançon. It returns four members to the Chamber of Deputies.

In respect of education this department is the third in France. Of the young men enrolled in the military census of 1828-29, seventy-three in every hundred could read and write.

This department formed part of the territory of the Sequani, one of the principal nations of the great Celtic stock. Under the Roman dominion it made part of the province of Maxima Sequanorum, a subdivision of Gallia Lugdunensis, or Celtica. It subsequently passed into the hands of the Burgundians and the Franks; and in the middle ages made part of the province of the county of Bourgogne, or Franche Comte. [BOURGOGNE; BURGUNDIANS; FRANCE, FRANCHE COMPTE.]

JURA MOUNTAINS. The range of elevated ground to which this name peculiarly applies lies to the west of the Lakes of Geneva and Neufchâtel, and may be described as a broad limestone ridge, swelling at several points to more than 5000 feet above the sea. The Mont Dôle, north-west of Geneva, is about 5500 feet, and the Mont Reculet, west of Geneva, is still higher. If to this region we give the name of the 'Swiss Jura,' the continuation of the same limestone country though Suabia and Franconia will be properly distinguished as the 'German Jura,' rising in the Rauhe Alp, near Ulm, to 2400 feet above the sea. The general direction of these calcareous mountains is north-eastward, but in Franconia it changes to a northward course; their boundaries are little sinuous; their breadth averages about 20 miles, and from the vicinity of Bamberg to the passage of the Rhone the length exceeds 400 miles. In a south-westward direction similar limestone rocks extend to the vicinity of Narbonne, about 140 miles farther, making the whole range of the Jura and its physically related rocks about 550 miles.

Nearly parallel to the Swiss and German Jura on the south, calcareous rocks, belonging to the same geological æra, range in front of the primary rocks of the Alps, from Chambery to Vienna, more than 500 miles; and similar ranges of the same strata occupy the right side of the Saône and the left of the Meurthe and Moselle, and connect themselves with the oolites which encircle the basin of Paris. Thus the Helvetic Jura occupies a nearly central position with respect to an immense and ramified system of elevated limestone districts, all belonging to one geological system; and hence it has become the almost universal practice of the continental geologists to designate that series of rocks by the title of the 'Jura formation,' which corresponds exactly to the 'oolitic system' of our general table. [GEOLOGY.]

The mountains of the German, Swiss, and French Jura, regarded in a general point of view, may be described as enclosing between their ranges an immense basin, which contains the greater portion of Burgundy and Lorraine, the whole of Alsace, Suabia, Franconia, and Hesse. Against this enclosed region the oolitic ranges present bold and abrupt descents, while toward the exterior the slopes are gentle. The chalk formation partially surrounds the Jura ranges on the French and German sides, but in the interior of the basin not a trace of it is to be found, and Von Buch believes that the Jura Mountains stood up amid the waters of the sea at the time of the deposition of the cretaceous system of rocks, nearly as we may suppose the coral reef of New Holland would appear if elevated by subterranean forces. (*Verhandlungen der Königl. Akademie der Wissenschaften zu Berlin*, 1838.) M. Boué had previously recognised the antiquity of the elevation of the German Jura, in discussing the characters of the Bavarian tertiary region. (*Proceedings of the Geological Society of London*, 1830.) And M. E. de Beaumont, from a general contemplation of the phenomena on the line of the Jura Mountains, adopted the conclusion that from the Cevennes through the Swiss and German Jura, perhaps even to the Erzgebirge, dislocations of considerable importance occurred, ranging north-east and south-west, after the deposition of the oolites and before the deposition of the chalk. (*Sur les Révolutions du Globe, in Annales des Sciences Naturelles*, 1827.)

Von Buch observes that the Swiss, Suabian, and Franconian divisions of the Jura Mountains have each their peculiar characters. In the Swiss Jura the strata are thrown up at high angles of elevation, and consequently form long extended ridges and chains; the Suabian region is formed of rocks which lie in regular and nearly horizontal layers, and constitute an extended and uniform plateau; in Franconia dolomite abounds, and crowns the heights with picturesque rocks, resembling the towers and pinnacles of ruined castles. The mineral composition of the Jura ranges is everywhere similar; and, when minutely analyzed, may be considered as forming a series of terms severally comparable to the larger divisions of the oolitic series of England and Normandy.

According to M. Thurman, 1832 (De la Beche's *Manual*), the central part of the Jura (at Porentruy) contains—

Fine oolites and compact limestones, equivalent to the 'Portland oolite.'

Marls and marly limestones, equivalent to 'Kimmeridge clay.'

Compact oolitic and coralline limestones, equivalent to the 'Oxford oolite,' &c.

Marly and sandy limestones, equivalent to the 'calcareous grit.'

Blue marls, limestones, ferruginous oolite, equivalent to 'Oxford clay.'

Oolitic shelly limestones, sandy limestones and marls, equivalent to the 'Cornbrash and forest marble' groups.

Fine-grained oolite, equivalent to the 'Bath great oolite.'

Marls and calcareous beds, equivalent to the 'Fullers' earth.'

Oolite, partly ferruginous, equivalent to the 'inferior oolite.'

Micaceous sandstones and marls, equivalent to the 'sand below inferior oolite.'

Lias.

This coincides very nearly with M. Thirria's notice of the series in Haute Saône.

According to M. Boué (1830), the German Jura contains the subdivisions of the oolitic series from the lias upward to the cornbrash. He thus includes in the Bath oolitic formation [Geology] the dolomitic limestones of Franconia, and the lithographic slates of Solenhofen, even more celebrated for their numerous tortoises, Pterodactyli, fishes, crustacea, ammonites, belemnites, insects, algæ, and other fossils, than the supposed equivalent beds of Stonesfield.

On these points M. Boué appears to be supported by Mr. Murchison (*Geol. Proceedings*, 1831); Von Buch regards the dolomites and lithographic slates as constituting a distinct upper band of the 'Jura formation' (corresponding to the Oxford and Portland oolites), and some of the highest layers of this group, full of Diceras and Nerinea (as in Haute Saône), have been recently followed by him over the whole northern inclination of the Suabian Jura. ('Verhandlungen der Königl. Akad. der Wissenschaften zu Berlin.')

Von Dechen's opinion on this subject appears to coincide with that of Von Buch; and the researches of Count Munster and Goldfuss on the organic remains may be quoted in confirmation of the view that the German Jura, like that of the Swiss frontier, contains the equivalents, more or less developed, of the whole English oolitic series; and we are encouraged to hope that a careful comparison of the limestone ranges which border the Alps and extend into Dalmatia will determine, more exactly than we now know, the relation which they bear to the 'Jura formation' of the rest of Europe.

The determination of the geological epoch of the elevation of the Jura ranges to constitute dry land is important, especially in reference to two phenomena which are witnessed in these mountains, viz. the ossiferous caverns of Franconia, and the dispersion of erratic blocks from the High Alps. The opinion of John Hunter (Dr. Travers's *Oration to the College of Surgeons*, 1838), that the caverns of the district of Muggendorf were filled by bears which voluntarily retired thither, has been confirmed by subsequent researches. (Buckland, *Reliquiæ Diluvianæ;* and Von Meyer, *Palæologica*.) But the geological æra of their existence is perhaps subsequent to the whole tertiary period, while Von Buch's view of the origin of the Jurassic limestones seems to imply their prominence as islands in the antient European sea before the deposition of the chalk. If this opinion be well founded, the problem of the dispersion of the erratic blocks from the High Alps, which has so long perplexed geology, is still involved in undiminished difficulty. These blocks lie in vast abundance on the south-eastern slopes of the Jura, and ascend towards their summits, even to the height of 1000 or 2000 feet above the Aar and the Lake of Geneva, which now interpose their waters between the Jura and the mountains whence the blocks were drifted.

These blocks lie in such a manner that ordinarily those which came from a particular district are distinct from the others, and seem to have been brought by a distinct channel. Blocks from the Grisons have descended the valley of the Rhine; those found on the shores of the Lake of Zürich and in the drainage of the Limmat are derived from the mountains of Glarus; while in the valley of the Aar and on the slopes of the Jura lie fragments from the Bernese Alps. They occur in greatest abundance opposite the mouths of the great valleys which descend from the High Alps; at such points they have been drifted farthest up the slopes of the Jura, in some cases even to 1200 metres (1300 yards) above the sea. They exhibit few or no marks of rolling.

To account for these facts, numerous speculations have been proposed. De Luc imagined a projectile force to have displaced the blocks when the Alps were raised; Saussure, Escher, Von Buch, De Beaumont, &c. speak of the effects of water thrown into violent agitation (as some think by the elevation of the mountains); Dolomieu attributed the inequalities of surface, which render the physical explanation of the phenomena by the ordinary agencies of nature almost desperate, to operations subsequent to the scattering of the blocks; Venturi introduced the consideration of floating ice-rafts, since become popular; while others have attempted to master the difficulty of the problem by admitting great changes of level since the blocks were moved from their native sites.

According to this view, the erratic blocks of the Jura were accumulated round the Alps by the ordinary or extraordinary action of water-currents in antient Alpine valleys, on surfaces which were at a later period lifted to their present height by subterranean movements. (Brongniart, *Tableau des Terrains.*) [Erratic Blocks.]

JURA KALK, the German equivalent of the oolitic system of England.

JURISPRUDENCE. The Latin word *prudentia* (contracted from *providentia*) came, by a natural transition, to mean *knowledge* or *understanding*. 'Habebat (says Nepos, *Life of Cimon*, c. 2) magnam prudentiam tum juris civilis tum rei militaris:' hence persons skilled in the Roman law were called *juris prudentes*, or simply *prudentes;* in the same manner that they were called *consulti*, as well as *juris consulti*. (Haubold's *Lineamenta Instit. Juris Romani*, lib. iv., cap. 5; Hugo, *Geschichte des Römischen Rechts*, p. 458, ed. xi.) A large part of the Roman law was gradually adopted by the legislature and the judices from the writings of the jurists: the emperors moreover sometimes appointed persons whose opinions (or *responsa*) the judex was bound to follow. (*Dig.*, lib. i., tit. 2., No. 2, s. 5-7, 35-47; *Inst.*, lib. i., tit. 2, s. 8.) According to the acceptation of the term *prudens* or *juris prudens* in the Roman law, *juris prudentia* is sometimes limited to the dexterity of a practical lawyer in applying rules of law to individual cases; whence the technical use of the term *jurisprudence* in the French legal language for law founded on judicial decisions, or on the writings of jurists.

By *general jurisprudence* is properly meant the science or philosophy of positive law, as distinguished from *particular jurisprudence*, or the knowledge of the law of a determinate nation. 'General jurisprudence, or the philosophy of positive law, is not concerned directly with the science of legislation: it is concerned directly with principles and distinctions which are common to various systems of particular and positive law, and which each of those various systems inevitably involves, let it be worthy of praise or blame, or let it accord or not with an assumed measure or test.

General jurisprudence is concerned with law as it necessarily is, rather than with law as it ought to be; with law as it must be, be it good or bad, rather than with law as it must be, if it be good.' (Austin's *Outline of a Course of Lectures on General Jurisprudence*, p. 3.) For example, every system of positive law must involve such notions as sovereignty, legal right, legal duty, legal sanction, civil or criminal injury, the grounds of imputation or legal guilt, and of non-imputation or legal innocence, property, possession, &c., which therefore belong to the province of general jurisprudence. [LAW; LEGISLATION.]

A systematic treatise on general jurisprudence does not fall within the scope of this Cyclopædia. A detailed, precise, and lucid description of the province of general jurisprudence will be found in Mr. Austin's work on the subject (8vo., London, 1832), and the annexed outline of a course of lectures. (*Journal of Education*, No. 8, p. 285.) Bentham's 'Traités de Législation' also contain much valuable matter relating to this subject. A list of works on general jurisprudence may be seen in Krug's 'Philosophisches Lexicon,' in the article *Rechtslehre*.

JURY (in English law) is a term of art denoting an assembly of men authorized to inquire into or to determine facts, and bound in both cases by an oath to the faithful discharge of their duty. The etymological derivation of the term is obviously from *juro*, to swear, whence we find this institution called in forensic Latin *jurata*, and the persons composing it *jurati*; in French *les jurés*, and in English *the jury*. In English law, when the object is inquiry only, the tribunal is sometimes called an inquest or inquisition, as in the instance of a grand jury or coroner's inquest; but when facts are to be determined by it for judicial purposes, it is always styled a jury. When the trial by jury is spoken of in popular language at the present day, it signifies the determination of facts in the administration of civil or criminal justice by twelve men sworn to decide facts truly according to the evidence produced before them.

Inquiry into facts on behalf of the crown by means of juries was frequent in England long before the trial by jury was commonly used in courts of justice for judicial purposes. Thus we find, immediately after the Conquest, inquisitions *ad quod damnum* (which antiently took place in all grants by the crown, though now of more limited use); inquisitions *post mortem*, which were instituted on the death of the king's tenants, to ascertain of what lands they died seised; inquisitions of lunacy (*de lunatico inquirendo*); and several other inquests, which were called inquests of office, and took place where the crown was concerned in interest: all of these inquiries were made by means of juries of the neighbourhood, who were presumed to be necessarily conversant with the facts. So in England also in the reign of John, when the lands of the Normans were seised into the hands of the king, inquisitions by jury were executed in each county to ascertain their value and incidents. (See the forms of these inquests in Hardy's *Rotuli Normanniæ*, vol. i., p. 122.)

Besides these juries of inquiry (*inquisitoria jurata*), there were accusatory juries (*jurata delatoria*), who presented offences committed within their district or hundred to the king or his commissioned justices. These inquests were immediately connected with the administration of justice, their duty being to charge offenders, who, upon such accusation, were put upon their trial before judges, and were afterwards condemned or 'delivered' by them according to the result of the trial. Though the character, incidents, and duties of these accusatory juries in early times are involved in much obscurity, there is little doubt that they formed the origin of our present grand juries.

The number of persons composing juries of inquiry and accusatory juries was arbitrary, and might consist of more or occasionally of fewer than twelve men.

The third species of jury is the institution by which disputed facts are to be decided for judicial purposes in the administration of civil or criminal justice, and which is in modern times familiar to us under the denomination of *trial by jury*. Dr. Pettingall, in a Tract published in 1769, expresses a confident opinion that juries of this description are the same functionaries as the dicastæ (δικασταὶ) of the Athenians and the judices of the Romans, and maintains that our trial by jury was derived immediately from Rome, and ultimately from Greece. No doubt the similarity of several of the incidents enumerated in this curious tract are remarkable [JUDEX, JUDICIUM]; but it seems more probable that they are rather to be ascribed to the accidental resemblance of popular institutions for the administration of justice in different countries than to identity of origin. The precise time at which this species of trial originated in England has been the subject of much animated discussion; and in particular the question whether it was known to the Anglo-Saxons, or was introduced by the Conqueror, has been warmly debated. Coke and Spelman, among earlier legal antiquaries, and, in later times, Nicholson (*Preface* to Wilkins's *Anglo-Saxon Laws*, p. 9), Blackstone (*Commentaries*, book iii., c. 22), and Turner (*History of Anglo-Saxons*, vol. iv., book xi., cap. 9), maintain with much confidence the existence of this institution before the Conquest. On the other hand, Hickes (*Dissert. Epist.*, p. 34), Reeves (*History of the English Law*, vol. i., p. 24), and several other learned writers, contend that it was introduced by the Conqueror, or at least that it was derived from the Normans, and was not of Anglo-Saxon origin. The latter opinion is adopted by Sir Francis Palgrave, in his *History of the English Commonwealth*, vol. i., p. 243.

Without entering minutely into this controversy, it may be stated that the traces of the trial by jury, in the form in which it existed for several centuries after the Conquest, are more distinctly discernible in the antient customs of Normandy than in the few and scanty fragments of Anglo-Saxon laws which have descended to our time. The trial by 12 compurgators, which was of canonical origin and was known to the Anglo-Saxons and also to many foreign nations, resembled the trial by jury only in the number of persons sworn; and no conclusion can be drawn from this circumstance, as 12 was not only the common number throughout Europe for canonical and other purgations, but was the favourite number in every branch of the polity and jurisprudence of the Gothic nations; *Purget se duodecimâ manu vel duodecim sacramentalibus* was a common phrase. (See Spelman's *Gloss.*, tit. *Jurata;* also *Edinburgh Review*, vol. xxxi. p. 115.) For this reason Mr. Hallam justly observes (*Middle Ages*, vol. ii., p. 401) that in searching for the origin of trial by jury, 'we cannot rely for a moment upon any analogy which the mere number affords.' Besides this, the trial by compurgators under the name of Wager of Law continued to be the law of England until it was abolished, in 1833, by the statute 3 and 4 Will. IV., c. 42, s. 13, and is treated by all writers and noticed in judicial records ever since the Conquest as a totally different institution from the trial by jury. The trial *per sectatores* or *per pares* in the county court, which has sometimes been confounded with the trial by jury, was in truth a totally different tribunal. The sectatores or pares were, together with the sheriff or other president, judges of the court,—as are the suitors in the county courts at the present day; and it appears to have been the common course with the Gothic nations that twelve assessors should be present with the king or judge to decide judicial controversies. (Du Cange, *Gloss.*, ad vocem *Pares.*) The *pares curiæ* resembled permanent assessors of the court, like the *scabini* mentioned in the early laws of France and Italy, much more nearly than sworn jurors indiscriminately selected, and performing a subordinate part to the judge. On the other hand, the incidents of the mode of trial prevalent in Normandy long before the Conquest correspond in a striking manner with those of our trial by jury as it existed for centuries afterwards. Thus in Normandy offenders were convicted or absolved by an inquest of good and lawful men summoned from the neighbourhood where the offence was surmised to have been committed. The law required that those were to be selected to serve on such inquest who were best informed of the truth of the matter; and friends, enemies, and near relatives of the accused were to be excluded. So also in the Norman Writ of Right, those were to be sworn as recognitors who were born and had even dwelt in the neighbourhood where the land in question lay, in order that it might be believed that they knew of the truth of the matter and would speak the truth respecting it. (*Grand Coustumier*, cap. 68, 69, 103.) These incidents, though unlike our present mode of trial (which, as will presently be shown, has entirely altered its character within the last four centuries), are nearly identical with the trial by jury as it is described first by Glanville and afterwards by Bracton, and correspond almost verbally with the form of the jury process, which has continued the same from very early times to the present day; by which the sheriff is commanded to return 'good and lawful men of the neighbourhood, by whom the truth of the matter may be better known, and who are not akin to either party, to recognize upon their oaths, &c.' On the other hand (as Madox remarks, in his *History of the Exchequer*, p. 122), 'if we compare the laws of the Anglo-Saxon kings with the forms of law process collected by Glanville, they are as different from one another as the laws of two several nations.'

Though there are some traces of the trial by jury in the four reigns which immediately succeeded the Norman Conquest, it was not till a century afterwards, in the reign of Henry II., that this institution became fully established and was reduced to a regular system. Its introduction into frequent use at this period was probably owing to the law or ordinance for the trial by assize in pleas of land or real actions, made by Henry II. This law has not come down to our times, but it is fully described by Glanville (lib. ii. cap. 7), and the greater part of the treatise of that writer is occupied by an account of the practical machinery of the trial by twelve men which he warmly eulogises and represents as having been introduced in opposition to the unsatisfactory mode of trial by battle or duel. In the reign of Henry II. it appears also that a jury was sometimes used in matters of a criminal nature—the proceeding in such cases being noticed as an inquiry *per juratam patriæ vel vicineti*, or *per juramentum legalium hominum*. Thus in the 'Constitutions of Clarendon,' enacted in 1164, it is directed that 'if no person appeared to accuse an offender before the archdeacon, the sheriff should, if requested to do so by the bishop, cause twelve lawful men of the neighbourhood or of the township to be sworn, who might declare the truth according to their conscience.' These however were probably accusatory juries, similar to our grand inquests, and not juries employed for the actual trial or 'deliverance' of criminals, which do not seem to have been commonly used until a later period.

The law of Henry II. introduced the trial by assize or jury in real actions as a mode of deciding facts which the subject might claim as a matter of right. Glanville calls it 'a certain royal benefit conferred upon the people by the clemency of the sovereign with the advice of the nobility.' Accordingly we find in the *Rotuli Curiæ Regis* in the time of Richard I. and John, many instances of trials by jury being claimed by parties, though it appears from these curious records that at this period the trial by battle was still in frequent use. In the reign of John we first begin to trace the use of juries for the trial of criminal accusations. At first it seems to have been procured by the accused as a special favour from the crown, a fine, or some gift, or consideration being paid in order to purchase the privilege of a trial by a jury. Several instances of this kind will be found collected in the Notes and Illustrations to Palgrave's *Commonwealth of England*, vol. ii., p. 186. The payment of a fine took place also not unfrequently in civil cases where any variation from the regular course was required; see *Rotuli Curiæ Regis*, vol. i., pp. 354, 375; vol. ii., pp. 72, 92, 97, 101, 114. It is quite clear, however, from Bracton and Fleta, that at the end of the thirteenth century the trial by jury in criminal cases had become usual, the form of the proceedings being given by them in detail. (See Bracton, p. 143.) Introduced originally as a matter of favour and indulgence, it gained ground with advancing civilization, gradually superseding the more antient and barbarous customs of battle, ordeal, and wager of law, until at length it became, both in civil and criminal cases, the ordinary mode of determining facts for judicial purposes.

It is right to notice the popular and remarkable error that the stipulation for the *judicium parium* in Magna Charta referred to the trial by jury. Sir Edward Coke in his commentary upon Magna Charta expressly distinguishes between the trial by peers and the trial by jury (2nd Inst. 48-9); but Blackstone says, 'The trial by jury is that trial by the peers of every Englishman, which, as the grand bulwark of his liberties, is secured to him by the Great Charter.' (*Commentaries*, vol. iv., p. 349.) This is confounding two distinct modes of trial. The *judicium parium* was the feudal mode of trial, where the *pares* or *convassalli ejusdem domini* sat as judges or assessors with the lord of the fee to decide controversies arising between individual *pares*. It was a phrase perfectly understood at the period of Magna Charta, and the mode of trial had been in use long before in France and all parts of Europe where feuds prevailed. (Du Cange, *Gloss*., ad vocem *Pares*.) It was essentially different from the trial by jury, which could never be accurately called *judicium parium*. We read frequently in the records of those times (and even in Magna Charta itself), of *juratores*, of *veredictum* or *juramentum legalium hominum*, and *jurata vicineti* or *patriæ*, all of which expressions refer to a jury; but not a single instance can be found in any charter, or in any antient treatise or judicial record, in which the jury are called *pares*, or their verdict *judicium*. (Reeves's *History of the Law*, vol. i., p. 249.) In the records of the 'Curia Regis' in the first year of John's reign, among numerous entries of *Ponit se super juratam vicineti* or *patriæ*, are also entries of *Ponit se super pares suos de eodem feodo*, plainly indicating a distinction between the two modes of trial. (*Rotuli Curiæ Regis*, vol. ii., p. 90.)

Until about the reign of Henry VI. the trial by jury was to all intents and purposes a trial by witnesses. The present form of the juror's oath is that they shall 'give a true verdict, *according to the evidence*.' At what precise time this form was introduced is uncertain; but for several centuries after the Conquest, the jurors both in civil and criminal cases were sworn merely *to speak the truth*. (Glanville, lib. ii., cap. 17; Bracton, lib. iii., cap. 22; lib. iv., p. 287, 291; Britton, p. 135.) Hence their decision was accurately termed *veredictum*, or verdict; whereas the phrase 'true verdict' in the modern oath is not only a pleonasm, but is etymologically incorrect, and misdescribes the office of a juror at the present day. Many other incidents of the trial by jury, as recorded in antient treatises, conclusively show that the jury were merely witnesses. They were brought from the neighbourhood where the disputed fact was suggested to have occurred, because, as the form of the jury process says, they were the persons 'by whom the truth of the matter might be better known;' no doubt upon the principle that *Vicini vicinorum præsumuntur scire*. Again, if the jurors returned by the sheriff in the first instance declared in open court that they knew nothing of the matter in question, others were summoned who were better acquainted with it. (Glanville, lib. ii., cap. 17.) They might be excepted against by the parties upon the same grounds as witnesses in the Court Christian. They were punished for perjury if they gave a wilful false verdict; and for *crassa ignorantia* if they declared a falsehood or hesitated about their verdict upon a matter of notoriety, which all of the country (*de patriâ*) might and ought to have known. (Bracton, p. 290.) And antient authors solemnly admonish judges to 'take good heed in inquisitions touching life and limb, that they diligently examine the jurors from what source they obtain their knowledge, lest peradventure by their negligence in this respect Barabbas should be released and Jesus be crucified.' (Bracton, lib. iii., cap. 21; Fleta, lib. i., cap. 34.) It is also remarkable, as one of the numerous circumstances which show the character of the jury in the earlier periods of the history of the institution, that though all other kinds of murder might be tried by a jury, murder by poison was excepted, 'because,' say the antient writers, 'the crime is so secret that it cannot be the subject of knowledge by the country.' (Bracton, lib. iii., cap. 18; Fleta, lib. i., cap. 31.)

The original principle and character of the trial by jury in criminal cases in Scotland appear to have been the same as in England. The following extract is taken from a curious paper delivered to the Speaker of the House of Commons, and recorded on the Journals at the date 4th June, 1607. (*Comm. Journ.*, vol. i., p. 378.) 'In Scotland criminal causes are not governed by the civil law; but *ordanes** and juries pass upon life and death, very near according to the law here (in England). Which jury being chosen out of the Four Halfs about (as the Scottish law terms it), which is to say, out of all places round about that are nearest to that part where the fact was committed, the law doth presume that the jury may the better discern the truth of the fact by their own knowledge; and therefore they are not bound to examine any witnesses, except out of their own disposition they shall please to examine them in favour of the party persuer; which is likewise very seldom or almost never used. It is of truth that the judge may either privately beforehand examine such witnesses as either the party persuer will offer unto him, or such others as in his own judgment he thinks may best inform him of the truth; and then when the jury is publicly called and admitted, he will cause these depositions to be produced and read; and likewise if the party persuer desire any witness there present to be examined, he will publicly do it in presence of the jury and both parties.' It will be observed, that the mode of commencing the introduction of evidence to juries as described in this document bears a strong resemblance to the growth of the proceeding in England.

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* This word is so printed in the Journals, but it is probably a mistake for some other word.

The earliest traces of the examination of witnesses or of evidence being laid before juries in England, which formed the commencement of a total change in their character, occur in the reign of Henry VI. The change was not effected suddenly, or by any particular act of parliament, but was introduced by slow degrees as population increased, and the habits and manners of society underwent alteration; and though distinctly discernible in the reign of Henry VI., was not completely effected before the times of Edward VI. and Mary. Fortescue, in the 26th chapter of his work 'De Laudibus Legum Angliæ,' written at the end of the reign of Henry VI., and about the year 1470, expressly mentions that witnesses were examined and sworn before the jury; but he calls the jury indiscriminately *testes* and *juratores*, and makes frequent allusions to their character as witnesses. Shortly after Fortescue's time, namely, in the year 1498, there is a reported case between the bishop of Norwich and the earl of Kent (*Year Book*, 14 Henry VII.), in which a jury had been separated by a tempest 'while the parties were showing their evidence;' and one question raised for the opinion of the court was, whether, when the jury came together again, they were competent to proceed with the case and to give a verdict. The objection pressed was that the jury had separated before the evidence was given; to which it was answered that 'the giving the evidence was wholly immaterial, and made the matter neither better nor worse; that evidence was only given in order to inform the consciences of the jury respecting the rights of the parties; but that if neither party choose to give evidence, still the jury would be bound to deliver a verdict.'

About the same period, that is, in the reign of Henry VII., it appears from records printed in Rastell's Entries that demurrers to evidence were an acknowledged form of proceeding, which shows that at that time evidence of some kind was given, and consequently that the character of the jury had been in some degree changed from that of *witnesses* to that of *judges* of facts upon testimony. The proofs mentioned in these records are called *evidentia;* and it is most probable that at first the only evidence given consisted of deeds, writings, and of depositions of absent witnesses taken before the justices of the peace or other magistrates, and that oral testimony was not common until a later period. The entire absence of all mention of evidence or witnesses, as contradistinguished from jurors, in treatises, reports, records, or statutes, previously to the sixteenth century, strongly corroborates the fact of the early character of the trial by jury. There is no trace of any rules of evidence, nor of any positive law compelling the attendance of witnesses, or punishing them for false testimony or non-attendance, nor of the existence of any process against them before the stat. 5 Eliz. c. 9 (1562). In the case of Summers v Mosely, reported in 2 Crompton and Meeson, p. 485, Mr. Baron Bayley says that he had been unable to find any precedents of the common *Subpœna ad testificandum* of an earlier date than the reign of Elizabeth, and expresses a conjecture that this process may have originated with the above-mentioned statute. The *Subpœna ad testificandum* does not appear in the registers of Writs and Process until the reign of James I. (West's *Symboleography.*) Witnesses were examined orally upon the trial of Sir Thomas More, in the reign of Henry VIII.; but the reported state trials in the reigns of Edward VI. and Mary show that the practice in that respect was then by no means settled. In the reign of Elizabeth however there is abundant proof, from Sir Thomas Smith's 'Commonwealth of England,' and other authorities, that oral testimony was used without reserve (except in state prosecutions) both in civil and criminal trials; and consequently it cannot be doubted that about the middle of the sixteenth century the trial by jury had fully assumed the character in which we are now familiar with it, namely, an institution deciding facts for judicial purposes by means of testimony or evidence produced before the jury.

This view of the original character and office of the jury seems to account for the practice of fining or otherwise punishing juries by the court when they gave an unsatisfactory verdict, a practice which was partially continued, though not without remonstrance by legal authorities, after the nature of the institution had been changed. If juries, who re merely witnesses sent for to inform the court of facts which they were presumed certainly to know, returned a wilfully false verdict, they were guilty of a contempt of justice, and might properly be punished; but when their character was changed, and their verdict depended not on their own knowledge of the facts, but upon the impressions produced on their minds by the evidence, such a course of summary punishment became intolerable injustice; and though occasionally practised in the sixteenth century, was declared to be illegal soon after the Restoration by the celebrated judgment in Bushell's case, reported in Vaughan's Reports, p. 135.

The juries now in use in England in the ordinary courts of justice are grand juries, petty or common juries, and special juries. Grand juries are exclusively incident to courts of criminal jurisdiction; their office is to examine into charges of crimes brought to them at assizes or sessions, and if satisfied that they are true, or at least that they deserve more particular examination, to return a bill of indictment against the accused, upon which he is afterwards tried by the petty jury. A grand jury must consist of 12 at the least, but in practice a greater number usually serve, and 12 must always concur in finding every indictment. No further qualification is required for grand jurors (except in the case of grand jurors at the sessions of the peace, provided for by the recent Jury Act) than that they should be freeholders, though to what amount is uncertain; or freemen, lawful liege subjects, and not aliens or outlaws. (Hawkins's *Pleas of the Crown*, chap. 25, sect. 16.)

Until the end of the thirteenth century the only qualification required for petty or common juries, for the trial of issues in criminal or civil courts, was that they should be 'free and lawful men;' *freemen*, as holding by free services or free burgesses in towns; and *lawful* men, that is, persons not outlawed, aliens, or minors, but entitled to the full privileges of the law of England. By the statute of Westminster 2, passed in the thirteenth year of Edward I. (1296), it was enacted that no man should be put on juries who had not some freehold of the value of 20*s.* a year within the county, or 40*s.* without it; and this qualification was raised to 40*s.* in counties by the stat. 21 Edward I. The object of these statutes was to protect poor persons from being oppressed and injured by being summoned on juries, and also to obviate the evil of the non-attendance of jurors, which frequently occurred from their inability to leave their agricultural or handicraft occupations. The stat. 2 Henry V. however was expressly intended to secure the intelligence and responsibility of jurors by requiring a property qualification. With this view it enacted that no person should be a juror in capital trials, nor in any real actions, or personal actions where the debt or damages declared for amounted to 40 marks, unless he had lands of the yearly value of 40*s.*; and if he had not this qualification he might be challenged by either party. This continued to be the qualification of common jurors until the passing of the late statute 6 George IV., c. 50, which repealed all former statutes upon this subject, and entirely remodelled the law respecting juries. By this statute 'every man (with certain specified exceptions) between the ages of twenty-one years and sixty years who has within the county in which he resides 10*l.* a year in freehold lands or rents, or 20*l.* a year in leaseholds for unexpired terms of at least twenty-one years, or who, being a householder, is rated to the poor-rate in Middlesex on a value of not less than of 30*l.*, and in any other county of not less than 20*l.*, or who occupies a house containing not less than fifteen windows, is qualified and liable to serve on juries in the superior courts at Westminster and the courts of the counties palatine for the trial of issues to be tried in the county where he resides, and also to serve on grand juries at the sessions of the peace, and on petty juries, for the trial of issues triable at such sessions in the county in which he resides.' The exceptions are:—peers, judges of the superior courts, clergymen, Roman Catholic priests, dissenting ministers following no secular employment but that of a schoolmaster, serjeants and barristers at law, and doctors and advocates of the civil law actually practising; attorneys, solicitors, and proctors actually practising; officers of courts actually exercising the duties of their respective offices; coroners, gaolers, and keepers of houses of correction; members and licentiates of the college of physicians actually practising; surgeons, being members of one of the royal colleges of surgeons in London, Edinburgh, or Dublin, and actually practising; apothecaries certificated by the Apothecaries' Company and actually practising; officers in her majesty's navy or army on full pay; pilots licensed by the Trinity House; masters of vessels in the buoy and light service; pilots licensed by the lord-warden of the cinque-ports, or under any act of parliament or charter; household servants of the sovereign; officers of customs and excise; sheriffs' officers, high constables, and parish clerks.

Lists of all persons qualified to be jurors are made out by the churchwardens and overseers of each parish, and fixed on the church door for the first three Sundays in September in each year; these are afterwards allowed at a petty sessions and then delivered to the high constable, who returns them to the next quarter-sessions for the county. The clerk of the peace then arranges the lists in a book, which is called the 'Jurors' Book' for the ensuing year, and afterwards delivers it to the sheriff. From this book the names of the jurors are returned in panels to the different courts.

Special juries are composed of such persons as are described in the 'Jurors' Book' as esquires, and persons of higher degree, or as bankers or merchants; and it is the duty of the sheriff to make a distinct list of such persons, which is called the 'Special Jurors' List.' When a special jury is ordered by any of the courts, which must always be the result of a special application of one of the parties, 48 names are taken by ballot from this list in the manner particularly described in the statute, which are afterwards reduced to 24 by means of each party striking out 12; and the first 12 of these 24 who answer to their names in court are the special jury for the trial of the cause.

The legitimate mode of objecting to a jury by the parties is by challenge, though in modern practice this course is seldom resorted to, having yielded to the more convenient usage of privately suggesting the objection to the officer who calls the jury in court; upon which the name objected to is passed over as a matter of course without discussion. This practice, though a far less troublesome and obnoxious mode of effecting the object of obtaining a jury indifferent between the parties than a formal challenge, is strictly speaking irregular, and being considered to take place by consent, and as a matter of favour, cannot be insisted upon as a right. Challenges are of two kinds: challenges to the *array*, and challenges to the *polls*. The challenge to the array is an objection to the whole panel or list of jurors returned for some partiality or default in the sheriff or the under-sheriff by whom it has been *arrayed*. Challenges to the polls are objections to particular jurors, either on the ground of incompetency (as if they be aliens, or of insufficient qualification within the provisions of the Jury Act, 6 Geo. IV., cap. 50), or of bias or partiality, or of infamy as having been convicted of some crime which the law deems infamous. Upon these challenges the cause of objection must in each case be expressly shown to the court; but in trials for capital offences the accused is entitled to challenge *peremptorily* (that is, without giving any reason) thirty-five jurors. The king however, as nominal prosecutor, has no right of peremptory challenge, though he is not compelled to show his cause of challenge until the panel is gone through, and unless a full jury cannot be formed without the person objected to.

The trial by jury, originally introduced into the law of France in criminal cases by the National Assembly, was retained in the French code. An account of the proceeding and of the qualifications and formation of the jury will be found in the *Code d'Instruction Criminelle*, livre ii., tit. 2, chap. iv. and v. See also *Edinburgh Review*, vol. xvii., p. 97, and the article Codes, les Cinq. It has often been remarked as a singular fact that the institution which in England has been highly prized as a security to the subject against the crown, should have been preserved in France by a despotic monarch, in the zenith of his power, and certainly not disposed to enlarge popular authority. Of late years the advantage of the trial by jury has been frequently the subject of debate among German and French jurists, and in particular the propriety of its introduction has been discussed in the various commissions issued with a view to reforming the laws of several of the German States. [Feuerbach.] The latest discussion of the latter kind related to the proposal to introduce the jury trial in the Canton de Vaud. The report of a commission issued by the state to inquire into this subject in 1836, against the jury, signed by a majority of the commissioners, and also a protest or counter-report containing the reasons of the only commissioner who dissented from the report, have been published. Upon the subsequent discussion of the proposition in the Grand Council, in December, 1836, the introduction of the trial by jury in the canton was negatived by a majority of 90 to 40 voices.

Anciently in Scotland all offences were tried by juries; at present all prosecutions of a higher nature must proceed by an assize or jury of 15 men, who determine their verdict by a majority of voices. (See Erskine's *Principles of the Law of Scotland*, book iv., tit. 4.) In the course of the improvements of the court of session projected and partly executed in the years 1808 and 1809, an attempt was made to introduce the trial by jury into civil proceedings in Scotland; but great and general opposition was made to it in that country, and the proposition was not at that time carried into effect. But in the year 1815 a statute (55 Geo. III., c. 42) was passed, though then still much opposed in Scotland, which established a jury court, not as a separate and independent tribunal, but as subsidiary to the court of session, for the trial of particular questions of fact to be remitted for trial by the judges of the court of session at their discretion. In order to meet a conscientious difficulty much insisted upon in petitions from Scotland against this measure, namely, that it would be often impossible for a jury to give a unanimous verdict unless some of the members violated their oaths, it was provided by the act that if the jury are not unanimous in 12 hours, they shall be discharged, and a new trial granted. The judges of this court, called the 'Lords Commissioners of the Jury Court in Civil Cases,' are appointed by commission, and consist of a chief judge and two other judges. The stat. 59 Geo. III., c. 35, which recites that the introduction of the trial by jury in civil cases by the former act had been found beneficial, enacts a variety of improvements in the machinery of the jury courts, and makes them a permanent part of the judicial establishment of Scotland. By the stat. 2 Geo. IV., and 1 Will. IV., c. 69, the jury court as a separate tribunal was abolished, and the trial by jury was united with the ordinary administration of justice in the court of session.

JUSSIEU, ANTOINE LAURENT DE, an eminent French botanist, was born at Lyon in 1748, and arrived in Paris in 1765 for the purpose of completing his education as a medical practitioner. He was then placed under the care of his uncle Bernard de Jussieu, at that time one of the demonstrators of botany in the Jardin du Roi, a man possessing a profound knowledge of plants, and who probably gave his nephew the first interest in that science which he subsequently illustrated with so much success. In the year 1770, his medical studies having been completed, he took the degree of doctor of medicine, on which occasion the title of his thesis was, *An œconomiam vitalem inter et vegetalem analogia*, a subject which sufficiently marks the turn his studies had already taken. In the same year he was nominated botanical demonstrator in the Jardin du Roi, as a substitute for Lemonnier, whose duties as chief physician to the king prevented his executing that office in person. Thus at the early age of twenty-two years Jussieu found himself under the necessity of undertaking the duty of teaching students the essential characters of the plants cultivated in the Paris Garden, a task for which experience in details and practical knowledge were required, rather than that general acquaintance with botany which a young man just released from his medical curriculum might be expected to possess. This obliged him to study one day the subjects to be demonstrated the next, and to occupy himself incessantly with acquiring a correct practical acquaintance with plants. At that time the collection of plants in the Jardin du Roi was arranged according to the method of Tournefort; but shortly afterwards it became necessary to rearrange it. Of this opportunity Jussieu took advantage; he drew up a memoir upon a new method of arrangement, which was read before the Academy of Sciences, and afterwards carried into effect in the Garden. The idea of this method was undoubtedly taken from a classification of the plants in the Royal Garden of Trianon, executed under the direction of his uncle; but it was different in much of the details, and was prepared without consultation with Bernard de Jussieu, who in fact was at that time old, nearly blind, ill, and incapable of taking part in any mental exertion. Previously to this, young De Jussieu had studied the natural order Ranunculaceæ with so much attention, that he had made it the subject of a communication to the Academy of Sciences, in whose Transactions it was printed. In after-years he used to say that it was the composition of this memoir which had opened his eyes to the real principles of botanical classification and made him a botanist. It is here that is found the first distinct trace of those clear ideas concerning the relative importance and subordination of characters which the author subsequently applied to the whole vegetable kingdom. In reality there is no natural order of plants altogether so well suited for this purpose as that which happened to be selected.

From this time, that is, from the year 1774 up to 1789, De Jussieu was constantly occupied in demonstrating to his class of botany, and as his new method was thus brought perpetually before him, with all its advantages and disadvantages in practice, he was able to alter and improve it yearly. The distinctions of genera, their mutual relation, the natural sequence of his orders, and in addition all that was written by other botanists during this period, became so familiar to him, that his son records his having actually commenced his great work, the 'Genera Plantarum,' in 1788, without having prepared more than the commencement of the manuscript; and he adds, that he was seldom, during the printing, above two sheets in advance of the compositors; a very remarkable circumstance, if the extreme attention to clearness and arrangement conspicuous in this work are borne in mind. It is however always to be remembered, that in those days botany was not what it now is; Jussieu enumerated only 2700 genera, while one, not of the latest general works, includes between 7000 and 8000.

This extraordinary work made its way slowly. At the time of its appearance the greater part of botanists were full of zeal and prejudice in favour of the sexual system of Linnæus; an idea prevailed that botany was merely the art of distinguishing one thing from another; and moreover the political state of Europe was most unfavourable to scientific investigations. As tranquillity was restored in France, the work of Jussieu began to be studied, and being studied it soon became the text-book of all the botanists of reputation in that country. But in the other nations of Europe it was otherwise. In England, when Dr. Robert Brown published his 'Prodromus Floræ Novæ Hollandiæ,' in 1810, upon the system of Jussieu, there probably were not more than two other botanists in this country who could understand or make use of it; and it was not till after the year 1820 that it became much known among us.

In his 'Genera Plantarum,' Jussieu divided the vegetable kingdom into classes, subclasses, orders, and genera, not according to certain arbitrary distinctions, but by taking into consideration all the circumstances which he was acquainted with in their manner of growth and degree of development. Those which he regarded as the least perfectly organized species he stationed at the one end of his system, and, proceeding upon the principle of continually grouping together those plants which resemble each other more than they resemble anything else, he gradually arrived at the highest forms of vegetable life through a long series of intermediate gradations. In determining the relative dignity of his orders, he assumed that those species are least perfectly organized which have no cotyledon or rudimentary leaf in their embryo; that next in degree, but higher than these, are such as have one cotyledon; and that highest of all are those whose seeds have two cotyledons: hence his classes *Acotyledons*, *Monocotyledons*, and *Dicotyledons*. In arriving at this conclusion he was justified by the fact that to the highest class belong the lofty trees of the forest, with all their intricate apparatus of trunks, and arms, and branches; to the middle the simple-stemmed palms, lilies, and grasses; and to the lowest such forms of vegetation as fungi, lichens, and sea-weeds.

In determining the subordination of the genera assembled under each of these classes Jussieu was influenced by other considerations. He regarded those dicotyledonous genera which have no corolla as lower than such as possess that organ, and among those which have it the adhesion of the parts of the corolla into a tube was looked upon as an indication of a structure inferior to the total separation of the petals: this gave him for his great dicotyledonous class the subclasses *Apetalæ*, *Monopetalæ*, and *Polypetalæ*. In addition to which he formed another subclass, called *Diclines irregulares*, out of such dicotyledonous plants as have the sexes separated, which he considered an irregularity of organization. As a last method of division Jussieu applied to Monocotyledons and all the subclasses of Dicotyledons a principle of analysis dependent upon the situation of the stamens, calling them *hypogynous* if the stamens originate clear of both calyx and ovary; *perigynous* if they grow from the calyx or corolla; and *epigynous* if their apparent origin is in the apex of the ovary. There seems to have been no other reason for this than that such a 'triplex staminis situs' was found to exist. The result of all these distinctions was the following scheme, under which were arranged all the natural orders known to the author:—

'Index Methodi
Ordines Naturales complectentis.

Acotyledones				Class 1
Monocotyledones	Stamina hypogyna			„ 2
	„ perigyna			„ 3
	„ epigyna			„ 4
Dicotyledones.	Apetalæ	Stamina epigyna		„ 5
		„ perigyna		„ 6
		„ hypogyna		„ 7
	Monopetalæ	Corolla hypogyna		„ 8
		„ perigyna		„ 9
		„ epigyna	Antheris connatis	„ 10
			Antheris distinctis	„ 11
	Polypetalæ	Stamina epigyna		„ 12
		„ hypogyna		„ 13
		„ perigyna		„ 14
	Diclines irregulares			„ 15

In the state of science when this system was promulgated its excellence was most remarkable, nor is it certain even now in what way it can be best improved. Its faults are the artificial nature of all the divisions except those which are primary, the difficulty in many cases of determining to which of them a given plant belongs, and the numerous exceptions to which they are all subject, which may be owing to their being mere structural and not physiological distinctions. They have accordingly been much criticised, especially of late years, and every original writer attempts to improve them, with various success. But to use the words of his son, to whose sentiments it is impossible for any botanist to refuse his assent, 'What is it that is most admired in this work? not so much the systematical key, which has been so often attacked and abandoned by modern writers, as the admirable sagacity which regulated all the details. It is the neatness of the characters, the happy employment of such as had been previously neglected, and the correct estimate of their value, the prodigality with which notes full of deep knowledge and fruitful in new ideas are dispersed throughout the work, the endless questions and doubts, which show how much the author had meditated upon his subject, and that he was among the first to regret the sacrifices he was compelled to make to the necessity of a systematical arrangement; and finally, that instinct, so true to natural affinities, which so often made him suspect the truth when he could not establish it.'

No doubt Jussieu was largely indebted to our countryman Ray, whose name however does not appear among his introductory remarks; no doubt he was also assisted most essentially by Tournefort, Linnæus, and other systematical writers; but we are not on that account to withhold from him one particle of that merit which his countrymen eagerly claim for him. Ray could not apply his own principles; Tournefort and Linnæus were mere system-makers, who did not understand the principles of philosophical classification; but Jussieu had the philosophy of the one, the systematical abilities of the others, and the peculiar skill of combining them into a consistent whole. His 'Genera Plantarum' is now obsolete, but the recent publication of a new edition of his beautiful 'Introductio in Historiam Plantarum,' with which the work was prefaced, shows that to the last day of his existence Jussieu preserved that brilliant combination of sound philosophical principles with a profound knowledge of facts which has placed him so far above all his countrymen as a botanist.

In 1779, when the 'Genera Plantarum' was published, the political state of France, which put an end to peaceful occupations and turned the public from all thoughts of botany, disturbed the tranquil tenor of the course of Jussieu, and compelled him to mingle in the busy scenes of public life. In 1790 he was named member of the municipality of Paris, and in this character was charged with the direction of the hospitals and charities of that city, which he continued to exercise till 1792. In 1793 the Jardin du Roi was re-organized under the new name of Jardin des Plantes; all the persons charged with the duty of public instruction were elevated to the rank of professors, and De Jussieu, who had been previously botanical demonstrator, became professor of rural botany. He afterwards became director and treasurer of the Museum of Natural History, and recommenced, in 1802, his botanical writings, chiefly in the form of memoirs upon his own natural orders of plants. These, amounting in number to fifteen, were continued in the 'Annales du Museum' till 1820, after which time De Jussieu became dead to science. He was then seventy-two, with a sight so feeble that it might almost have been called blindness; and he was no longer able to do more than profit by the observations of others. Nevertheless he employed himself between his eighty-third and eighty-eighth year in dictating a new edition of his 'Introductio in Historiam Plantarum.' This work has been published since his death; it is written in elegant Latin, and is a remarkable proof of the vigour of his intellect even at this advanced age. He appears to have been much loved by his family and greatly respected by his friends. His amenity of character was such that he was never in any one of his writings betrayed into a single word of harshness towards his contemporaries. He died, after a short illness, on the 15th of September, 1836, and left behind him a son, Adrien, his successor in his chair of botany, and the inheritor of the virtue and talents of his father.

JUSTICE CLERK OF SCOTLAND. This name properly designated the clerk of court of the chief justice, or lord justiciar, of Scotland; and originally there were as many justice clerks as there were justiciars, that is to say, one for Galloway, one for Lothian, or the territory of the Scots king south of the Forth, and one for Scotland then strictly so called, or the territory north of the Forth.

The same circumstances also which reduced the number of justiciars to one justice-general for the whole realm, reduced likewise the number of justice clerks. The calamitous affair of Flodden however, to which we especially refer, had a further effect on the latter; for by the fall of Lawson and Henryson on that fatal field, the offices of both king's advocate and justice clerk became vacant at one time, and this at a period when perhaps few remained capable of either. Wishart of Pittarrow was appointed to both places, and in his time a deputy was first constituted, to act as clerk to the justice court. This was the first step in the singular rise of the justice clerk from the table to the bench of the Court of Justiciary.

At the institution of the Court of Session in 1532, the justice clerk was made one of the judges. This will not surprise us when we consider the constitution of that court. It was essentially an ecclesiastical tribunal, and, agreeably to the practice of such, deliberated in secret with shut doors. It was necessary therefore for the security of the crown that some of the crown officers should be continually present. The justice clerk was one of these: he was public prosecutor on behalf of the crown. The king's treasurer was another; and accordingly both these were lords of session. For the same reason the king's advocate was made a lord of session; and when, from there being no vacancy, or otherwise, such appointment did not or could not take place, these officers had special writs from the crown authorising them to remain in court during its deliberations.

A further rise of official dignity took place: for it having become usual to appoint certain lords of session as assessors or assistant judges to the lord justice-general, the justice clerk began in the early part of the seventeenth century to be appointed to that duty; and about the middle of the same century he had acquired the style of 'lord justice clerk.' In ten years afterwards the privy council met and passed an act, declaring the justice clerk a constituent part of the justice court; and in the act of parliament 1672, c. 16, he was made the president of the Court of Justiciary, to preside in absence of the justice-general. His rise in the Court of Session followed; for in 1766, when Miller, afterwards Sir Thomas Miller of Glenlee, took his seat on the bench, it was, by desire of the court, on the right of the lord president; to which latter office he himself afterwards rose, being the first justice clerk so promoted. And in 1811, when the Court of Session was, by 48 Geo. III., c. 151, divided into two chambers, the lord justice clerk was made *ex officio* president of the second division, where the individual then appointed still remains. His salary is 2000*l.*, besides an equal sum as a lord of session. In the end of the fourteenth century it was 10*l.* Scots, or 16*s.* 8*d.* sterling.

With respect to the *justice clerk depute*, that officer was long so termed; but at length, when the justice clerk acquired the style of lord, and was declared a constituent part of the Court of Justiciary, his *depute* came to be termed 'the principal clerk of justiciary,' and this becoming a sinecure, he got himself a 'depute' about the middle of last century, and the second depute about thirty years ago an 'assistant;' all of whom continue to this day, and are in the gift of the lord justice clerk. It is not a little remarkable, that on both occasions when these changes took place, there took place also not a diminution, as we might expect, but a duplication of the salary; that of the first depute being raised in 1764 from 100*l.* to 200*l.*, and that of the second depute, in 1795, from 80*l.* to 150*l.* The present principal clerk of justiciary, so called, is the justice clerk's son; and his substitute, or the second depute clerk, is the justice clerk's Court of Session clerk.

Besides these there are three other justice clerk deputes, and his appointees. They are commonly called the 'circuit clerks,' being his deputies to the three circuits of the Court of Justiciary. They had their origin in the act 1587, c. 82, which directed such circuits to be made, in place of the former practice of the justiciar passing through the realm from shire to shire successively.

JUSTICES OF THE PEACE are persons appointed to keep the peace within certain prescribed limits, with authority to act judicially in criminal causes, and in some of a civil nature arising within those limits, and also to do certain other things in which they act not judicially but ministerially, *i.e.* as servants of the crown performing official acts in respect of which they are entrusted with no judicial discretion. The authority of justices of the peace is derived from the king's prerogative of making courts for the administration of the law, or created by different statutes; their duties are expressed in the royal commission appointing them to the office, or are prescribed by those statutes.

Before the reign of Edward III. there were in every county conservators of the peace, whose duty it was to afford protection against illegal force and violence. These conservators were chosen by the freeholders assembled in the county court under the king's writ.

The lord chancellor, the judges of the king's bench, and every sheriff and coroner, were conservators, and are now justices, of the peace, by virtue of their office; and some lands are holden under the service annexed to the tenure of such lands of being conservators of the peace, or of providing fit persons to perform the duties of that office. High and petty constables are also by virtue of their offices conservators of the peace. The authority of conservators of the peace at the common law was the same as that now exercised by constables within their respective townships; and their duty consisted in acting themselves, and commanding the assistance of others, in arresting and quieting those who in their presence and within the limits of their jurisdiction went about to break the peace.

The following account is generally given of the origin of the present justices of the peace. Upon the compulsory resignation of Edward II., Edward III., or rather his mother Isabella, in his name, sent writs to the different sheriffs, stating that his accession had taken place with his father's assent, and commanding that the peace should be kept on pain of disinheritance and loss of life and limb. Within a few weeks from this time it was ordained, by 1 Edward III. c. 16, that for the better keeping and maintaining of the peace in every county good and lawful men who were not maintainers of barretry (malveiz barrets) should be assigned to keep the peace. The mode in which these new keepers of the peace were to be assigned was construed to be by the king's commission; and this ordinance had the double effect of transferring the appointment from the people to the crown, and of laying a foundation for the gradual accession of those powers which are now exercised by justices of the peace.

By 12 Richard II., c. 10, the wages of justices of the peace are fixed at four shillings per day of sessions, and two shillings for their clerks, payable out of the fines and amerciaments at such sessions; but these wages, like those of members of parliament, have long ceased to be received.

Justices of the peace are appointed either by act of parliament, by royal charter (in the case of justices in boroughs not within the Municipal Corporation Act the charter usually appointing certain municipal officers to be justices, and prescribing the manner in which vacancies in the offices are to be filled up), or by a commission from the crown under the statute of 1 Edward III. The form of the commission of the peace has from time to time been altered, and the authority of the justices enlarged. As now framed it consists of two distinct parts, and contains two separate assignments or grants of authority. Of these the former gives to any one or more justices not only all the power relating to the maintenance of the peace which was possessed by the conservators at common law, but also all the additional authority mentioned in the statutes. The latter assignment defines the power of justices when the whole body, or such of them as choose to attend, act together in general sessions. [SESSIONS.]

The former part of the commission is as follows:—'Victoria, &c., to AB, CD, EF, &c., greeting: Know ye that We have assigned you jointly and severally, and every one of you, Our justices to keep Our peace in Our county of Z, and to keep and cause to be kept all ordinances and statutes for the good of the peace and for the preservation of the same, and for the quiet rule and government of Our people made, in all and singular their articles in Our said county, as well within liberties as without, according to the force, form, and effect of the same, and to chastise and punish all persons that offend against the form of those ordinances or statutes, or any one of them, in the aforesaid county, as it ought to be done according to the form of those ordinances and statutes; and to cause to come before you or any of you all those who to any one or more of Our people, concerning their bodies or firing their houses, have used threats, to find sufficient security for the peace or their good behaviour towards Us and Our people, and if they shall refuse to find such security, then them in Our prisons, until they shall find such security, to cause to be safely kept.'

By 5 Geo. II., c. 18, no attorney, solicitor, or proctor shall be a justice of the peace for any county whilst he continues in practice. By 18 Geo. II., c. 20, no person shall be capable of acting as a justice of the peace for any county, riding, or division, within England or Wales, who shall not have, in law or equity, to and for his own use and benefit, in possession a freehold, copyhold, or customary estate for life, or for some greater estate, or an estate for some long term of years determinable upon life or lives, or for a certain term originally created for twenty-one years or more, in lands, tenements, or hereditaments in England or Wales, of the clear yearly value of 100*l.* over and above all incumbrances affecting, and all rents and charges payable out of or in respect of the same, or who shall not be seised of or entitled to, in law or equity, to and for his own use and benefit, the immediate reversion or remainder of and in lands, tenements, and hereditaments, leased for one, two, or three lives, or for any term of years determinable on lives upon reserved rents, and which are of the yearly value of 300*l.*, and who shall not have taken and subscribed an oath stating the nature of the qualifying estate. The third section of this statute imposes a penalty of 100*l.* upon those who act without having taken and subscribed the oath, and for acting without being qualified. The statute however excepts from these provisions certain official persons, &c. A justice of the peace cannot legally act after he has ceased to be qualified; but it is not necessary that he should continue to retain the same qualification, nor will the absence of a qualification render his acts absolutely void·

Justices appointed by act of parliament or by the king's charter are not removable except for misconduct, but the authority of a justice appointed by the king's commission may be determined at the pleasure of the crown, either directly by writ under the great seal, or impliedly, by making out a new commission, from which his name is omitted. But until notice of the revocation of the authority, or publication of a new commission, the acts of the ex-justice are valid in law, and the warrant of a justice remains in force until it be executed, although he die before its execution. The commission is also determined by the death of the king by whom it was issued; but now, by 6 Anne, c. 7, s. 8, all offices, civil and military, are to continue for six months after the demise of the crown, unless sooner determined.

The 9 Geo. IV., c. 17, repeals the statutes which imposed the taking the sacrament of the Lord's Supper as a qualification for office, and requires the following declaration:—'I, AB, do solemnly and sincerely, in the presence of God, profess, testify, and declare, on the true faith of a Christian, that I will never exercise any power, authority, or influence which I may possess by virtue of the office of justice of the peace, to injure or weaken the Protestant church as it is by law established in England, or to disturb the said church, or the bishops and clergy of the said church, in the possession of any rights or privileges to which such church or the said bishops or clergy are or may be entitled.' The omission to subscribe this declaration does not subject a person acting as a justice of the peace to any penalty; the statute (s. 5) merely renders the appointment void; and whilst the justice continues in the exercise of his office his acts are not either void or voidable so as to affect the rights of those who are not privy to such omission.

Justices of the peace, when they are out of the county, &c. for which they are appointed, have no coercive power; but examinations, recognizances, and informations voluntarily taken before them in any place are good. But by 28 Geo. III., c. 49, justices who act for two or more adjoining counties may act in one of those counties for another of them, and those who act for a county at large may act for such county within any city, town, &c., being a county of itself, and situated within, surrounded by, or adjoining to any such county at large; and by 1 and 2 Geo. IV., c. 63, a similar power is given to county justices to act within any city, town, &c., having exclusive jurisdiction, though not a county of itself.

Justices of the peace have in general no authority over matters arising out of the district for which they are appointed, but they may secure the persons of those who are charged before them with felony or breach of the peace; and by the Municipal Corporation Act, s. 111, in every borough to which the king does not grant a separate court of quarter-sessions the justices of the county within which such borough is situated are to exercise in it the same jurisdiction as in any other part of the county.

By 24 Geo. III., c. 55, if any person against whom a warrant is issued escape, go into, reside, or be in any other county, &c., out of the jurisdiction of the justice granting the warrant, any justice of the county, &c., where such person escapes, &c., upon proof on oath of the handwriting of the justice granting the warrant, is to indorse his name thereon, which will be a sufficient authority to execute the warrant in such other jurisdiction, and carry the offender before the justice who indorsed the warrant, or some other justice of the county, &c., where it was indorsed. Summonses and warrants issued by borough justices, appointed under the provisions of the Municipal Corporation Act, in a matter within their jurisdiction, may be executed at any place within the county in which the borough is situated, or at any place within seven miles of such borough, without being backed.

The judicial authority of a justice out of sessions is both civil and criminal—civil, where he is authorized by statute to adjudicate between master and servant, or to enforce the payment of rates, tithes, &c., or the observance of the regulations of friendly societies [FRIENDLY SOCIETIES], &c.; criminal, where he requires surety of the peace or a recognizance for the peace or for good behaviour, or where he acts in the suppression of riots, or where he acts with summary power to decide upon the guilt or innocence of the party accused, according to the view which he may take of the evidence, and to punish the offender. But all proceedings before justices, whether civil or criminal, if removed into the King's Bench, are there treated as belonging to the crown side of the court.

Where a statute empowers justices to hear and determine an offence in a summary way, it is necessarily implied that the party be first cited to appear, so that he may have an opportunity of being heard, and of answering for himself; and to proceed against an offender without causing him to be summoned is a misdemeanour. A statute authorizing justices to require any person to take the oath of allegiance, or to do some other specific act, impliedly gives them power to issue their precept requiring the attendance of the party.

Upon the hearing of informations and in other preliminary proceedings before justices out of sessions neither the prisoner on the one hand, nor the prosecutor on the other, can claim as of right, and against the will of the justices, to have a legal adviser present, except, it would seem, in cases in which the deposition may by some statutory provisions be made evidence against the accused upon his trial for the offence in the event of the death of the witness. In practice however both counsel and attorneys are frequently admitted as a matter of courtesy to advise and protect the interest of prisoners. Every person has a right to be present before a justice, acting in his judicial capacity. But although in such a case counsel or attorneys, or any third persons, are at liberty to attend, they cannot insist upon being heard on behalf of their respective clients; the justices may refuse to hear them, or to allow them to interfere with the proceedings. But now, by 6 and 7 Will. IV., c. 114, in all cases of summary conviction, persons accused are to be admitted to make their full answer and defence, and to have all witnesses examined and cross-examined by counsel or attorney. In all cases where justices are directed to take examinations or evidence, it will be implied that the examination or evidence is to be taken under the sanction of an oath or solemn affirmation.

Statutes frequently empower justices to award damages to an injured party, as in cases of assault [ASSAULT], or malicious injuries to property. [MALICIOUS INJURIES.]

Where a complaint is made before a justice, and a summons or warrant issues, the justice upon hearing and determining the matter may award costs to either party, and enforce the payment of such costs.

Justices ought not to exercise their functions in cases in which they are themselves the persons injured. They should cause the offenders to be taken before other justices, or, if present, should desire their aid. In all cases which a justice may hear and determine out of sessions upon his own view, or upon the confession of the party, or upon oath of witnesses, he ought to make a record on parchment under his hand of all the proceedings and proofs, which record should in the case of summary convictions be returned to the next sessions and there filed.

By 27 Geo. II., c. 20, in all cases where a justice is required to issue a warrant for the levying of any penalty inflicted, or any sum of money directed to be paid, by any statute, the justice granting the warrant is empowered therein to order and direct the goods distrained to be sold within a certain time, to be limited in such case (so as such time be not less than four days, or more than eight days), unless such penalty, or sum of money, with reasonable charges of taking, keeping, and selling the distress, be sooner paid.

When justices refuse to hear a complaint over which they have jurisdiction, or to perform any other duty which the law imposes on them, the party aggrieved by such refusal may apply to the court of king's bench for a writ of mandamus, a process by which the king requires the party to whom it is addressed to do the thing required or to show cause why it is not done. If no sufficient excuse be returned, a peremptory mandamus issues, by which the party is commanded absolutely to do the thing required. [MANDAMUS.] But as justices have no indemnity in respect of their acts because done in obedience to a mandamus, this process is not granted where there is anything like a reasonable doubt of the justice's authority to do the required act.

Justices of the peace are strongly protected by the law in the execution of their office. Opprobrious words which would not subject the speaker to any proceeding, civil or criminal, if uttered under other circumstances, yet if spoken of a justice whilst actually engaged in his official duties may be made the subject of an action or of an indictment, or if spoken in the presence of the justice may be punished by commitment to prison as for a contempt of court; this commitment however must be by a written warrant.

Where a justice of the peace acting in or out of sessions acts judicially in a matter over which he has jurisdiction, and does not exceed his jurisdiction, he is not liable to an action however erroneous his decision may be; nor will even express malice or corruption entitle a party aggrieved by such decision to any remedy by action: the delinquent magistrate is answerable only to the crown as for an offence committed against the public. Where the justice has no jurisdiction or exceeds his jurisdiction, or having jurisdiction deviates from the prescribed legal form to an extent which renders the proceedings void, or where a conviction under which the justice has granted a warrant is set aside by a superior court, an action will lie against the justice to recover damages in respect of any distress, imprisonment, or other injury which may have resulted from his acts, though done without malice or other improper motive. But even in these cases, if the justice has acted *bonâ fide* in his magisterial capacity, if he has intended to act within his jurisdiction, though by mistake he may have exceeded it and not acted within the strict line of his duty, and also in cases where a justice has acted or intended to act in the execution of his ministerial duties, he is entitled to the protection of several important statutory regulations; though where there is no colour whatever for a belief or supposition on the part of the justice that he is acting within his jurisdiction, where the act is wholly alien to the magisterial functions and done *diverso intuitu*, these regulations do not apply.

Thus, no action can be brought against a justice of the peace for anything done by him in the execution of his office without one calendar month's previous notice in writing, specifying the cause of the intended action, within which period of one month the justice may tender amends to the party complaining, which will be a bar to the action, if refused, and found to be sufficient by the jury. Nor can any such action be maintained unless it be commenced within six calendar months after the committing of the act complained of; nor unless it be brought or laid in the county in which the act was committed. The defendant in such action may under the general issue, *i.e.* a plea simply denying the alleged trespass, &c., give in evidence any matter of justification or excuse without being bound, as other defendants are, to select one particular line of defence, and set that defence with precision upon the record in the shape of a special plea. When the plaintiff in such action obtains a verdict and the judge certifies that the injury for which the action is brought was wilful and malicious, the plaintiff will be entitled to double costs of suit.

Where the action is brought on account of any conviction which may have been quashed, and cannot therefore be produced as a justification of the consequent distress or imprisonment, the plantiff is disabled, by 43 Geo. III., c. 141, from recovering more than 2*d.* damages, or any costs of suit unless it be expressly alleged in the declaration that the acts complained of were done maliciously and without any reasonable or probable cause.

When a justice acts with partial, corrupt, or malicious motives he is guilty of a misdemeanor, for which he may be indicted, and in a clear case of misconduct the court of King's Bench, which exercises a general superintendence over the conduct of those to whom the administration of the criminal law of the country is entrusted, will, if the application be made without delay, give leave to file a criminal information. But the court will consider, not whether the act complained of be strictly right or not, but whether it proceeded from unjust, oppressive, or corrupt motives, among which motives fear and favour are both included. If the affidavits filed in support of the application disclose nothing which may not be attributable to mere error or mistake, the court will not even call upon the justice to show cause why a criminal information should not be filed. The court will not entertain a motion for a criminal information against a justice of the peace, unless notice of the intended application have been given in sufficient time to enable him, if he thinks proper, to meet the charge in the first instance by opposing the granting of the rule to show cause.

The proceedings after an information has been filed or an indictment found against justices of the peace for criminal misconduct are the same as in other cases of misdemeanor. If the defendant suffer judgment by default, or is found guilty by the verdict of a jury, the punishment is by fine or imprisonment or both; after which an application may be made to the lord chancellor to exclude him from the commission; and when affidavits are filed in the King's Bench impeaching the conduct of justices of the peace, such affidavits are frequently directed by the court to be laid before the chancellor, to enable him to judge whether such persons ought to remain in the commission.

The institution of justices of the peace has been adopted in most of the British colonies, and has with some modifications been retained in the United States of America.

JUSTI'CIA, a genus of Acanthaceous Exogens, whose numerous species inhabit all the tropical parts of the world, preferring however damp woods to dry and open plains. It is especially in the forests of Brazil and India that they occur. Many of them are never woody, some are bushes or small trees, and a small number are valued by gardeners as objects of ornament. As limited by Linnæus, the genus comprehended a very discordant collection of species; modern writers have accordingly broken it up into many new genera. As now limited, Justicia itself scarcely contains a plant of any importance.

As among the species now removed from Justicia to other genera there are some which are useful as medicinal agents, especially in India, it may be as well to mention them here, instead of referring to genera which are not yet generally known. Thus Justicia Adhatoda, celebrated in Sanscrit works by various names, as Vidiumatri, Vasika, &c., has been called *Adhatoda Vasika*, and is chiefly esteemed as a demulcent in coughs. *J. Nasuta* is now *Rhinacanthus communis*, and is much employed in Indian medicine, especially for the cure of ringworm and other cutaneous affections, mixed, according to Dr. Roxburgh, with lime-juice and pepper. It is also one of their remedies for snake-bites, but is no doubt inefficacious for such purpose. *Andrographis* (formerly *Justicia*) *paniculata* is the best known and probably the most valuable of all, as one of its names, *Muha tita*, implies *chief*, or *king of bitters*; it is also very commonly called *kalup-nath*, and well known to Europeans in the peninsula of India by the name of *Creyat*, or *Kreat*, and has been prescribed with benefit as a bitter in this country. It forms one of the ingredients of the *Drogue amère*, which is well known in India, and at one time obtained considerable repute as a cure for cholera; but it can be useful only as a stimulant and tonic.

JUSTICIAR OF SCOTLAND. The earliest individual in this high office which extant records name seems to be Geoffrey de Maleville of Maleville in the county of Edinburgh, *temp.* K. Malc. IV.

The term 'Scotland' was then less extensive in its application than at present: it designated, properly speaking, not the whole territory of the realm, but that part only which lay north of the Forth, or *Scots sea*, as it was called; and accordingly, contemporary with Maleville there was another justiciar, David Olifard, justiciar of Lothian, that is to say, the territory south of the Forth, excepting the district of Galloway, which had long its own peculiar laws and customs. About the middle of the thirteenth century however Galloway too had its justiciar, so at this time there were *three* justiciars in the realm of Scotland—a justiciar of Galloway, a justiciar of Lothian, and a justiciar of Scotland strictly so called. They were all probably of co-ordinate authority: each, next to the sovereign, supreme in his district; but the district of the last was the most extensive, and, containing within it the metropolis of the kingdom, it was also no doubt the most important and the most coveted. The justiciars of Scotland were accordingly the most conspicuous men of the time:—the Comyns, earls of Buchan; the MacDuffs, earls of Fife; Melville; and Sir Alan Durward. This last had an eye to the crown itself; for having married the illegitimate daughter of King Alexander II., he gained over the chancellor to move in council her legitimation, and that, on failure of issue of the king's body, she and her heirs might inherit her father's throne. But the king conceived so great a displeasure at this, that he immediately turned the chancellor out of office, and soon afterwards the justiciar also. The proud Durward removed to England, joined King Henry III. in France, and served in his army, till in a few years he was, by the influence of the English king, restored to his office of justiciar, whence he was displaced only by the more powerful Comyn. The incident in Durward's life to which we have just alluded was not singular: the justiciar was *caput legis et militiæ*, at the head both of the law and also of the military force of the kingdom, and repeated instances occur in early times of their military prowess as well as judicial firmness.

The death of King Alexander III. left the crown open to a competition which allowed Edward I. of England to invade the kingdom. In 1292 the English Court of King's Bench sat for some time in Roxburgh; and in 1296 Sir William Ormesby, a justice of the Common Pleas and justice in eyre in England was constituted, by Edward, lord justiciar of Scotland. This appointment was of short duration; but in 1305 Edward, having again put down the Scots, distributed the kingdom into four districts, and constituted for each district two justices (an Englishman and a Scotchman), in the nature of the English justices of assize—with a view to put the whole island under one and the same judicial system. Edward's early death however rendered the scheme abortive; and Galloway had soon its own laws, and Lothian and Scotland their justiciars as before, with this difference, that the metropolis of the kingdom was now shifting southwards to Edinburgh, and the term Scotland, in its strict acceptation, had given place to the appellation 'north of the Forth.' Sir Hugh de Eglinton, justiciar of Lothian in the middle of the fourteenth century, and distinguished for his poetical genius, was now therefore 'Hugh of the Awl Ryal,' or of the royal palace; and towards the end of the next century Andrew lord Gray was advanced from the situation of justiciar north of Forth to that of justiciar south of Forth. He continued in this place with approbation for eleven years, and died but a few months before the calamitous affair of Flodden.

On this event, which happened in the beginning of the sixteenth century, the office of lord justiciar, or, as he was now styled, justice-general (in contradistinction to the special justiciars, now frequently appointed as well for particular trials as for particular places and districts), came into the noble family of Argyle, where it was hereditary for a century, and comprehended at once the entire kingdom. The High Court of Justiciary then also began to be settled at Edinburgh, and the regular series of its records, or books of adjournal, to commence. It was at this time also that the Court of Session was erected by ecclesiastical influence. Various attempts had been made by the clergy in former reigns to establish such a court. In 1425 the first 'Court of the Session' was instituted under the influence of Wardlaw, bishop of St. Andrew's and founder of the university there; but immediately on his death, which happened soon after, it drooped and expired. In 1458 Bishop Shoreswood, the king's secretary, tried to revive it; and about thirty years after, Elphinstone, bishop of Aberdeen, did so likewise. In 1494 however the latter founded, or rather re-founded, the university of Aberdeen, and had interest enough to get an act passed in parliament to enforce in all the courts of the kingdom the study and practice of the Roman laws; and in 1503 the 'Court of Daily Council' was established. This court had a more extensive jurisdiction than the former: it was universal, being instituted to decide all manner of summonses in civil matters, complaints, and causes daily as they happened to occur; and it was calculated to be permanent. But the present was not an opportunity to be lost; and accordingly, in the minority of King James V. and while the nation was weakened and distracted by the loss at Flodden, the Court of Session was established under the lord chancellor, and with a majority of ecclesiastics both on its bench and at its bar. The consequence was, that from that day forward the Court of Justiciary declined; its civil jurisdiction ceased, being engrossed by the Court of Session; and the latter became in its place the supreme court of the kingdom. The Reformation effected a change in the composition of the Court of Session, but not much in its position or powers; and in 1672 an act was passed in parliament constituting a certain number of the judges, or lords of session, judges of justiciary under the justice-general and justice-clerk, who was now made vice-president of the Court of Justiciary.

Nothing else of consequence touching the constitution of the court occurred till lately, when, by 1 Will. IV., c. 69, sec. 18, the office of lord-justice-general, which had become in a manner a perfect sinecure, was appointed to devolve on and remain with the office of lord-president of the Court of Session, who should perform the duties thereof as presiding judge in the Court of Justiciary. The effect of which enactment is to place the lord-justice-general again at the head of the administration of the law; and thus, by a singular revolution, restore him, after the elapse of 300 years, to his former situation of lord-chief-justice of Scotland.

JUSTICIARY, CHIEF, of England (*Capitalis Justitiarius Angliæ*). None either of the English lawyers or legal antiquaries who have handled this subject appear to have given at all a satisfactory explanation of it. As the following passage in the 'Pictorial History of England' affords the best explanation of the difficulty that we have met with, we consider it but fair to give it as it stands in that work. It will be observed that in order to comprehend the functions of the chief justiciary it is necessary first to understand those of 'The *Grand Seneschall*, or *Dapifer* —*Senescallus*, or *Dapifer** *Angliæ*: in modern phraseology, the lord high steward—*comes palatii*, *major domus regiæ*, or *maire du palais*. The word *seneschalch*, about the etymology of which opinions vary somewhat, meant originally a sort of steward in the household of the Frank kings. After their conquest of Gaul, it came to signify a high political dignity. Dapifer, as shown in the note below, means the same thing, being the Latin synonyme for it. This officer was the highest in the state after the king, executing all the chief offices of the kingdom as the king's representative. He was not only at the head of the king's palace, but of all the departments of the state, civil and military, chief administrator of justice, and leader of the armies in war. This is proved not only to have been the case in France, by Ducange and other high authorities, as well as by the public records of that kingdom,[*] but to have been so also in England, by a document published by Madox himself, from the black and red books of the Exchequer—to wit, the celebrated *Dialogus de Scaccario*, written in the time of Henry II.;[†] and likewise by certain MSS. preserved in Sir Robert Cotton's collection in the British Museum, particularly an old MS. entitled " Quis sit Seneschallus Angliæ, et quid ejus officium."[‡] Consequently, Madox is wrong when he says (" Hist. Excheq.," p. 28) that in the reign of William I., William Fitz-Osbern was the king's constable, *because* he is called *magister militum*. Whereas in the very same passage (of " Ordericus Vitalis") he is called *Normanniæ Dapifer*, in virtue of which office he would be *magister militum*. It was not till afterwards that the constable became magister militum, being originally an officer subordinate to the dapifer.' (*Pictorial History of England*, vol. i. p. 567.)

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* 'That these terms are synonymous, is shown by Ducange, Spelman, &c. Dapifer seems to have been introduced when a Latin word came to be wanted for seneschall, and was adopted for want of a better, there being no Latin term exactly corresponding. Dapifer has been ignorantly translated "sewer" by Dugdale and others; whereas sewer, so far from meaning seneschall, means only *ecuyer tranchant*, an officer a great many degrees below the seneschall. See Ducange, *ad voc. Dapifer, Senescallus*; Spelman, *ad voc. Dapifer, Capitalis Justitiarius, Senescallus*; and Dugdale's 'Baronage.'

By the nature of the feudal system everything had a tendency to be given in fief. 'Among other things, the office of seneschal was given in fief too, and became hereditary among the Franks, Normans, and, at the conquest of England, among the Anglo-Normans. In France, under the Merovingian dynasty, the office was in the family of Charles Martel, from whom sprung the Carlovingian dynasty; afterwards the Plantagenet counts of Anjou were hereditary seneschals of France; and in England this high office was granted by William the Conqueror to the Grantmesnils, and thence came by marriage to the earls of Leicester. After the attainder of the family of Montfort, earls of Leicester, the office was given to Edmund, the second son of King Henry III., and it then remained in the royal family till its abolition—Thomas Plantagenet, second son of King Henry IV., being the last permanent high steward,[§] the office being conferred afterwards only *pro unicâ vice*.

'In France, when the office became hereditary in the counts of Anjou, it soon became necessary, for various reasons, to have another seneschal, or dapifer, besides the hereditary one; and this officer, whether he be considered as the representative or deputy of the hereditary seneschal, still took precedence, as appears from the charters of the French kings, of all the other great officers of state. In England also something of the same kind took place, but with this difference—that the various functions of the original grand seneschal, or *senescallus Angliæ*, were divided into two parts, and committed to two distinct officers as his representatives; the judicial functions being committed to an officer styled the High, or rather Chief Justiciary; the administrative and those relating to the affairs of the king's palace or household, to an officer styled, *not* the Senescallus *Angliæ*, but the Senescallus, or Dapifer *Regis*.[‖] This explanation will be found to completely remove the confusion that has so long prevailed among the English historians, antiquaries, and lawyers on this subject. Our view of the subject, if it needed it, would be corroborated by the high privileges of the officer created in later times, to preside in the House of Lords at state trials, which officer, be it observed, is not " high justiciary," but " lord high steward," that is " *Senescallus Angliæ*." This explanation also removes the difficulty of accounting for the extraordinary powers of the lord high steward's court, which some English lawyers have attempted to get over, by saying that the lord high steward succeeded to some of the powers of the high justiciary, whereas he merely exercises powers which he had delegated to the high justiciary.'[*]—(*Ibid.*)

The chief justiciary was usually, even in those times, when, from the circumstance of the king and the great officers of his household acting as judges, we may conclude that a special education was not considered absolutely necessary to fit a man for the judicial office, a person who had given particular attention to the study of jurisprudence. As the representative of the judicial portion of the grand seneschal's power, his authority extended over every court in the kingdom. For as to what Blackstone says[†] of the court of the marshalsea, *i.e.* the court of the lord steward of the king's household, having never been subject to the jurisdiction of the chief justiciary and no writ of error lying from it to the king's bench, it merely amounts to this, that the court of the lord steward was in fact originally the court of the lord high steward, and in that court either of his representatives, the chief justiciary or the lord steward, might preside.

The chief justiciary not only presided in the king's court and in the exchequer, but he was originally (or rather when the lord high steward fell into abeyance, partly from dread of his power and partly from the impossibility of securing an hereditary succession of the qualities necessary to fulfil his great and numerous duties), by virtue of his office, regent of the kingdom during the king's absence; and at those times writs ran in his name, and were tested by him.[‡] And in this light the chief justiciary is regarded as having been the greatest subject in England. One of the most distinguished men who held this high office was Ranulph de Glanville, who is usually regarded as the author of the *Tractatus de Legibus et Consuetudinibus Angliæ*, the oldest book extant on English law.[§]

The last who held the office and bore the title of *Capitalis Justitiarius Angliæ* was Philip Basset: and the first who held the office of *Capitalis Justitiarius ad placita coram Rege tenenda*, *i.e.* chief justice of the king's bench, was Robert de Bruis, appointed in the fifty-second year of Henry III.[‖] Sir Edward Coke was fond of indulging his vanity by bestowing the same title, 'Chief *Justice* of England,' upon himself and on the Grand Justiciary, the mighty *Capitalis Justitiarius Angliæ;* which was noticed by Lord Chancellor Ellesmere in his address to Sir Henry Montague, Coke's successor, upon his being sworn in chief justice, in these words:—'instead of containing himself within the words of the writ to be the chief justice, as the king called him, " ad placita coram nobis tenenda." '

JUSTIFICATION is used in theology to signify the acceptance of a sinner by God, and is frequently employed by the sacred writers as equivalent to the forgiveness of sin. Thus, St. Paul says, 'Be it known unto you therefore, men and brethren, that through this man is preached unto you the forgiveness of sins, and by him all that believe are justified from all things from which ye could not be justified by the law of Moses.' (*Acts*, xiii. 38, 39.) The Protestants and Roman Catholics differ respecting the signification that should be attached to the word justification. The former maintain that the Hebrew word הִצְדִּיק, and the Greek words *δικαιοῦν* and *δικαίωσις*, are almost invariably employed in the Bible in a judicial sense; that is, to declare a person righteous notwithstanding the sins he has committed, and to deliver him from the punishment which his sins had deserved. The latter interpret the words in a physical sense; and maintain that to be justified is not to be reckoned righteous by God, but actually to be made righteous by the infusion of a sanctifying principle. The Protestants, on the contrary, believe, that though sanctification is a consequence of justification, yet it is a distinct and separate operation.

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[*] 'Ducange, Gloss., ad voc. Dapifer et Senescallus. See also the " Grand Coustumier de Normandie," c. x. " Solebat autem antiquitus quidam justiciarius predictis *superior* per Normaniam discurrere qui seneschallus principis vocabatur."—Conf. " La Coutume Reformée de Normandie commentée par Basnage." t. i., p. 2, col. 2 (Senéschal). See also the charters of the various Frank kings, in the witnessing of which the name of the seneschal or dapifer (sometimes the one word is used, sometimes the other) always stands before those of all the other great officers. It is right to add, that in the English charters, the name of the dapifer, or seneschal, does not *invariably* stand so high as in the French.'

[†] 'Madox, " Hist. Exchequer" (edition 1711). See also " Co. Litt.," fol. 61 a, for some account of the judicial part of the office of seneschal, or steward, and some attempt at the etymology of the word, not much more successful than attempts of that kind usually are.'

[‡] 'Cotton MSS. Vespasian, b. vii., fol. 99, b. It will also be found in Harl. MSS. 805, fol. 48, transcribed in a modern hand by D'Ewes, who supposed it to be of the age of Edward II. See also Cotton MSS., Titus C. *passim*, at the beginning of which volume there is a well-written tract, which contains the most satisfactory account we have met with of the subject. There is also a tract entitled " Summus Angliæ Seneschallus," in Somers's Tracts, vol. viii. All these agree in one thing, viz—the vastness and paramount nature of the authority *originally* wielded by the high steward, though none of them explain the anomaly of the co-existence of such an officer as the high justiciary. This we hope we shall now be enabled to do.'

[§] 'For a list of high stewards see Harl. MSS 2194.'

[‖] 'Among many other proofs of this, see Madox's "Form. Anglic.," cclxxxix.'

[*] 'See a Disquisition on the Office of Lord High Steward, by Mr. Amos, in Phillips's " State Trials," Appendix, vol. ii. Mr. Amos falls into the usual error of supposing that the judicial authority of the lord high steward grew out of that which appertained to the chief justiciar at the period when the latter office was abolished.'

[†] III Com. 76.

[‡] Madox's 'Hist. of the Exchequer,' p 14.

[§] Madox, p. 35; Beames's 'Glanville'

[‖] Dugd. 'Orig.,' 38.

The reason or cause of our justification is generally divided by theologians into the originating, the meritorious, and the instrumental cause, or the *causa efficiens*, the *causa meritoria*, and the *causa apprehendens*.

1. The *Originating cause* is the love of God towards his fallen creatures (*Rom.* iii. 24; *Eph.* ii. 8). 2. The *Meritorious cause* is, according to the 11th article of the Church of England, and the opinion of most Protestants, 'the merit of our Lord and Saviour Jesus Christ, and not our own works or deservings' (*Rom.* iii. 24; v. 18; *Eph.* i. 7; *Col.* i. 14); but the Roman Catholic church maintains that good works, penances, and the intercession of saints also contribute to our justification. 3. The *Instrumental cause* is faith in the vicarious sacrifice of Christ; since the merit of Christ's sacrifice does not produce our pardon, unless we believe in its efficacy.

The consequences of justification are said to be: 1. peace with God (*Rom.* v. 1); 2. tranquillity of conscience; 3. adoption of the persons justified into the family of God (*Rom.* viii. 14-17); 4. spiritual joy, arising from the belief of our being adopted by God (*Rom.* xiv. 17); 5. the hope of eternal life.

JUSTINIAN'S LEGISLATION. Justinian, soon after ascending the throne, gave orders (Feb. A.D. 528) to a commission consisting of Joannes and nine other persons, among whom were Tribonian or Tribunian, and Theophilus, to make a general compilation of the best and most useful laws, or 'constitutions,' which had been promulgated by the emperors his predecessors, beginning from Hadrian's perpetual edict down to his own time. [CONSTITUTIONS, ROMAN.] Partial compilations had been made in the time of Constantine by private individuals, Gregory and Hermogenes, of which only fragments remain, and a more complete one was effected under Theodosius II. [THEODOSIAN CODE.] All these were now merged in the new code of Justinian. A remarkable difference of style and manner is observable between the older constitutions issued before Constantine and those promulgated afterwards. The former being issued at Rome and framed upon the decisions, or 'responsa,' of learned jurists, are clear, sententious, and elegant; the latter, which were promulgated chiefly at Constantinople in the decay of the Roman language, are verbose and rhetorical. Joannes and his nine associates completed their task in fourteen months, and the new code, having received the imperial sanction, was published in April, A.D. 529. A few years after, Justinian, by the advice of Tribonian, ordered a revision of his code to be made by Tribonian and four others. These commissioners suppressed several laws, as either useless or inconsistent with present usage, and added many constitutions which the emperor had been promulgating in the mean time, as well as fifty decisions on intricate points of jurisprudence. The code thus revised was published in December of the year 534, under the title of 'Codex Justinianeus repetitæ prælectionis,' and thenceforth had the force of law.

The Code is divided into twelve books; every book is subdivided into titles, and each title into laws. Book i. treats of the Catholic faith, defines its creed agreeably to the first four general councils, forbidding public disputations on dogmas; it then treats of the rights, privileges, and discipline of bishops and other ecclesiastical persons; next of heretics, Samaritans, Jews, apostates, &c., against whom it contains several penal enactments; after which the book proceeds to speak of the laws, and their different kinds, and lastly of the magistrates. Book ii. treats of the forms to be observed in commencing a suit; then of restitution, compromises, sureties, and lastly of the oath of calumny.* Book iii. treats of judicia and judices, and judicial proceedings generally; of holidays, of the various jurisdictions, of illegal (inofficiosa) testaments and donations, of dowries and inheritances, of the Lex Aquilia, of mixed actions, of actions for crimes committed by slaves, of gaming, of burying-places and funeral expenses. Book iv. begins with the explanation of personal actions which are founded on loan and other causes; of obligations and actions, with their effect in relation to heirs and other persons bound by them; of testimony and written evidence; of things borrowed for use; of contract by pledge, and the personal action thereon; of compensation, interest, deposit, mandate, partnership, buying and selling, permutation, hiring, and emphyteutic contracts. Book v. treats of betrothment, gifts in contemplation of marriage, of marriages, women's portions, and the action that lies for the recovery of the dowry, of gifts between husband and wife, of estates given in dowry, of alimony, of concubines, natural children, and the process of legitimation. It next treats of tutorships (tutela), of the administration by tutors, and of the alienation of minors' estates. Book vi. treats of slaves, and freedmen, and the rights of their patrons; then it explains at large the Prætorian possession called 'Bonorum possessio:' after which it expounds the whole matter of testaments, as institutions and substitutions of heirs, preteritions and disinheritings, refusals of inheritance, the opening of wills, codicils, legacies, and fiduciary bequests, and lastly succession to the property of intestates. Book vii. treats of manumissions; afterwards of matters relating to prescription, of judgments (sententiæ) and appeals, of the cession of estate or goods, of the seizure of goods, of the privileges of the exchequer, those of dowries, and the revocation of alienations made to defraud creditors. Book viii. begins with interdicts: it then treats of pledges and pawns, of stipulations, novations, delegations, &c. It treats next of the paternal power, of the emancipation of children, and their ingratitude; it then explains what is meant by custom, or unwritten law; it next speaks of gifts (donationes mortis causâ, &c.) and their various kinds; and lastly, of taking away the penalty of celibacy. Book ix. treats of crimes, criminal judgments and punishments. Book x. treats of the rights and prerogative of the exchequer, of vacant goods, of treasurers, taxes levied upon the people, and tolls; of the decuriones and their office, of the freedom of citizens, of domicilia, of public offices and exemption from them, and of the various kinds of public offices and functions appertaining to them. Book xi. treats of the rights common to the city of Rome and municipal towns, the right of having corporate bodies and communities, and the right of having public registers. Book xii. continues the same subject, explaining the right of cities as to having offices civil and military, and also as to having functionaries for the execution of judgments and the orders of magistrates.

The learned Gothofredus, in his Prolegomena attached to his edition of the Theodosian code, observes that Tribonian and his associates have been guilty of several faults in the compilation of the Code; that the order observed in the succession of the titles is confused, that some of the laws have been mutilated and have been rendered obscure, that sometimes a law has been divided into two, and at other times two have been reduced to one; that laws have been attributed to emperors who were not the authors of them, or had given quite contrary decisions; all which would be still more injurious to the study of the Roman law, if we had not the Theodosian code, which is of great use towards rightly understanding many laws in the code of Justinian.

In the year following the publication of the first edition of his Code, Justinian undertook a much greater and more important work; to extract the spirit of jurisprudence from the decisions and conjectures, the questions and disputations, of the Roman civilians. In the course of centuries, under the republic and the empire, many thousand volumes had accumulated, filled with the learned lucubrations of the jurisconsults, but which no fortune could purchase, and no capacity could digest. The jurisconsults ever since the time of Augustus had been divided into opposite schools, and thus conflicting opinions were often produced, which only served to puzzle those who had to decide what was law. To put order into this chaos, was the object of Justinian. In December, 530, he commissioned seventeen lawyers, with Tribonian at their head, with full authority to exercise their discretion as to the works of their predecessors, by making a choice of those whom they considered as the best authorities. They chose about forty out of Tribonian's library, most of them jurisconsults who had lived during that period of the empire which has been sometimes called the age of the Antonines, from Hadrian to the death of Alexander Severus. From the works of these writers, said to have amounted to two thousand treatises, the commission appointed by Justinian was to extract and compress all that was suited to form a methodical, complete, and never failing book of reference for the student of law and the magistrate. Justinian gave Tribonian and his associates ten years' time to perform their task; but they completed it in three years. The work was styled 'Digesta,' and also 'Pandectæ' ('embracing all'), and was published in December, 533. It was declared by the emperor that it should have the force of law all over the empire, and should supersede all the text books of the old jurists, which in future were to be of no authority.

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* Many of the terms here used are terms of Roman law, and as such do not admit of translation by equivalent English terms.

The following is a list of the Roman jurists from whose works the 'Pandect' or 'Digest' was composed, with their several epochs, so far as they can be ascertained, and the relative proportions which they have contributed to the 'Pandect.' Where (*a*) is added, the contribution is less than 1. The sum total of all the figures denotes the whole amount, of which the several figures opposite each jurist's name denote the proportion which his part bears to the whole. In addition to the extracts contained in the 'Pandect' from each author, many of them are very often merely cited.

Aburnus (Valens).	
Ælius (Gallus, Marcianus).	
Æmilius (Macer, Papinianus).	
Africanus, lived in Hadrian's time and was a disciple of Salvius Julianus	24
Alfenus, a native of Cremona, and a pupil of Servius Sulpicius, who died B.C. 43.	9
Anthianus, time unknown	(*a*)
Anthus (Anthianus).	
Antistius (Labeo).	
Aquila, supposed by some to have lived under Sept. Severus	(*a*)
Arcadius, under Constantine the Great . .	2½
Arrius (Menander).	
Aurelius (Arcadius).	
Cæcilius (Africanus).	
Caius (Gaius).	
Callistratus, under Caracalla . . .	17½
Celsus, lived under Trajan and Hadrian .	23
Ceridius (Scævola).	
Charisius (Arcadius)	
Claudius (Hermogenianus, Saturninus, Tryphoninus).	
Clemens (Terentius).	
Domitius (Ulpianus).	
Florens (Tertullianus).	
Florentinus, time uncertain, supposed to have lived under Alex. Severus	4
Furius (Anthianus).	
Gaius, lived under Antoninus and Aurelius .	72
Gallus, Aquilius, a friend of Cicero, with whom he was prætor, B.C. 66	(*a*)
Herennius (Modestinus).	
Hermogenianus, under Constantine . . .	9½
Javolenus, lived under Trajan	23½
Julianus, lived under Hadrian, was a pupil of Javolenus, and author of the perpetual edict .	90
Julius (Aquila, Paulus).	
Junius (Marcianus).	
Justus (Papirius).	
Juventius (Celsus).	
Labeo, lived under Augustus, was the head of the school called Proculeians from his disciple Proculus	12
Licinius (Rufinus).	
Lucius (Mæcianus, Papinianus).	
Macer, under Alexander Severus, . . .	10
Mæcianus, lived under Antoninus Pius . .	8
Marcellus, under Antoninus and Aurelius .	32½
Marcianus, probably under Caracalla . .	38
Marcus (Labeo).	
Massurius (Sabinus).	
Mauricianus, lived under Antoninus . .	1½
Maximus, time unknown	(*a*)
Menander, under Severus and Caracalla .	3
Modestinus, flourished under Alex. Severus and the Maximini	41½
Mucius, Quintus, son of P. Mucius Scævola, consul in the year 659 of Rome, or B.C. 95 . . .	1
Neratius, lived under Trajan	10
Papinianus, under Sept. Severus, whose friend he was; was put to death by Caracalla . . .	104
Papirius, under Marcus Aurelius . . .	2½
Paternus (Tarruntenus).	
Paulus, flourished under Alexander Severus .	297
Pomponius, lived under Antoninus Pius; another Pomponius is said to have lived under Alex. Severus	80
Priscus (Javolenus, Neratius).	
Proculus, lived under Nero and Vespasian .	6
Publius (Alfenus, Anthianus, Juventius).	
Quintus (Mucius, Tertullianus, Venuleius).	
Rufinus, about the time of Alex. Severus .	1½
Rutilius (Maximus).	
Sabinus, Massurius, flourished under Tiberius, was the head of the Sabinian school . .	1½
Salvius (Julianus).	
Saturninus, supposed by some to be the same as Venuleius	1
Saturninus Quintus (Venuleius).	
Scævola, Cervidius, under Antoninus and Aurelius	78½
Scævola, Mucius (Mucius).	
Sempronius (Proculus).	
Septimius (Tertullianus).	
Sextus (Pomponius).	
Tarruntenus, under Marcus and Commodus .	(*a*)
Terentius, lived under Hadrian and Antoninus	3½
Tertullianus, time uncertain, by some supposed to be the same as the father of the church . .	1½
Titus (Gaius).	
Tryphoninus, under Severus and Caracalla .	22
Valens, lived under Hadrian and Antoninus Pius	3
Varus (Alfenus).	
Venuleius, under Antoninus and Aurelius .	10
Ulpianus, flourished under Alex. Severus, whose counsellor he was	610
Ulpius (Marcellus).	
Volusius (Mæcianus).	

If the whole 'Digest' is divided into three equal parts, the contributions of Ulpian are somewhat more than one-third.

The 'Digesta' is divided into 50 books, each book being also divided into titles, and subdivided into sections. The following are some of the principal heads. Book i. lays down the general principles and the different kinds of law; it then establishes the division of persons and of things; then speaks of senators, and of magistrates and their delegates and assessors: ii. treats of the jurisdiction of magistrates; of the manner of bringing actions, of compromises after an action is commenced: iii. explains what kind of persons are allowed to sue in law, and it defines who are styled infamous, and as such not permitted to sue; it then treats of advocates, proctors, syndics, and other counsellors: iv. treats of restitution, compromises, and arbitrations, after which it speaks of innkeepers and others in whose custody we leave anything: v. treats of trials; and complaints against inofficious (inofficiosa) testaments: vi. treats of real actions and their various kinds to recover one's property: vii. treats of personal services (servitutes, as usus fructus): viii. speaks of real services both in town and country: ix. treats of personal actions which are in imitation of real actions, as actions for a fault or crime committed by a slave, the action of the lex Aquilia, and the action against those who throw any thing into the highway by which any one is wounded or injured: x. treats of mixed actions, the action of partition of an inheritance, &c: xi. speaks of interrogatories, and of such matters as are to be heard before the same judge (judex). It also treats of run-away slaves, of dice-playing, bribery, corruption, and false reports; and lastly, of burials and funeral expenses: xii. explains the action for a loan, condictions, &c. · xiii. continues the subject of the preceding, and treats of the action of pawning: xiv. and xv. treat of actions arising from contracts made by other persons and yet binding upon us; of the Senatus Consultum Macedonianum; and of the peculium: xvi. treats of the Senatus Consultum Velleianum, and of compensation, and the action of deposits: xvii. treats of the mandate, and of partnership (societas): xviii. explains the meaning and forms of the contract of sale, the annulling of this kind of contract; and treats of gain or loss upon the thing sold: xix. treats of bargains, of actions of hiring, of the action called æstimatoria, of permutation, of the action called præscriptis verbis, &c.: xx. treats of pledges and hypothecæ, of the preference of creditors, of the distraction or sale of things engaged or pawned: xxi. contains an explanation of the Ædile's edict concerning the sale of slaves and beasts, and also treats of evictions, warranties, &c.: xxii. treats of interest (usuræ), fruits, accessions to things, and of proofs and presumptions, and of ignorance of law and fact: xxiii. is upon betrothment (sponsalia), marriage, dowry, and agreements upon this subject, and lands given in dowry: xxiv. treats of gifts between husband and wife, divorces, and recovery of the marriage portion: xxv.

treats of expenses laid out upon the dowry, of actions for the recovery of things carried away by the wife or other person against whom there is no action for theft, of the obligation to acknowledge children and provide for them, on the Rescript De Inspiciendo Ventre, and lastly of concubines: xxvi. and xxvii. treat of tutorship and curatorship, and the actions resulting from them: xxxviii. treats of testaments, of the institution and disinheriting of children, of the institution of an heir, of substitutions, &c.: xxix. treats of military testaments, of the opening of wills, and of codicils: xxx., xxxi., xxxii. treat of legacies and fiduciary bequests in general: xxxiii. and xxxiv. treat of particular legacies, of the ademption of legacies, and of the Regula Catoniana: xxxv. treats of legacies on condition, and of the Lex Falcidia: xxxvi. treats of the Senatus Consultum Trebellianum, and of fiduciary bequests, of the time when they become due, of the security to be given by the heir, &c.: xxxvii. treats of universal succession by bonorum possessio: xxxviii. treats of the services due by freedmen to their patrons, of the succession of freedmen, of the succession of intestates appointed by the prætor, of heredes Sui and Legitimi, and of the Senatus Consultum Tertullianum and Orphitianum: xxxix. explains the means which the law or the prætor provides for preventing any one from receiving damage where a personal, real, or mixed action will not lie, after which it ends with the explanation of donations generally, and of such as are made in contemplation or view of death (mortis causâ): xl. relates to manumission or freeing of slaves: xli. treats of the various ways by which the property of things is acquired, and of the acquisition and loss of possession, and lastly of lawful causes which authorize possession and lead to usucaption: xlii. treats of definitive and interlocutory sentences, of confessions in judgment, of the cession of goods, of the causes of seizure and their effects, of the privileges of creditors; of curators appointed for the administration of goods, and of the revocation of acts done to defraud creditors: xliii. treats of injunctions (interdicta) and possessory actions: xliv. speaks of pleas (exceptiones) and defences, and of obligations and actions: xlv. of stipulations, &c.: xlvi. of sureties, novations, delegations, payments, discharges, prætorian stipulations, &c.: xlvii. treats of private offences: xlviii. treats of public offences; then follow accusations, inscriptions, prisons; and lastly it treats of torture, punishments, confiscation, relegation, deportation, and of the bodies of malefactors executed: xlix. treats of appeals; and then gives an account of the rights of the exchequer, and of matters relating to captives, military discipline, soldiers and veterans: l. treats of the rights of cities and citizens, of decuriones and their children, of public offices, of immunities, of deputies and ambassadors; of the administration of things belonging to cities, of public works, fairs, &c.; of taxes laid upon the provinces, and lastly it concludes with the interpretation and signification of legal terms, and with the rules of law.

Of the merits and imperfections of the 'Digest,' Cujas, Hotomannus, Heineccius, Gravina, Schulting, Bynkershoek, and many others have amply spoken. With all its faults it is a noble work, and much superior to the Code in its style, matter, and arrangement; it has, in great measure, embodied the wisdom of the most learned men of the best age of the Empire, men who grounded their opinions on the principles of reason and equity, and who for the most part were personally unconcerned and disinterested in the subjects on which they gave their responsa. Tribonian and his colleagues are charged with making many interpolations, with altering many passages in the writings of their predecessors, substituting their own opinions, and passing them off to the world under the name of the antient jurists. Justinian himself acknowledged that he was obliged to accommodate the old jurisprudence to the altered state of the times, and to 'make the laws his own.' Another charge, which is however unsupported by evidence or probability, is, that Justinian and his civilians purposely destroyed the old text books that had served them for the compilation of the 'Pandects.' Long however before Justinian's time, the works of the antient jurists were partly lost, and the vicissitudes of the ages that followed may easily have obliterated the rest. While the Digest was being compiled, Justinian commissioned Tribonian and two other civilians, Theophilus and Dorotheus, to make an abridgment of the first principles of the law, for the use of young students who should wish to apply themselves to that science. This new work, being completed, was published under the name of 'Institutiones,' about one month before the appearance of the Digest. The Institutions were mainly based on an older work of the same description and title. [Gaius.] They are arranged in four books, subdivided into titles. As the law has three objects, persons, things, and actions, the first book treats of persons or status; the second and third, and first five titles of the fourth, treat of things; and the remaining titles of the fourth book treat of actions. [Roman Law.]

Besides these three compilations, the Code, the Institutes, and the Digest, Justinian, after the publication of the second edition of his Code, continued to issue new laws or constitutions chiefly in Greek upon particular occasions, which were collected and published together after his death under the name of Νεαραὶ Διατάξεις, or Novæ or Constitutiones Novellæ, or Authenticæ. The Novellæ are divided into nine Collationes and 168 Constitutiones, or, as they are now often called, novels. The Novellæ, together with thirteen Edicts of Justinian, make up the fourth part of his legislation. There are four Latin translations of the Novellæ, two of which were made soon after Justinian's death; the third is by Haloander, printed at Nürnberg in 1531; and the fourth was printed at Basel by Hervagius in 1561. This first translation is that which is printed in the editions of the Corpus Juris opposite to the Greek text, and is very valuable, notwithstanding it has been stigmatized by some with the name 'barbarous:' it is sometimes called Authentica Interpretatio or Vulgata. The version of Haloander is also printed in some editions of the Corpus Juris. The Novellæ made many changes in the law as established by Justinian's prior compilations, and are an evidence that the emperor was seized with a passion for legislating; a circumstance which enables us to form a more correct judgment of his real merits, and lowers his character as a philosophic jurist.

A few words on Tribonianus, who was so mainly instrumental in the compilation of Justinian, may not be misplaced here. He was a native of Pamphylia, and his father was from Macedonia. His learning was most extensive: he wrote upon a great variety of subjects, was well versed both in Latin and Greek literature, and had deeply studied the Roman civilians, of which he had a valuable collection in his library. He practised first at the bar of the prætorian prefects at Constantinople, became afterwards quæstor, master of the imperial household, and consul, and possessed for above twenty years the favour and confidence of Justinian. His manners are said to have been remarkably mild and conciliating; he was a courtier, and fond of money, but in other respects he appears to have been calumniated by his enemies. He was a superior man, and most valuable to Justinian. His death took place A.D. 545. (Ludewig, *Vita Justiniani Magni atque Theodoræ, nec non Triboniani*, Halle, 1731; Zimmern, *Geschichte des Römischen Privatrechts bis Justinian*, Heidelberg, 1826; Hugo, *Lehrbuch der Geschichte des Römischen Rechts*, Berlin, 1832; *History of the Roman or Civil Law*, by Ferriere, translated by J. Beaver, London, 1724; Hommelii, *Palingenesia*; Brinkmannus, *Institutiones Juris Romani*, Schleswig, 1822; *System des Pandekten-Rechts*, by Thibaut, 7th ed., Jena, 1828; *Das Corpus Juris in's Deutsche übersetzt von einem vereine Rechtsgelehrter und'herausgegeben von* Otto, Schilling und Sintenis, Leipzig, 1831; *Les Cinquante Livres du Digeste, &c., Traduits en Français par feu* M. Henri Hulot, Paris, 1805; *Pandectes de Justinien mises dans un nouvel ordre, &c., par R. J. Pothier, traduites par Bréard Neuville, révues et corrigées par* M. Moreau de Montalin, Avocat, Paris, 1810; Pothier's edition of the *Digest*, reprinted at Paris in 5 vols. 4to., 1818—20, is a useful edition; there is a very cheap edition of the *Corpus Juris* recently published in Germany, by Beck, 3 vols. small fol., Leipzig, 1829; the editions of the Corpus Juris and of the Institutes are very numerous.) [Corpus Juris; Gaius.]

JUSTINIA'NUS, FLA'VIUS, born near Sardica in Mœsia, A.D. 482 or 483, of obscure parents, was nephew by his mother's side to Justinus, afterwards emperor. The elevation of his uncle to the imperial throne, A.D. 518, decided the fortune of Justinian, who, having been educated at Constantinople, had given proofs of considerable capacity and application. Justinus was ignorant and old, and the advice and exertions of his nephew were of great service to him during the nine years of his reign. He adopted Justinian as his colleague, and lastly, a few months before his death, feeling that his end was approaching, he crowned him in presence of the patriarch and senators, and made over the imperial authority to him, in April, 527. Justinian was then in his forty-fifth year, and he reigned above thirty-eight years, till November, 565, when he died. His long reign forms a remarkable epoch in the history of the world. Although himself unwarlike, yet by means of his able generals Belisarius and Narses he completely defeated the Vandals and the Goths, and re-united Italy and Africa to the empire. Justinian was the last emperor of Constantinople who, by his dominion over the whole of Italy, re-united in some measure the two principal portions of the antient empire of the Cæsars. On the side of the East the arms of Justinian repelled the inroads of Khosroes, and conquered Colchis; and the Negus or king of Abyssinia entered into an alliance with him. On the Danubian frontier the Gepidæ, Longobards, Bulgarians, and other hordes were either kept in check or repulsed. [BELISARIUS.] The wars of Justinian's reign are related by Procopius and Agathias.

Justinian must be viewed also as an administrator and legislator of his vast empire. In the first capacity he did some good and much harm. He was both profuse and penurious; personally inclined to justice, he often overlooked, through weakness, the injustice of subalterns; he established monopolies of certain branches of industry and commerce, and increased the taxes. But he introduced the rearing of silkworms into Europe, and the numerous edifices he raised, the towns he repaired or fortified, attest his love for the arts, and his anxiety for the security and welfare of his dominions. Procopius, 'De Ædificiis Domini Justiniani,' gives a notice of the towns, temples (St. Sophia among the rest), convents, bridges, roads, walls, and fortifications constructed or repaired under his reign. The same Procopius however wrote a secret history ('Anecdota') of the court and reign of Justinian and his wife Theodora, both of whom he paints in the darkest colours. Theodora indeed was an unprincipled woman, with some abilities, who exercised, till her death in 548, a great influence over the mind of Justinian, and many acts of oppression and cruelty were committed by her order. But yet the 'Anecdota' of Procopius cannot be implicitly trusted, as many of his charges are evidently misrepresentations or malignant exaggerations. Justinian was easy of access, patient of hearing, courteous and affable in discourse, and perfect master of his temper. In the conspiracies against his authority and person he often showed both justice and clemency. He excelled in the private virtues of chastity and temperance; his meals were short and frugal: on solemn fasts he contented himself with water and vegetables, and he frequently passed two days and as many nights without tasting any food. He allowed himself little time for sleep, and was always up before the morning light. His restless application to business and to study, as well as the extent of his learning, have been attested even by his enemies ('Anecdota,' c. 8, 13). He was or professed to be a poet and philosopher, a lawyer and theologian, a musician and architect; but the brightest ornament of his reign is the compilation of Roman law [JUSTINIAN'S LEGISLATION] which has immortalized his name. Unfortunately his love of theological controversy led him to interfere with the consciences of his subjects, and his penal enactments against Jews and heretics display a spirit of mischievous intolerance which has ever since afforded a dangerous authority for religious persecution.

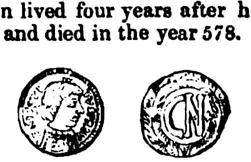
Justinian died at eighty-three years of age, on the 14th November, 565, leaving no children, and was succeeded by his nephew Justinus II. (Ludewig, *Vita Justiniani Magni*; Gibbon, ch. xl.-xliv.)

Coin of Justinian.
British Museum. Actual Size.

JUSTINIANUS II., son of Constantine III., a lineal descendant of the Emperor Heraclius, succeeded his father on the throne of Constantinople, A.D. 685. His reign, which lasted ten years, was marked chiefly by wars with the Saracens, and by the exactions and oppressions of his ministers. At last his general Leontius drove him from the throne, had his nose cut off, and banished him to the Crimea, A.D. 695. Leontius however was soon after deposed himself and banished by Tiberius Apsimerus, who reigned for seven years. Meantime Justinian had escaped from the Crimea, and married the daughter of the Kakan, or king of the Gazari, a tribe of Turks; and he afterwards, with the assistance of the Bulgarians, entered Constantinople, and put to a cruel death both Leontius and Tiberius, with many others. He ordered also many of the principal people of Ravenna to be put to death. At last Justinian was dethroned and killed by Philippicus Bardanes, A.D. 711.

JUSTI'NUS I., by birth a peasant of Dacia, in his youth enlisted in the guards of the emperor Leo I. Under that and the two following reigns Justin distinguished himself by his military services, and gradually attained the rank of tribune, count, general, and lastly the command of the guards, which he held when the emperor Anastasius died, A.D. 518. He was then proclaimed emperor by the soldiers, being sixty-eight years of age, and the clergy and people approved the choice. Justinus, being himself uninformed in civil affairs, relied for the despatch of the official business of state on the quæstor Proclus, a faithful servant, who was also the friend of Justinian, Justin's nephew, who himself had acquired a great ascendency over his uncle. By Justinian's advice a reconciliation was effected between the Greek and the Roman churches, A.D. 520. The murder of Vitalianus, who had been raised to the consulship, but who, having excited the suspicion and jealousy of the court, was stabbed at a banquet, casts a dark shade upon the character of both Justin and Justinian. In other respects Justin is represented by the historians as honest and equitable, though rude and distrustful. After a reign of nine years, being afflicted by an incurable wound, and having become weak in mind and body, Justin abdicated in favour of his nephew, and died soon after, in A.D. 527.

JUSTINUS II., nephew of Justinian I., by his mother Vigilantia, was raised to the throne by the senators and the guards immediately after the death of his uncle, on the 15th November, A.D. 565. Soon after complaints reached Constantinople from the Romans against Narses the conqueror of the Goths, and exarch of Ravenna, whose great qualities were stained with avarice, and whose government had become unpopular in Italy. A new exarch, Longinus, was appointed to supersede Narses, and the empress Sophia, Justin's consort, added to the letters of recal the insulting message, that the eunuch Narses should leave to men the exercise of arms and the dignities of the state, and return to his proper place among the maidens of the palace, where a distaff should be placed in his hand. To this insult Narses is said to have replied, 'I will spin her such a thread as she will not easily unravel;' and he is said to have invited the Longobards, and their king Alboin, to invade Italy. However this may be, Alboin invaded Italy by the Julian Alps, A.D. 568, and in a few years all North Italy was lost to the Byzantine emperor. The provinces of Asia were likewise overrun by the Persians. Internal discontent prevailed in the capital and provinces, owing to the malversations of the governors and magistrates, and Justin himself, deprived by infirmity of the use of his feet, and confined to the palace, was not able to repress abuses and infuse vigour into the administration. Feeling at last his impotence, he resolved on abdicating the crown, and as he had no son, he chose Tiberius, the captain of his guards, as his successor. The conduct of Tiberius fully justified Justin's discernment. Justin lived four years after his abdication, in quiet retirement, and died in the year 578.



Coin of Justinus I. or II.
British Museum. Actual Size.

JUSTI'NUS, commonly called **JUSTIN, MARTYR**, one of the early fathers of the Christian church, and considered one of the ornaments of the body of men who professed the Christian faith in the times of its great discouragement while it was making head against the power of the Gentile world.

He was born in Palestine, at a place then called Neapolis, a new city, as may be inferred from its name, which had arisen near the antient town of Sichem, of which we read in the Old Testament, if it were not Sichem itself with a new name. His father was a Greek. Justin was carefully instructed in the learning of the Grecian schools of philosophy, in the course of his studies visiting Alexandria, then a celebrated seat of learning; and travelling much in Egypt. With a mind deeply embued with the Platonic philosophy, he became sensible to the truth and beauty of Christianity, and made a public profession that he received it as divine truth. This was about the year A.D. 132.

During the remainder of his life he continued in the profession of Christianity, and is distinguished among the fathers of the church by the apologies and defences which he published. His first apology for Christianity was addressed to the emperor Antoninus, at a time when the Christians were suffering rather from popular fury than from the bearing upon them of the regular authority of the state, and it prevailed so far as to obtain for them some favourable concessions from the emperor. His second apology was addressed to the successor of Antoninus, Marcus Aurelius, on occasion of several Christians having been put to death for their faith. Both these apologies are extant; as well as another work of Justin's, which is a dialogue with Trypho, a learned Jew, in defence of Chistianity. Of the genuineness of these works there is no doubt. There is also another work of his 'On the Unity and Sovereignty of God;' but great suspicions are entertained of the genuineness of some other writings which have been attributed to him.

We have now to relate his end. The usual place of his residence was Rome, where, in or about A.D. 164, he was put to death a martyr to Christian truth. It was eminently as a martyr or witness that he suffered; for he might have saved his life had he consented to join in a sacrifice to the heathen deities. Hence with his name has descended the addition of The Martyr, a distinction which in a later age was given to Peter, one of the Protestant sufferers for the truth.

'The Dialogue with Trypho' was edited by Dr. Samuel Jebb, and the 'Apologies' by Dr. Charles Ashton, two learned Englishmen of the last century. Among the best editions of the whole works of Justin may be named that of Stephens, folio, 1551, and that of Oberthür, 2 vols. 8vo., 1777. There are English translations of the Apologies by William Reeve, M.A., 2 vols. 8vo., 1809; and of the Dialogue by Henry Brown, M.A., 1755.

Middleton in his 'Free Inquiry' has various remarks on this father, whose intellectual character and acquirements he rates very low (p. 27, &c).

JUSTI'NUS, the historian, is supposed to have lived under Antoninus Pius, as it would appear from the preface to his History, which he addresses to that emperor. The passage in which the emperor's name occurs is found in the older editions, but its authenticity is disputed. Nothing else is known of his personal history. He compiled an abridgment or epitome of the Universal History of Trogus Pompeius, who lived in the time of Augustus, and which consisted of forty-four volumes, as Justin tells us in his preface. The work of Trogus is unfortunately lost, except the prologi or heads of contents of each book, from which it appears that Justinus has been at times a careless abbreviator, having entirely omitted several interesting subjects which were treated by Trogus, such as in book i., the account of the Æolian and Ionian cities in Asia, of the origin of the Tusci or Etrusci in Italy, and of the cities of Egypt. Another charge against Justinus is the confused order in which he has narrated events, but this fault may be ascribed to the text of Trogus. Book i. treats of the Assyrians from Ninus to Sardanapalus, and of the Medians, Lydians, and Persians to Darius Hystaspes. The next five books are occupied by the history of the Greek and Persian wars; but by far the largest part of the work, from book vii. to book xvii. inclusive, is engrossed by the history of the Macedonian kingdom and empire, before and after Alexander. Books xviii. to xxiii. treat of Carthage and Sicily; books xxiv. to xl. treat of Greece, Macedonia, Asia, and Egypt, under the successors of Alexander down to the Roman conquest; books xli. and xlii. treat of the Parthians; book xliii. treats of the origin of Rome and of Massilia (Marseille); and the last book is upon the history of Spain. Book xxxvi., in which the author speaks of the Jews, has been commented upon by J. J. Schudt, in his 'Historiæ Judaicæ ex Gentilium Scriptis Collectæ,' 8vo., Frankfort, 1700. Among the best of the numerous editions of Justinus may be mentioned that by Abr. Gronovius, with variorum notes and dissertations, 1719, reprinted in 1760; that of J. G. Grævius, Leyden, 1683; that of the Bipontine Society, 1802; and that of Wetzel, 1806.

JUTES, an old Teutonic or Scandinavian tribe which in the fifth century of our æra appear as being settled in the northern part of the Chersonesus Cimbrica, which is still called, after their name, Jutland. Mannert (*Geographie der Griechen und Römer*) thinks that they were a colony from the opposite coast of Scandinavia, of the same race as the Guthi, or Gutæ, mentioned by Ptolemy. [GOTHS] The first Germanic invaders of Britain after the departure of the Romans were Jutes, who, under their leaders Hengist and Horsa, A.D. 455, landed in the Isle of Thanet and settled in Kent. The Saxons under Ella came A.D. 477, and the Angles did not come till the following century. [ENGLAND.]

JUTLAND is the name of a large province of the kingdom of Denmark. The name was formerly given to the whole of the peninsula, which constitutes the continental portion of the kingdom. At present the name is restricted to the northern half, which is sometimes called North Jutland, the Duchy of Schleswig being considered as South Jutland. North Jutland is situated between 55° 20′ and 57° 42′ N. lat. and 8° 6′ and 10° 50′ E. long. Its form as far as 55° 12′ is a pretty regular parallelogram lying nearly due north and south: the northern part is almost a right angled triangle. The extreme length is about 170 miles; the breadth of the parallelogram varies from 70 to 85 miles, but in the centre it is 100 miles, the district of Kalloe projecting towards the east. It is bounded on the west and north by the German Ocean, on the east by the Cattegat and the Little Belt, and on the south by Schleswig. The area is 9408 square miles, and the population about 525,900. Few countries have such an extensive line of coast in proportion to their area as the Danish peninsula, which, especially on the more elevated east coast, is indented with numerous bays and inlets, and no town is above 45 miles from the sea. The most considerable of these inlets, the Lymfiord, extends across the peninsula. The entrance is on the east side, in lat. 57° and long. 10° 10′ E. It runs west to about 9° 20′, where it suddenly expands, forming as it were a large lake, stretching in a south-west direction to 56° 30′, where it turns to the north-west and reaches 56° 45′, the whole length being about 100 miles. It contains numerous islands, the largest of which, called Mors, situated in the broad part, has an area of 136 square miles and a population of 7800 inhabitants. In the year 1825 the North Sea broke through the narrow strip of land which separated it from the Lymfiord, and the breach being gradually enlarged, the northern part of Jutland is now a complete island. The apparent advantage of this extensive line of coast is much diminished by the shallowness of the sea, and the innumerable little islands, sandbanks, and shoals which render access difficult. The north coast, besides an immense range of sandbanks rising almost to the surface of the water, is rendered dangerous to navigators by numerous currents and the shortness and rapidity of the waves. The west coast, facing the German Ocean for above 200 miles, is bordered by a narrow strip of moving sand and a chain of sand-hills, within which there are many good pastures. The southern part of the west coast is alluvial soil, extremely fertile, but swampy and unhealthy, and requiring dikes to protect it from the inroads of the German Ocean, which however sometimes breaks through them, as happened in 1634, when 15,000 persons perished. The east coast is more elevated, rising in chalk-cliffs above the sea, and to the south of Aarhuus it presents a series of fertile and well-cultivated eminences. The province in general is very deficient in natural beauties. The only elevations are a range of low hills, seldom rising above a few hundred feet: they are the prolongation of the chain which runs through Mecklenburg and Holstein, and thence extends through the whole peninsula, terminating at its extreme northern point, the promontory of Skagen. Only the Himmelsberg attains the height of 1200 feet. The rivers are very small, and are all called 'aae;' the largest are, the Scholmaae, Widaae, Bredeaae, and Ribsaae. With respect to the soil, 5426 square miles are arable land, 2719 heath, 715 meadows and marshes, 313 forests, and about 235 tracts of moving sand. The productions are corn (more than sufficient for the inhabitants), hemp, flax, tobacco, and some timber. In the tenth and eleventh centuries the country was covered with vast forests, and there are still considerable woods of oak, fir, beech, &c. on the east coast, but on the west there are only willow, beech, and alder. The horses are large, but fitter for draught than for riding. The breed of black cattle is good, and numbers of them and of hogs are exported to Holstein. There is abundance of game, and some wild boars are still found in the forests. The lakes, gulfs, and bays afford an inexhaustible supply of fish. The climate, through the proximity of the sea, is more temperate than might be supposed from the latitude. It is very variable, with frequent fogs and rains; the winters are not very rigorous, but the summer is often extremely hot. The inhabitants are in general illiterate, credulous, and indifferent to improvement. Till the ninth century the Jutes, from whom the country has its name, were governed by their own princes, two of whom, Gotice and Hemming, carried on war with Charlemagne. In the second half of the ninth century the country was conquered by Gormo Gammut, king of Denmark, who annexed it to his own dominions.

The peninsula is divided into four large districts called *stifts*, in this instance equivalent to diocese or bishopric:—Aalborg in the north, Aarhuus in the east, Wiborg in the centre, and Ripen in the south and west. The first two have been already described. Wiborg has an area of 1050 square miles and 85,000 inhabitants. The capital, of the same name, is situated on a small lake nearly in the centre of the peninsula, and has 4000 inhabitants. It is about 2½ miles in circuit, is surrounded with ramparts, has six gates, and is pretty well built. There are a cathedral and two other churches, and a few manufactories. The bishopric of Ripen, or Ribe, the most extensive of all, has an area of 3842 square miles, but is in proportion the least populous, having only 150,000 inhabitants. Ribe, the capital and seat of the bishop, is a small walled town with 3000 inhabitants. It is situated on a little river called the Ribsaae, two miles from the German Ocean. Only small vessels can come up to the town, which has some trade in corn, oxen, and horses. There is one church besides the cathedral, and the oldest Latin school in Denmark (founded in 1248), with a library. Fredericia, the only fortress in Jutland, is in this diocese; it is situated on the Little Belt, has 4700 inhabitants, a Calvinist, a Roman Catholic, and two Lutheran churches, a synagogue, a custom-house for ships passing through the Little Belt, and other public buildings, and several manufactories.

JU'VENAL. Of the personal history of this great poet scarcely anything appears to be certainly known. His name is variously written Decius, or Decimus, Junius Juvenalis. His birthplace, on no very sure ground, is said to have been Aquinum, a Volscian town; and he is said to have been born somewhere about A.D. 40, under Caligula, and to have died, turned of 80, under Hadrian. He was of obscure extraction, being the grandson of an enfranchised slave. Some of his biographers say that he followed the profession of a pleader. He was intimate with the poet Martial. (Martial's *Ep.*, vii. 24, 91; xii. 18.) It does not appear that he gained any reputation until the publication of his Satires, which was late in life, after he was turned sixty. Still later he was sent in command of a cohort of infantry to Egypt, where he died from vexation and weariness of this honourable exile, which it is said was inflicted upon him as a punishment for satirizing a favourite of Hadrian under the person of Paris, the favourite actor of Domitian. See *Sat.* vii. 88, where Paris is described as the bestower of military patronage.

The relative merits of Juvenal and Horace as satirists have been warmly contested. It is a question on which men will form opposite opinions, as their tempers are more fit to relish brilliancy and playfulness, or earnest and dignified declamation. Juvenal is said to have spent much time in attendance in the schools of the rhetoricians, and the effect of this, in an age not remarkable for purity of taste, may be observed perhaps in a tendency to hyperbolical inflation, both of thought and style, which would soon betray a writer of less power into the ridiculous. From this his wit, command of language, and force and fullness of thought, completely preserve him: still perhaps he would produce more effect if the effort to do his utmost were less apparent. Dryden says, 'Juvenal gives me as much pleasure as I can bear. He fully satisfies expectation; he treats his subject home. His spleen is raised, and he raises mine: I have the pleasure of concernment in all he says. He drives his reader along with him, and when he is at the end of his way I willingly stop with him. If he went another stage it would be too far, and turn delight into fatigue. When he gives over 'tis a sign the subject is exhausted, and the wit of man can carry it no farther. If a fault can justly be found in him, 'tis that he is sometimes too luxuriant, too redundant.' His writings are addressed to the encouragement of virtue no less than to the chastisement of vice; and parts of them have been recommended by Christian divines as admirable storehouses of moral precepts. Still they lie open to the objection of descending so minutely into the details of vice as to minister food as well as physic to the depraved mind. To the scholar they are invaluable for the information which they supply concerning private life among the Romans. The editions of Juvenal are very numerous; that of Ruperti has (in England at least) nearly superseded others: it is attended by a copious body of explanatory notes, which are much needed in reading this difficult author. He is translated into English by Holiday, Dryden (who however only translated five satires of the edition which bears his name), Gifford, and Hodgson. The French prose translation of Dusaulx is highly praised. [DRYDEN; GIFFORD.] (*Proemium to* Ruperti's *Juvenal; Dedication to* Dryden's *Juvenal.*)

JYENAGUR, or JEYPORE, a principality in Rajpootana, lying between 26° and 28° N. lat., and between 75° and 78° E. long. On the west it is bounded by the British possessions in the same province, and on all other sides is contiguous to other Rajpoot territories. The surface of the country is in general level; the hills do not in any case acquire the size of mountains. The soil is for the most part sandy and arid, and in many places is strongly impregnated with salt, a considerable quantity of which is manufactured both for home use and for exportation. During the dry season, from February to July, the heat is excessive, and the clouds of hot sand which are driven about by the wind are so annoying as nearly to prevent travelling, and confine the inhabitants as much as possible within their dwellings. The cultivated fields are watered by means of wells, there being no permanent streams, and those produced by the rains being of little use for the purpose of irrigation during the dry season. The principal articles of produce are cotton, tobacco, and wheat, with some smaller grains. Cattle are reared for draught, and sheep for their wool. Jyenagur is more populous than most of the other Rajpoot states, and contains numerous forts in every part of the country; a great proportion of the villages also are defended by walls, and surrounded by ditches, notwithstanding which the inhabitants formerly suffered so severely from the incursions of plunderers, that so recently as 1819 the country had the appearance of being an extensive waste, in which large herds of cattle and of deer roamed about without restriction. Since that time a state of greater security has prevailed, cultivation has been resumed, the population has increased, and the public revenue, which had been almost annihilated through the general disorganization, now yields about 800,000*l.* per annum.

Jeypore, the capital, is situated in 26° 54′ N. lat. and 75° 38′ E. long., about 156 miles south-west from Delhi. The town is placed in a valley open to the south, and is surrounded by a wall of grey stone; it is well and regularly built, with four principal streets, which meet in a large square. The houses are three or four stories in height, and many of them are decorated with paintings in *fresco*, sculptures, porticoes, and other ornamental works executed in marble. Most of the dwellings are separate and built at equal distances; they are connected by means of a low wall. The temples, although modern, are built in the purest style of Hindu architecture, and some of them are of large dimensions. The distance of this city from Agra is 136 miles; from Benares 515 miles; from Bombay 740 miles; from Calcutta 975 miles; and from Delhi 156 miles—all travelling distances.

INDEX TO THE LETTER J.

VOLUME XIII.

J, page 68
Jábiru, 68
Jablonski, 68
Jácamar [Kingfishers]
Jácana [Rallidæ]
Jacchus, or Iacchus, 68
Jackal, 69
Jackdaw, 70
Jacksaw [Merganinæ]
Jackson, William, 70
Jackson, Port [Sidney]
Jácobi, 71
Jacobins, 71
Jacobites [Eutychians]
Jade, 72
Jaen, 72
Jaen [Ecuador, vol. ix., p. 267]
Jæra, or Jaëra [Isopoda, vol. xiii., p. 55]
Jaffa [Syria]
Jaffnapatam, 72
Jaganath [Juggernauth]
Jager (Ornithology) [Laridæ]
Jaguar [Leopards]
Jainas, 72
Jalap [Convolvulus Jalapa]
Jalapa [Mexico]
Jalisco [Mexico]
Jaloffs, or Yaloffs, 73
Jamaica, 73
James, Saint, Epistle of, 77
James I., II., III., IV., V., of Scotland, 77-79
James I., II., of England, 79-87
James River [Virginia]
Jamesonite, 87
Janeiro, Rio de, 87
Janira [*Isopoda*, vol. xiii., p. 55]
Janizaries, 88
Jansenists, 88
Janssen, Cornelius, 89
Janssens, Abraham, 89
Janssens, Victor Honorius, 89
Jánthina, or Ianthina, 89
January, 90
Janus, 90
Japan, 91
Japanning, 94
Jaroslaw [Yaroslaw]
Jasher, Book of, 95
Jasmináceæ, 95
Jason [Argonauts]
Jason [Thessaly]
Jasper [Silicium]
Jassa, 95
Jassy [Moldavia]
Játropha, 95
Jaum Ghaut [Hindustan, p. 212]
Jaundice, 95
Java, 96
Javelin Snake, 99
Jaxt, 99
Jay [Corvidæ, vol. viii., p. 69]
Jayadéva, 100
Jean I., II., Kings of France, 100
Jean sans Peur [Bourgogne]
Jean de Montfort [Bretagne]
Jean d'Angely, St., 100
Jedburgh [Roxburghshire]
Jedo, or Jeddo [Japan]
Jefferson, Thomas, 100
Jeffersonite [Pyroxene]
Jejúnum [Intestines]
Jelly [Food]
Jena, 103
Jenesei [Siberia]
Jeniseisk [Siberia]
Jenner, Edward, 104
Jenye [Hindustan, p. 216]
Jenyns, Soame, 104
Jer-Falcon [Falconidæ, vol. x., p. 182]
Jerboa [Muridæ]
Jeremiah, 104
Jericho [Syria]
Jericho, Rose of, 105
Jerome, Saint, 105
Jerome of Prague [Huss]
Jersey, 106
Jersey, New, 107
Jerusalem, 108
Jervis, John, Earl St. Vincent, 109
Jesuits, 110
Jesuits' Bark [Cinchona]
Jessulmer [Hindustan, p. 221]
Jesus [Christ]
Jesus, Son of Sirach, 116
Jesus College, Cambridge, 116
Jesus College, Oxford, 116
Jet, 116
Jethou [Guernsey]
Jetsam [Flotsam]
Jewell, John, 116
Jewelling of Watches, 117
Jew's-harp, 118
Jews, 118
Jidda [Arabia]
Jig, 123
Joan, Pope, 123
Joan I., II., of Naples, 123-4
Joan of Arc [Arc Joan of]
Joánnina, or Yánnina, 124
Job, the Book of, 124
Joel, 125
Johanna [Anzouan]
Johannisberg [Nassau]
John, Saint, the Baptist, 125
John, Saint, the Apostle and Evangelist, 125
John, King of England, 126
John of Gaunt [Edward III.; Henry IV.]
John of Salisbury, 128
John, Kings of Portugal [Portugal]
John Hyrcánus [Hyrcanus, John]
John I.—XXIII.,(popes),128-9
John's College, St., Oxford, 129
John's College, St., Cambridge, 130
John's, St. [Newfoundland]
John's, St. [New Brunswick]
John's, St., River [Maine]
Johnson, Samuel, 130
Joint [Articulation]
Joint Stock Companies [Bank, Banker, Banking; Partnership]
Joint Tenancy, 132
Jointure, 133
Joinville, 133
Joliba [Quorra]
Jomelli, Nicolo, 134
Jonah, 134
Jonathan Apphus, 134
Jones, Inigo, 134
Jones, Sir William, 135
Jones, John Paul, 136
Jonésia, 137
Jonson, Benjamin, 137
Joppa [Syria]
Jordaens, Jacob, 138
Jordan [Syria]
Jortin, John, 138
Jorullo [Mexico]
Joseph I., II., of Germany, 138
Joseph, king of Portugal [Portugal]
Joséphus, 138
Joshua, 139
Joudpore [Marwar]
Journals of the Lords and Com mons [Parliament]
Jovellános, 140
Joviánus, 140
Jovínus, 140
Jóvius, Paul [Giovio]
Juan Fernandez [Fernandez]
Juan de Ulloa [Mexico]
Juan del Rio [Mexico]
Juba I., II., 141
Judah, Judæa [Jews; Palestine]
Judaism, 141
Judas Maccabæus, 141
Jude, the Epistle of Saint, 141
Judex, Judícium, 141
Judiciary [Courts]
Judges, the Book of, 143
Judith, 143
Juggernauth [Vishnu]
Juglandáceæ, 143
Jugular Veins, 144
Jugurtha, 144
Juliánus, Flávius Claúdius, 144
Julian Period, 145
Jülich-Cleve-Berg, 145
Július I., II., III. (popes), 146
July, 146
Jumna [Hindustan]
Juncáceæ, 146
Juncagináceæ, 146
Júncus Odorátus, 147
June, 147
Jungermanniáceæ, 147
Juníperus, 147
Június, Franciscus, 148
Junius's Letters [Francis, Sir Philip]
Juno (heathen goddess), 148
Juno (planet), 148
Júpiter (heathen god), 149
Jupiter (planet), 148
Jura (island), 149
Jura (department), 150
Jura Mountains, 151
Jura Kalk, 152
Jurisprudence, 152
Jury, 153
Jussieu, 156
Justice Clerk of Scotland, 158
Justices of the Peace, 158
Justícia (botany), 160
Justiciar of Scotland, 161
Justiciary, Chief, of England, 161
Justification, 162
Justinian's Legislation, 163
Justiniánus I., II., 165-6
Justínus I., II., 166
Justínus (Justin, Martyr), 166
Justínus (historian), 167
Jutes, 167
Jutland, 167
Júvenal, 168
Jyenagur, or Jeypore, 168

K

K has the same sound which C has before the vowels *a, o, u.* A reference to that consonant will therefore suffice for the power of the letter; its various forms may be seen in Alphabet. Although this letter is now superfluous, it was not so when the characters of an alphabet were syllabic in power. Thus the letter *k* appears to have denoted at one time the syllable *ka*, while another character represented *ko*, and so on. Hence in the Greek and Hebrew alphabets the former was called *kappa, kaph;* the latter *koppa, koph.* This accounts for the fact, that in Latin the letter *k* was never used except before the vowel *a*, precisely as *q* is found only before *u*, and the Greek koppa only before *o*. Even our own alphabet seems to imply such a limit in the use of this consonant, when it gives it the name *ka*, not *ke;* though the latter name would better agree with *be, ce, de,* &c.

KABYLES. [Algiers, vol. i., p. 327.]

KAEMPFER, ENGELBERT, well known as a botanist, and still more as a traveller, was born the 16th of September, 1651, at Lemgo, in the principality of Lippe-Detmold, in Germany, where his father was rector of the church of S. Nicholas. He was sent successively to the schools of Hameln, Lüneburg, Hamburg, and Lübeck, in all which he was distinguished by his rapid progress in the antient languages, history, geography, and music. He was afterwards sent to the gymnasium of Danzig. He next studied at the university of Cracow, in Poland, for three years, and at Königsberg, in Prussia, for four years more. At the last-mentioned place he applied himself closely to the study of physic and natural history. From Prussia he went to Sweden, where the extent of his knowledge and his talents procured him very advantageous offers on condition of settling at Upsala; but his desire to see remote countries led him to decline the proposals, and he solicited and obtained the place of secretary to an embassy which was then going to Persia. The embassy passed through Moscow, Kasan, and Astrakhan, where they embarked for Persia, and landed at Nizabad, in Daghestan, on the western shores of the Caspian Sea. While they were waiting for their passports in the town of Shamaki, in Shirvan, Kaempfer made an excursion to the peninsula of Absheran: he was the first naturalist who visited this remarkable spot, its wells of naphtha, and its ever-burning fire, which he described in his 'Amœnitates Exoticæ.' In 1684 the embassy arrived at Ispahan, then the capital of Persia. The information which Kaempfer collected during a residence of two years at that place respecting Persia and its natural productions is embodied in his 'Amœnitates.' When the embassy returned to Europe in 1685 Kaempfer entered as surgeon into the service of the Dutch East India Company, and served in that capacity in the navy then cruising in the Persian Gulf. After a long illness at Bender Abassi, he sailed for Batavia in 1689, and in this passage visited most of the countries on the western shores of Hindustan. At Batavia he occupied himself chiefly with the natural history of the island of Java. In 1690 he set out from Batavia on his voyage to Japan, as physician to the embassy which the Dutch East India Company annually sent to the Japanese court. He embarked in the vessel which was to touch at the kingdom of Siam, and visited Judia, or Juthia, then the capital of that country. He remained at Nagasaki, in Japan, from September, 1690, to November, 1692, and during this time he accompanied two embassies to Yeddo. His observations on Siam and Japan are given in his great work entitled 'The History of Japan,' the original of which has never been published, but a translation was made from a copy in the possession of Sir Hans Sloane by J. G. Scheuchzer, and published in England in 2 vols. fol., 1727. Kaempfer returned from Japan to Batavia, which he left in 1693 for Amsterdam. In April, 1694, he took the degree of doctor of physic at the university of Leyden, and in the theses which he published on that occasion he showed that the *Agnus Scythica*, or *Barometz*, a pretended plant-animal, was nothing but a fiction he also describ[illegible]ther remarkable objects, and among them the electrical eel. On his return to his native place his reputation soon procured him the honour of being appointed physician to his sovereign, a circumstance which brought him into extensive practice. This however was a loss to science. Of the various works which he designed to publish only his 'Amœnitates Exoticæ' appeared during his lifetime (in 1712). His 'History of Japan,' as already observed, appeared much later, and only in English, from which it was afterwards translated into German and French. He died on the 2nd of November, 1716, his health having been much impaired by his travels and some domestic calamities. If we consider the variety, extent, and accuracy of the information contained in Kaempfer, we may confidently place him at the head of those naturalists who, more than any other class of travellers, have enlarged our knowledge of natural history and geography, and he may be considered as the precursor of Tournefort, Pallas, Sir Francis Hamilton, and Alexander von Humboldt.

(Scheuchzer's *Life of Kaempfer*, in his translation of the *History of Japan.*)

KÆMPFE'RIA, a small genus of Indian Scitamineæ, or Zingiberaceæ of some authors, of which the species are indigenous to the islands of the Archipelago and the southern parts of the continent of India, as Bengal and the districts on its eastern frontier. All are furnished with tuberous roots like the turmeric and ginger plants. The spikes of the flowers are short and rising from the root, in some species before, in others with, and nestled among the leaves: all are highly ornamental, and *K. rotunda*, called by the natives *bhooi chumpa*, or *ground chumpa*, is much cultivated in gardens on account of the beauty and fragrance of its flowers. It was supposed to yield the round Zedoary of the shops, but incorrectly as Dr. Roxburgh thinks, since he considers his *Curcuma Zedoaria* to be the plant. So *K. Galanga* was, equally incorrectly, long supposed to yield the Galanga of the shops. [Galanga.] It is a native of the mountainous districts beyond Chittagong, and there called *Kumula*, and is cultivated by the Mugs; by them it is sold to the people of Bengal, who use it as an ingredient in their betel. The roots possess an agreeable fragrant smell, and a somewhat warm, bitterish, aromatic taste. The Hindus use them, according to Dr. Roxburgh, not only as a perfume, but also medicinally. The roots of *K. angustifolia* are, according to the same authority, used as a medicine for cattle by the people of Bengal.

KAFFA, called also Feodosia, is a town built on the south-eastern shores of the Crimea, in 45° 2′ N. lat. and 35° 20′ E. long., on a wide open bay, which is more than twenty miles across. The town stands on the most western angle of this bay, and its harbour is protected by a projecting cape. In antient times the town was called Theodosia, and was one of the towns of the Greek kingdom of the Bosporus. [Bosporus.] According to the author of the 'Periplus of the Euxine' it was a Milesian colony. Its importance appears to date from the time of Leucon, the contemporary of Demosthenes, who made it a port, and gave certain advantages to Athenian ships which came there for the purpose of carrying grain back to Athens. According to the author of the Periplus (who probably lived in the second century of the Christian æra), it was then called Ardauda in the Alan or Tauric dialect, which name signifies 'the seven gods.'

In the middle ages it seems to have been a considerable place, but especially so between the twelfth and fourteenth centuries, when it was in possession of the Genoese, who carried on a considerable commerce with India through Persia from this town. In 1474 it was taken from the Genoese by the Turks, but still continued a considerable place, though its population had decreased from 80,000, which it is stated to have had when the commerce of the Genoese was most flourishing, to 20,000 individuals. The wars which the Russians, in the latter half of the last century, carried on in these parts, ruined Kaffa, and still more the emigrations which took place when the Russians got possession of the town. Towards the end of the last century Pallas describes it as a heap of ruins, enclosed by strong and lofty walls, which were fortified by towers, at the distance of 20, 40, and 60 fathoms from each other. The space enclosed by these walls is an oblong square along the bay, more than an English mile in extent. Among its ruins Pallas observed a large mosque, which was then used as the chief guard-house. In this ruined state the town, whose population at present probably does not exceed 5000 souls, remained up to the year 1806, when Russia tried to raise it again by declaring it a free harbour, and by establishing a quarantine, an assurance company, a botanic garden, a museum of antiquities, which are frequently found in the neighbourhood, a library, &c.; but the effect of these efforts seems not to have been great, for in 1830 the exports did not exceed 1,148,288 rubles, nor the imports 890,910 rubles, in paper money. Fishing is the principal occupation of the inhabitants. In its neighbourhood are oysters. Caviar is made here, as well as a small quantity of tobacco. It exports a great quantity of salt.

(Pallas, *Travels through the Southern Provinces of Russia*; Jones's *Travels in Norway, Sweden, Finnland, &c.*; Lyall's *Travels in Russia, the Crimea, &c.*; Demosthenes, *Leptin.*, c. 9; Strabo, vii., pp. 309, 311; Steph. Byzaut. Θευδοσία.)

KAHIRA, or **CAIRO**, more properly *El Chdhireh*, which was its former name, but now called by the natives *Musr*, the capital of modern Egypt, is situated in 30° 5′ N. lat. and 31° 20′ E. long., in a plain midway between the right or eastern bank of the Nile and the ridge of Mokattam, and near the apex of the Delta of the Nile. The tract of land between the town and the river, which is above a mile in width, in the direction of Boolak, the northern harbour of Kahira, becomes narrower farther south, so as to be less than half a mile wide, in the direction of Musr el Ateeckah, the southern harbour or landing-place. Kahira occupies about three square miles; it is surrounded by a wall, the gates of which are shut at night, and is commanded by a large citadel situated at an angle of the town, on one of the lower elevations of the contiguous ridge, in which is the residence of the Pacha. The streets of Kahira are unpaved, irregular, and narrow; they are more like lanes than streets. The great thoroughfare streets have generally a row of shops on each side. Above the shops are apartments which do not communicate with them, and which are inhabited by private families. Most of the bye-streets have a wooden gate at each end, closed at night, and guarded by a porter within, who opens it to persons who require admittance. There are also many courts with several narrow lanes branching out of them, but no thoroughfare, and only one common entrance, with a gate, which is also closed at night. The external walls of the better sort of houses are cased to the height of the first floor with the soft calcareous stone of the neighbouring mountain. The superstructure, the front of which generally projects about two feet, is of burnt brick of a dull red colour, but often plastered. The roof is flat, and covered with a coat of plaster. The ground-floor apartments next the street have small wooden grated windows; but the windows of the upper apartments are mostly formed of turned wood lattice-work, which is so close that it shuts out much of the light and sun, but admits the air. In the better houses the windows are furnished with frames of glass in the inside, which are closed in the winter, for a penetrating cold is felt in Egypt when the thermometer is below 60°. The houses in general are two or three stories high, and most of them enclose an open unpaved court, into which the principal apartments look. In the court is a well of slightly brackish water, which filters through the soil from the Nile; and on its most shaded side are commonly two water-jars, which are daily replenished with water of the Nile, brought from the river in skins.

There are in the town three or four squares or open places of considerable extent, two of which are overflowed during the high floods of the Nile. Among the numerous mosques, four are distinguished for their size and architecture—that of Tooloon, which dates from the ninth century of our æra; that of El Hakim; that of El Azhar, with a splendid dome, and a college attached to it; and lastly, the mosque of Hhasaneyn, with its high dome, its two lofty minarets, and its marble and other ornaments. Among the other remarkable buildings are the public baths, of which there are between sixty and seventy in the town, several of them very spacious, handsomely ornamented and painted, externally and internally, the various apartments being paved with marble. The coffee-houses, which are very numerous, are extremely plain and unadorned. There are in Kahira numerous buildings called wekalehs, for the accommodation of merchants and their goods. These buildings are square or oblong, having an open court in the middle, with vaulted warehouses for merchandise on the ground-floor opening into the court, and lodgings above them. The shops in the streets are small square recesses or cells, about six or seven feet high and between four and six feet wide, in which there is just room enough for the seller and one or two customers. The public gardens consist of groves of orange and lemon trees and vines; and the cemeteries, both within and without the town, are also frequented as promenades.

The population of Kahira is reckoned at 240,000 inhabitants, of whom about 190,000 are native Mussulmans, 10,000 Copts, between 3000 and 4000 Jews, and the rest strangers from various countries. The police maintained in the metropolis is tolerably strict: punishments are arbitrary but lenient; convicted malefactors are mostly employed in the public works.

In the neighbourhood of Kahira are, Boolak, with the custom house, the bazaar, the printing-press, a school or college, some silk manufactories and about 18,000 inhabitants; Musr el Ateeckah, where the town of Fostat, or Old Kahira, once stood, and where the vast granaries are now seen; Schoobra, with a country-house and fine gardens of the Pacha; Aboo Zabel, where is a school of medicine, anatomy, and surgery, and a large military hospital, all created by the present Pacha Mehemet Ali. Nearly opposite Kahira, on the left bank of the Nile, are the great pyramids of Jizeh.

Kahira still maintains the reputation of being the best school of Arabic literature; and for Mohammedan theology and jurisprudence the fame of its professors remains unrivalled. Schools for children are very numerous at Kahira: almost every mosque has a koottab, or day-school, attached to it, in which children are instructed in reading the 'Koran,' and, if required, in writing and arithmetic. The schoolmasters are mostly persons of very little learning. Those youths who propose to devote themselves to religious employment or the learned professions pursue their studies in a great college attached to the mosque of El Azhar, which has a considerable library. Besides the study of grammar, rhetoric, and versification, lectures are given on logic, theology, the exposition of the Koran, and the traditions of the Prophet; on religious, moral, civil, and criminal law, which is chiefly founded on the Koran and the traditions; arithmetic and algebra, &c. The instruction is gratis. The number of students is about 1500, from almost all parts of the Mohammedan world. The Azhar has lost the greater part of its revenues, the Pacha having seized the cultivable lands belonging to the mosques. The professors subsist by teaching in private houses, copying books, and on the presents which they receive from the wealthy. Besides this college or university, there are, an elementary school of arts and sciences at Casr el Ain, a school of administration to instruct those who are designed for civil offices, and a school of artillery and engineering. The Arabic spoken by the middle and higher classes at Kahira, though inferior in grammatical correctness and pronunciation to that of the Beduins of Arabia, is much superior to that spoken in Syria, and still more to that of the Moghrabins, or Barbary Arabs. (Lane's *Account of the Manners and Customs of the Modern Egyptians*; Wilkinson; Minutoli; Planat, *Histoire de la Régénération de l'Egypte*, Paris, 1830.)

KAHAU. (Proboscis Monkey.) [NASALIS.]

KAKOXENE, a mineral occurring in small crystals, which appear to be six-sided prisms terminated by pyramids, disposed in radiating tufts. Colour yellow of several shades, and sometimes brownish-red. Lustre silky, sometimes adamantine; adheres to the tongue, and has an earthy smell.

When placed on a hot coal it emits a green phosphoric light, and before the blowpipe on charcoal decrepitates: with borax forms a deep green-coloured glass, and with soda a blackish mass.

It occurs in clayey brown iron-stone at Zbirow, in Bohemia.

Analysis by Steinman:—

Phosphoric acid	17·86
Fluoric acid and water	25·95
Peroxide of iron	36·82
Alumina	10·01
Silica	8·90
Lime	0·15
	99·69

KALENDAR, a register or distribution of the year, accommodated to the uses of life; containing the order of days, weeks, months, festivals, &c., as they occur in the course of the year. It is so called from the *kalendæ*, or Kalends, which among the Romans denoted the first day of every month. The kalendar, being of civil institution, varies according to the different distributions of time in different countries. Those which we shall take more particular notice of are, the Roman, the Julian, the Gregorian, and the Reformed Kalendar: a slight mention of the others will be sufficient.

Romulus, according to tradition, formed what is deemed the original Roman kalendar, by which the year was divided into ten months only, consisting of an unequal number of days, and began with March. The total number of days was 304. It was however soon discovered that the civil year, as thus constituted, was much shorter than the solar year. Romulus therefore added two intercalary months to every year; but these months were not inserted in the kalendar, nor were any names assigned to them until the following reign. Some Roman antiquarians maintained that the old kalendar continued in use till the time of Tarquinius Priscus.

Numa, in imitation of the Greeks, divided the year into twelve months, according to the course of the moon, consisting in all of 354 days: according to Pliny (*Hist. Nat.* xxxiv. 7), he afterwards added one day more to make the number odd, which was thought a more fortunate number. But as ten days, five hours, forty-nine minutes (or rather forty-eight minutes fifty-eight seconds) were wanting to make the lunar year correspond to the course of the sun, he intercalated every other year an extraordinary month, called *Mensis intercalaris*, or *Mercedonicus*, between the 23rd and 24th of February. This month appears to have consisted alternately of 22 and 23 days during periods of 22 years, the last biennium in the 22 years being entirely passed over. The intercalation of this month was left to the discretion of the pontifices, who, by inserting more or fewer days, used to make the current year longer or shorter, as was most convenient for themselves or their friends; for instance, that a magistrate might sooner or later resign his office, or contractors for the revenue have longer or shorter time to collect the taxes. In consequence of this licence the months were transposed from their proper seasons; the winter months carried back into autumn, and the autumnal into summer. Some critics are of opinion that there is a reference to this confusion in one of Cicero's letters to his friend Atticus (x. 17).

Julius Cæsar, when he had made himself master of the state, resolved to put an end to this disorder, by abolishing the use of the intercalations; and for that purpose, B.C. 47, adjusted the year according to the course of the sun, and assigned to the months the number of days which they still contain. He also added an intercalary day to February every four years. [Bissextile.] To make everything proceed regularly, from the 1st of the ensuing January, he inserted in the current year, besides the intercalary month of 23 days, which fell into it, two extraordinary months between November and December, the one of 33, the other of 34 days; so that this year, which was called the last year of *confusion*, consisted of fifteen months, or 445 days. (Sueton., *Vit. J. Cæs.*, c. 40.) These 67 days were inserted in order to set the year right, which was 67 days in advance of the true time.

All this was effected by the care and skill of Sosigenes, an astronomer of Alexandria, whom Cæsar had brought to Rome for that purpose; and a new kalendar was formed from his arrangement by Flavius, digested according to the order of the Roman festivals, and the old manner of computing the days by kalends, nones, and ides, which was published and authorised by the dictator's edict.

This is the *Julian* or Solar year, which continues in use to this day in all Christian countries, without any other variation than that of the *old* and *new style*, which was occasioned by a regulation of Pope Gregory XIII., A.D. 1582, who, observing that the vernal equinox, which at the time of the council of Nice, A.D. 325, had been on the 21st of March, then happened on the 10th, by the advice of astronomers caused ten days to be thrown out of the current year, between the 4th and 15th of October; and to make the civil year for the future to agree with the real one, or with the annual revolution of the earth round the sun, or, as it was then expressed, with the annual motion of the sun in the ecliptic, which is completed in 365 days, 5 hours, 49 minutes, he ordained that every 100th year should not be leap-year; excepting the 400th; so that the difference will hardly amount to a day in 7000 years, or, according to a more accurate computation of the length of the year, to a day in 5200 years.

This alteration of the style was immediately adopted in all Catholic countries; but not in Great Britain till the year 1752, when eleven days were dropped between the 2nd and 14th of September, so that this month contained only nineteen days; and thenceforth the new or reformed style was adopted, as it had been before in the other countries of Europe. The same year also another alteration was made in England, by which the legal year, which before had begun on the 25th of March, began upon the 1st of January; this alteration first took place on the 1st of January, 1752. (See the Statute, 24 Geo. II., ch. 23.) By this statute it was also enacted that the several years of our Lord 1800, 1900, 2100, 2200, 2300, or any hundreth years of our Lord which shall happen in time to come, except only every fourth hundredth year of our Lord, whereof the year 2000 shall be the first, shall not be deemed bissextile or leap-years, but shall be considered as common years, consisting of 365 days only; and that the years of our Lord 2000, 2400, 2800, and every other fourth hundredth year of our Lord from the year 2000 inclusive, and also all other years of our Lord which, by the present computation, are considered bissextile or leap-years, shall, for the future be esteemed bissextile or leap-years, consisting of 366 days: and that whereas according to the rule then in use for calculating Easter-day, that feast was fixed to the first Sunday after the first full moon next after the 21st of March; and if the full moon happens on a Sunday, then Easter-day is the Sunday after; which rule had been adopted by the general council of Nice; but that as the method of computing the full moons then used in the church of England, and according to which the table to find Easter prefixed to the book of Common Prayer is found, had become erroneous, it was enacted that the said method should be discontinued, and that from and after the 2nd of September, 1752, Easter-day and the other moveable and other feasts were henceforward to be reckoned according to the kalendar tables and rules annexed to the act, and attached to the books of Common Prayer.

It is not generally known that an effort was made to reform the kalendar in England, as early as the reign of Queen Elizabeth. On the 16th of March, 27 Eliz., A.D. 1584-5, a bill was read the first time in the House of Lords, entitled 'An Act giving Her Majesty authority to alter and new make a Kalendar according to the Kalendar used in other Countries.' It was read a second time on the eighteenth of that month, after which no notice occurs of the proposed measure.

The formation of the *Hebrew* kalendar is fixed by some to the same year as the council of Nice, A.D. 325: others have placed it in the year 360; and others as late as A.D. 500. Lindo however assures us that the Mishna compiled according to the Jewish account in the year A.D. 141 proves that the kalendar as used by the Jews in its present form, with the intercalary month, was generally known and followed at that time. For further information upon the Jewish kalendar the reader may consult Dr. Adam Clarke's *Commentary upon the Bible*, and Lindo's *Jewish Calendar*.

Two *Kalendars* are *in use in the East*: the Arabian, which is common to all the Mohammedan countries; and the Persian, the use of which is peculiar to that country. This last is founded on the Persian æra called 'Yezdegird.'

The last we shall mention is the *French Revolutionary Kalendar*. In September, 1793, the French nation resolved that the republic should form a new æra, and that a kalendar should be adopted on what were termed philosophical principles. The Convention therefore decreed, on the 24th of November, 1793, that the common æra should be abolished in all civil affairs: that the new French æra should commence from the foundation of the republic, namely, on the 22nd of September, 1792, on the day of the true autumnal equinox, when the sun entered Libra at 9^{h} 18 30^{s} in the morning, according to the meridian of Paris; that each year should begin at the midnight of the day on which the true autumnal equinox falls; and that the first year of the French republic had begun on the midnight of the 22nd of September, and terminated on the midnight between the 21st and 22nd of September, 1793. To produce a correspondence between the seasons and the civil year, it was decreed, that the fourth year of the republic should be the first sextile, or leap-year · that a sixth complementary day should be added to it, and that it should terminate the first Franciade; that the sextile or leap-year, which they called an olympic year, should take place every four years, and should mark the close of each Franciade; that the first, second, and third centurial years, namely, 100, 200, and 300 of the republic, should be common, and that the fourth centurial year, namely, 400, should be sextile; and that this should be the case every fourth century until the 40th, which should terminate with a common year. The year was divided into twelve months of thirty days each, with five additional days at the end, which were celebrated as festivals, and which obtained the absurd name of 'Sans-culottides.' Instead of the months being divided into weeks, they consisted of three parts called Decades, of ten days each. It is however to be observed that the French republicans rarely adopted the decades in dating their letters, or in conversation, but used the number of the day of each month of their kalendar.

The republican kalendar was first used on the 26th of November, 1793, and was discontinued on the 31st of December, 1805, when the Gregorian was resumed.

Of the three parts into which the Romans divided their month, the *kalendæ*, or kalends, have been already explained. They were so called (à *calando* vel *vocando*), from the pontifex calling out to the people that it was new moon. The fifth day of the month was called *Nonæ*, the nones, and the 13th *Idus*, the ides, from the verb *iduare*, to divide; because the ides nearly divided the month. The nones, from *nonus*, the ninth, were so called because, counting inclusively, they were nine days from the ides. In March, May, July, and October, the nones fell on the 7th and the ides on the 15th of the month. The mode of fixing any particular day was by saying that it was so many days before the kalends, nones, or ides, next immediately following. Thus the 28th of April was the 4th day before the kalends of March; the 4th of March was the 4th day before the nones of March; and the 9th of March was the 7th day before the ides of March.

The Attic year consisted of twelve lunar months of 30 and 29 days alternately: an intercalary month of 29 or 30 days was inserted every two years, but as this was 7½ days too much, the intercalary month was sometimes omitted. The full Attic month consisted of 30 days, and was divided into three decades.

On the subject of the Greek Kalendar the reader may consult Ideler, *Handbuch der Mathematischen und Technischen Chronologie*.

(Adams's *Roman Antiquities*; Niebuhr, *On the Secular Cycle*, *Hist. of Rome*; Brady's *Clavis Calendaria*; Sir Harris Nicolas's *Chronology of History*; Hutton's *Philosophical and Mathematical Dictionary*, v. *Calendar*; Lindo's *Jewish Calendar*, 8vo. Lond. 1838.)

KALENDÆ. [KALENDAR.]

KALI, the name of the maritime plant from the ashes of which soda is obtained by lixiviation; and from the name of this plant, with the Arabic article *al*, is derived that of a class of substances possessing peculiar properties. [ALKALI.] Kali was also formerly employed to designate the alkali potash. [POTASSIUM.]

KALMUCKS. [CALMUCKS.]

KALSEEPEE. [ANTELOPE, vol. ii., p. 83.]

KALU'GA, a government of European Russia, lies between 53° 24′ and 55° 21′ N. lat., and 33° 20 and 37° E. long. It is bounded on the west and north-west by Smolensk, on the north-east by Moscow, on the east by Tula, and on the south by Orel. Authors differ extremely respecting its area. Schubert and Stein make the area about 8500 square miles; others make it considerably more, and Soimonoff gives it at 12,530, which Hassel however thinks too much, and prefers Schubert's estimate. According to the maps before us, we should say between 11,000 and 12,000; its length being 150 miles, and the mean breadth 75. The population is stated in 1836 at 1,309,500. The face of the country is one unvarying level; here and there broken by a low hill or the wooded bank of a river. In every direction there is one boundless flat, consisting partly of corn-fields, partly of meadows and commons, and it is but seldom that a little enclosure or a group of wood interrupts the uniformity of this uninviting scene. The soil varies considerably, but for the most part is clayey and sandy; in parts there is stiff clay: rich black mould is rare. Of the eighteen rivers, the principal are the Oka, a branch of the Volga, which is navigable by barks all the year; the Uva, which flows into the government of Tula, but is here navigable by barks only when the water is high; the Shisdra, which falls into the Oka to the west of Kaluga; the Ugra, which in some places forms the boundary towards Smolensk, and united with the Wora joins the Oka; the Ressata and the Tarusa, which flow into the Oka, and which, like the Shisdra and Ugra, are used only for floating rafts of timber. The Bolwa continues its course to Orel. According to Storch there are eleven, and according to Georgi five small lakes, one of which, in the circle of Serpeisk, is five wersts in length and one in breadth. There are marshes in some parts. The rivers freeze about the end of November and thaw by the end of March. The soil, being on the whole indifferent, requires much care and abundance of manure to make it yield four or five-fold; in general the produce is but two or three-fold; common barley, which produces from five to eight-fold, is often mixed with rye for bread. It is only in favourable years that the province produces enough for its own consumption. Hemp and flax are staple products, affording a surplus for exportation. Horticulture is carefully attended to: the inhabitants of the towns, as well as of the country, have their kitchen-gardens, which yield not only ordinary vegetables and potatoes, but abundance of hops and apples; finer kinds of fruit and vegetables are confined to the gardens of the rich. The forests, having been better managed than in some other governments, yield plenty of timber for all purposes. Game and fish are not plentiful. The breeding of cattle is merely subsidiary to agriculture, and the number of cattle is very small; the breeding of horses alone is attended to. The mineral products are bog-iron, stone for mill-stones, lime, gypsum, and turf; though no mines are worked, there are several great iron-forges, where, besides a little of their own bog-iron, ore from the other provinces is smelted.

The inhabitants are active, very temperate, and in easy circumstances. The country-people, especially the women, are much engaged in spinning and weaving; the men are chiefly mechanics and shopkeepers; and many go for work into other provinces. The brandy distilleries are very considerable. The manufactures of coarse woollens, linen, sail-cloth, calico, silk, velvet, ribbons, leather, paper, glass, are important, considering the backward state of the country in general, and pretty large quantities are exported. Of the natural productions very little can be spared for exportation. The inhabitants are all Russians of the Greek church, under the bishop of Kaluga. The nobility are very numerous.

KALUGA, the capital of the government, is situated in 54° 30′ W. lat. and 36° 5′ E. long., on the river Oka, which is here 200 yards wide. It is about six miles in circumference, surrounded with a rampart converted into a public walk, has narrow crooked streets, and for the most part wooden houses. There are some good buildings, such as the bishop's palace, the residence of the governor, and the principal church; and there are 23 stone churches, an ecclesiastical seminary, a convent of nuns, a gymnasium, several schools, a theatre, a foundling hospital, &c. The manufactories are considerable, and the export trade, which extends even to Danzig, Königsberg, Brody, and Leipzig, is very active. The exports are canvas, paper, hats, leather, cottons, and woollens; likewise hemp-seed, hemp, flax, linseed, honey, and wax. Population (1836) 32,345.

KAMICHI. [PALAMEDEA; RALLIDÆ; MEGAPODIDÆ.]

KA'MPEN, or **CAMPEN**, a town of the Netherlands, in the province of Overyssel,* in 52° 37′ N. lat. and 5° 48′ E. long., situated on the left bank of the Yssel, near its mouth in the Zuyderzee, where it divides into several arms, and forms the island of Kampen. It was built in the year 1286; the antient fortifications are in a very dilapidated state. It has two churches, and a wooden bridge over the Yssel 723 feet long and 20 feet wide. The inhabitants amount to 8900: they manufacture great quantities of blankets, plush, and felt; and carry on a salmon-fishery on the Yssel. The trade, which formerly was considerable, has declined in consequence of the port being much choked up with sand. The environs can be laid under water.

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* By mistake a reference has been made to this article from DRENTHE.

KAMTCHATKA, a peninsula projecting from the north-eastern parts of Asia into the Pacific, in a direction nearly due south, lies between 51° and 63° N. lat., and between 155° and 165° E. long. Its length is above 800 miles, and its width varies between 30 and 120 miles. Its area is stated to be about 86,000 square miles, or somewhat less than that of Great Britain.

Its southern extremity, Cape Lopatka, is a low and narrow tongue of land (51° N. lat.), which however widens as it proceeds northward, and gradually rises into mountains. The country south of 53° 5′ is covered with hills and mountains, which are rocky and barren, and only in some inconsiderable valleys clothed with creeping cedar, and willow and stunted birch. At about 53° 5′ N. lat. is a mountain-knot, whence issue two ranges, one running due north, and the other north-east. These ranges enclose the vale of the river Kamtchatka. The western range, which first runs nearly due north, declines afterwards to north-north-east, and in that direction traverses the whole length of the peninsula, joining north of it the eastern branches of the Aldan Mountains. It does not appear to contain high summits, and its mean elevation probably does not rise above the line of trees, which in this country is about 3000 feet above the sea. But the range running east of the river Kamtchatka is distinguished by several high summits, which are of volcanic origin, and most of them still active. The highest, from south to north, are the Awatchanskaja, which rises to about 9500 feet; the Tolbatchinskaja, which attains 8346 feet; the Kliootchewskaja, the highest of all, rising to 15,825 feet; and the Shiwelutchkaja, whose highest summit is 10,591 feet above the sea-level. These volcanoes constitute the northern extremity of that extensive series which encloses the eastern coast of Asia, and traversing the islands of Japan and the Philippines, probably has a connection with the other series of volcanoes which traverse the Sunda and Molucca islands from east to west.

The mountains approach close to the eastern coast, which is composed of high rocks, rugged cliffs, and bold promontories, forming numerous inlets, the entrances to which are blocked up by reefs of rocks. The mountains are mostly covered with trees, which grow to a considerable height towards the south, but diminish in size as we advance northward. Numerous rocks are scattered in the sea at a distance of from one to three miles from the shores; some of them are only discernible by the breakers, while others tower up to a considerable height. The depth of the sea varies considerably and suddenly from 30 to 90 fathoms and more. Earthquakes are frequent, and sometimes very violent.

The western shores along the Sea of Okhotzk, or, as it is now frequently called, the Sea of Tarakai, north of the mountain-knot, are uniformly low and sandy to a distance of about 25 or 30 miles inland. They produce only willow, alder, and mountain-ash, with some scattered patches of stunted birch, and towards the north they are almost entirely overgrown with rein-deer moss. The sea is shallow to a considerable distance, and the soundings very regular. The small rivers which traverse this region have at their mouth not more than six feet at low water, with a considerable surf breaking on the sandy beach.

The best part of the peninsula is the vale of the Kamtchatka river, which towards its southern extremity is 40 miles across, but grows narrower as it proceeds northward. Its length is 180 miles. Its soil is deep and rich, composed of a black earth, and exhibits a considerable degree of fertility.

Among the rivers, only the Kamtchatka requires notice. It rises on the northern declivity of the mountain-knot, runs in general in a northern direction through the vale, but at Nishnei Kamtchatka, where it approaches its northern extremity, it turns east, and empties itself in a large but shallow bay, which is only eight feet deep at high water, and in which the breakers are very violent when an easterly wind blows. It flows about 300 miles, and is the only navigable river in the peninsula.

The climate of Kamtchatka, when compared with that of Europe under the same latitude, is very severe, but it is much milder than the eastern districts of Siberia. The frost sets in about the 10th of October, but up to the middle of December the thermometer commonly varies between 23° and 27° Fahr. During the following months it averages between 14° and 20°. In very severe frost it descends to − 10° and − 15°, and sometimes, though rarely, to − 25°. On the sea-coast vegetation does not begin before the end of April, but in the vale of the Kamtchatka, which is sheltered on all sides by mountains, it begins at the end of March. Rain is frequent in summer, and in winter a great deal of snow falls.

Agriculture was introduced more than 80 years ago. In some places on the western coast, but more extensively in the vale of the Kamtchatka river, rye, barley, buck-wheat, potatoes, white cabbages, turnips, radishes, and cucumbers are grown, but these articles are only cultivated by the Russian settlers. The number of horses and cattle is on the increase. The natives formerly lived chiefly on the produce of the chace, by hunting bears, wild sheep, or argalis, wild rein-deer, ermines, black, red and stone foxes, wolves, sables, sea-otters, and fish otters; but since the number of these animals has considerably decreased, their time and industry are employed in fishing. In no part of the globe is fish more abundant. The natives scarcely know any other kind of food, and the bears and dogs, wolves and foxes, sea-otters and seals, water-fowl and birds of prey of various sorts, all feed upon fish. The most numerous kinds are herrings, salmon, and cod. Wild-fowl, especially geese and ducks, are very numerous and easily taken, as also sea-fowl, some species of which are eaten; but their eggs are of more importance to the inhabitants, of which whole boats-full are easily collected. Poultry is very scarce on account of the dogs, who devour the fowls wherever they find them. Whales are numerous, but they are not taken.

The forests, which cover the eastern chain, contain many fine timber-trees, which are little used, but might be employed in ship-building. These forests contain chiefly birch, larch, fir, and cedar pine (*pinus cembra*). The mineral wealth is little known: in some places there is iron-ore, and sulphur in immense beds is found in the vicinity of the volcanoes.

Two native tribes inhabit the peninsula, the Kamtchadales and the Koriakes, the former occupying the peninsula as far as 58° N. lat. The Koriakes wander through the country north of that of the Kamtchadales. It is not certain whether both tribes belong to the same race of men, but the difference in their features is not great. The Kamtchadales are short, but stout, and broad in the shoulders. Their head is large, their face flat and broad, their cheek-bones are prominent, their lips thin and their nose flattened. Their hair is black, hard and lank, their eyes sunk in the head, and their legs thin. They evidently belong to the Mongol race. The Koriakes are principally distinguished from them by the smallness of their head. Both nations differ in language and in mode of life. The Kamtchadales are huntsmen and fishermen, have fixed habitations, and use dogs to draw their sledges in winter. The Koriakes are a wandering tribe, subsisting on the produce of their numerous herds of rein-deer, of which the richer among them frequently possess several thousands, and their sledges are drawn by these animals. This last-mentioned tribe is scattered over a considerable part of the country between the Sea of Okhotzk and the Polar Sea. The whole population of the peninsula is stated not to exceed 5000 souls, but it seems that the wandering Koriakes are not included in this estimate. The number of Russian settlers and their descendants is said to amount to 1400, a few Cossacks included. The remainder are Kamtchadales.

The principal place is now Pétropaulovski, built on an extensive bay [AWATSKA BAY], with about 600 inhabitants. Nishnei Kamtchatka, on the river Kamtchatka, formerly the residence of the governor, hardly contains more than 100 inhabitants. Bolcheresk has a small harbour on the western coast, and about 200 inhabitants.

The commerce of Kamtchatka is inconsiderable. It exports only the furs of several animals which are taken by the natives, and imports several articles of food, especially flour, and of luxury, as whiskey, &c. But during the last century it acquired a greater importance by becoming the place whence the Russo-American Company sent vessels to the north-west coast of America for the purpose of procuring furs and skins of several wild animals, which pass from Kamtchatka to Okhotzk and thence to Kiachta. Since the re-establishment of peace in Europe, and the restitution of the island of Java, the Dutch have begun to send every year one or two vessels to Petropaulovski with rice, flour, brandy, sugar, coffee, cloth, &c., and these goods pass hence into the eastern districts of Siberia.

Kamtchatka is a Russian province annexed to the government of Eastern Siberia, or that of Irkutsk.

(Cook's *Third Voyage;* Beechy's *Voyage;* Suer's *Account of an Expedition to the Northern Parts of Russia;* Krusenstern's *Voyage;* and Langsdorff's *Voyages and Travels in various Parts of the World.*)

KANDAHAR, or CANDAHAR. [AFGHANISTAN.]

KANGAROO, KANGOOROO, or KANGUROO. [MARSUPIALIA.]

KANT, IMMANUEL, the author of the 'Critical Philosophy,' and distinguished as well for the profundity of his views as for the extent and variety of his researches, was born April 22, 1724, at Königsberg in Prussia, where he died on the 12th of February, 1804. His native city, to which he was so attached that in a long life of nearly 80 years he never left it long or for a great distance, was the scene of Kant's literary activity. Educated at its gymnasium, he removed in 1748 to its university to attend the classes of philosophy, mathematics, and theology. Upon the completion of his academical studies, Kant passed many years in the capacity of tutor, according to his own confession with little satisfaction to himself, since the desire of acquiring knowledge interfered with the duty of imparting it. In 1755 he passed to the degree of M.A., when he commenced a series of private lectures on logic and metaphysics, physics, and mathematics, which he continued to give for fifteen years, until he was invited, in 1770, to fill the chair of the former science, which he held until 1794, when his declining strength compelled him to resign its arduous and laborious duties.

The skill and success with which Kant attacked, with his able and searching criticism, the specious but false pretensions of the existing philosophy, gained him the name of the 'smasher,' or the 'destroyer' (*der zermalmende*), from those who pretended that he was more skilful in destroying than in reconstructing a system. At the time when Kant first entered directly into the arena of philosophy, its possession was disputed by a superficial eclecticism and uncompromising dogmatism on the one hand, and on the other by a bold unlimited doubt which was cherished by the refined and consequential scepticism of Hume's writings. To put an end to this state of things, which was as dangerous to the truths of morality and religion as it was subversive of the legitimacy of knowledge, was the object of Kant's philosophical labours; and for this purpose he sought to expel both dogmatism and scepticism from the domain of philosophy.

Kant accordingly proceeded to an examination of man's cognitive faculty, in order to discover the laws and extent of its operation. This investigation he designated the criticism of the pure reason, and held that the reason, as a pure faculty, must criticise not only itself, but also, as the highest activity of the human intellect, the subordinate faculties of sense and understanding. Kant understood by *pure* whatever is independent of experience, as opposed to the empirical, which rests upon it. The pure, or whatever in knowledge expresses the universal and necessary is *à priori*, that is, antecedent to experience; whereas all that is contingent or only comparatively general is *à posteriori*. The first requisite in philosophy is a science which may establish a possibility, and determine the principles and extent of such knowledge. Now it cannot be derived from experience, which only shows an object to us such as it appears to be, without declaring that it must be such as it is. All attempts to derive the necessary from experience are unsuccessful, simply because they contradict the consciousness which recognises an essential difference between necessary and contingent. Experience serves only as a stimulus to awaken the faculties of pure cognition, so that afterwards, by reflection and abstraction (*absonderung*), we become specially conscious of them. As then we are undoubtedly in possession of such pure or *à priori* knowledge, of which it is impossible to place the origin in experience, it must have its root in the pure reason itself, which, on the other hand, cannot be the ground of the contingent and empirical; for the pure reason contains nothing but the formal or necessary principles of all knowledge, whereas the objects to which these principles refer are given to the mind from without. As an instance of these universal and necessary principles, Kant adduces the law of causation, the speculations of Hume upon which afforded the occasion of his philosophical investigations. He observes that the notion of a cause so manifestly implies the necessity of its being connected with some effect, and enforces so strongly the universality of this law, that it is totally inconsistent with the derivation of it from the repeated association of an effect with an antecedent. The next point which Kant notices in the 'Introduction to Critic of the Pure Reason,' as of great importance for the right appreciation of his philosophical system, is the distinction between analytical and synthetical judgments. The former are those in which the predicate is connected with the subject by identity; the latter are devoid of all identity of the subject and predicate. Analytical judgments may be also termed explanatory, the synthetical extending (*erweiterungsurtheile*) judgments; since in the former the predicate adds nothing to the notion of the subject, and only resolves the notion which forms the subject into its constituent and subordinate notions, which however involved are really contained in it, whereas in the latter a new element is added by the predicate to those already contained in the subject, which was not previously understood in it, and therefore would not result from it by any analysis. For instance, the proposition that all bodies are extended is analytical; but the assertion that all bodies are heavy is synthetical. All the conclusions of experience are synthetical. Experience proves the possibility of the synthesis of the predicate 'heavy,' with the subject 'body;' for these two notions, although neither is contained in the other, are nevertheless parts of a whole, or of experience, which is itself a synthetical combination of its intuitions (*anschauungen*), although they only belong to each other contingently.

This contingent bond of union however is wholly wanting in synthetic judgments *à priori*. For instance, in the position, 'whatever happens has a cause,' the notion of a cause is not contained in the subject 'whatever happens,' and it indicates something very different from it. How then, and by what means, are we enabled to say of 'whatever happens' something absolutely different from it, and to recognise 'cause,' although not contained in it, as necessarily belonging to it? What is that unknown principle (=X) on which the understanding relies, when of the subject A it finds a foreign predicate B, and believes itself justified in asserting their necessary connexion? It cannot be experience, since in the above proposition the conception of a cause is attached to the subject, not merely generally, but universally and necessarily. Now all speculative *à priori* knowledge ultimately rests upon such synthetic or extending judgments; for though the analytical are highly important and requisite for science, still their importance is mainly derived from their being indispensable to a wide and legitimate synthesis, whereby alone a new acquisition in science can be made. The proper problem therefore of the pure reason is contained in the question—how are synthetic judgments *à priori* possible?

With a view to resolve this problem of the pure reason Kant begins with an exposition of the transcendental elements of knowledge (*transcendental elementarlehre*). By transcendental he understood original or primary, or whatever is determined *à priori* in reference not only to human cognition but also to man's collective activity, and which consequently is the basis of the empirical, or that which is determined *à posteriori*. In short, all pure knowledge makes up the transcendental philosophy, and on it rest the authority and possibility of cognition. The *elementarlehre* is divided into the transcendental æsthetic and the trancendental logic. In the former Kant investigates the *à priori* elements of the lowest cognitive faculty—sensation; in the latter, those of the understanding and of the reason. In the æsthetic he shows that the sensuous faculty receives the matter of its intuitions and sensations from without by means of certain affections or excitements of the sense, whereas the forms according to or by means of which this matter is shaped into representations or conceptions of determinate objects are given originally and by itself. These forms are the pure intuitions of space and time, because in them nothing else is intuitively viewed than the unity of that which is multiple either in succession or in co-existence. On this account he calls time and space forms of intuition, and designates the objects which we so intuitively view by the name of phenomena. Of the ground of these phenomena, or, as Kant termed it, the thing in and by itself, it is left doubtful and undetermined whether it is anything actual or not, notwithstanding that Kant ascribes to phenomena themselves a certain objectivity or reality, on the ground that from their constancy and regularity they cannot be a mere semblance or illusion of the senses. On this account his theory has been called a transcendental idealism, as being in nowise inconsistent with that system of empirical realism which by our conduct in life we practically maintain.

Transcendental logic is divided into analytic and dialectic, of which the former is the critic, or investigation of the understanding, as the faculty of notions; the latter, of the reason, as the faculty of ideas. In the analytic we are taught that it is only when objects have been conceived by the understanding agreeably to its laws, that they can become an object of knowledge. The operations of the understanding are confined to analysis and synthesis, where however every analysis presupposes a synthesis. A combination of the multiple into unity constitutes a notion (*begriff*), and the understanding is therefore the faculty of notions. The law of the forms of these notions, irrespective of their contents, is investigated by logic in general, whereas the investigation of these notions in reference to their contents is the proper office of transcendental logic. Notions are either pure or empirical: the former indicating merely the nature and the manner of their combination; the latter, the multiple matter presented by experience. Both are equally necessary to knowledge, for the pure notion is an empty thing apart from the representations, and the latter without the former are blind (*Kritik d. rein. Vern*, p. 55). As sensation only receives matter upon the affection of the senses, it is a mere receptivity, whereas the understanding, which subsumes the given multiple into unity, is a spontaneity. The consciousness of the individual in this multiplicity is effected by the imagination, which combines them into a whole; whereas the unity, by which the multiplicity, as sensuously perceived, is recognised as an object, is a work of the understanding. Now this unity constitutes the form of the notion, which therefore is the peculiar creation of the understanding. As these forms are different, a complete enumeration of them conformable to some stable principle is necessary in order to a discovery of the laws of knowledge by the understanding. Now all the primary modes of the operations of the understanding, whereby objective unity is imparted to the perceived matter, may be reduced to one of these four: quantity, quality, relation, and modality. These, with their subordinates, Kant denominates categories after Aristotle, as determining in and by themselves what in general and antecedently (*à priori*) may be predicated of objects.

The three categories of quantity are unity, multitude, and totality; those of quality, reality, negation, and limitation. Those of relation are double and are paired together, as substance and accident, cause and effect, action and re-action. Lastly, the subordinates of modality are possibility, existence, and necessity.

The process by which these 12 categories, or pure notions of the understanding, are combined with space and time, the pure intuitions of sensation, and thereby presented to knowledge in their possible application to the objects of sense, Kant calls schematism (σχηματισμός). For instance, the notion of substance is said to be schematised, when it is not conceived of absolutely as a self-subsisting thing, but as one which persists in time, and therefore as a constant and persisting substrate of certain variable qualities or determinations. Notions thus rendered sensible are called schematised, in opposition to the pure categories. In this process the imagination co-operates with the understanding, and its action is original and necessary, since its activity is inseparably bound up with the primary images of space and time. Out of this schematism of notions and the judgments which arise from their combination, the grand principles which regulate the operations of the understanding result. These judgments are either analytical or synthetical. The grand principle of the former in which identity affords the connexion between the subject and the predicate, is the principle of contradiction. The mere absence however of contradiction is not sufficient to legitimate the object matter of any proposition, since there may easily be a synthesis of notions which is not grounded in objects, notwithstanding that it is not inconsistent to conceive. In synthetic judgments, on the other hand, we go beyond the notion which forms the subject, and we ascribe to it a predicate, the connexion of which with the subject does not appear immediately from the judgment itself. The possibility of this synthesis implies a medium on which it may rest, and this is the unity of the synthesis in truth *à priori*. The following is the ultimate principle of synthetic judgments:—All objects are subject to the necessary conditions of the synthetic unity of the multiple objects of intuition in a possible experience. As this unity is established according to the table of categories, there must be as many pure synthetic principles as categories, and the different characters of their application must depend upon the different characters of the latter. These are either mathematical, and relate to the possibility of intuition, or dynamical, and relate to the existence of phenomena. Accordingly the principles of the understanding are, relatively to their use, either mathematical or dynamical. The former are unconditionally necessary, since the possibility of intuition depends upon them; the latter only conditionally necessary, for so far as concerns the existence of phenomena, which for a possible experience is contingent, they imply the condition of empirical thought, notwithstanding that in their application to it they invariably maintain their *à priori* necessity.

By these principles of the pure understanding the possibility of mathematics and of a pure science of nature may be fully and satisfactorily explained. The matter of mathematics is the multiple object of space and time, which are given as the forms of *à priori* intuition. This multiple matter is elaborated by the understanding according to the rules of logic, and as the phenomena must be in accordance with the conditions of space and time, or the forms under which they are intuitively viewed, *i.e.* the relations of space and time must be discoverable in phenomena themselves. The possibility of mathematics therefore rests simply on this, that objects cannot be conceived of except in space and time, from which however it follows at the same time that mathematics do not admit of application beyond the sphere of sensible phenomena. The pure science of nature likewise cannot have any other object than the system of *à priori* laws. It is only under the forms of sensation that individual objects can be intuitively viewed, and their mutual connexion cannot be thought of otherwise than under the forms of the understanding. If then the system of phenomena are to be an object of knowledge, they must correspond to the pure synthetical principles of the understanding, and it is only by these *à priori* laws that a science of nature is possible. But the principles of this pure science of nature do not admit of being applied beyond the domain of experience.

The important result of the transcendental logic is that the operations of the understanding are only legitimate in reference to experience, and that consequently the use of the understanding is empirical, and not transcendental. It would be the latter if it could apply itself to objects not as phenomena merely, but as things absolutely. But such a use of the understanding is obviously invalid, since the objective matter of a notion, or *begriff*, is given by intuition alone, and it is only by means of the empirical that the pure intuition itself comes to the object of which it is the form. These forms are simply representations of the object according as it conceived under them. To the *subsumtion* of an object under a category, a schema, 'time,' is indispensable, and, apart from all sensation, this schema itself does not subsist; and the subsumtion, or arrangement of an object under the categories, is impossible. There may undoubtedly be a logical use of the categories beyond the domain of experience, but this, notwithstanding that it has its ground in the nature of human reason, is either altogether idle, or else involved in contradictions (antinomie) which the transcendental dialectic investigates.

But besides phenomena there are other objects presented to the understanding, by a non-sensuous intuition of which consequently it can take cognisance. These Kant calls *noumena* (νούμενα). The distinction between noumena and phenomena does not consist merely in a logical difference of the greater or less distinctness of their cognoscibility, but in a specific difference of the objects themselves. A noumenon is not the thing in and by itself, for the thing in and by itself becomes evanescent for knowledge when conceived of independently of all sensuous forms. Nevertheless as experience invariably refers back to something independent of and prior to sensation, the noumenon may be considered as an object which is presented to the understanding by an unsensuous intuition. The general possibility of such a species of intuition is undeniable, notwithstanding that its objects are impossible to be known by man, whose knowledge is dependent on sensation. In a positive sense Kant applies the term of *noumenon* to the notion of God, and generally to all supra-sensible objects, which may be conceived of, but nevertheless cannot be an object of perception.

The criticism of the transcendental dialectic gives this result—that the ideas of the reason, as pure speculative ideas, are nothing more than simple conceptions, for which no corresponding object can be scientifically shown to exist. Accordingly neither the existence of God, nor the immortality of the soul, nor the freedom of the will, can be demonstratively established. Nevertheless the reason is not merely a theoretical, but also a practical faculty, *i.e.* it gives the law of human conduct and action. Now these laws present themselves with such unconditional necessity (the *categorical imperative*), that no rational man endued with self-esteem can refuse obedience to them; and, on the other hand, without the freedom of the will these laws could not be obeyed; and without God and the soul's immortality there would be no final cause or motive for human conduct, which must be placed in a state of felicity, agreeable to morality, provided by and to be obtained through God, in another and a better life. Consequently every man who is conscious of his moral destination holds these practical ideas to be both true and objectively legitimate, notwithstanding that he is compelled or required to admit them merely by a subjective ground—the testimony of his own consciousness, and of the moral wants resulting from *its* dictates. This Kant calls the postulate of the practical reason. The acceptance of this postulate as true and legitimate does not constitute a scientific certainty, or knowledge properly, which indeed does not exist for the supra-sensible; it is merely a belief. This faith, or belief, however, is thus distinguished from every other, that it is a moral or practical faith, and consequently possesses for the believer all the certainty requisite for the guidance and conduct of life, and consequently it enjoys a subjective certainty and authority. This faith is the proper foundation of religion, which is nothing else than a conscientious observance of all duties as divine commands, since God, as the moral law-giver, cannot be worthily honoured otherwise than by obedience to the laws of morality.

Lastly, the critic of the faculty of the judgment (*urtheilskraft*) investigates its operations from an æsthetical or teleological point of view. The totality of objects which constitute nature are in harmony with man's faculty of knowledge. Every object may be considered æsthetically or teleologically; it possesses as it were two natures, one æsthetical and one teleological. The former is the point of view under which it appears to man; the latter consists in its formal or material concordance with the general harmony of things. Now the agreement which we perceive to subsist between a particular object and such an end does not belong to and is not in the object itself. It is, on the contrary, purely subjective; it belongs to the mind that discovers it, and is dependent upon the mental constitution. In the same manner the judgment is of two kinds. It may either refer to man's mode of conceiving and apprehending objects, and to the degree of pleasure with which the perceptions of them are accompanied; or it may consider the harmonious co-ordination of all things and their subordination to a general end, *i.e.* the objective harmony of nature. The beautiful, the agreeable, and the useful are the forms of our æsthetical judgments, and the perceptions of them are accompanied with pleasure. Nevertheless they affect us differently, and the sensation of pleasure which the beautiful occasions is of all the most complete. The beautiful is the most noble and most elevated of all the forms of æsthetical judgments. It exists in us antecedently to and independently of all experience. It is inherent in us, and forms a constituent element of our proper nature. Our judgments of objects are as necessarily respective of the beautiful as the practical reason is of the just and the good.

The knowledge of nature is only possible on these two conditions: that there are certain relations subsisting between the system of nature and the human mind; and that harmony reigns throughout the system of natural objects, and the necessary subordination of each separately to some general end. Considered in this light, organical being is the most excellent production of nature. The examination of any organical body displays an admirable subordination of the parts to the whole, and the whole itself is in exquisite harmony with each of its parts. But at the same time the whole itself is but a mean to other ends, a part in a greater totality. Consequently the most exalted form of the teleological judgment is that which considers the whole system of nature as one vast organical structure. Thus considered, the synthetic activity of the judgment exercises itself in two ways, either æsthetically or teleologically. In the former case it refers all its decisions to the idea of the beautiful; in the latter, it subordinates all things to a final cause.

No complete edition of the works of Kant has yet appeared. The most important in a philosophical sense are the 'Kritik der reinen Vernunft,' 7 ausg., Leipzig, 1828; 'Kritik d. praktischen Vernunft,' 6 ausg., Leipz., 1827; and the 'Kritik d. Urtheilskraft,' 3 ausg., Berl., 1827. For a list of his other works see Tennemann's *Manual of the History of Philosophy* (English translation), p. 409, Oxford, 1832.

KANTEMIR, PRINCE ANTIOCHUS DMITRIJVITCH, descended from a family of Turkish extraction, was born at Constantinople, September 10th, 1708. He received his first education at Kharkov, whence he proceeded to the academy at Moscow, where he made such proficiency in his studies that when scarcely ten years old he composed and recited a discourse in Greek on St. Demetrius. In 1722 he accompanied his father, who was hospodar of Moldavia, in the campaign against Persia, after which (1725) he prosecuted his studies in the Academy of Sciences at St. Petersburg, directing his attention to that language whose literature he subsequently enriched. It was not long before his talents recommended him to the notice of the empress Anne; and in 1731 he was despatched to the British court in quality of resident, but in the following year was promoted to be ambassador extraordinary and plenipotentiary, in which capacity he was sent in 1738 to the court of France. The empress Elizabeth confirmed all the dignities that had been bestowed upon him by her predecessor. He died at Paris, March 1, 1774, of dropsy in the chest, and his body was conveyed to Moscow for interment in the Greek cloister.

Equally amiable and intelligent, his aim as a writer was to inform and correct, as is sufficiently attested by his Satires, which if now somewhat antiquated in regard to versification and style, are justly esteemed for their originality, truth, and force of colouring, and for the philosophical mind which they display. Both Zhukovsky and Batiuskkov have eulogized the merits of Kantemir as a writer and a man; the first in an analytical essay on his Satires, the other in a very interesting sketch entitled 'An Evening with Kantemir,' a long extract from which may be found in the second volume of the 'Foreign Review.' His other works were chiefly translations, viz. ten of the 'Epistles of Horace,' Fontenelle's 'Plurality of Worlds,' Epictetus, Cornelius Nepos, Montesquieu's 'Persian Letters,' &c.; but except the two first none of the others have been published.

KAOLIN, the Chinese name for porcelain clay. It occurs massive and disseminated in disintegrating granite rocks, and is generally supposed to be derived from the decomposition of the felspar which they contain. Its colour is either white, yellowish, or reddish-white. Fracture fine earthy; soft, dull, and opaque; adheres to the tongue; specific gravity 2·216; infusible.

Kaolin is found in China, France, Saxony, &c.; and in England a large tract of this substance occurs near St. Austle in Cornwall, on the south side of the granite range. It contains crystals of felspar, quartz, and mica. From this source the porcelain manufactory of Worcester is supplied.

Analysis by Berthier:—

	Limoges.	Schneiberg.
Silica	46·8	43·6
Alumina	37·3	37·7
Potash	2·5	0·0
Peroxide of iron	0·0	1·5
Water	13·0	12·6
	99·6	95·4

Rose analyzed a Kaolin which was composed of 56 silica and 44 alumina.

KARABAGH. [GEORGIA.]

KARAMSIN, NIKOLAI MIKHAELOVITCH, one of the most eminent writers that Russia has yet produced, and the one to whom its literature is mainly indebted for the popularity it has acquired, and the rapid progress it has made since the commencement of the present century, was born in the government of Simbirsk, December 1st, 1765. Having completed his education at Moscow, he served with a commission in the Guards, and in 1789-91 visited Germany, Switzerland, Italy, France, and England, which tour he has described in his 'Letters of a Travelling Russian,' of which there exists an English translation, or rather a copy of the German one. On his return to Moscow he devoted himself entirely to literature, one of his first undertakings being the 'Moscow Journal,' which was succeeded by 'Aglaia,' the 'Pantheon,' and the 'Væstnik Europæ,' or European Intelligencer (1802). Besides various narratives and other papers, both original and translated, these publications contained many articles of criticism by him, and were well calculated to promote a love of reading among all classes of his countrymen. These however were comparatively insignificant productions, chiefly remarkable for careful polish and correctness of style. The great work to which he entirely devoted himself from 1803 to the very time of his death, is his 'History of the Russian Empire,' which however he did not live to complete beyond the eleventh volume. This laborious task, which may in more senses than one be said to be the very first historical work in Russian literature, is a monument both of diligence and genius. The labour of collecting and arranging the vast mass of materials requisite for it must have been immense, yet never was historian more liberally repaid by the enthusiasm with which his work was instantly received. Its sale and popularity were unprecedented; it was to be seen everywhere, in the hut of the peasant and the palace of the noble; and no wonder, for in spite of all the imperfections that the utmost rigour of criticism has been able to allege against it, it is most captivating and interesting to all who are capable of perusing it in the original, whether foreigners or natives. It has been translated both into German and French, but with what degree of fidelity or ability we are unable to state. The first edition, comprising the first eight volumes (1816), produced him the sum of 100,000 rubles, also the title of counsellor of state, and the order of St. Anne, which were bestowed on him by the emperor Alexander.

After his death the twelfth volume, then nearly prepared in manuscript (bringing the history down to 1611), was edited by M. Bludov, minister of the interior. Since then a continuation of the work has been undertaken. Karamsin died in the Tauridan palace, where apartments had been assigned him, June 3rd, 1826. The emperor munificently bestowed on his widow and family a yearly pension of 50,000 rubles.

His merits and celebrity as an historian and a prose writer have so completely eclipsed his reputation as a poet, that he is scarcely ever considered in that character, notwithstanding that his poetical pieces are not without their value. In his private character he was amiable, noble, liberal, and disinterested; and an interesting sketch of his domestic habits has been given by Bulgarin in a piece entitled 'My First Acquaintance with Karamzin,' an English translation of which has appeared in the 'Old Monthly Magazine.'

KARPHOLITE, a mineral which occurs in minute crystals and in stellated silky fibres. Scratches fluor spar, and is scratched by felspar; colour wax or straw yellow. Lustre of the crystals vitreous; of the fibres silky. Specific gravity 2·93.

Before the blowpipe on charcoal fuses into a dark glass, which becomes darker in the interior flame. With borax it melts into a transparent glass, which in the exterior flame has a manganese colour, and in the interior becomes greenish.

Analysis by

	Stromeyer.	Steinman.
Silica . .	36·154	37·53
Alumina . .	28·669	26·48
Oxide of manganese .	19·160	17·09
Oxide of iron .	2·290	5·64
Lime . .	0·271	..
Fluoric acid . .	1·470	..
Water . .	10·780	11·36
	98·794	98·10

KARPHOSIDERITE, hydrous phosphate of iron, occurs in reniform masses. Structure granular, compact; fracture uneven; hardness 4·0 to 4·5; specific gravity 2·5; colour pale and bright straw yellow, and streak the same; lustre resinous; feels greasy; opaque: when heated in a tube gives off water, and a vapour which reddens litmus paper.

Before the blowpipe, *per se*, it becomes black, and melts into a globule which obeys the magnet; with salt of phosphorus, it forms a black scoria. It is found at Labrador.

KARTLI. [GEORGIA.]

KASAN. [CASAN.]

KATMANDU. [NEPAUL.]

KATTI. [HINDUSTAN, p. 221.]

KEATS, JOHN, was born in Moorfields, London, in the year 1796. He received a classical education at Enfield, under Mr. Clarke, and was afterwards apprenticed to a surgeon. Mr. Clarke introduced him to Mr. Leigh Hunt, who is said to have introduced him to public notice. In 1817 he published a volume containing his juvenile poems, and shortly afterwards his long poem 'Endymion,' which called forth a violent attack from the 'Quarterly Review.' Keats was of a remarkably sensitive disposition: his constitution was weak, and greatly impaired by the attentions which he bestowed on a dying brother, and his death has been attributed to the shock which he received from the article in the 'Quarterly.' Lord Byron seems to have believed this, and in his 'Don Juan' alludes to the circumstance, concluding with the reflection:—

> 'Tis very strange, the mind, that fiery particle,
> Should let itself be snuffed out by an article.'

To recover his health, Keats travelled to Rome, where he died on the 24th of February, 1821, having previously published a third volume of poems, containing 'Lamia,' 'Isabella,' 'The Eve of St. Agnes,' and 'Hyperion.'

The poetry of Keats is of an exceedingly rich and luxuriant character, and his writings so crowded with images, that it at last becomes almost fatiguing to apprehend them. It seems as if his imagination were of that volatile nature which must start off to every idea associated with his subject, and embody it as a part of the whole. Hence the reader must put himself in the place of the poet, and allow his own imagination to fly from thought to thought, or the work will seem but a compound of wild unconnected pictures. The article in the 'Quarterly' observed, that he introduced many images merely for the sake of rhyme, and this remark is not wholly unjust. He did not however, like many poets, merely write some common-place epithet or sentence for the sake of rhyme; but it seems as if his imagination was so fertile, that a chiming word brought with it a new image suitable to his purpose. Some have thought that time would have matured his judgment and have improved him, but this is doubtful; the wild transition from thought to thought is the essence of his poetry, and not a mere accident, and a cool inquiry into the aptness or connection of his images would rather have injured him as a poet than have been of advantage.

To elucidate the above remarks, a passage is selected by way of example:—

> 'Oh! magic sleep—oh! comfortable bird,
> That broodest o'er the troubled sea of the mind
> Till it is hush'd and smooth'd! Oh! unconfined
> Restraint! Imprison'd liberty! Great key
> To golden palaces, strange minstrelsy,
> Fountains grotesque, new trees, bespangled caves,
> Echoing grottoes, full of trembling waves
> And moonlight; aye, to all the mazy world
> Of silvery enchantment!'———

The poet begins by representing sleep under the figure of the bird brooding over the mind, and, still having the idea of comfort associated with that of sleep, does not hesitate to give the bird the dubious epithet 'comfortable.' Then suddenly dropping sleep as an active power (the *brooding* bird), he takes it as a state, and finds the paradoxical expressions 'unconfined restraint,' 'imprison'd liberty.' The word liberty gives rise to the question 'liberty for what?' The answer is, 'to roam in the world of dreams;' and the fertile imagination of Keats at once converts sleep into a key which is to open the gate leading to that world. The above is a fair specimen of the richness and wild luxuriance of Keats's poetry, and the tendency of his mind to dart in all directions for images.

The article in the 'Quarterly' dwelt too much on the *form* of the poetry, and did not regard the beauty of many of the thoughts, nor the great power displayed of giving a being and a presence to the wildest imaginations. Hence most of the observations were just, but the poet was only regarded on his most unfavourable side.

Again Keats laid himself greatly open to ridicule; he evidently lived in a world created by his own imagination; the words that he used were to him symbols of beautiful thoughts, but he forgot that the sound of certain expressions is ridiculous in society, however appropriate the conception belonging to such words may be. Thus he says seriously, 'Dolphins *bob* their noses through the brine,' the justness of the image making him forget that an ordinary reader would necessarily smile at the word 'bob;' and this is one of numerous instances. Hence when the conventional rules of language are taken as the standard by which to judge him, he is always open to attack.

In the sublime Keats is not so happy as in the wildly beautiful. In the fragment 'Hyperion,' where we miss the exuberance, we also miss the brilliant fancies of the 'Endymion,' while at the same time the attempt at sublimity is rather an incumbrance.

In conclusion, it may perhaps be said, the works of Keats are adapted only to those who are really of a poetical temperament, and who have an imagination capable of following if not of creating. To the readers who look for poetry as a pleasant form of some clear and connected subject, who prefer authors that rather anticipate their imagination than call it into violent action, Keats's poems will be of small value.

KEEPER, LORD. [Lord Keeper.]

KEIGHLEY. [Yorkshire.]

KELP, the ash remaining after the incineration of seaweed, which is burnt for the purpose of obtaining carbonate of soda from it. It contains but little of the alkaline salt, but a large quantity of common salt, some salts of potash, and probably iodide of sodium. It was formerly much used in glass and soap making, and from the residue, after separating the carbonate of soda, large quantities of iodine are now obtained. [Sodium.]

While a heavy duty was imposed upon barilla imported from foreign countries, a considerable quantity of kelp was made on the coasts of Ireland and the western coasts and islands of Scotland, the inferior quality of the native production being more than compensated by its exemption from duty. The business of kelp-burning was long before carried on in Ireland, and about a century from the present time the manufacture was begun in Scotland, where, in consequence, the land in certain localities by the sea-shore became greatly advanced in value, very large annual revenues being derived from estates which had previously been wholly unproductive. The adoption of a more liberal line of commercial policy in this country, and the advancement of chemical science, have caused the manufacture of kelp to be given up, and the rocks and shores on which it was produced have again become valueless.

From the impurity of the alkali, and the large proportion of foreign matters combined with it, kelp could be used only in processes of a coarse description: its principal employments were in the manufacture of soap and common bottle-glass, for which purposes a better and cheaper alkali, made from common salt (chloride of sodium), is now used, and the only purposes for which sea-wrack is at present collected are the manuring of land, and, in hard seasons, the supply of winter food for cattle. Kelp having never been subject to the payment of duty, no record was ever taken of the quantity produced, which was at one time estimated to be more than 25,000 tons annually.

KELSO. [Roxburghshire.]

KEMBLE, JOHN PHILIP, was born on the 1st of February, 1757, at Prescot, in Lancashire. His father, Mr. Roger Kemble, was manager of a provincial company performing in Staffordshire, Warwickshire, Gloucestershire, &c. His mother's maiden name was Ward. John Kemble was not intended by his father for the stage, although during his childhood he was occasionally called upon to represent parts suitable to his age, the first upon record being that of the little Duke of York in Havard's tragedy of 'Charles I.,' his sister Sarah (afterwards Mrs. Siddons) acting the Princess Elizabeth. This was on the 12th of February, 1767, Mr. Kemble being then just ten years old. He received the rudiments of education in a preparatory school at Worcester, from whence he was sent to the Roman Catholic seminary of Sedgeley Park, in Staffordshire, and afterwards to the English college at Douay, in France, where he made great progress. At the age of nineteen he returned to England, and following immediately the natural bent of his inclination towards the stage, made his appearance in the character of Theodosius in the tragedy of that name, at Wolverhampton, January 8th, 1776. Two years afterwards he was a regular member of the York Company. On Tuesday, 30th of September, 1783, Mr. Kemble made his first appearance in London at the Theatre Royal, Drury-lane, in the character of Hamlet. In 1790 he became manager of that theatre. In 1803 he purchased for 24,000*l.* a sixth share in Covent-garden Theatre from Mr. Lewis, and became manager of that establishment, having previously made a tour through France and Spain. In 1808 Covent-garden was destroyed by fire, and on the 31st of December, at the ceremony of laying the foundation-stone of the new theatre, Mr. John Kemble's bond for 10,000*l.* was munificently cancelled by his Grace the late Duke of Northumberland. On the opening of the new theatre in 1809, under Mr. Kemble's management, an advance in the prices of admission to the pit and boxes gave rise to the well-known O. P. riots, during which the great tragedian was personally and grossly insulted whenever he appeared upon the stage. A compromise was at length made between the manager and the public, and Mr. Kemble continued to direct the entertainments at Covent-garden in the best spirit of enterprise and liberality, reviving the plays of Shakspeare with great splendour and as much propriety as was at that time perhaps within his power. On the 23rd of June, 1817, he took his leave of the London audience, having previously bid farewell to that of Edinburgh (March 29th), and on the 27th of June a public dinner was given to him at the Freemasons' Tavern, when Lord Holland was in the chair. Mr. Kemble, who had long suffered severely from asthma, soon afterwards retired to the south of France for the benefit of his health, and, after a short visit to England on the death of his partner, the elder Mr. Harris, he finally took up his residence at Lausanne, in Switzerland, where he expired February 26th 1823, aged 66. Mr. Kemble's talents, both as an actor and a manager, were of a very high order: his fine taste and classical acquirements were perceptible in every effort, and in his personation of the loftier heroes of the drama he has never been equalled. His Brutus, Coriolanus, Cato, King John, Wolsey, and Macbeth, are still fresh in the remembrance of thousands, and, while the recollection of them remains, his successors to the tragic throne must, in those particular characters, suffer by comparison. His King Lear also, as a whole, may be mentioned amongst his almost unapproachable impersonations. His very feebleness in his latter years added to the terrible truth of the picture. In society Mr. Kemble was ever the accomplished gentleman as well as the convivial companion, and to the last enjoyed the respect and regard of the noblest and wisest in the land. The theatrical profession owes him a deep debt of gratitude for the respectability to which he raised it by his example. He furthered the good work which Garrick had begun, next to whom he must always rank amongst the worthies of the drama. Mr. Kemble's life has been written by his friend Mr. Boaden, in two vols. 8vo.

KEMPIS, THOMAS A, born about 1380, at Kempen, near Cologne, studied at Deventer, in a religious congregation or community called 'the brothers of common life,' and afterwards became a regular canon of the monastery of Mount St. Agnes, of which his brother John of Kempis, was prior. He there applied himself to transcribing the Bible, the Missale, several works of St. Bernard, and other religious books. He was an excellent copyist, and very fond of that kind of occupation. He was employed fifteen years in transcribing a Bible in 4 vols. fol., which he completed in 1439. He afterwards began a collection of pious and ascetic treatises, among which were the four books 'De Imitatione Christi,' which have been erroneously ascribed to him as his own composition, but which he merely transcribed from older manuscripts. The question of the authorship of the work 'De Imitatione Christi,' which is a book of real merit, displaying a deep knowledge of the human heart, and of the world, as well as of the inward spirit of Christianity, has been often debated. It is however most generally attributed to John Gerson, chancellor of the university of Paris, and a great theologian, who died in 1429. (Barbier, *Dissertation sur les Traductions Françaises de l'Imitation de J C.*, Paris, 1812.)

Thomas à Kempis composed some ascetic treatises, such as 'Dialogus Novitiorum de Contemptu Mundi,' &c., but they are very inferior to the book 'De Imitatione J. C.' He wrote also a Chronicle of his Monastery, and other compilations. He died in 1471, at ninety years of age.

KEMPTEN (the antient Campodúnum), a town of Bavaria, in the old duchy of Suabia, and the modern circle of the Upper Danube, on the bank of the Iller, in 47° 44′ 40″ N. lat. and 10° 18′ 45″ E. long. It is built in the old-fashioned style, and consists of two parts, that called the *Stifts-stadt*, or St. Hildegard, which is situated on a mountain, and is an open town, and the antient free imperial city, which is in the valley. It has a castle, two churches, a gymnasium, with a library and collection of works of art, an hospital, and an orphan asylum. There are manufactures of cotton and linen, and considerable trade in furs, wool, salt, linen, Italian and Dutch goods. The antient abbey was in the Stifts-stadt. The Prince Abbot was among the estates of the Empire, high marshal to the empress, was immediately under the pope, and possessed, with the district of Buchenberg, 326 square miles, 8 towns, 145 villages, with 43,000 inhabitants, and a revenue of 300,000 florins. The abbey and the town were assigned to Bavaria in 1802. The population of Kempten is about 7000.

KENDAL. [WESTMORLAND.]

KENEH. [EGYPT.]

KENILWORTH. [WARWICKSHIRE.]

KENNEBECK. [MAINE.]

KENNETT, WHITE, born 1660, died 1728, distinguished as a divine, antiquarian writer, and prelate of the Church of England; a man, as his biographer says, 'of incredible diligence and application, not only in his youth, but to the very last, the whole disposal of himself being to perpetual industry and service, his chiefest recreation being variety of employment.' His published works are, according to his biographer's catalogue, in number fifty-seven, including several single sermons and small tracts; but perhaps not a less striking proof of the indefatigable industry ascribed to him is to be seen in his manuscript collections, mostly in his own hand, now in the Lansdowne department of the British Museum Library of Manuscripts, where from No. 935 to 1042 are all his, and most of them containing matter not incorporated in any of his printed works.

His course in life was this: he was the son of a Kentish clergyman, educated at Westminster and Oxford, had the living of Amersden early bestowed upon him, with a prebend in the church of Peterborough, but returned to Oxford, where he became vice-principal of Edmund Hall, the college to which Hearne belonged; resigned Amersden; settled in London as minister of St. Botolph's, Aldgate; was a popular preacher; made archdeacon of Huntingdon, dean of Peterborough, and finally, in 1718, bishop of Peterborough.

His principal published works are:—1. 'Parochial Antiquities, attempted in the History of Ambrosden, Burcester, and other adjacent places in the counties of Oxford and Bucks,' 4to., 1695. This has been reprinted. In this work his very useful glossary is to be found. 2. 'The Case of Impropriations, &c., with an Appendix of Records and Memorials,' 1704. 3. 'A Register and Chronicle, Ecclesiastical and Civil,' in two volumes folio, 1728; relating to the events of a few years of the reign of King Charles II. He also published a corrected edition of 'The History of Gavelkind,' by William Somner, to which he prefixed a life of that eminent Saxonist. Most of his other works were either sermons or controversial tracts, many of the latter being in ecclesiastical controversy, in which he was reckoned what is called a Low Churchman; and having, previously to the Revolution, taken the opposite side, he was often severely handled by the other party. In particular, a sermon which he preached at the funeral of the first duke of Devonshire was severely animadverted upon, as if he gave too flattering a view of the character of the deceased for the sincerity of a Christian divine.

There is an octavo volume, published in 1730, entitled 'The Life of the Right Reverend Dr. White Kennett, late Lord Bishop of Peterborough,' from which the above particulars have been derived. It is anonymous; and as the fact is not generally known, it may not be improper to state that the author was William Newton, rector of Wingham in Kent.

KENNICOTT, BENJAMIN, was born of humble parents, at Totness in Devonshire, April 4th, 1718. Being appointed master of a charity-school in his native town, he continued in this situation till 1744, when several of his friends raised a sufficient sum of money to enable him to go to Oxford. He entered at Wadham College, and applied himself with the greatest diligence to the study of divinity and Hebrew. While he was an undergraduate he published a work 'On the Tree of Life in Paradise, and on the Oblations of Cain and Abel,' which was so well received by the public that the university allowed him to take his degree before the usual time, without the payment of the customary fees. He was elected a Fellow of Exeter College shortly afterwards, and took his degree of M.A. in 1750. He continued to reside at Oxford till the time of his death, which happened September 18th, 1783. He was a canon of Christ Church, and librarian of the Radcliffe Library, to which office he was appointed in 1767.

The most celebrated of Kennicott's works is his edition of the 'Hebrew Bible,' which was published at Oxford in 2 vols. fol., the first volume in 1776, and the second in 1780. In 1753, Dr. Kennicott published a work 'On the State of the Printed Hebrew Text of the Old Testament,' which was succeeded by another volume on the same subject in 1759. The first volume contained a comparison of 1 *Chron.* xi. with 2 *Sam.* v., xxiii., with observations on 70 Hebrew manuscripts, in which he maintained that numerous mistakes and interpolations had crept into the Sacred Text. In the second he gave an account of numerous other manuscripts of the Hebrew Bible, and proposed an extensive collation of Hebrew Manuscripts, with the view of publishing a correct edition of the Hebrew Bible. This undertaking met with much opposition from several persons, who were afraid that such a collation might overturn the received reading of various important passages, and introduce uncertainty into the whole system of Biblical interpretation. The plan was however warmly patronized by the majority of the clergy, and nearly 10,000*l.* were subscribed to defray the expenses of the collation of the manuscripts and the publication of the work. Several learned men were employed both at home and abroad, and more than 600 Hebrew manuscripts, and 16 manuscripts of the Samaritan Pentateuch, were collated either wholly or in the more important passages. The business of collation continued from 1760 to 1769, during which period Dr. Kennicott published annually an account of the progress which was made. Though the number of various readings was found to be very great, yet they were neither so numerous nor by any means so important as those that are contained in Griesbach's edition of the New Testament. But this is easily accounted for from the revision of the Hebrew text by the Masorites in the seventh and eighth centuries, and from the scrupulous fidelity with which the Jews have transcribed the same text from that time.

'The text of Kennicott's edition was printed from that of Van der Hooght, with which the Hebrew manuscripts, by Kennicott's direction, were all collated. But as variations in the points were disregarded in the collation, the points were not added in the text. The various readings, as in the critical editions of the Greek Testament, were printed at the bottom of the page, with references to the corresponding readings of the text. In the Pentateuch the variations of the Samaritan text were printed in a column parallel to the Hebrew; and the variations observable in the Samaritan manuscripts, which differ from each other as well as the Hebrew, are likewise noted, with references to the Samaritan *printed* text. To this collation of manuscripts was added a collation of the most distinguished editions of the Hebrew Bible, in the same manner as Wetstein has noticed the variations observable in the principal editions of the Greek Testament. Nor did Kennicott confine his collation to manuscripts and editions. He further considered that as the quotations from the Greek Testament in the works of ecclesiastical writers afford another source of various readings, so the quotations from the Hebrew Bible in the works of Jewish writers are likewise subjects of critical inquiry. For this purpose he had recourse to the most distinguished among the Rabbinical writings, but particularly to the Talmud, the text of which is as antient as the third century.' (Marsh's *Divinity Lectures*, part ii.)

Kennicott annexed to the second volume a 'Dissertatio Generalis,' in which he gives an account of the manuscripts and other authorities collated for his work, and also a history of the Hebrew text from the time of the Babylonian captivity. This dissertation was reprinted at Brunswick in 1783, under the superintendence of Professor Bruns, who had collated a great number of manuscripts for the original work.

An important Supplement to Kennicott's Hebrew Bible was published by De Rossi, under the title of 'Variæ Lectiones Veteris Testamenti,' Parma 1784-88, 4 vols. 4to.; to which an appendix was added in 1798.

The works of Kennicott and De Rossi are too bulky and expensive for general use. An edition of the Hebrew Bible, containing the most important of the various readings in Kennicott's and De Rossi's volumes, was published by Doederlein and Meissner, Leip. 1793; but the text is incorrectly printed, and the paper is exceedingly bad. A far more correct and elegant edition of the Hebrew Bible, which also contains the most important of Kennicott's and De Rossi's various readings, was published by Jahn, Vienna, 1806, 4 vols., 8vo. which may be recommended as the best critical edition of the Hebrew Bible.

Two scholarships were founded at Oxford by the widow of Dr. Kennicott for the promotion of the study of the Hebrew language.

KENT, a maritime county in the south-eastern corner of England. It is bounded on the north by the æstuary of the river Thames, by which it is separated from the counties of Middlesex and Essex; on the east by the German Ocean and by the Straits of Dover; on the south by the county of Sussex, from which it is separated in one part by the River Rother, in another part by the Teyse, or Teise, a feeder of the Medway; and in the south-western corner of the county by Kent Water and other branches of the Medway: on the west side the county is bounded by Surrey. A detached portion of the parish of Woolwich in Kent lies on the north side of the Thames.

The form of the county is irregular. Its principal dimensions are as follows: length of the northern boundary, from the neighbourhood of London to the North Foreland, 64 miles in a straight line; of the southern boundary, from the junction of the three counties, Kent, Surrey, and Sussex, to Denge Ness, or Dungeness, 43 miles; of the eastern boundary, from the North Foreland to Denge Ness, 38 miles; and of the western boundary, from the neighbourhood of London to the junction of the above counties, 24 miles: the length of a diagonal drawn from London to Denge Ness is 59 miles; and of one from the North Foreland to the junction of the above counties, 62 miles. The area is estimated at 1557 square statute miles; the population in 1831 was 479,155, giving 308 inhabitants to a square mile. In size it is the ninth of the English counties; in population the sixth; and in density of population the seventh. Maidstone, the county town, is on the Medway, 31 miles from London in a direct line south-east, or 34½ miles by the road by Eltham, Farningham, and Wrotham.

Coast-line, Islands, &c.—The northern part of the county, along the æstuary of the Thames, is skirted by a line of marshes extending inland from the Thames a distance varying from a few yards to a mile and a half or two miles. At the junction of the æstuaries of the Thames and the Medway these marshes are very extensive, and occupy a large portion of the tongue of land between these rivers, the extremity of which, being nearly or quite insulated by Yantlet Creek, forms what is termed the Isle of Grain.

Eastward of the Isle of Grain, the Swale, an arm of the æstuary of the Medway, cuts off from the main land the Isle of Sheppey, of which the isles of Elmley and Harty are subordinate portions, nearly severed from the rest by ditches or creeks. The northern side of the Isle of Sheppey is upland; the face toward the Thames is abrupt but not very lofty, the cliffs rising about ninety feet above the river. The southern part of the island is a low flat. The length of the island from east to west is about 10 miles; its greatest breadth from north to south about 5 miles. It probably once extended farther on the north side, but the cliffs have been gradually washed away. Its area is nearly 33 square miles, divided between seven parishes; it comprehends the antient but decayed borough of Queenborough, and the royal dockyard and town of Sheerness at its north-western point. The population of the island in 1831 was 9934. The surface is laid down for the most part in grass: but the upland part on the northern side produces good corn. The air is loaded with vapours in the low marshy grounds, and the water is brackish; the population is thin, except in and about Sheerness. The Isle of Sheppey constitutes a separate liberty (with the exception of Harty Island, which is in Faversham hundred), and had formerly a 'Court of Hustings for the trial of all causes or pleadings relating to the island. The marshes terminate east of the Swale, and the coast again rises to some height in clayey cliffs, which, with a slight interruption at Herne Bay, extend to Reculver and the flats which form the western limit of the Isle of Thanet. In the Isle of Thanet, which occupies the north-eastern corner of the county, the cliffs again commence and continue along the whole line of coast to Pegwell Bay, which is the boundary of the Isle to the south-east. The North Foreland is on the coast of the Isle of Thanet, due east of Margate.

The Isle of Thanet contains about 40 square miles with a population in 1831 of 26,090, and includes the well-known watering places, Margate, Ramsgate, and Broadstairs. It is now separated from the mainland only by the narrow channels of the Stour, one of which runs through the marshes to the æstuary of the Thames at Reculver, and the other enters the German Ocean in Pegwell Bay. The coast from the Isle of Sheppey to the North Foreland is skirted by sands which extend from a quarter of a mile to a mile from high-water mark; and for some miles farther out by 'the flats,' which, except in Margate Roads, rarely afford, when the tide is out, more than two fathoms water. Margate Roads are sheltered to seaward by Margate Sands, which are dry at low water.

The chalk cliffs of the Isle of Thanet are succeeded by the low coast of Pegwell Bay, which continues to Walmer Castle near Deal. Here the chalk cliffs recommence and continue round the South Foreland (a headland bearing 14 miles nearly due south from the North Foreland), to Sandgate between Folkestone and Hythe. Between Dover and Folkestone a portion of the chalk cliffs has fallen forward towards the sea, so as to present an under cliff similar to that at the back of the Isle of Wight. From the neighbourhood of Folkestone the coast begins to get lower until it forms the extensive tract of Romney Marsh, the coast line of which extends south-west to Denge Ness, a point 19 miles in a straight line south-west of the South Foreland, and from thence westward 6 or 7 miles to the border of the county of Sussex. Romney Marsh is in one part protected against the sea by an embankment called Dymchurch Wall. There are lighthouses at the North and South Forelands, and on Denge Ness, and beacons in various other places. Opposite to the coast which extends from the Isle of Thanet to the South Foreland lies the Goodwin Sand, the channel between which and the Kentish coast is the well-known roadstead of the Downs. The popular tradition is that the Goodwin Sand was once an island, forming the estate of Goodwin earl of Kent. This island, which some suppose to have been called Lomea, is said to have been destroyed by the sea, A.D. 1097. Others, with more probability, consider it to have been a shallow previously covered with a depth of water sufficient to admit the passage of vessels over it, but made bare about the above-mentioned period by the accumulation of sand. There has been an impression that the sand was possessed of a peculiarly 'voracious and ingurgitating property; so that should a ship of the largest size strike on it, in a few days it would be so wholly swallowed up by these quicksands, that no part of it would be left to be seen.' More accurate observers have however found that the sand is of the same quality with the sands on the opposite shore. The Goodwin Sand is of irregular form, about 10 or 11 miles long from north to south; its greatest breadth is three or four. It is divided into two parts by a narrow channel called 'the Swatch,' navigable by small boats.

The Downs, which are about 8 miles in length and 6 in width, are a safe anchorage, and are the general rendezvous of shipping leaving the Thames for the Channel, or returning homeward. They are sheltered on the west and north-west, and partially on the north sides, by the Kentish coast or by the sands connected with it: on the east side the Goodwin Sand forms a sort of breakwater. To the north of the Downs are 'The Small Downs,' a smaller roadstead immediately contiguous to the Downs properly so called.

Surface and Geology.—Kent is on the whole a hilly county. The chalk range of the North Downs enters the county on the west side from Surrey, not far from Westerham, and runs to the east-north-east to the valley of the Medway between Maidstone and Rochester. The southern slope of this chalk range is steeper than the northern, and forms a line of hills, from the summit of which there is an extensive prospect. The North Downs are interrupted between the border of the county and the Medway by the valley of the Darent. On the eastern side of the Medway, which completely interrupts the chalk range, the Downs rise again, and run to the east-south-east to the coast near Folkestone, still presenting their steepest slope to the south. This part of the range also is divided into two parts by the valley of the Stour. On the north side the Downs gradually subside towards the æstuary of the Thames. The coast line from Walmer to Folkestone shows a transverse section of this range.

The breadth of the chalk formation, which thus extends through the county from west to east, varies; west of the Stour it is from three miles to six; east of the Stour it occupies the whole extent of the county north of a line drawn from Folkestone to Wye, except where it is interrupted by the marshy valley which surrounds the Isle of Thanet. The height of the chalk hills is considerable. Hollingbourne station, about midway between the valleys of the Medway and the Stour, is 616 feet above the level of the sea; Paddlesworth hill, about three miles north-west of Folkestone, is 642 feet; Folkestone hill, on the coast near Folkestone, is 575 feet; and Dover Castle hill is 469 feet. The cliffs near Dover are about 400 feet high. The cliffs of the Isle of Thanet are also of chalk; those about the North Foreland are from 100 to 200 feet high.

The district between the chalk range and the æstuary of the Thames is, for the most part, occupied by the plastic clay which immediately overlies the chalk. The tongue of land between the Medway and the Thames, including the Isle of Grain and the Isle of Sheppey, is formed of the London clay, which overlies the plastic clay. This formation also occupies a considerable district north and north-west of Canterbury, extending to the shore between Whitstable and Reculver, where (as well as in the Isle of Sheppey) it forms cliffs: those between Whitstable and Reculver are in some places 70 feet high. The London clay also covers a small tract near Pegwell Bay. The hills of Sheppey, which are of London clay, rise to the height of 200 feet. Shooters Hill, near Woolwich, which is an insulated mass of London clay, is about 446 feet high.

In the valleys of the Darent and its feeder the Cray the strata above the chalk have been washed away, and the chalk is covered only by the vegetable soil. Another strip of chalk, denuded of the superior strata, runs along the bank of the Thames from the valley of the Darent to below Gravesend.

South of the North Downs the chalk marl and green sand crop out, and cover a belt of land skirting the chalk throughout the whole extent of the county from west to east. The breadth of this belt varies from two miles to six or seven. Its southern slope, which is the steepest, forms what is designated 'the ragstone range' of hills, the higher points of which are from 600 to 800 feet high, and overlook the valley watered by the Eden, the Medway (from Penshurst to Yalding), and the Beult. The thickness of the chalk marl averages 300 to 400 feet; of that of the green sand we have no account.

The valley just referred to is occupied by the Weald clay, and forms another belt extending throughout the county from the border of Surrey to the edge of Romney Marsh, having an average breadth of five miles. The thickness of this formation may be estimated at about 300 feet.

The remaining portion of the county, which forms a narrow belt or strip of land along the Sussex border, is occupied by the iron-sand, which forms the nucleus of the great Weald district of the south-eastern part of England. This formation constitutes a range of hills, amid which the upper waters of the Medway and its tributary the Teyse have their sources; and extends far into Sussex. It rises in some parts of the Weald clay district through the overlying strata of that formation.

The county thus appears, when viewed with reference to its geology, to consist of five parallel belts, extending nearly in the direction of its length, and occupied by different formations, which succeed each other in regular order from north to south:—1, The London and plastic clays; 2, the chalk; 3, the chalk marl and green sand; 4, the Weald clay; 5, the iron-sand. The southern border of the chalk and green-sand formations, and the iron-sand district, form three parallel ranges of hills separated from each other by the Homesdale and Weald clay valleys, the former lying at the foot of the chalk hills, and the latter of the ragstone or green-sand hills.

What is termed the Weald (Saxon ƿealꝺ, a forest, or perhaps generally, a wild uncultivated tract) was antiently an immense forest, inhabited only by deer and hogs. It has however been gradually cleared and brought into cultivation. The iron-sand of this district was formerly much in request for the furnace and the forge; and the iron-works were numerous and important. But the introduction of coal in the manufacture of iron has caused this branch of industry to be transferred to other parts of the island where fuel is more abundant.

Beds of limestone occur in the green-sand formation, and are quarried near Maidstone for common purposes of building, for road-making, and for burning into lime, which is used for stucco, or exported to the West Indies for refining sugar.

Hydrography and Communications.—The northern boundary of the county is formed by the Thames, to the basin of which nearly the whole county belongs. This river affords to that side of the county a ready means of communication with the metropolis and with other parts. The royal dockyards of Deptford and Woolwich are upon it.

The other principal rivers are the Ravensborne, the Darent, and the Medway, which flow into the æstuary of the Thames; and the Stour, and the Rother, which flow into the sea.

The Ravensborne rises on Keston Common, near the border of Surrey, and flows northward past the town of Bromley and the village of Lewisham, and between the towns of Greenwich and Deptford, into the Thames. It turns several mills, and supplies Greenwich and Deptford with water by means of waterworks. It is navigable for nearly a mile up to Deptford bridge for lighters and other small craft. The whole length of the Ravensborne is about ten miles.

The Darent rises in Squirries park, near Westerham, just under the North Downs, and close to the border of Surrey. Its course is first east-north-east, parallel to the course of the North Downs, to Riverhead near Sevenoaks, where it turns north and passes through a depression in the Downs by Otford, Shoreham, Farningham, and other villages, to the town of Dartford, below which it is called Dartford Creek, and becoming navigable, flows through the marshes into the Thames. Its whole course is about twenty miles, for three of which it is navigable. Just before joining the Thames it receives the Cray, which rises near Orpington, and has a course of about nine miles. The Cray is said to produce the best trout of any stream in the neighbourhood.

The Medway rises in Sussex, near the northern border, between East Grinsted and Crawley, and flows eastward through that county into Kent, which it enters near Ashurst about five miles west of Tunbridge Wells. In this upper part of its course the Medway is swelled by many brooks, which drain the higher districts of the Weald of Sussex. At Penshurst, in Kent, the Medway is joined by the Eden, one of its main branches, which rises about Godstone, in Surrey, and receives the drainage of the valley that separates the green-sand hills from the central iron-sand high lands of the Weald. The Eden is about sixteen miles long. The length of the Medway before it receives the Eden may be estimated at eighteen miles. From Penshurst, where the navigation of the river commences, it flows east-north-east five miles to Tunbridge, forming in its way two or three islands. From Tunbridge the Medway flows eight miles east by north to Yalding, in the Weald, near which it is joined by the Teyse or Teise and the Beult. The Teise rises in the northern part of Sussex, and flows by Lamberhurst and between Horsmonden and Goudhurst into the Medway. Its length is about seventeen miles. It sends off an arm which joins the Beult. This river rises in the Weald of Kent, not far from the foot of the iron-sand hills, near Shadoxhurst, and flows north-by-west twenty miles to Yalding. The course of the Medway and of its principal feeder the Beult to their junction is in the direction of the valley of the Weald clay, of which they receive the drainage, the Beult of the eastern, and the Medway of the western part. From Yalding the course of the Medway, though very winding, is for the most part northward; it passes through an opening in the green-sand hills, across the prolongation of the valley of Holmsdale by Maidstone and Aylesford, through a great opening in the North Downs, and by Rochester and Chatham, into the æstuary of the Thames at Sheerness. Its length below Yalding is more than thirty miles, and its total length above sixty, for more than forty of which it is navigable. The tide flows up to Maidstone bridge, just above which it is now stopped by a lock; it previously flowed a mile or two higher up. Ships and large vessels cannot ascend above Rochester bridge. Below Rochester the æstuary gradually expands to a considerable width, and forms an important harbour for the British navy. Numerous arms of the river or creeks penetrate the marshes, which spread inland to a considerable extent from the banks of the river. The royal dockyard of Chatham is on the Medway, and that of Sheerness at the junction of the Medway with the Thames. The Medway is plentifully stored with fish: above Maidstone is an abundance of the usual fresh-water fish; and below Rochester are soles, flounders, and other flat fish, and smelts of excellent quality and large size. In the creeks in the lower part of the river are considerable oyster-beds.

The British name of this river is said to have been Vaga, but if a judgment may be formed from the name given by Nennius to the town of Maidstone, 'Caer Meguaid' or 'Caer Megwad,' the first syllable of the modern name was also part of the British name, and not (as supposed by some) a Saxon addition. The Romanized name of a town mentioned in the Peutinger Table, and by Richard of Cirencester, supposed to be on this river, was Ad Madum or Madis, which corroborates the notion that 'Mag' or 'Mad' formed part of the British name.

The Stour has two main branches, distinguished as the Greater and the Lesser Stour. The Greater Stour is formed by two streams, which flow along the valley between the North Downs and the green-sand hills in opposite directions, one coming from the north-west near Lenham, the other from the south-east, not far from Hythe on the coast; they unite near Ashford, and, turning to the north-east, pass through a depression in the North Downs, and flow by Wye and Canterbury to the neighbourhood of Sarre in the Isle of Thanet. Here the Stour parts into two branches, one of which falls into the æstuary of the Thames, near Reculver; the other falls into Pegwell Bay, below Sandwich. These two arms cut off Thanet from the rest of the county, and constitute it an island.

The Lesser Stour rises near Lyminge, about three miles north of Hythe, and, flowing north by east to Barham, above which it sometimes becomes dry, turns north by west, and skirting Barham Downs, flows to Bridge near Canterbury. Here it makes another bend, and runs north-east into that arm of the Greater Stour which falls into Pegwell Bay. The two arms of the Stour, which insulate Thanet, were once a channel three or four miles over, which received several streams beside the Greater and Lesser Stour. This channel was called the Wantsume. In Bede's time the breadth was diminished to three furlongs, and was usually passable at two places only, Sarre and Stonar, near Sandwich, where ferry boats were kept. The channel continued to be navigable for ships of tolerable burden in the reign of King Henry VIII.; but subsequently the waters of the northern branch having been distributed by means of floodgates over the land, this arm from the Stour to Reculver became too small for navigation, and was for a period quite dry in the neighbourhood of Sarre, so that Thanet became a peninsula rather than an island. A cut from the Stour restored the continuity of the watercourse, but this north channel has never since been used for navigation. The Greater Stour enters Pegwell Bay after making a great bend, at the elbow of which Sandwich is situated. It is navigable up to Fordwich, near Canterbury. The whole length of the river from Lenham to Pegwell Bay may be estimated at forty-five miles. Both the Greater and the Lesser Stour contain excellent trout; salmon trout, generally of about nine pounds weight, are taken in the Greater Stour, and a peculiar species called the Fordwich trout, which are rather larger.

The river Rother rises in Sussex, to which county it more properly belongs. [SUSSEX.] It first touches the border of Kent at the junction of a small stream, which rises near Hawkhurst, and separates the two counties. From this junction the Rother flows by Newenden and Wittersham, below which it quits the border and re-enters Sussex. Several small streams from the Weald of Kent flow into it, and the arms of these, with the Rother itself, enclose the river island of Oxney (six miles long from east to west, and three miles broad), the centre of which is occupied by the hills about Wittersham, Stone, and Ebony Chapel, while the rest of the island (of which the greater part is in Kent) forms the continuation of Romney Marsh. The Rother is navigable in all that part which touches this county. This river, which was antiently called the Limene, once entered the sea at New Romney, but in the reign of Edward I., during a great inundation of the sea, it forsook its antient channel and formed for itself a new one into the sea at Rye.

The principal canal in the county of Kent is the Royal Military Canal, which was formed, rather for the purposes of defence than of commerce, during the alarm of invasion in the late war against Napoleon. It has however since been converted to commercial use. It runs along the edge of Romney Marsh from its commencement in the sea near Hythe to its junction with the Rother in the south-eastern corner of Oxney Isle. The line of this canal is very little above the level of the sea.

An act was obtained in 1812 for a canal to be cut from the Medway, just above the junction of the Teyse, to Ashford. It was to take a circuitous course through the Weald, and to have a branch by Tenterden to the Royal Military Canal. Nothing has ever been done under this act.

A canal, about nine miles long, extending from Gravesend to Frindsbury, opposite Chatham, unites the Thames and the Medway, and saves a circuitous navigation of forty-seven miles round the extremity of the Isle of Grain. It passes, by a tunnel about two miles long, through the chalk hills. There is a basin at each end of the canal.

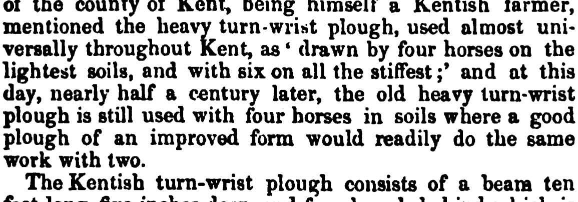
Three principal roads traverse the county. The Dover road enters the county at New Cross, 3½ miles from London, and runs east-south-east in a very direct line through Deptford, Greenwich, Dartford (15 miles from London), Gravesend (22 miles), Rochester and Chatham (30 miles), Sittingbourne (40 miles) and Canterbury (55 miles) to Dover (71 miles). The principal communication between London and the Continent is by this road. The Hythe road branches off from the Dover road at New Cross, and runs south-east through Eltham, Farningham, and Wrotham, to Maidstone (34½ miles); and from thence by Lenham (44 miles), Charing, and Ashford (53 miles), to Hythe (65 miles). The Hastings road branches off from the Hythe and Maidstone road more than a mile beyond New Cross, and diverging more towards the south, passes through Bromley, Seven Oaks (24 miles), and Tonbridge (30 miles); at Lamberhurst (40 miles); it crosses a projecting angle of Sussex, and finally quits Kent for Sussex near Flimwell (45 miles). The road travelled by the Hastings mail diverges from this road at Tonbridge, and passes through Tonbridge Wells (36 miles from London). The road to Rye branches off from the principal Hastings road just before it quits Kent, and passes through Hawkhurst and Newenden (53 miles), where it crosses the Rother into Sussex. The roads to Margate and Ramsgate, and to Sandwich and Deal, branch off from the Dover road at Canterbury, and a branch from the Hastings road near Lamberhurst leads to Cranbrook and Tenterden, in the Weald, and to New Romney near the sea. A railroad from London to Dover is in progress. It is to branch off from the Brighton railroad about 20 miles from London, and to pass by Tunbridge, and from thence in a tolerably direct line by Ashford to Folkestone. From Folkestone it will pass by a road along the face of the cliffs and by a tunnel through Shakspeare's Cliff to the town of Dover.

Agriculture.—The climate of Kent is in general mild and genial. The proximity to the continent of Europe exposes it to occasional north-east winds, which chill the air, but they carry off the superfluous moisture of the soil; and some of the most fertile spots are in the Isle of Thanet, which lies at its north-eastern extremity, and in the adjacent parts. The soil of this county may be divided into the gravel, chalk, and clay, which produce, where they mix in due proportions, an extremely fertile loam. The alluvial soils along the Thames and Medway, and in Romney Marsh, produce some of the richest marsh pastures in the kingdom.

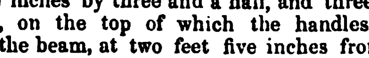
A ridge of hills composed of ragstone traverses the county from west to east, along which there are some very fertile clays, which, with moderate attention to the cultivation, are highly productive. The chalk, which lies chiefly to the north of these, rises into hills between Canterbury and Dover, where there are some extensive sheep-downs, but from Canterbury towards London it is mostly covered by a stiff clay, and only breaks out here and there on the banks of the Thames. To the south of the ragstone hills are the Wealds, which contain some very fertile clays and woods, in which oaks grow to a great size. The soil in the Isle of Thanet is not naturally so fertile as the appearance of the crops might lead one to suppose. It consists mostly of a thin light soil; but it has been so long improved by careful cultivation and abundant manuring, chiefly with sea-weed, that it may now be considered one of the most fertile spots in Great Britain. The subsoil is everywhere a hard chalk, over which there is in some places a thin layer of earth mixed with flinty pebbles, not exceeding six or eight inches in depth: in some of the hollows the soil is deeper and more loamy, and so dry as to allow of its being ploughed quite flat without any ridges or water-furrows. There is not an acre of waste land in all the Isle of Thanet.

Throughout the whole county the clay may be said to predominate, and the mode of cultivation generally adopted is that which suits the strongest soils. The Kentish farmers and yeomen, though generally rich and independent, are not very ready to introduce improvements in the system by which their forefathers were enriched; and although a great quantity of corn is annually raised in the county, and contributes a great portion of the supply of the London market, it cannot be denied that this produce might be greatly increased, and raised at a less expense than it is now, by adopting improvements in the tillage of the land and the implements in use. An old Kentish farmer may perhaps smile at this assertion, and, looking at his fine fields of wheat and beans, defy any one to cultivate the land better. This is the very reason why improvements which have been introduced in less productive districts have made little or no progress in this county. In the year 1793, Mr. John Boys, who drew up the general view of the county of Kent, being himself a Kentish farmer, mentioned the heavy turn-wrist plough, used almost universally throughout Kent, as 'drawn by four horses on the lightest soils, and with six on all the stiffest;' and at this day, nearly half a century later, the old heavy turn-wrist plough is still used with four horses in soils where a good plough of an improved form would readily do the same work with two.

The Kentish turn-wrist plough consists of a beam ten feet long, five inches deep, and four broad, behind which is a foot five inches by three and a half, and three and a half feet long, on the top of which the handles are fixed. Through the beam, at two feet five inches from the foot, is a sheath of oak seven inches wide and one and a half thick, which is morticed into the chep in an oblique direction, so that the point of the share is twenty-two inches distant from the beam. The chep, to which the share is fixed, is five feet long, four inches wide, and five inches deep. The share is of hammered iron, weighs about 32lb., is twenty inches long, and from four and a half to seven inches wide at the point. The upper end of the beam rests on a carriage with two wheels three feet two inches high: on the axletree is a gallows, on which is a sliding bolster to let it up and down. Through the centre of the axle is a clasp-iron, to which is fixed a strong chain called a tow. This comes over the beam, and, by lengthening it, the beam is let out a greater length from the axle, and thus the plough goes to a greater depth in the ground; by shortening it the reverse takes place.



Turn-wrist Plough.



Share of the turn-wrist Plough. The point is flat, like a chisel, for stiff clays, and with a blunt point for stony soils.

We do not mean to disparage this plough for heavy soils, nor doubt the necessity of its being drawn by four horses in some very stiff clays; but it might be greatly improved, and the draught diminished, so as to save at least one horse in four. In clay soils, which are retentive of water, it is always advantageous to lay the land in stitches with deep water-furrows between them; and for this purpose the Suffolk or the Scotch ploughs with a fixed turn-furrow are much better adapted than the turn-wrist.

On the soils in the Isle of Thanet, where wheat and beans are raised alternately without fallow or intermission, the practice is good, and, if effected at a moderate expense, is not to be found fault with. The ground is well stirred and amply manured for the beans, which are drilled in rows with wide intervals, and repeatedly horse-hoed till the crop is too far advanced to admit of it. The returns cannot fail to be good. The bean stubble is cleared of the stems and roots of the beans by a plough with a very broad share, which effects a perfect hoeing and leaves the surface quite clean. A deep ploughing is then given for the wheat. We cannot suggest any improvement in this practice, unless it be in the economy of the labour. But such soils are very scarce, and much of the Kentish clays and loams must be cultivated with a greater variety of crops. There is room here for improvement, both in the rotations and in the manner in which each crop is raised; and the Kentish farmer might find it profitable to adopt some of the methods which experience has fully proved to be advantageous in soils and situations not so well adapted to them as many parts of Kent are. A journey through the northern counties of England and the south of Scotland would give the young Kentish farmer some useful hints, and would remove some prejudices which impede his progress in agriculture.

Besides the usual crops which are raised on good clays, Kent produces several which are peculiar to it, such as canary and radish seed, which grow chiefly in the Isle of Thanet, where there are few hedgerows to harbour birds, which are very destructive to these crops. The canary seed is cut in September, and is left for some time in the field until it is fit to be thrashed; for the seed adheres so strongly to the husk that it requires the influence of rain and exposure to the weather for some time to destroy the texture of the envelopment before it can be separated; and it suffers very little from this exposure. The produce is from three to five quarters per acre, and is chiefly used to feed birds kept in cages, and for this purpose is largely exported. The offal is very good food for horses. Radish seed is also cultivated in the richer soils for the London seedsmen. It is sown in drills and carefully hoed, so as to leave the plants eighteen inches asunder. The pods, when ripe, require to be left long in the field before the seed can be thrashed out. The produce is from eight to twenty-four bushels per acre. The demand for this seed is very great: every garden, however small, has a bed of radishes, and few gardeners think it worth while to save the seed.

Other seeds are likewise raised for the London seedsmen, such as spinach, cresses, and white mustard. Kidney beans are cultivated to a considerable amount in the neighbourhood of Sandwich, and produce from ten to twenty bushels per acre.

Woad and madder were formerly more commonly cultivated in Kent than they are now; the foreign, being raised at a less expense, have driven the Kentish out of the market. With a greater attention to the management of these valuable crops, they might probably still be raised advantageously; but everything which is done in Kent is done in a more expensive manner than in many other countries; a great proof of the easy circumstances of the farmers and landowners there.

There is comparatively a very small proportion of grass land in Kent, if we except the sheep downs on the chalk hills and the marshes. The marshes produce most of the hay consumed in winter. Romney Marsh, which is well known for the richness of its grass, contains about 44,000 acres; on the borders of the Stour are 27,000; and along the Medway, Thames, and Swale, about 11,500 more. A great many sheep are reared and fattened in these marshes. The cattle fed there are only a secondary consideration, sheep being found more profitable. The quantity of sheep which the land will keep varies from two to five per acre; sometimes the grass grows faster than the flock can consume, and becomes too rank, a circumstance which is owing to want of attention in stocking, and is detrimental. Lean cattle are then taken in to eat it close;

but a careful farmer never allows his marshes to be either over or under stocked, and keeps the grass close fed and yet abundant. The hay made in the marshes is often stacked in the marsh itself, near some shed, where the stock may be supplied in winter.

There are very few dairies of any consequence in Kent, nor is any cheese made, except for domestic consumption.

Hops are grown to a very great extent in this county; and, with the exception of those which are raised at Farnham in Surrey, are the most esteemed of any in England. [Hops.]

In that part of Kent which is nearest to London there are many extensive gardens; and about Deptford hundreds of acres are laid out in asparagus beds. Great quantities of peas are also raised for the London market on the line of road from London to Rochester. Apples, pears, plumbs, and cherries are raised in orchards, and the produce sent to the London market. Cider is also made in considerable quantities. In some places hops, apples, cherries, and filberts may be seen growing together in the same grounds; the proportion is 800 hop hills, 200 filberts, and 40 apple or pear trees per acre. The hops last twelve years, the filberts thirty; after which the apples and pears require the whole ground. This is a very good arrangement, by which the land is constantly producing.

The cultivation of the filberts is peculiar to Kent, and very well managed there, especially in the neighbourhood of Maidstone. They do not require a very rich soil, but grow well in that which is rocky and gravelly. The ground is kept clean around the trees, which stand about 12 feet apart. They are very carefully pruned, and one stem only is left to branch out a few inches above the ground; the branches are trained and pruned in the shape of a punch-bowl, and are not allowed to run above 4 or 5 feet high: thus they will bear abundantly, and be very profitable. When the filberts are gathered, they are laid to dry in the sun or under a shed exposed to the air. If they are well dried, they will keep good for several years.

There are still some extensive woods in Kent, but they are diminishing every year; and the produce of bark and timber is much reduced from what it formerly was. The demand for hop-poles has caused more attention to be paid to underwood; and some of the coppices, which are well managed, give a sufficient return to prevent their being grubbed up and converted into arable land.

On a general review of the agriculture of this county, it may be observed, that notwithstanding its present productive state, and the natural fertility of many parts, it is capable of very great improvement, and that by a little attention, and a judicious outlay of capital in draining and liming where it is required, and especially by a more economical application of agricultural labour, both in men and horses, its produce might be greatly increased, and raised at much smaller expense than it is at present.

Divisions, Towns, &c.—Kent has been long divided into five lathes. These divisions, in the opinion of some writers, take their name from the Saxon ʒe-laðian, to assemble; they had formerly distinct courts superior to the hundred courts; each of them comprehends several hundreds, and other smaller divisions. The lathes are as follows:—

I. *Sutton-at-Hone Lathe* occupies the western extremity of the county. It is bounded on the north by the Thames, on the west by Surrey, on the south by Sussex, and on the east by an irregular line drawn from the Thames just above Northfleet to the border of the county near Penshurst. It comprehends an area of 173,440 acres, and had in 1831 a population of 135,951. It includes the following hundreds:—

1. Axton (or Axtane, or Clackstone), Dartford, and Wilmington; 2. Blackheath; 3. Bromley and Beckenham; 4. Codsheath; 5. Little and Lesnes or Lessness; 6. Ruxley; 7. Somerden; 8. Westerham and Eatonbridge.

II. *Aylesford Lathe* is on the western side conterminous with Sutton-at-Hone Lathe; on the north it is bounded by the Thames, on the south by Sussex, and on the east by a line drawn from the Medway at Rainham below Chatham, south-east to Otterden near Charing, from thence south-west to the neighbourhood of Headcorn, in the Weald, from thence north-west along the Beult to the junction of a stream flowing from the Teise, and from thence south along that stream and along the Teise to the Sussex border at Lamberhurst. It comprehends an area of 244,150 acres, and had in 1831 a population of 134,176. It is subdivided into the following hundreds:—

9. Brenchley and Horsmonden; 10. Chatham and Gillingham; 11. Eythorne, or Eyhorne; 12. Hoo; 13. Larkfield or Lavercefield; 14. Littlefield; 15. Maidstone; 16. Shamwell, or Shamel; 17. Toltingtrough, or Toltingtrow; 18. Twyford; 19. Washlingstone, or Watchlingstone; 20. Wrotham; beside the liberty of the city of Rochester, and the liberty of the Lowy of Tonbridge.

Hasted adds to the above West or Little Barnefield hundred, containing part of the parish of Goudhurst, but not the church.

III. *Scray Lathe* is on the western side conterminous with Aylesford Lathe. On the north it is bounded by the Thames, on the south by Sussex, and on the east by a tolerably regular line drawn from Sea Salter near Whitstable to Aldington Corner, six miles west of Hythe; and from thence by Orlestone and Appledore to the eastern end of Oxney Isle. It comprehends an area of 260,510 acres, and had in 1831 a population of 78,973. It includes the following hundreds:—

21. Barnfield (East); 22. Barclay, or Barkley; 23. Blackbourne, or Blacetune; 24. Boughton-under-Blean, or Bocton; 25. Calehill; 26. Chart and Longbridge; 27. Cranbrook; 28. Faversham; 29. Felborough, or Feleborg; 30. Marden; 31. Milton, or Middleton; 32. Rolvenden; 33. Selbrittenden; 34. Tenterden; 35. Teynham; 36. Wye.

The Liberty of the Isle of Sheppey is a part of Milton hundred, but has a constable of its own. According to Hasted, Chart and Longbridge, Calehill, Felborough, and Wye hundreds have long been detached from the Lathe of Scray, and annexed to that of Shipway or Shepway; but all our other authorities give them as being still included in Scray.

IV. *St. Augustine Lathe* (formerly called also *Hedelinth Lathe*) is conterminous on the west with Scray Lathe. On the north and east it is bounded by the sea; on the south it is conterminous with Shepway Lathe; the boundary line being drawn from the border of Scray Lathe, near the town of Wye, to Ewell near Dover, and from thence south to the sea at Hougham, between Dover and Folkestone. Its area is 166,760 acres, and it had in 1831 a population of 103,621. It comprehends the following hundreds:—

37. Bewsborough; 38. Bleangate, or Blengate; 39. Bridge and Petham; 40. Cornilo; 41. Downhamford; 42. Eastry, or Estrege; 43. Kinghamford; 44. Preston; 45. Ringslow, or Tenet, comprehending the Isle of Thanet; 46. Westgate; 47. Whitstable; 48. Wingham.

V. *Shepway* or *Shipway Lathe* is conterminous on the north with St. Augustine Lathe, and on the west with Scray Lathe and the county of Sussex, and is bounded on the other sides by the sea. Its area is 127,380 acres; its population in 1831 was 25,849. It contains the following hundreds:—

49. Aloesbridge; 50. Folkestone; 51. Ham; 52. Hayne, or Heane; 53. Hythe; 54. Langport; 55. Loningborough; 56. St. Martin Pountney; 57. Newchurch; 58. Oxney; 59. Stouting; 60. Street; 61. Worth; besides the franchise and barony of Bircholt, called a hundred by Hasted.

There are several parts of the county which have their particular 'liberties,' exempt from the jurisdiction of the county magistrates. They are as follows:—I. The county of the city of Canterbury, in St. Augustine Lathe. II. The city of Rochester, and—III. The borough of Maidstone, both in Aylesford Lathe. IV. The Liberty of Romney Marsh, comprehending the hundreds of Langport, St. Martin Pountney, and Worth, and part of the hundreds of Aloesbridge, Newchurch, and Street, and of the barony of Bircholt, all in Shepway Lathe. The Marsh is under the jurisdiction of its own bailiff and jurats. V. The Liberty of the Cinque-Ports, which is partly in this county and partly in Sussex. The part which is in this county comprehends—1. Sandwich, including the borough of Sandwich; the ville of Sarr, in the parish of St. Nicholas, and the ville of Ramsgate, in the parish of St. Lawrence, in the Isle of Thanet; the town and parish of Deal, the parish of Walmer, and part of that of Woodnesborough, near Sandwich; and the parish of Fordwich, near Canterbury, all in St. Augustine Lathe: 2. Dover, including the town of Dover, with part of the neighbouring parishes of Charlton and Hougham, the parish of Ringswould, between Dover and Deal, and the town and parish of St. John, Margate;

the parishes of Birchington, St. Peter's, and Wood, or Woodchurch, in Thanet; the town and part of the parish of Folkestone, in Shepway Lathe; and the town and part of the parish of Faversham, in Scray Lathe. All these, except Faversham and Folkestone, are in St. Augustine Lathe: 3. Hythe, including the town and parish of Hythe, and part of the parish of West Hythe, in Shepway Lathe: 4. New Romney, including the town and parish of New Romney, part of the parishes of Old Romney, Appledore (in Scray Lathe), Brenzet, Ivechurch or Ivychurch, Snargate and part of Bromhill, all near Romney, and, except Appledore, in Shepway Lathe: 5. Rye, the liberty of which includes in this county the town of Tenterden, in the Lathe of Scray. [Cinque-Ports.]

The Liberty of Hastings formerly included in this county the parish of Beaksbourn, near Canterbury (St. Augustine Lathe), and the hamlet or ville of Grange, or Grench, in Gillingham parish, near Chatham, in Aylesford Lathe: but these were separated from it by the statute 51 Geo. III., c. 36.

Several other places, though not out of the jurisdiction of the county magistrates, are not under the constables of the hundred, but have constables of their own.

There are in the county two cities. Canterbury and Rochester; the Cinque-Ports of Dover, Hythe, New Romney, and Sandwich; the parliamentary boroughs of Greenwich (including Deptford and Woolwich), Chatham and Maidstone, and eighteen other market-towns, viz. Ashford, Bromley, Cranbrook, Dartford, Deal, Faversham, Folkestone, Gravesend, Lydd, Margate, Milton, Ramsgate, Sevenoaks, Sheerness, Sittingbourne (held monthly), Tenterden, Tonbridge or Tunbridge, and Westerham. There is a market held at long intervals at Eleham, or Elham, on the Lesser Stour, in order to prevent the forfeiture of the charter; and there were formerly markets at Aylesford, St. Mary Cray, Eltham, Goudhurst, Lenham, Town Malling, Queenborough, Smarden, Wrotham, and Wye. Of some of these places an account is given elsewhere. [Ashford; Aylesford; Canterbury: Chatham; Deal; Dover; Greenwich (under which Deptford is included); Maidstone; Margate; Ramsgate; Rochester; Sandwich; Sheerness; Woolwich.] The others we shall notice here.

Hythe is locally in Hythe hundred, in the lathe of Shepway, 65 miles from London. It is called in antient records Hethe, and in Domesday Hede, from the Saxon hyð, a haven. This town is supposed to owe its origin to the decay of West Hythe and Lympne, or Limne (the Portus Lemanis of the Antonine Itinerary), which are now both inland. It was early a place of importance, being one of the Cinque-Ports, and having once had, according to Leland, a fair abbey and four parish churches. In the reign of Henry IV. the inhabitants of this town experienced such heavy calamities, pestilence, conflagration, and shipwreck, that they contemplated abandoning the place; but the king by the grant of a liberal charter induced them to remain. The parish of St. Leonard, Hythe, which coincides with the Cinque-Port, contains 860 acres, and had in 1831 a population of 2287, of which scarcely any part was agricultural. The town, which is at the foot of a steep hill or cliff, about half a mile from the shore, consists chiefly of one long street, parallel to the sea, with some smaller ones branching from it, or parallel to it. The townhall and market-place are in the centre of the town. The church is on the slope of the hill above the town; it is a cross church, very antient, with a west tower. Some of the western part of the church is of Norman architecture: the eastern part is early English, of remarkably good design and execution; this part of the church has bold buttresses, and under it a remarkably fine groined crypt. There are two hospitals, or almshouses, in Hythe, of antient foundation. There are barracks at the east end of the town, a small theatre, and a public library and reading-room. The market is on Saturday. The corporation of Hythe, under the Municipal Reform Act, consists of four aldermen or jurats, and twelve councillors. Hythe formerly returned two members to parliament, by the Reform Act it sends only one. The parliamentary borough includes the municipal borough, the Liberty of the town of Folkestone, and the parishes of West Hythe, Saltwood, Cheriton, and Folkestone, and part of that of Newington. These limits include the watering-place of Sandgate. The living of Hythe is a perpetual curacy united with the rectory of Saltwood; their joint annual value is 784*l.*, with a glebe-house; they are in the diocese of Canterbury, but exempt from the archdeacon's visitation. There were in 1833 in the parish ten day-schools with 197 children; two day and Sunday national schools with 238 children, and two Sunday-schools with 137 children.

About a mile north of Hythe are the ruins of Saltwood castle; the outer walls, which are partly remaining, enclose an elliptical area of three acres. These walls were strengthened by several square or circular towers, now much dilapidated. The keep, or gate-house, which was almost entirely rebuilt by Courtenay, archbishop of Canterbury, in the time of Richard II., is now occupied as a farm-house.

New Romney, in the lathe of Shepway, is situated near the sea, in Romney Marsh, and is 70 miles from London.

The name appears to be of Saxon origin. The etymology given by Lye is Rumen-ea, from Rume, wide, spreading, *q.d.* the spreading water or marsh. Perhaps it may be from Rumen-eȝe, 'the island in the flat or marsh,' a spot sufficiently elevated from the surrounding marsh to be dry being termed an island, or 'ey,' by the Saxons. New Romney appears to have risen before the time of Edward the Confessor, from the decay of Old Romney (more inland), the haven of which was deserted by the sea. The haven of New Romney being commodious and well frequented, the town became important, and was made one of the cinque-ports, perhaps in the place of Old Romney, which, with Lydd, Denge Marsh (extending to Denge Ness), and Oswardestone, were added to it as subordinate members. But the Rother, which then entered the sea at this place and formed its harbour, having forsaken its channel (in the reign of Edward I.), the harbour was choked up with beach, and the town went to decay. In its flourishing time it is said to have been divided into twelve wards, and to have had five parish churches, as well as a priory and an hospital, of both which there are some remains. At present it is an insignificant place, built on a soil of gravel and sand, slightly elevated above the surrounding country. It consists chiefly of one wide well-paved street, with a market-house and a hall, or brotherhood-house, in which the mayor, jurats, and commons of the Cinque-Ports frequently hold their sittings. There is a weekly market and one yearly fair. The parish comprehends 2320 acres, and had, in 1831, a population of 983. The church is a very antient and handsome building. The lower part of the tower and part of the nave are of Norman architecture and of good composition; the upper part of the tower is of early English, and the remaining part chiefly of decorated English character, with large and fine windows. The living is a vicarage in the diocese of Canterbury, exempt from the archdeacon's visitation, of the clear yearly value of 161*l.*, with a glebe-house not fit for residence, in the gift of All Souls' College, Oxford.

There were, in 1823, two infant or dame schools, with 26 scholars, two day-schools with 50 scholars, and one national day and Sunday school with 142 children. Up to the passing of the Reform Act, Romney returned two representatives to the House of Commons; these, like the other members for the Cinque-Ports, were styled 'barons.' The first return of members from the town was in the reign of Edward I. It was disfranchised by the Reform Act; and is one of the polling-places for East Kent.

At the village of Dymchurch, about four miles north-east of New Romney, along the shore of Romney Marsh, is a sea-wall or embarkment of earth more than three miles in length, by which the marsh is preserved from the inundation of the sea. It is called Dymchurch wall. Its perpendicular height varies from fifteen to twenty feet above the general level of the marshes: at the side next the sea it has a slope of a hundred yards: the width of the top varies from fifteen to thirty feet. There are sluices through it for draining the marshes. Old Romney, from the decay of which New Romney arose, is now a mere village with a population of 113 persons.

Bromley is in Bromley and Beckenham hundred, in the lathe of Sutton at Hone, and near the Ravensbourne River, 10 miles from London Bridge. Bromley parish contains 4630 acres, and had in 1831 a population of 4002. The town consists principally of one street, with neat well-built houses, and having a market-house in the middle of the town supported on wooden pillars. The church contains the monuments of Dr. Hawkesworth, Dr. Zachary Pearce, bishop of Rochester, and several others. The bishop of Rochester's palace at Bromley is a plain brick mansion, rebuilt A.D. 1777. In the palace garden is a chalybeate spring, 'St. Blaise's well,' of some repute. There is a well-endowed hospital or 'College,' founded in 1666 for clergymen's widows, and since much enlarged: there are now forty widows in the establishment. The buildings surround two quadrangular courts: there is a chapel, and a chaplain is attached to the foundation. There are some dissenting meeting-houses. There is a market on Thursday, at which, on the third Thursday in each month, much business is done in cattle; there are also two cattle fairs. The living of Bromley is a perpetual curacy in the diocese and archdeaconry of Rochester, and in the gift of the dean and chapter of the cathedral of that see: its clear yearly value is 160*l.* There were in Bromley, in 1833, two day and Sunday national-schools, one with 100 boys, and another with 90 girls; 15 children of each sex were clothed from an antient endowment. Bromley is one of the polling-places for the western division of the county of Kent.

Cranbrook, the principal town in the Weald of Kent, is in the hundred of Cranbrook in the lathe of Scray, 48 miles from London Bridge. The parish comprehends 10,460 acres, and had in 1831 a population of 3844, about half agricultural. The town of Cranbrook is irregularly built. The church is a large and handsome edifice in the perpendicular style, with good buttresses and fine windows; it is advantageously situated on a small eminence near the centre of the town. There are several dissenting meeting-houses. Cranbrook was once the centre of the clothing trade introduced by the Flemings, whom the policy of Edward III. induced to settle in this country. Since the removal of this branch of industry to the north and west of England, Cranbrook has been a mart for the agricultural produce of the neighbourhood, especially hops. The market, which is now held on Wednesday, is chiefly for corn and hops; every fortnight there is a cattle-market. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear annual value of 163*l.*, with a glebe-house. There were, in 1833, eleven day-schools (two of them endowed) with 299 scholars; and six Sunday-schools with 449 children. In the parish of Cranbrook are the ruins of Sissinghurst, a fine mansion formerly the residence of the Baker family. From having been used as a French prison during one of the wars of the last century, it acquired the inappropriate name of Sissinghurst Castle. In the hamlet of Milkhouse Street, in this parish, are the remains of an antient chapel dedicated to the Holy Trinity. Cranbrook is one of the polling stations for the western division of the county.

Dartford is in the hundred of Axton, Dartford, and Wilmington, in the lathe of Sutton-at-Hone. It is on the river Darent, from which it gets its name (in Saxon Darentford, in Domesday Tarenteford), about three miles from its junction with the Thames, 15 miles from London Bridge on the road to Dover. The great insurrection under Wat Tyler, in the reign of Richard II., broke out here. The parish contains 4150 acres, and had, in 1831, a population of 4715, about one-tenth agricultural. The town is in a narrow valley, and the principal street is on the line of the Dover road. The church is near the east end of the town, close to the bridge over the Darent. The antient burying-ground is at some distance eastward from the church, on a hill which overlooks the town; a new burial-ground was consecrated a few years since. There are several dissenting places of worship. The trade of Dartford is considerable: there are chalk-pits near the town, and corn, oil, powder, and paper mills in the neighbourhood on the river Darent; also a large iron foundry and manufactory of machinery. The first paper-mill erected in this country was at Dartford; it was built by Sir John Spielman, a German, who introduced the manufacture, and stood on the site of the present powder-mills: the first mill established in England for rolling and slitting iron was also near Dartford. Barges from the Thames come up to the wharf below the town. The market is on Saturday; and there is a yearly fair. The trade in corn is considerable. The living of Dartford is a vicarage in the diocese and archdeaconry of Rochester, of the clear yearly value of 534*l.* with a glebe-house. There were, in 1833, nine day-schools with 311 children; one of these, with 80 scholars, is endowed: there were two day and Sunday national schools with about 200 children; and three Sunday-schools with 166 children.

Near the town are the ruins of a nunnery, founded A.D. 1371, by Edward III., for Augustine nuns, but afterwards occupied by Dominican nuns. At the dissolution the prioress and several of the nuns were of some of the best and most antient families of the county: the revenues were then 400*l.* 8*s.* gross, or 380*l.* 9*s.* 0½*d.* clear. The buildings were occupied by Henry VIII., and, during her progress in Kent, by Queen Elizabeth, as a royal residence. The present remains are of brick and consist of a large embattled gateway, with some adjacent buildings, now occupied as a farm-house: the gardens and orchards occupied twelve acres, and were surrounded by a stone wall yet entire. There is an almshouse at Dartford, formerly an hospital for lepers.

Faversham is locally situate in the hundred of Faversham in the lathe of Scray, but has a separate jurisdiction, being a member of Dover, one of the Cinque-Ports. It is on a stream running into the East Swale, and just to the left of the road to Dover, 47 miles from London Bridge. It appears to have been a place of some note before the time of Stephen, who built and endowed here an abbey for Cluniac monks, in which himself, his queen Matilda, and his eldest son Eustace of Boulogne were buried. This abbey was at the time of the dissolution in the hands of the Benedictine order: its revenue was 355*l.* 15*s.* 2*d.* gross, or 286*l.* 12*s.* 6¾*d.* clear. Some portions of the outer walls remain. At the dissolution the remains of King Stephen were thrown into the river, for the sake of the leaden coffin in which they were contained.

The parish of Faversham comprehends 2270 acres, and had in 1831 a population of 4429, less than one-tenth agricultural. The population of the adjacent parish of Preston, a village which joins Faversham town, was at the same time 675. The town, which has been much improved in the last half century, consists principally of four streets forming an irregular cross, and having the guildhall and market-place in the centre. The church, which is a large cruciform structure of flint, has some portions in the decorated English style; other portions are of later date. There is a light tower at the west end, crowned with pinnacles, and surmounted by an octagonal spire. There are an assembly-room and a theatre. Faversham is a port, and has an excise-office and custom-house. The creek or arm of the Swale on which the town stands is navigable for vessels of 150 tons, several coasting vessels belong to the port. Coals from the North of England and timber from the Baltic are imported. The exports are chiefly agricultural produce, corn, hops, fruit, and wool, which are sent to London by hoys. There is no manufacture now except of gunpowder and cement on a small scale. The oyster fishery, which is an important branch of industry, employs about 250 adult males. The oyster fishermen and dredgermen form an incorporated company. The markets are on Wednesday and Saturday: there are a monthly cattle-market and an annual fair. The council of the borough of Faversham, under the Municipal Reform Act, consists of four aldermen or jurats and twelve councillors. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear yearly value of 342*l.*, with a glebe-house. There were in 1833 a well endowed grammar-school, with 12 scholars; a national school with 185 children; and twenty-one other day-schools, with 640 children; two boarding-schools with 105 children; and three Sunday-schools with 452 children. There are several dissenting meeting-houses.

Folkestone is locally in the hundred of Folkestone in Shepway lathe, 70 miles from London, but has separate jurisdiction, being a member of the Cinque-Port of Dover. It was early a place of some importance: the Romans had a tower here on a high hill, of the earth-works or entrenchments of which there are yet some remains. By the Saxons it was called Folcestane; in Domesday, Fulchestan. There was a monastery, which had been destroyed by the Danes during or before the time of Athelstan. There was also a castle built by the Saxon kings of Kent, and rebuilt by the Normans, which has been in later times nearly all destroyed, with the cliff on which it stood, by the encroachments of the sea. All that remains is a small part of the wall near the church.

The parish of Folkestone comprehends in all 4360 acres, of which 680 are in the separate jurisdiction of the town: the population in 1831 consisted of 4296 persons, of whom 3638 were in the town. Folkestone is situated on the shore of the English Channel, partly in a hollow between two cliffs, and partly on the west cliff. The streets are narrow, steep, and indifferently paved. The harbour, owing to the accumulation of shingle, is not capable of affording anchorage to many vessels. Many boats belong to it, which are engaged in the mackerel and herring fisheries. The church, which stands at the west end of the town, is a cross church of early English character, having a tower in the centre supported by strong piers. The western end was partly blown down by a hurricane in December, 1705, and when rebuilt the dimensions were contracted. There are three dissenting places of worship. There was a Benedictine priory at Folkestone, originally alien, but afterwards made denizen. A gateway in the wall and some part of the foundations are all that remain of this building. The trade of the town is dull: fishing and smuggling are both on the decline. The market is on Thursday, and there is one yearly fair. The council under the Municipal Reform Act consists of four aldermen or jurats and twelve councillors. The market-house and the guildhall have been lately rebuilt. The living is a perpetual curacy, in the diocese and archdeaconry of Canterbury, of the clear yearly value of 185*l.* There were, in 1833, one infant-school, with 60 children; twelve dame-schools, with 251 scholars; six day or boarding and day schools, with 242 children; and four Sunday-schools, with 491 children. Dr. William Harvey was born at Folkestone.

Folkestone was by the Reform Act made part of the parliamentary borough of Hythe.

The village of Sandgate, which is partly in Folkestone parish, is a place of some resort as a bathing-place. There is a castle at Sandgate, built by Henry VIII., probably on the site of a more antient one.

Gravesend is on the south bank of the Thames, locally in the hundred of Toltingtrough, in the lathe of Aylesford, 22 miles from London Bridge through Dartford. The western part of the town is in the parish of Gravesend, the eastern in that of Milton. In the time of Richard II. Gravesend was burned, and most of the inhabitants carried into captivity by a squadron of French galleys. In the reign of Henry VIII. two platforms were raised for the protection of the town, and a blockhouse at Tilbury, in Essex, to guard the passage of the river.

The parish of Gravesend comprehends 630 acres, with a population, in 1831, of 5097; Milton contains 650 acres, with a population of 4348: making together 1280 acres, with a population of 9445. Gravesend has of late years become a great place of resort for visitors from the metropolis, and has been much enlarged and improved: the old town is however still mean and irregular. Two piers have been erected for landing passengers, and a convenient bathing-house for visitors. There are a library, concert-room, theatre, and gardens. The country round Gravesend is pleasant, and the view from the Windmill Hill, above the town, extensive. The church, which is near the centre of the town, is a neat spacious brick building: there are a chapel of ease and several dissenting places of worship. Milton church is near the east end of the town.

Formerly vessels sailing from the port of London were obliged to stop at Gravesend to take their clearances. Outward-bound Indiamen still take in fresh provisions here: seamen going out provide themselves with slops. There are considerable lime-works and brick-fields about the town, and a great quantity of land in the neighbourhood is occupied by market-gardeners, who raise vegetables, especially asparagus, for the supply of the London markets. Many vessels are employed in fishing; and some rope-making and ship-building are carried on. The resort of visitors from the metropolis to Gravesend during the summer season is very great, owing to the cheapness of steam-boat conveyance and its convenient distance from London. The market is on Wednesday and Saturday, the former for corn. The canal which unites the Medway and the Thames enters the latter near Gravesend. This town is one of the polling-places for West Kent. There is a fort at Gravesend, mounting sixteen guns.

The living of Gravesend is a rectory, of the clear yearly value of 307*l.*; that of Milton a rectory, of the clear yearly value of 359*l.*; both of them are in the diocese and archdeaconry of Rochester.

The inhabitants of the parishes of Gravesend and Milton were incorporated by Queen Elizabeth. By the Municipal Reform Act the borough was divided into two wards: it has 6 jurats or aldermen and 18 councillors. There were, in 1833, in the two parishes, two infant or dame schools, with 74 children; two national schools, with 180 children; one endowed day-school, with 34 children; seventeen other day-schools, with 449 children; seven boarding-schools, with 165 children; and four Sunday-schools, with 559 children.

Lydd, or Lid, is in the hundred of Langport, in the lathe of Shepway. The hundred is one of those included in the liberty of Romney Marsh; but Lydd is a corporate town, and a member of the cinque-port of New Romney, from which it is distant about three miles. The name is written in antient records Hlyda, and is supposed to be a corruption of the Latin *littus*, 'a shore,' a name corresponding to its situation. It is upon the tongue of land, the termination of which is Denge Ness, about two miles from the sea; but it is probable that the sea once came nearer to it. The parish comprehends 11,660 acres, with a population, in 1831, of 1357, more than half of which was agricultural. The town consists of houses irregularly built on an open flat, and from its being quite out of any thoroughfare, and from the decline of the contraband trade, by which it was formerly supported, it is a dull decayed place. The church is a large building, with a fine tower in the perpendicular style, and crocketted pinnacles. The market is on Thursday: the chief employment of the townsmen is in fishing. The corporation, which is left untouched by the Municipal Reform Act, consists of a bailiff, jurats, and freemen. The bailiff and jurats are justices in the borough, which is co-extensive with the parish. The living is a vicarage, in the diocese of Canterbury, exempt from the archdeacon's visitation, of the clear yearly value of 1247*l.*, with a glebe-house. There was, in 1833, only one school in the parish, a national school, of 116 children, with a lending library attached.

On the point of Denge Ness is a lighthouse 110 feet high, and a small fort. There is a spring of fresh water on this point, which is covered by the sea every tide.

Milton, sometimes distinguished as Milton-next-Sittingbourne, is in the hundred of Milton and in the lathe of Scray, on a creek or arm of the Swale, 39½ miles from London.

This town was a demesne of the Saxon kings, who are said to have had a palace in the neighbourhood. In the struggle of the Danish chieftain Hastings with Alfred the Great, the Danes formed an encampment here, the remains of which yet exist, under the name of Castle Rough, from its being overgrown with trees and underwood. The town was burned by Earl Godwin during his quarrel with Edward the Confessor, but rose to importance again in the time of the Conqueror. The parish comprehends 2340 acres, and had, in 1831, a population of 2233, of which about an eighth is agricultural. The town is on the side of a hill sloping down to the creek, and is ill built. The business of the place arises from its oyster fishery, and from its being the port of communication with London for the surrounding agricultural district. In the centre of the town is the antient court-house for holding the manor courts and public meetings, with the town gaol beneath. The market is on Saturday, and there is one yearly fair. Much corn is shipped here. The church, which is to the north of the town, is chiefly in the decorated English style; it is large and handsome, with an embattled tower at the west end. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear yearly value of 256*l.* with a glebe-house.

There were in the parish, in 1833, seven infant or dame schools, containing 140 children; three day-schools, with 163 children; one day and Sunday national school, with 150 children, partly supported by endowment; and one Sunday-school, with 152 children.

Sevenoaks, in the hundred of Codsheath and the lathe of Sutton-at-Hone, is on the Hastings road, 24 miles from London. This town, called in an antient document Seovanacca, received its name from seven oak trees which once occupied the eminence on which the town stands. The parish comprehends an area of 6790 acres (of which 1910 are in the liberty of Riverhead, and 3210 in the Weald liberty), with a population of 4709; about one-third agricultural. The town is situated on the northern brow of the chalk marl and greensand range of high lands, in the midst of a fertile and well cultivated district. It is well built, and contains a number of good houses. The church is spacious and elegant, and, from its situation on an eminence, forms a conspicuous object; it is chiefly in the perpendicular style. There are several dissenting meeting-houses. At the south end of the town is the grammar-school, which has a good endowment: there is also a large range of almshouses; both these institutions owe their origin to Sir William de Sevenoke, a foundling brought up by some charitable persons in this town, from which he took his name. There are two other well endowed schools, founded by Lady Margaret Boswell, with a handsome school-house lately rebuilt. The market-house is an old building, in which the county assizes were held frequently during the reign of Elizabeth and occasionally since. The market is on Saturday, chiefly for corn; there is a monthly cattle market; and also two yearly fairs. There are some silk-mills in the neighbourhood. The living is a vicarage and sinecure rectory, in the peculiar jurisdiction of the archbishop of Canterbury, of the clear yearly value of 935*l.*, with a glebe-house.

Near Sevenoaks is Knowle Park, the seat of the Earl of Plymouth.

There were, in 1833, in Sir William de Sevenoke's grammar-school 31 boys (11 on the foundation); in Lady Boswell's schools, 215 children of both sexes; and in thirteen other day or boarding and day-schools, 408 children. There were four Sunday-schools, with 397 children, three of them with lending libraries attached.

Sittingbourne is in the hundred of Milton and the lathe of Scray, 40 miles from London on the road to Canterbury. The parish contains 1260 acres, and had, in 1831, a population of 2182, about one-eighth agricultural. It consists chiefly of one main street. There are some good inns, and the prosperity of the place depends in a great degree on the passage of travellers between London and Dover. The church is a spacious edifice, rebuilt, with the exception of the tower and the external walls, since A.D. 1762, when it was accidentally burnt. It has some curious windows of decorated character, and some fine ones of perpendicular date. Queen Elizabeth granted, in two successive charters, a weekly market and two fairs· she also incorporated the town, and granted the privilege of returning members to parliament. Communication with London is maintained by hoys from a quay on Milton creek in this parish. The weekly market has been long discontinued, the fairs remain, and the other privileges were never exercised. The present market is held monthly. The living is a vicarage in the diocese and archdeaconry of Canterbury, of the clear yearly value of 212*l.*, with a glebe-house. There were, in 1833, two dame-schools, with 29 children; nine boarding and day schools, with 186 children; one national school, with 160 children; and one Sunday-school, with 233 children. Sittingbourne is one of the polling-places for East Kent.

Tenterden is locally in the hundred of Tenterden and lathe of Scray, but has a separate jurisdiction, being a member of the cinque-port of Rye. It is 55 miles from London, on the road through the Weald of Kent to Romney. The parish comprehends 8620 acres, and had, in 1831, a population of 3177, about half agricultural. The town stands on an eminence, in a rich agricultural district, upon which it depends: it consists of one main street along the Romney road, and contains some good houses. The church is a spacious and handsome edifice, chiefly of perpendicular character, having a lofty tower at the west end, to which a beacon was formerly attached. It has been a popular saying that 'Tenderden steeple was the cause of Goodwin Sands.' This has been supposed to originate from the circumstance of the funds destined for keeping up Sandwich haven having been applied to the building of this church. There are some dissenting places of worship. There is a townhall, a modern building, sometimes used as an assembly-room. The market is on Friday, and there is a yearly fair. When the clothing trade was carried on in the Weald of Kent, this town was one of the manufacturing places. Tenterden was incorporated by Henry VI. The corporation, under the Municipal Reform Act, consists of 4 jurats or aldermen and 12 councillors. The living is a vicarage, in the diocese and archdeaconry of Canterbury, of the clear yearly value of 177*l.* There were, in 1833, a national school, with 190 children, endowed with the transferred funds of a decayed grammar-school; six other day-schools, with 127 children; and four Sunday-schools, with 181 children.

Tunbridge, or Tonbridge, is in the liberty of the Lowey of Tunbridge, and in the lathe of Aylesford, 30 miles from London, on the road to Hastings. In the time of the Conqueror a castle was built on this spot on the banks of the Medway by Richard Fitz-Gilbert (otherwise Richard de Tunbridge), afterwards earl of Clare; and the town rose under the protection of the castle. In the civil troubles of the reign of Henry III. the castle was besieged and taken from its owner Gilbert Rufus, earl of Clare, Glo'ster, and Hertford, by Prince Edward. During the siege the garrison burnt the town. There was also a priory at Tunbridge founded by Richard de Clare, first earl of Hertford, in the time of Henry I., for canons of St. Augustin, the revenue of which at the suppression was 169*l.* 10*s.* 3*d.* The parish comprehends 14,730 acres, and has a population of 10,380, about one-fourth agricultural. The town consists chiefly of one street, broad, partially paved, and, from its being on a declivity, clean. There are several bridges over the Medway, which is here divided into various arms. Near the principal bridge is a wharf, where the timber brought from the Weald is sent down the Medway. The church, which is near the centre of the town, is a large and handsome fabric, in various styles of architecture. There is a free-school, founded by Sir Andrew Judd, and richly endowed: it has 16 exhibitions of 100*l.* per annum each, tenable at any college of Oxford or Cambridge, besides thirteen other exhibitions, and a fellowship at St. John's College, Oxford. There are a townhall and market-house. The ruins of the castle, which are near one of the bridges, consist of an entrance gateway, flanked with round towers, and tolerably perfect, and of the artificial mound on which the keep stood; the outer walls enclosed an area of six acres. The ruins of the priory consist principally of the refectory, now converted into a barn. There is a weekly market on Friday, and a monthly cattle-market, also one yearly fair. The trade of the town is in coal and timber brought from Maidstone for the supply of the neighbourhood: gunpowder and wooden wares (which last take their name from the town) are made to a small extent. The living is a vicarage in the diocese and archdeaconry of Rochester, of the clear yearly value of 763*l.*, with a glebe-house.

There were in 1833 seven infant or dame schools, with 272 children; Judd's endowed grammar-school, with 100 boys (60 of them on the foundation); the 'Southborough Free-school,' with 57 children; and fourteen other boarding and day schools, with 430 or 440 children; four day and Sunday schools of the established church (two of them national schools), with 382 children, and three Sunday-schools with 420 children.

Tunbridge Wells is between five and six miles south of Tunbridge, upon the border of Kent and Sussex, part of it being in each county. It extends into the parishes of Speldhurst (Washlingstone hundred, lathe of Scray), and Frant (Rotherfield hundred, rape of Pevensey, Sussex), but is chiefly in that of Tunbridge. The population cannot be given distinct from that of the parishes in which the town is situated. The chalybeate spring, to which the town owes its origin, was first noticed in the reign of James I., by Dudley lord North, who had been residing in the neighbourhood for the recovery of his health. The benefit which he derived from the water brought the spring into notice; the wells were sunk, paved, and enclosed, but the visitors found accommodation at Tunbridge town. The water is chalybeate, and nearly equal in strength to that of Spa, in Germany. The soil is dry, and the air of the place is healthy, though cold. When Henrietta, queen of Charles I., visited the Wells, she and her suite remained under tents. By degrees however permanent habitations were erected in the immediate vicinity of the wells, and at the neighbouring villages of Southborough and Rusthall. After the Restoration the place rapidly increased. A chapel was built at Tunbridge Wells dedicated to King Charles the Martyr; a subscription-school was also established, and an assembly-room, coffee-house, bowling-greens, and other places of amusement were erected in the neighbourhood. The town has much increased of late years. The Wells, properly so called, are in the centre of the town, and near them are the markets, the chapel, the assembly-rooms, and the public walks, or parades. There are a theatre, libraries, and the other usual requisites of a watering-place. Different groups of houses are distinguished by the names of Mount Zion, Mount Ephraim, Mount Pleasant, and Bishop's Down. About a mile and a half south-west from the Wells, in the county of Sussex, are the High Rocks, which present a striking and romantic scene. The chapel at Tunbridge Wells has been enlarged since its first erection, and stands partly in each of the three parishes. There is a new church lately erected in Tunbridge parish, and there are some dissenting meeting-houses. Tunbridge Wells is famous for toys and small articles turned in holly, plum-tree, cherry-tree, sycamore, and various foreign woods.

Southborough is midway between Tunbridge town and the Wells. A new district church has been erected here, and there is (as already noticed), an endowed free-school. The place consists of a number of scattered houses.

Westerham is in the hundred of Westerham, in the lathe of Sutton-at-Hone, 21 miles from London, through Bromley. It is near the source of the Darent, and in the valley of Holmesdale, between the chalk and the ragstone hills. The parish has an area of 5740 acres, and the population in 1831 was 1985, about two-fifths agricultural. The town is on a declivity; the principal street runs east and west on the road which runs from Maidstone along the valley of Holmesdale into Surrey. The church is a neat and tolerably spacious building, chiefly in the perpendicular style: it contains a neat cenotaph to the memory of General Wolfe. There are one or two dissenting places of worship. The market is on Wednesday, and there is a yearly cattle-fair.

The living is a vicarage united with the parochial chapelry of Edenbridge; they are in the diocese and archdeaconry of Rochester; their joint annual value is 608*l.*, with a glebe-house. There were in 1833 a national school with 46 girls, and five other day-schools with 144 children; two boarding-schools with 45 children; and two Sunday-schools with 96 children.

General Wolfe and Bishop Hoadley were natives of Westerham.

Queenborough, or Quinborowe, is in the liberty of the Isle of Sheppey, in the lathe of Scray, 45½ miles from London, by a road branching from the Dover road eight miles beyond Chatham, and leading into the Isle by King's Ferry over the West Swale. Queenborough (antiently Cyningburg) belonged to the Saxon kings, who had a castle here, on the site of which Edward III. commenced a new and more extensive fortress. Edward made the town a free borough, and gave it the name of Queenborough, in honour of his consort Philippa. This castle was demolished in the time of the Commonwealth, but the moat and well point out its site. The well, after being partly filled up with rubbish, was cleared out and restored to use in 1725; it supplies the town with water. Queenborough is a poor place; the greater part of the inhabitants are dependent on the oyster fishery; a few of them possess boats of their own. The houses form one main street: the church was originally a chapel to the parish church of Minster, but is now parochial: the interior is neat. There is a guildhall and a small gaol under it. Queenborough has a corporation, and until disfranchised by the Reform Act it returned two members to parliament.

The parish had in 1831 a population of 786. The income of the corporation is derived from the oyster fishery, the management of which is in their hands. The markets, which are now disused, were held on Monday and Thursday. The living is a perpetual curacy in the diocese and archdeaconry of Canterbury, of the clear yearly value of 66*l.*, with a glebe-house. There were in 1833 a free-school, with 72 children, five other day schools, with about 100 children, and two Sunday-schools, with 177 children.

St. Mary Cray, the most considerable of the villages which take their name from the river Cray (the others are St. Paul's Cray, Foot's Cray, and North Cray), in Ruxley hundred, Sutton-at-Hone lathe, is on a cross-road which connects the Maidstone and Hastings roads, 13 miles from London. It had formerly a market, but it was discontinued in 1703 in consequence of the market-house having been blown down. The population in 1831 was 905. Elham, or Eleham, is in Loningborough hundred, Shepway lathe, on the Lesser Stour. It was formerly a place of consequence, though now only a village. A market was granted by Henry III., and it is still held at intervals of five or six years in the market-house, which is yet standing, in order to maintain the charter. The church has a large tower of early English architecture, with a small leaden spire. Population in 1831, 1302. Eltham is in Blackheath hundred, Sutton-at-Hone lathe, eight miles from London on the Maidstone road. Here was a royal palace built at an early but unknown period. Henry III. kept Christmas here A.D. 1270. Most of the succeeding sovereigns frequently resided here till Henry VIII., but on the rise of Greenwich it was deserted. The principal part of the palace yet remaining is the antient hall, 100 feet long by 56 broad, and 60 high, now occupied as a barn or cow-house: the windows now bricked up have been extremely elegant: the roof is of timber curiously wrought and richly ornamented. The area of the palace is surrounded by a high stone wall, and a broad deep moat, now converted into a garden, over which are two bridges. Population in 1831, 2005, or including the hamlet of Mottingham, 2129. Goudhurst is partly in Marden and partly in Cranbrook hundred, in the lathe of Scray. The church, which is on a commanding eminence, is a spacious fabric, with a low massive western tower formerly crowned with a lofty spire. Goudhurst was formerly one of the clothing towns of the Weald, and had a weekly market. Population in 1831, 2758. Lenham is in Eyhorne hundred, in the lathe of Aylesford, on the road from Maidstone to Ashford and Folkestone. The market was discontinued early in the last century, and the attempts since made to revive it have failed. Population in 1831, 2197. Town Malling, otherwise West Malling, is in Larkfield hundred, lathe of Aylesford, 29 miles from London Bridge, just out of the Maidstone road. Here was an antient Benedictine nunnery, the yearly value of the possessions of which at the dissolution was 245*l.* 10*s.* 2½*d.* gross, or 218*l.* 4*s.* 2½*d.* clear. Many parts of the conventual buildings are yet standing, especially a portion of the west end of the church, a beautiful specimen of Norman architecture. There is also at St. Leonard's, a hamlet of Malling, a tower 71 feet high, much resembling the keep of a Norman castle; it belonged to St. Leonard's chapel, now destroyed. Town Malling church, a handsome and spacious building, has a Norman tower at the west end. There is a small endowed free-school. The market, held on Saturday, has not been long discontinued. Population in 1831, 1459. Smarden is in Calehill hundred, in the lathe of Scray, in the Weald. The market-house is yet standing. There are one or two dissenting meeting-houses and a small free-school. Population in 1831, 1177. Wrotham is in Wrotham hundred, in Aylesford lathe, 24 miles from London, on the Maidstone road. It lies near the foot of the chalk hills. The church is a large well-built edifice in a great mixture of styles. The market was held in the centre of the village at the intersection of the two principal streets. Population in 1831, 2601. Wye is in Wye hundred, in the lathe of Scray, about three miles north-east of Ashford under the chalk hills. Here was before the Reformation a college, the buildings of which, forming a quadrangle round an open court, are used for the purposes of two endowed schools. The market has been long discontinued. Population in 1831, 1639.

Besides the foregoing decayed market-towns, one or two villages claim notice. Lewisham in Blackheath hundred, in the lathe of Sutton-at-Hone, consists of a long street of good houses, extending about two miles along the Hastings road. There is a modern church near the centre of the town. There are a grammar-school and an English school, both endowed, and an almshouse. The chapelry of Sydenham is a part of Lewisham parish, which had in 1831 a population of 9659. Broadstairs on the coast, near the North Foreland, has risen into notice as a watering-place: it is in Ringslow or Thanet hundred, in St. Augustine lathe. A small pier for the protection of the fishing craft was antiently built here, and the passage down the cliff to the sea was defended by an arch, gates, and portcullis; the arch still remains. There are some remains of an antient chapel near the pier, which is now converted into a dwelling-house. There are many good houses at Broadstairs, with libraries, warm baths, and other accommodations. Many Roman coins have been found here. Minster, in the Isle of Thanet and Ringslow hundred, had an antient nunnery destroyed by the Danes. The church is antient, and chiefly of early English character: it is a cross church, with a tower at the west end. Minster in Sheppey (lathe of Scray), had also a very antient nunnery, whose yearly possessions at the dissolution were valued at 29*l.* 7*s.* 10½*d.* gross. The gate-house and part of the church and chapel yet remain.

Whitstable, in Whitstable hundred, in the lathe of St. Augustine, on the æstuary of the Thames, is about six miles from Canterbury, with which city it communicates by a railroad. It may be considered as the port of Canterbury. Hoys convey goods to and from London, and colliers discharge their cargoes here. The inhabitants are engaged in the oyster fishery; in dredging for oysters round a rock called 'the Pudding-pan,' many pieces of Roman pottery have been found. Population in 1831, 1926. What is called Whitstable-street extends into Seasalter parish. A few miles east of Whitstable, on the æstuary of the Thames, is the new watering-place Herne Bay, which contains many good houses and several hotels; but the place has been laid out on so extensive a scale that it will long have an unfinished appearance. There is a pier or jetty, built on wooden piles, extending three-quarters of a mile over the sand or ooze, which is left dry at low water. A handsome clock-tower stands near the jetty. Steam-boats ply between London and Herne Bay during the season. Herne church, which is about a mile from Herne Bay, has some good portions in the early English and perpendicular style. There is a chapel at Herne Bay.

Divisions for Ecclesiastical and Legal Purposes.—The county was formerly divided between the dioceses of Canterbury and Rochester. The part east of the Medway constituted the diocese and archdeaconry of Canterbury; it was subdivided into the eleven rural deaneries of Bridge, Canterbury, Charing, Dover, Eleham, Limne, Ospringe, Sandwich, Sittingbourne, Sutton, and Westbere, and comprehended, according to Hasted (A.D. 1778) two hundred and eighty-one parishes. The remaining part of the county, west of the Medway, constituted, for the most part, the diocese and archdeaconry of Rochester; it was subdivided into the three rural deanries of Dartford, Malling, and Rochester, and comprehended ninety-eight parishes. The deanery of Shoreham, west of the Medway, comprehending thirty-four parishes, was in the peculiar jurisdiction of the archbishop of Canterbury.

By the late act 6 & 7 Will. IV., c. 77, provision has been made for the alteration of these arrangements. The parishes of Charlton, Lee, Lewisham, Greenwich, Woolwich, Eltham, Plumstead, and St. Nicholas and St. Paul, Deptford, all hitherto in the deanery of Dartford, and diocese of Rochester, and in the neighbourhood of London, are to form part of the diocese of London: the city and deanery of Rochester are to remain part of the diocese of Rochester, to which diocese nearly the whole of Essex and the whole of Hertfordshire are added; the remainder of Kent is to form the diocese of Canterbury. The deanery of Rochester is to form an archdeaconry.

Kent is in the Home circuit, excepting certain parishes near London, namely, Charlton, Lee, Lewisham, Greenwich, Woolwich, Eltham, Plumstead, and St. Nicholas and St. Paul, Deptford, which are in the jurisdiction (in criminal matters) of the Central Criminal Court. The assizes are held at Maidstone, where are the county gaol and the house of correction. For subordinate jurisdictions the county is divided into East Kent and West Kent; the former comprehending the lathes of St. Augustine and Shepway, and the hundreds of Middleton or Milton, Teynham, Faversham, Boughton, Felborough, Wye, Calehill, and Chart and Longbridge, forming the upper or northern division of the lathe of Scray; the latter comprehending the lathes of Sutton-at-Hone and Aylesford, together with the hundreds of Marden, Cranbrook, Barclay, Blackbourne, Tenterden, Rolvenden, Barnfield (East), and Selbrittenden, which form the lower or southern division of the lathe of Scray. The justices of the peace, though by their commission appointed for the whole county, usually confine the exercise of their power to their own division of it, and separate quarter-sessions are held, for East Kent, at Canterbury, and by adjournment at Maidstone a day or two after, for West Kent.

The same two great divisions are, since the county was divided by the Reform Act, used for parliamentary purposes. East Kent returns two members; the election takes place at Canterbury, and the polling stations are Canterbury, Sittingbourne, Ashford, New Romney, and Ramsgate. West Kent also returns two members; the court for their election is held at Maidstone; and the polling stations are Maidstone, Blackheath, Bromley, Gravesend, Tunbridge, and Cranbrook. Two members each are returned for the cities of Canterbury and Rochester, for the Cinque-ports of Dover and Sandwich, and for the boroughs of Greenwich and Maidstone, and one member each for the Cinque-port of Hythe and the borough of Chatham. The total number now returned from the whole county is eighteen. Before the Reform Act it was the same, By that Act New Romney and Queenborough, returning two members each, were disfranchised, and Hythe reduced from two members to one, making a deduction of five members; but the loss was exactly compensated by the division of the county, and the creation of the new boroughs of Greenwich and Chatham.

History and Antiquities.—This county comprehends that part of England which from its proximity to the Continent first obtained distinct historical notice. The name is very antient, probably of Celtic original: its meaning has been inferred, from a comparison with other names which seem to include the same element (Cant-ire, Cant-abri, Cant-æ), to be 'corner' or 'projection,' a designation suitable enough to the position of this and of the other countries or nations mentioned.

Cæsar mentions the district by its name, which he gives in the Latinized form Cantium; he ascribes to the inhabitants civilization much superior to that of the other islanders. It was the part on which his attack was made in his first invasion, and he did not then pass beyond its limits: in his second invasion he passed through it to the assault of other tribes; some sharp encounters took place during his march in this county, and in his absence five of the reguli or petty princes of Cantium made an unsuccessful attempt to storm the fortified intrenchment which protected his fleet, B.C. 54. In the invasion under Aulus Plautius, A.D. 43, and in the subsequent wars with the Romans, there are no historical incidents the locality of which can be identified with Cantium, except the destruction of London by the insurgents under Boadicea. Ptolemy places *Λονδίνιον* (Londinium) among the towns of the *Κάντιοι* (Cantii, or people of Cantium); a statement which, if accurate, supposes the district to have exceeded the limits of the present county, whether we place the antient Londinium on the north or south side of the Thames; and which, if we place the original site of London on the north of the river, as it most likely was, supposes that some part of Middlesex must have been included in Cantium.

In the division of the Roman empire which prevailed in its later period Cantium was comprehended in the province of Britannia Prima (one of the four into which the diocese of Britain was divided), except that part of it (if any) which lay north of the Thames, which was in the province of Flavia Cæsariensis. Several important stations were within the limits of the modern county. There were the four harbours of Regulbium, Reculver; Ritupæ, or Ad Portum Ritupis, Richborough near Sandwich; Dubræ, or Ad Portum Dubris, Dover; and Lemanæ, or Ad Portum Lemanis, Lympne or Limme, near Hythe Roads from these places met at Durovernum, or Canterbury; from whence the military way called Watling Street ran in a direct line to Londinium, London, passing by the way through Durolevum, Newington, or more probably Judde Hill near Ospringe; Durobrivæ or Durobrivis, Rochester; and Vagniacæ, Southfleet near Gravesend. The above places, with the exception of Regulbium, are mentioned in the 'Itinerary of Antoninus,' which also notices Noviomagus, Holwood Hill near the source of the Ravensbourne, which though placed in the Itinerary between Vagniacæ and Londinium, was out of the line of Watling Street. Regulbium is mentioned in the 'Notitia Imperii' and by Richard of Cirencester. Besides these there were other stations, as Madus, mentioned by Richard and noticed in the Peutinger table or map; and Anderida, a harbour mentioned both in the 'Notitia Imperii' and by Richard, but which is more likely to have been on the coast of Sussex. Besides Watling Street, and Stone Street, which runs from Canterbury to Lympne, there were probably several Roman roads in Kent which have not been distinguished by any particular name.

Of these stations and roads there are many remains. Regulbium, now Reculver, defended the northern entrance of the channel between Thanet and the rest of the county. The encroachments of the sea have washed away part of the station. The church of Reculver, which forms a well known sea-mark, occupies the centre of it. The enclosure was a square with the angles rounded off. Parts of the walls on the east, south, and west side yet remain: in their general structure they bear a close resemblance to those of Richborough Castle, but are in a much inferior state of preservation. The town is supposed to have been to the north of the station, on a site now undermined and washed away. Many Roman antiquities of various kinds have been discovered here, and imperial coins are still often found after heavy rains. Richborough Castle, near Sandwich, is the Ritupæ or Ad Portum Ritupis of the Romans. The name of this place is variously spelt. It is called Ad Portum Ritupis in Antoninus; *'Ρουτούπιαι* by Ptolemy; Rhutupis by Richard of Cirencester, who terms it a colony; and Ratupis in the Peutinger table. Ritupæ is the presumed nominative of Ritupis, as Dubræ of Dubris, and

Lemanæ of Lemanis. Richborough is one of the noblest Roman remains in the island. It was the usual place of communication with the Continent, and guarded one mouth of the channel which then insulated Thanet. It stands on a small elevation, along the base of which the Stour flows, and about one mile in a direct line from its entrance into Pegwell Bay. The walls form a parallelogram, but the east wall has disappeared and probably fallen into the Stour. The area within the walls is five acres. The walls are flanked by projecting round towers at the angles, and by intermediate round towers. There is a large opening in the west wall, and a narrower one, the Porta Decumana, in the north wall. The foundations of the walls are laid with great care; and the walls were built of blocks of chalk and stone, and faced on both sides with squared blocks of Portland or grit-stone, banded at intervals with double rows of large flat tiles. The walls to the height of six feet are eleven feet three inches thick, above that height they are ten feet eight inches. The top of the wall is everywhere imperfect; its greatest height is twenty-three feet. A quarter of a mile from the south-west angle of the castle are the remains of a Roman circular amphitheatre of about seventy yards diameter. Coins and other antiquities have been dug up here. In the circuit of Dover Castle are the ruins of a pharos or watch-tower, an indubitable relic of the Roman Dubræ. This watch-tower has an octangular base externally, but within it is a square: the height, when Stukeley examined it, was about forty feet, but the upper part is an addition or repair of a later period. The foundations were laid in a bed of clay, though it is built on a chalk rock. The structure is composed of long, thin, irregular bricks, with intermediate courses formed by blocks of hard stalactitical incrustations: it is now in a very dilapidated state. The ruin of an old church adjoining the pharos is not Roman, but Roman bricks have been worked up in it.

At Lymne, or Lympne, near Hythe, are the remains of the Roman fortress Lemanæ, or Ad Portum Lemanis. This fort, now called Stutfall Castle, had an area of about five acres. Stukeley and Leland have much exaggerated it; the walls are imperfect, and have been overthrown in some places by the subsidence of the soil, which here forms a steep hill or cliff on the edge of Romney Marsh. The river Limene or Rother formerly had its course under this hill and formed the harbour. Richard spells the name of this place Lemanus.

At Durovernum (Canterbury) numerous antiquities have been discovered, and until towards the end of the last century three semicircular arches of Roman bricks were standing in different parts. Many Roman bricks have been worked up into the city walls. Richard gives to Durovernum the name Cantiopolis. At Durobrivæ (Rochester) various antiquities have been found, and Roman bricks have been worked up in the ruined walls of the cathedral precinct. The name of this place is said to have been corrupted in the later period of the empire into Roibis (Roibæ), or, in the Peutinger table, Raribis (Raribæ). From Roibis or Roibæ appears to have been formed the Saxon Hrof-Ceastre and the modern Rochester. Bede however derives Hrof-Ceastre from one Hrof, a Saxon chieftain. To Durolevum two positions have been assigned: at Newington there are the remains of entrenchments, and an abundance of Roman pottery has been dug up; on Judde Hill, in the parish of Ospringe, south of the Canterbury road, which agrees better with the distances of the Itinerary, are the remains of a square camp with the corners rounded off. Roman coins and fragments of culinary vessels, intermixed with many parcels of oyster shells, have been found; and in the ruins of Stone Chapel, just on the other side of the road, Roman bricks have been worked up, and in one place a separate piece of a Roman wall has been built in. At Southfleet, the Roman Vagniacæ, a large earthern vessel and a stone tomb containing several funeral antiquities were discovered early in the present century. On Holwood Hill, near Farnborough, on the Hastings road, the antient Noviomagus there are the remains of an immense elliptical encampment, in which Roman bricks and tiles have been turned up by the plough, and Roman coins picked up. Noviomagus, is said by Richard to have been the metropolis of the Bibroci. To the Madus of Richard (perhaps it should be Ad Madum) it is difficult to assign a position which will accord with the distances given by him. The name would lead us to Maidstone, or some post, or ferry, or ford, on the Medway, but the distances as they stand will not admit of this. Some identify the place with Durobrivæ or Rochester, but the numbers will not agree with this supposition. It may be mentioned here, that the numbers in Richard's Itinerary (Durolevo.. Mado XII. Vagnaca XVIII.), if transposed, would sufficiently well suit the distance of Maidstone from Judde Hill and Southfleet respectively, if we suppose a branch road from the Watling Street at Newington to Maidstone, and another road direct from Maidstone to Watling Street at Southfleet. The remains of an entrenchment at Newenden, the discovery of some Roman coins, and a tradition, mentioned by Camden, that a very antient town and harbour had existed here, have led some to fix on this as the site of Anderida. But the distance from Ad Portum Lemanis in Richard, and the declaration of Gildas, that it was in 'littore oceani ad meridiem,' would lead us to some position on the Sussex coast as the site of that town.

Of the Roman roads, the Watling Street, which nearly coincided with the present road from London to Canterbury, may be traced in several places. Dr. Plot observed traces of it on or near Blackheath. It is still visible on Bexley Heath, and again just beyond Dartford, where the modern road bends to the left towards Gravesend, while the Street pursues a direct course through Southfleet to Rochester. From hence to Canterbury the antient and modern roads coincide, and the traces of the antient one appear to have been, except in a few places, obliterated. The branch of Watling Street which led from Durovernum (Canterbury) to Lemanæ (Lympne), is still conspicuous for some miles. It pursues a straight course between the two places, and is known by the name of Stone Street.

The North Foreland is mentioned by Ptolemy under the name of *Κάντιον* or *'Ακάντιον ἄκρον*, the promontory Cantium or Acantium. The Medway, the Stour, the small stream which enters the sea at Dover, and the Rother, appear to be mentioned in Richard under the respective names of Madus, Sturius, Dubris, and Lemanus. Thanet appears in the pages of Richard under the name of Thanatos, and the channel which insulates it, under that of Wantsuam. Cauna, which appears in Richard's map, is probably Canvey Island on the Essex shore; but its position more nearly resembles that of Sheppey.

In the Saxon invasion Cantium was the scene of many interesting events. The brothers Hengist and Horsa landed in Pegwell Bay, near Ipwines Fleet, now Ebb Fleet, in Thanet, probably about A.D. 446 or 449. Their force consisted of three ships, and perhaps three hundred men; and it is uncertain if their arrival was accidental, or whether they premeditated an incursion for the sake of plunder. One of the island princes, Wyrtgeorn or Gwrtheyrn (popularly Vortigern), engaged them to support him against the invasions of the Scots, whom they repelled. The names of Hengist and Horsa are poetical names (both in the Anglo-Saxon denoting a horse); and their exploits are, if not entirely fabulous, of so doubtful a character as to deserve little credit. Having received a grant of the Isle of Thanet, then insulated by a channel of some width, they received accessions of strength from their countrymen at home, and were soon involved in hostilities with the Britons. Thanet was called by the Britons Ruim or Ruym.

Of the early battles of Hengist and his Jutes with the Britons, the principal were fought in the year 455; the first on the Dereuent (Darent); the second at Epsford or Eglesford (Aylesford) on the Medway, in which battle the British prince Catigern, son of Vortigern, and the Saxon Horsa, fell; and the third at Stonar, near Sandwich. The localities indicate that at the commencement of the struggle the Jutes had advanced some way into the island, and that they were gradually repelled. The antient chronicles distinctly assign the victory in the second and third engagements to the Britons, who were led by Guortemir, popularly called Vortimer, son of Vortigern; after the battle of Stonar, the Jutes fled to their ships, and did not return to England till Vortimer's death, two years after. In A.D. 457, Hengist and his son Eric or Æsc, are said to have defeated the Britons with great slaughter at Creccanford (Crayford), the position of which indicates the advance of the Jutes; yet that advance was probably only for plunder, as the next recorded engagement, eight years after, A.D. 465, was at Wyppedes-fleot in Thanet. In A.D. 473, the Jutes obtained another victory at a place not named. Hengist died some years after (A.D. 488), leaving a reputation out of all proportion to the real extent of his achievements. The ravages of others seem to have been ascribed to him, and his pre-eminence has probably resulted from his priority in point of time rather than from the wider extent or greater destructiveness of his devastations. Even their priority in point of time is questionable; for it has been supposed that during the decline of the Roman power the east coast, or the Saxon shore, had been to a considerable extent colonized by Saxons. Hengist's dominions never extended beyond Kent, and it may be questioned if he ever took the title of king. His son Æsc did; and was honoured as the real founder of the Kentish dynasty of the Æscingas, or sons of the ash-tree. Kent was called by the Saxons Cantwaraland: Durovernum became Cantwarabyrig or Cantwaraburh, whence Canterbury. In a Latin charter of Ethelbert, Kent is Cantia, and Canterbury Dorobernia.

Æsc was succeeded by Ocha or Octa, and Ermeric, whose genealogy and the period of whose reigns are obscure. Kent passed unnoticed in the more exciting events which occurred in other parts. But Oedilberct (Bede) or Aethelbyrht, or in Latin Ethelbertus, popularly Ethelbert, who succeeded Ermeric, was of a more aspiring disposition than his predecessors. In the year 568, being only sixteen years of age, he claimed the supremacy of the Anglo-Saxon princes, and invading the dominion of Ceawlin, king of Wessex, the most powerful of them, was defeated by that prince and his brother Cutha, or Cutholf, at Wibbandune (perhaps Wimbledon in Surrey). In A.D. 589 or thereabout, Ethelbert obtained the supreme power or dignity of Bretwalda, which he retained till his death A.D. 616. After the conversion of Ethelbert to Christianity, a church was built by Augustin, adjacent to the royal palace, which was the precursor of the present cathedral of Canterbury, which, from the political supremacy of Ethelbert and his earlier conversion, became the ecclesiastical metropolis of England. [ETHELBERT.]

Under Eadbald, son and successor of Ethelbert, the crown of Kent lost the supremacy which the talent or power of Ethelbert had acquired. A succession of obscure princes followed: Erconbert, A.D. 640; Ecgbryht, or Egbert, A.D. 664; Hlothere, or Lothar, A.D. 673,—in the reign of this prince Ethelred, king of Mercia, invaded Kent, put Hlothere to flight, and destroyed Rochester, A.D. 676; Eadric (A.D. 685) had previously reigned for some time in conjunction with Hlothere, with whom he was competitor for the royal power, which he compelled him to divide. In this reign, A.D. 686 and 687, Ceadwalla, king of Wessex, and his brother Mollo, or Wolf, attacked and ravaged Kent with extreme ferocity. Mollo was surprised by the Kentish men, driven into a hut, and burnt with twelve followers. Ceadwalla however established his supremacy over the kingdom of Kent, and held it till his abdication, A.D. 688. Wihtred and Swaebhard or Waebhard, were kings of Kent about A.D. 690 and 693: the former reigned for more than thirty years. He paid a heavy fine to Ina of Wessex, who had invaded Kent, as an expiation for the death of Mollo. Ethelbert, Eadbert, and Alric, brothers, reigned in conjunction under the supremacy of Mercia, A.D. 725. Alric was the survivor of the three, and in him ended the line of the Æscingas.

In A.D. 752, Kent was subject to Mercia, for Kentish men formed part of the army of Ethelbald, the Mercian king, in his war against Cuthred of Wessex. In the following half century Kent appears to have been in an unsettled state, and was perhaps divided between two or more petty princes: among whom Alchmund, Eadmund, or Eanmund, father of Egbert, afterwards king of Wessex, may be numbered. During part, if not the whole of this period, Kent was in subjection to Mercia, having been conquered by Offa, who defeated the Kentish men, A.D. 776, at Ottford. About A.D. 796 or 797, Eadbert, or Ethelbert Pren, king of Kent, was attacked by Cenwulf of Mercia; and having been seized by some of his own subjects 'the Merscwara,' or men of Romney Marsh, was by them cruelly mutilated and delivered up to the Mercians. Cenwulf bestowed the crown of Kent on his brother Cuthred, as subordinate prince; but on his death resumed the direct government of it. Other princes subordinate to Mercia were however soon appointed, of whom Baldred was one. Wessex was now establishing its supremacy over the other Anglo-Saxon kingdoms. Egbert, king of the West Saxons, having defeated the Mercians at Ellandun or Wilton, A.D. 823, dispatched a force into Kent under his son Ethelwulf, the Ealdorman or Alderman Wulfheard, and Alstan, bishop of Sherbourn. Baldred fled at their approach; and Kent passed from under the Mercian supremacy to that of the West Saxons, under which it long remained.

From this time Kent, with which Surrey and Sussex, and probably Essex, were incorporated, became a subordinate part of the West Saxon empire. It commonly formed the appanage of the eldest son, or heir apparent, of the king of Wessex, and when the heir succeeded to the paramount sovereignty he usually resigned the Kentish crown to his heir. Thus Ethelwulf, son of Egbert, was, during his father's reign over Wessex, king of Kent; and when he succeeded to the throne of Wessex, he bestowed Kent successively on his sons Athelstane and Ethelbert; the latter of whom retained the crown when his brother Ethelbald ruled over Wessex, and, on the death of Ethelbald, united Kent and Wessex under one sceptre. It is to be observed that after the death of Athelstan, Ethelwulf united for awhile the direct administration of the sovereignties of Kent and Mercia in his own person; and afterwards reigned in Kent in conjunction with Ethelbert, who was subordinate to him. In a grant, Ethelwulf takes the title of 'Rex Occidentalium Saxonum necnon et Cantuariorum.' During the reign of Ethelwulf in Wessex, and of his sons in Kent, the latter kingdom was repeatedly attacked by the Danes: Canterbury and Rochester were sacked by them. Athelstan, king of Kent, and the alderman Elchere, or Ealhere, however defeated the Danes at Sandwich, and took many of their ships. At a subsequent period the Danes landed in the Isle of Thanet, and vanquished the men of Kent and Surrey.

In the warfare of Alfred the Great with Hastings the Northman, Kent was again the scene of conflict. In the year 893 a fleet of two hundred and fifty vessels arrived on the coast, and the crews having landed in Romney Marsh, and built a fort at Apuldre, now Appledore, on the Rother, marched inland to ravage the country. Hastings himself with eighty vessels arrived in the East Swale, landed at Milton, and threw up a strong intrenchment near Sittingbourne. Alfred marched an army into Kent, and encamped between the two divisions of Hastings, which he thus kept in check: but the Northmen, by a rapid march, passed his army and penetrated into Surrey. Their subsequent hostilities and ravages, though widely spread, do not appear to have touched Kent.

From this time the crown of Kent was never separated from that of Wessex. The 'Juti Cantiani,' Jutes of Kent, are mentioned by an antient chronicler as subdued by Edward the Elder in the very commencement of his reign: they perhaps at first supported the claim of his cousin and competitor Ethelwold, though in a subsequent part of the struggle they supported Edward. In the next reign, that of Athelstan, Kent possessed its separate legislature, which regulated the terms on which the laws of Wessex should be accepted. Traces of the distinct laws and franchises of Kent continued however till long afterwards.

In the reign of Ethelred (A.D. 980, 991) when the Northmen renewed their ravages, Kent was subjected to their fury until they were bought off by Ethelred. In A.D. 993 they appeared with a fleet off Sandwich, which they plundered. In the following year they ravaged Kent and other parts until again bought off by the king. In the year 998 they entered the Medway, took Rochester, and plundered the western part of the county. In A.D. 1006 Sandwich was plundered by Sweyn, king of Denmark, who retired on the approach of Ethelred into the Isle of Thanet; and he soon after received a large sum from Ethelred as the price of his retreat. In A.D. 1008 a large Saxon fleet had its rendezvous at Sandwich, but performed nothing; and the next year the Danes landed in the Isle of Thanet, and being joined by their countrymen from other parts, besieged Canterbury, from the inhabitants of which they extorted a large sum as the price of their retreat. In subsequent years they renewed their ravages in Kent, took Canterbury by treachery, plundered it, and reduced it to ashes. In the short but fierce struggle between Canute and Edmund Ironside, Kent was again the scene of contest. Edmund defeated his rival at Otford, in 1016, and drove him to the Isle of Sheppey.

In the reign of Edward the Confessor Kent was included in the earldom of the famous Godwin, but it does not appear that he took his title from it, but from his more important earldom of Wessex. The earldoms of that day were not mere titles, but conveyed viceregal power over the districts confided to the earl.

At the great battle of Hastings the men of Kent formed the vanguard of the Anglo-Saxon army: it was their privilege to occupy that post. A detachment of the Norman force having landed at Romney just before the battle, were defeated by the townsmen, which led William, when after the battle he marched along the coast, in order to secure the ports which communicated with the Continent, to burn that town and massacre the inhabitants. Having secured Dover Castle after a slight resistance, hung the governor, and burnt the town, he marched toward London by Watling Street; and in his way conciliated the favour, or at least disarmed the resistance, of the men of Kent, by granting them the continuance of their privileges. An unsuccessful attempt was subsequently made, A.D. 1067, by the Kentishmen, aided by the Earl of Boulogne, to surprise Dover Castle. In the reign of William Rufus, Kent was the scene of civil war: Odo, bishop of Bayeux and earl of Kent, raised the county in favour of Robert duke of Normandy. Rochester town and castle were defended on behalf of Odo, to whom the castle belonged, by Eustace earl of Boulogne, and the besieged did not capitulate till after a siege of many weeks. King John, when threatened with an invasion by Philippe II. Auguste of France, encamped with an army of 60,000 men on Barham Downs; but his courage failed him, and he made his memorable submission and surrender of his crown to Pandulphus, the Pope's Legate, at Dover. In the subsequent troubles, A.D. 1215, John collected an army of mercenaries at Dover, and marched inland; but William de Albini bravely defended Rochester Castle for three months against him, at which he was so enraged that on the surrender of the castle he ordered all the common soldiers, except the cross-bowmen, to be hung. In A.D. 1216, Louis, dauphin of France, landed in the Isle of Thanet, near Sandwich, in order to assist the barons, and took the castle of Rochester after a short siege; but after his retreat and the death of John, it again submitted to the crown. The rest of Kent submitted for a time to Louis, except Dover Castle, which was all along defended for the king against the Dauphin and the barons by Hubert de Burgh. In the troubles of the succeeding reign Rochester Castle was defended for the king against Simon de Montfort, who besieged it in vain.

It was in Kent that the rebellion of Wat Tyler broke out. The commons in this county and in Essex rose in a body, A.D. 1381. They attacked the archbishop of Canterbury's house at Maidstone, and released John Balle, a priest, who had been imprisoned for teaching doctrines like those of Wickliffe. The issue of the rebellion is well known. In the reign of Henry VI. the insurrection of Jack Cade broke out in Kent, A.D. 1450. [Cade.]

At the outbreak of the war of the Roses, A.D. 1451, Richard duke of York encamped near Dartford, where he fortified himself. The king, Henry VI., encamped on Blackheath. Some years afterwards, A.D. 1460, the navy which the duke of Somerset had collected at Sandwich was surprised and captured by an expedition from Calais, then in the power of the Yorkists. The earl of Warwick soon after landed at Sandwich and marched to London, being joined on his way by nearly 40,000 men. The bastard of Falconbridge, a Lancastrian, after his unsuccessful attempt on London, A.D. 1471, encamped on Blackheath, whence he slowly retreated through Kent to Sandwich, where he had a fleet: he submitted however to Edward IV., and surrendered his fleet and the town.

In the reign of Queen Mary, Kent was the scene of rebellion under Sir Thomas Wyatt, A.D. 1554. In the civil war of Charles I. and the Parliament, a severe battle was fought at Maidstone, A.D. 1648, in which the Parliamentarians, under Fairfax, obtained a complete victory.

In the reign of Elizabeth the river Medway appears to have formed the only harbour for the royal navy, then in its infancy. The dock at Chatham was built by that queen; and she erected Upnor Castle, on the opposite side of the Medway, to defend the passage of the river. In the reign of Charles II., A.D. 1667, a detachment from the Dutch fleet under De Ruyter sailed up the Medway as far as Upnor Castle. [Chatham.]

Of ancient castellated edifices, not already noticed or referred to, the most remarkable are Leeds, Hever, Chelham, Allington and Westerhanger castles, to which may be added the castellated mansions of Penshurst and Knowle. Leeds Castle is to the right of the road from Maidstone to Ashford, four or five miles from Maidstone. It is surrounded by a broad moat: the entrance is by a stone bridge of two pointed arches, and through a deep gateway in good preservation. Another gateway, which defended the entrance of the bridge, is in ruins. Part of the building has been modernized: the foundations of the more antient part, which formed the keep, rise immediately from the water, and are very strong. Leeds Castle was the residence occasionally of Richard II. and Henry IV. Hever Castle, on the Eden, one of the upper waters of the Medway, was erected in the time of Edward III., and possesses some historical interest as the residence of the Boleyn family. Here Henry VIII. used to visit Ann Boleyn in the days of their courtship. The castle is surrounded by a moat: the entrance gateway is flanked by round towers; the inner buildings form a quadrangle enclosing a court. Chilham Castle, about midway between Canterbury and Ashford, occupies a site on which there was probably a Roman building. After the Conquest a Norman castle was built here, of which the keep is the only part in good preservation. It is an irregular octagon of three stories, with walls ten or twelve feet thick, built of flint, chalk, and stone intermingled, faced with squared stone, and now mantled with ivy. The interior has been much altered and damaged: the view from the platform is very fine. The remains of Allington Castle, on the left bank of the Medway just below Maidstone, are occupied as two tenements. Allington was the seat of Sir Thomas Wyatt, an accomplished scholar of the time of Henry VIII., and of his son Sir Thomas, who suffered for treason against Queen Mary. Of Westerhanger, or Westonhanger, near Hythe, the principal remains are the outer walls, with the towers of the north and east sides, and a small chapel. Penshurst Castle is a very extensive pile. It is one of those castellated dwellings that immediately succeeded the baronial castles of a more troubled period. The principal buildings form a quadrangle enclosing a spacious court, and comprehending a hall, chapel, and other apartments. It derives its chief interest from having been the residence of the Sydney family. Knowle, or Knole, near Sevenoaks, the residence of the Sackvilles, dukes of Dorset, is another extensive and magnificent mansion: the principal buildings form a spacious quadrangle, and are in the castellated style. The greater part is of the fifteenth century, but some portions of it are yet older. There are earthworks, remains of castles, at Cowling, near the mouth of the Thames; at Thurnham, on the brow of the chalk hills near Maidstone, and one or two other places. Sandown, Sandgate, and Walmer Castles, all on the coast, hold a middle place between antient and modern fortifications. They are coeval with Deal Castle, and are of the time of Henry VIII.

Of monastic remains the principal are St. Augustine's Abbey [Canterbury], Aylesford Priory [Aylesford], and St. Radigund's Abbey, near Dover, which was founded about A.D. 1191, for Premonstratensian canons: its yearly revenue at the dissolution was 142*l*. 8*s*. 9*d*. gross, or 98*l* 9*s*. 2½*d*. clear. The walls of the outbuildings, gardens, &c., cover a considerable extent of ground, and the whole appears to have been surrounded by a semicircular rampart and ditch. The walls of the entrance gateway are nearly entire; the north and west sides of the chapel, and part of the dwelling, now patched up as a farm-house, are also standing. The walls are generally covered with ivy. There are considerable remains of the Benedictine priory at Dover, including the gateway and refectory, both nearly entire. The abbeys of Faversham and Malling, and the priories of Tunbridge and Folkestone, have been already noticed. Of Boxley Abbey, near Maidstone, there are few remains; and the abbey buildings at West Langdon, not far from Dover, have been new fronted with brick and much altered. There are some remains of the priories of Bilsington, on the edge of Romney Marsh, and of Monks Horton, near Stone Street causeway, of which last the western entrance to the church is a small but beautiful ruin of late Norman architecture, with insertions of windows and doors of perpendicular character. The chapel of St. Nicholas's Hospital at Harbledown, near Canterbury, is partly of Norman and partly of later architecture.

Of the churches of the county the most worthy of note are its two cathedrals [Canterbury; Rochester] For antiquity Barfreston, or Barston Church, between Canterbury and Dover, but not on the high road, is most deserving of notice. This has been considered to be of Anglo-Saxon architecture, but is more probably Norman. It consists of a nave and chancel, having a joint length of 43 feet 4 inches; the width of the nave, 16 feet 8 inches; of the chancel, 13 feet 6 inches, interior dimensions. The nave and chancel communicate by an arch rising from wreathed columns and richly sculptured. There have been some insertions, but on the whole the church is much in its original state. Several other churches, including St. Mary's at Dover, are chiefly valuable for their Norman features; but the predominant character in the churches of the county is the early English.

(*Ordnance Map;* Greenough's and Walker's *Geological Maps;* Hasted's *History of Kent; Beauties of England and Wales;* Palgrave's *Rise of the English Commonwealth;* Sharon Turner's *History of the Anglo-Saxons;* Rickman's *Gothic Architecture;* Batteley's *Antiquitates Rutupinæ.*)

STATISTICS.

Population.—The inhabitants of Kent are principally engaged in agricultural pursuits. The government establishments at Chatham, Deptford, and Woolwich give employment to numerous artisans and labourers; but out of 155,655 males, twenty years of age and upwards, living at the enumeration of 1831, only 476 were returned as employed in manufactures or in making manufacturing machinery. Of these 164 were employed in calico-printing at Crayford and Bexley, 88 in weaving bagging at Maidstone, and the remaining 224 were employed as millwrights and in chemical works at Deptford and Greenwich, in the gunpowder-mills at Dartford, and in the making of Tonbridgeware. Compared with the other counties of England the proportion of persons engaged in agriculture in Kent has been increasing. Under this aspect it stood thirty-third on the list in 1811, it was the twenty-eighth in 1821, and in 1831 it ranked the twenty-fifth. The actual proportions at each of the three periods here mentioned were—

	1811.	1821.	1831.
Families employed in Agriculture . . .	35·5	35·9	32·6
" Trade, Handicraft, &c. .	36·7	35·1	30·3
Other classes	27·8	29·	37·1
	100·	100·	100·

The population of Kent at each of the four enumerations made during the present century was—

	Males.	Females.	Total.	Increase per cent.
1801	151,374	156,259	307,624	..
1811	183,500	189,595	373,095	21·28
1821	209,833	216,183	426,016	14·18
1831	234,572	244,583	479,155	12·47

showing an increase between the first and last periods of 171,531, or 55¾ per cent., which is very nearly equal to the whole rate of increase in England and Wales during that interval.

The following table gives a summary of the population of every hundred, &c., in the county, as found at the census of 1831:—

Summary of the County of Kent.

LATHES, CITIES, OR BOROUGHS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceeding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
St. Augustine (Lathe). .	13,254	14,999	122	619	5,612	4,986	5,301	36,395	38,519	74,914	17,654
Aylesford (Lathe) . .	15,442	18,081	221	440	8,448	4,837	4,796	45,859	45,609	91,468	22,731
Scray	12,957	15,293	63	339	7,879	4,205	3,209	39,785	39,188	78,973	19,108
Shepway	4,267	5,052	22	211	2,516	1,353	1,183	12,898	12,951	25,849	6,216
Sutton-at-Hone . .	12,728	14,659	172	519	5,985	3,811	4,863	36,137	37,805	73,942	18,305
Canterbury (City) . .	2,661	3,033	5	173	349	1,736	948	6,212	7,437	13,649	3,189
Chatham (Town) and Rochester (City) . . .	4,578	5,686	49	301	304	2,724	2,658	13,064	14,257	27,321	5,690
Deptford and Greenwich (Towns) . . .	8,051	9,689	113	765	184	2,700	6,805	22,007	22,341	44,348	12,281
Dover (Town and Port) .	2,095	2,551	26	56	37	989	1,525	5,303	6,619	11,922	2,823
Maidstone (Borough) .	2,844	3,034	31	143	233	1,499	1,302	7,295	8,092	15,387	3,464
Sandwich (Town and Port) .	595	722	..	33	90	271	361	1,439	1,697	3,136	750
Woolwich (Town) . .	2,672	4,343	18	219	30	1,208	3,105	7,593	10,068	17,661	3,444
Militia under training. .	..	..	..	..	..	..	..	585	..	585	..
Totals . . .	82,144	97,142	842	3,818	31,667	29,419	36,056	234,572	244,583	479,155	155,655

County Expenses, Crime, &c.—The sums expended for relief of the poor at each of the four dates when the census was taken were—

	£.		s.	d.	
1801 . .	206,508,	being	13	5	for each inhabitant.
1811 . .	317,990	"	17	0	"
1821 . .	370,711	"	17	4	"
1831 . .	345,512	"	14	5	"

The sum expended for the same purpose in the year ending 25th March, 1837, was 185,503*l.*; and assuming that the population has increased since 1831 at the same rate of progression as in the ten preceding years, this sum gives an average of 6*s.* 10½*d.* for each inhabitant. These averages are all above the general averages for the whole of England and Wales.

The sum raised in Kent for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1838, was 433,274*l.* 16*s.*, and was levied upon various descriptions of property as under:—

On land . .	£275,810	11*s.*
Dwelling-houses .	140,513	8
Mills, factories, &c. .	12,510	17
Manorial profits, navigation, &c.	4,440	0
	433,274	16

The expenditure in the same year was—

For the relief of the poor . .	£369,587	13
In suits of law, removal of paupers, &c.	16,011	5
For other purposes . .	64,752	16
	450,351	14

The returns made up during subsequent years do not specify the proportions in which different descriptions of property were assessed. In the four years ending with 25th March, 1837, there were raised for local purposes—

1834 . . .	£418,785	13*s.*
1835 . . .	370,718	19
1836 . . .	313,669	7
1837 . . .	215,499	0

The expenditure for each of these years was as follows:—

	1834.		1835.		1836.		1837.
	£.	s.	£.	s.	£.	s.	£.
For the relief of the poor .	343,878	9	297,098	6	247,929	12	185,503
In suits of law, removals, &c.	15,339	11	12,371	3	9,383	16	6,206
Payments towards the county-rate . .	65,430	14	24,790	2	22,933	12	..
For all other purposes			47,742	18	40,127	1	23,790
Total money expended	£424,648	14	382,002	9	320,374	1	215,499

The saving effected on the sum expended for the relief of the poor in 1837, as compared with the expenditure of

1834, was therefore 46 per cent.; while the saving on the entire expenditure, comparing those two years, was 47 per cent.

The number of turnpike-roads' trusts in Kent, ascertained in 1835 under the Act 3 and 4 William IV., chap. 80, was 50; the number of miles of road under their charge was 586. The annual income arising from tolls and parish compositions in lieu of statute duty was, in 1835, 73,674*l.* 9*s.* 6*d.*, and the annual expenditure in the same year was 72,801*l.* 18*s.* 7*d.*, as follows:—

	£.	*s.*	*d.*
Manual labour	15,112	9	5
Team labour and carriage of materials	10,767	4	0
Materials for surface repairs	8,144	14	8
Land purchased	998	0	3
Tradesmen's bills, law charges, &c.	4,677	8	4
Salaries of treasurer, clerk, and surveyors	3,708	7	10
Improvements	5,743	5	2
Interest of debt	10,321	6	7
Towards redemption of the debt	11,089	10	0
Incidental expenses	2,239	12	4

The county expenditure in 1834, exclusive of that made for the relief of the poor, was 16,692*l.* 15*s.* 6*d.*, and was disbursed as follows:—

	£.	*s.*	*d.*
Bridges, building, repairs, &c.	1,538	0	6
Gaols, houses of correction, and maintaining prisoners	5,651	0	11
Shire-halls and courts of justice, building, repairing, &c.	260	13	10
Lunatic asylum	1,105	17	4
Prosecutions	3,562	14	8
Clerk of the peace	1,102	8	8
Conveyance of prisoners before trial	1,475	11	1
Apprehending and conveying vagrants		15	3
Constables, high and special	226	18	10
Coroner	449	6	0
Miscellaneous	1,319	8	5

The number of persons charged with criminal offences within the county in each of the three septennial periods ending with 1819, 1826, and 1833, were 2741, 3800, and 4640, being an average of 391 annually in the first period, of 543 in the second period, and of 663 in the third period. The numbers accused in subsequent years were—

1834	775
1835	894
1836	872
1837	896

Of the number accused in 1837 there were—

	Males.	Females.	Total.
For offences against the person	50	3	53
„ „ against property, with violence	48	5	53
„ „ „ without violence	623	131	754
„ forgery and offences against the currency	21	5	26
„ other offences, not included above	8	2	10
	750	146	896

The number of persons against whom bills were not found by the grand jury, and who were acquitted on trial, was 246; of the remaining 650 who were convicted, 481 were for simple thefts, and 25 for common assaults. There were 9 persons sentenced to death; of these 8 had their punishment commuted to transportation for life, and the other to transportion for seven years. Of the remaining convicts there were transported—

For life	34
„ 15 years	2
„ 14 years	24
„ 10 years	1
„ 7 years	90
	151

Imprisoned for 2 years and above 1 year	12
„ 1 year and above 6 months	56
„ 6 months and under	410
	478
Whipping, fine, and discharge on sureties	12

The ages of the persons accused were—

	Males.	Females.
12 years and under	13	4
16 „ and above 12	97	14
21 „ „ 16	229	41
30 „ „ 21	218	32
50 „ „ 30	150	43
60 „ „ 50	23	7
Above 60	7	3
Age could not be ascertained	13	2

Their state of instruction was as follows:—

	Males.	Females.
Could neither read nor write	298	72
„ read and write imperfectly	398	71
„ read and write well	33	1
Had received superior instruction	8	0
State of instruction could not be ascertained	13	2

The number of electors qualified to vote for the county members in Kent at the registration of 1837 was, for the eastern division 7293, and for the western division 8432, being about 1 in 30 of the whole population, and about 1 in 10 of the male population 20 years of age and upwards, as taken in 1831.

There are 20 savings' banks in Kent. The number of depositors in these, and the amount of their deposits as they stood on the 20th of November in each of the last five years, were as follows:—

	1833.	1834.	1835.	1836.	1837.
Number of depositors	18,188	19,312	20,010	21,326	22,149
Amount of deposits	£531,018	£566,017	£582,056	£613,804	£629,083

The deposits of the last two years were divided in the following classes:—

		1836.		1837.	
		Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding	£20	11,836	£82,248	12,506	£86,194
„	50	5,814	179,553	5,867	181,857
„	100	2,385	164,325	2,442	168,454
„	150	800	96,281	838	101,200
„	200	399	67,862	408	68,872
Above	200	92	23,535	88	22,506
		21,326	613,804	22,149	629,083

Education.—The following summary is taken from returns made to the House of Commons in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	207		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		1,325	
Females		1,711	
Sex not specified		1,479	
			4,515
Daily schools	1488		
Number of children at such schools; ages from 4 to 14 years:—			
Males		24,241	
Females		18,496	
Sex not specified		6,469	
			49,206
Schools	1695		
Total of children under daily instruction			53,721
Sunday schools	479		
Number of children at such schools; ages from 4 to 15 years:—			
Males		15,791	
Females		15,556	
Sex not specified		6,176	
			37,523

Assuming that the population between the ages of 2 and 15 has increased in the same proportion with the whole population since 1821, when the relative population at different ages was last taken, and likewise assuming that the whole population has increased since 1831 in the same ratio as it did in the ten years preceding that date, we find by approximation that there were 127,096 children between the ages of 2 and 15 years in Kent in 1834, when these returns were obtained. Thirty-one Sunday-schools are returned from places where no other school existed, and the children taught in these (1005 in number) cannot be supposed to have attended any other school. At all other places Sunday-school children are able to resort to other schools also, and there can be no doubt that many do so resort; but in what number or proportion duplicate entry is thus occasioned in the Parliamentary Returns there are no means of ascertaining. Ninety-two schools, containing 7209 children are returned from various places as being both daily and Sunday-schools, and duplicate entry is known to have been thus far created. Making due allowance for this circumstance, it may perhaps be fairly concluded that at the time the inquiry was made little more than three-fifths of the children between the ages of 2 and 15 were receiving instruction of any kind in schools within the county.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	2	262	7	406	181	2,519	17	1,328
Daily Schools	129	7180	72	5,344	1197	29,628	90	7,054
Sunday Schools	26	1731	410	32,011	1	30	42	3,751
Total.	157	9173	489	37,761	1379	32,177	149	12,133

The schools established by Dissenters, included in the above statement, are—

	Schools.		Scholars.
Infant schools . . .	. .		. .
Daily schools . . .	12	containing	844
Sunday-schools . . .	148	„	15,486

The schools established since the inquiry of 1818 are—

			Scholars.
Infant and other daily schools .	986	containing	31,410
Sunday-schools . . .	349	„	29,333

No school in Kent appears to be confined to the children of parents belonging to the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for the children of Roman Catholic parents.

Lending-libraries of books are attached to 53 schools in the county of Kent.

KENT, WILLIAM, an artist of moderate ability as a painter and sculptor, nevertheless one of considerable ability and influence as an architect and landscape-gardener, was born in Yorkshire, in 1684. Both his parentage and education were humble, and he was apprenticed to a coach-painter. Conceiving however that he had abilities which ought to elevate him above that grade, he attempted to establish himself as a portrait and historical painter, and so far attracted notice that some gentlemen raised a contribution for the purpose of enabling him to go and study in Italy. Thither he accordingly proceeded in 1710, and remained there several years, till he had the extreme good fortune to become acquainted there with the earl of Burlington in 1716. The noble patron not only brought home his protégé, and exerted all his influence and authority in matters of taste to recommend him to others, but took him under his own roof, where he remained till his death, April 12, 1748. How far Kent assisted his patron in his designs, or the latter assisted him, is doubtful; but it is certain that he soon discovered greater capacity for architecture than he had done for painting: and if it be true that the designs for Holkham, the seat of the earl of Leicester, in Norfolk, emanated principally, if not entirely, from him, that single edifice alone proves him to have possessed very superior talent and taste as an architect, it being a chef-d'œuvre in plan, and possessing many graces and beauties of design. As architect and landscape-gardener he was in his proper sphere, and followed both pursuits with the true spirit of an artist. In landscape-gardening, in fact, he forms an epoch, and may justly be considered as the father of the English style of gardening; for, as Walpole, who has not been niggard of praise towards him, observes, he was 'painter enough to taste the charms of landscape, bold and opinionative enough to dare and to dictate, and born with a genius to strike out a great system from the twilight of imperfect essays.' Shakspeare's monument in Westminster Abbey will preserve his name as a sculptor, without at all adding to his reputation. It is therefore fortunate for it that it will bear such retrenchment without injury to its vital part.

KENT, JAMES, a distinguished and deservedly popular composer of English church music, was born at Winchester, in 1700, and at an early age placed as a chorister in the cathedral of that city, but soon removed to London, and admitted as one of the Children of the Chapel Royal, under the celebrated Dr. Croft, then Master of the Children. After completing his education, he was chosen organist of Finden, in Northamptonshire, and subsequently was appointed organist of Trinity College, Cambridge, whence he removed, in 1737, upon being elected to fill the same situation in the cathedral of his native place, an office which he resigned in favour of his pupil, Mr. Fussell, in 1774. He died, deeply regretted, in 1776.

Mr. Kent was very serviceable to Dr. Boyce while the latter was preparing his magnificent work, the *Collection of Cathedral Music*, and his assistance is duly acknowledged by that learned editor. In 1773 he published his now well-known volume of *Twelve Anthems*, among which are, 'Hear my Prayer,' 'When the Son of Man,' 'My Song shall be of Mercy,' and others familiar to and the delight of the congregations of our cathedrals. Upon presenting a copy of this work to Trinity College, the Master and Fellows voted him a valuable piece of plate. After his decease, a *Morning and Evening Service, and Eight Anthems*, composed by him for the Winchester choir, were collected and printed by Mr. Corfe, of Salisbury; but the probability is that the author never intended them for publication, for only the service and one of the anthems admit of comparison with the productions he himself gave to the world.

'Mr. Kent was remarkably mild in his disposition, amiable in his manners, exemplary in his conduct, and conscientiously diligent in the discharge of his duties. His performance on the organ was solemn and impressive, and he was, by competent judges, considered as one of the best musicians of the age in which he lived.' (*Harmonicon.*)

KENT'S HOLE, a cavern near Torquay, which has yielded a great quantity of bones, very similar, as to the species of animals to which they belong, and the condition in which they are preserved, to the bones in Kirkdale Cave. The same explanation of the phenomena probably applies to both cases. [KIRKDALE.]

KENTUCKY, one of the republics constituting the United States of North America, is situated between 36° 30′ and 39° 8′ N. lat., and between 82° and 89° 30′ W. long. Its greatest length is 380 miles, and its mean width 99 miles. The area is stated at 37,680 square miles. Its boundary-lines are formed on three sides by rivers. The Mississippi on the west divides it from the State of Missouri for 42 miles. The Ohio runs along its northern side, in a winding course of 583 miles, separating it from the states of Illinois, Indiana, and Ohio. The Big Sandy River constitutes the boundary between Kentucky and Virginia for 70 miles, but the remainder of the boundary-line between these two states is formed by one of the ridges of the Alleghany Range, called the Cumberland Mountains. The boundary-line between Kentucky and Tennessee, which is to the south, is formed by two straight lines, the eastern running from the Cumberland Mountains eastward to the Tennessee River for 242 miles, on the parallel of 36° 35′ N. lat., and the western between the last-named river and the Mississippi for 84 miles, on the parallel of 36° 30′. Both lines are united by the river Tennessee, whose course constitutes the boundary-line for 12 miles.

Surface and Soil.—The south-eastern portion of Kentucky, which is less than one-tenth of the whole state, is covered with ridges of mountains and high hills, the slopes of which are rather steep, and which contain between them narrow, deep, and gloomy valleys. The whole of this region is well wooded, especially the lower parts of the hills and the vales. None of the summits of these mountains appear to attain the height of 3000 feet above the sea, and their mean elevation probably does not exceed 2000 feet. The highest ranges are the Cumberland Mountains along the boundary-line of Virginia, and the Laurel Mountains, which run parallel to the Cumberland Mountains, and join them between the upper branches of the Kentucky and Cumberland rivers. To the north and west of the hilly region lies what may be called the upland region, which extends from the Big Sandy River, on the boundary of Virginia, to about 86° W. long., and comprehends more than half of the whole area of the state. Its surface is undulating, with gentle ascents and descents, but it is intersected by numerous deep cuts, which are from 100 to 300 feet below the surface of the plain, and in which the rivers run. The plains belonging to these rivers are narrow. Though this upland region is sparingly provided with spring-water, its soil is of the first quality, and as fertile as any part of the United States. The western portion of the state is divided between the Barrens and a country which is partially hilly. The Barrens in their natural state are generally destitute of trees, and resemble the prairies or savannas which occur north of the Ohio River; but the level surface is diversified by a considerable number of gently rising hills, called *oak knobs*, on account of the trees which cover them. Though this tract does not deserve the name which it bears, it is of inferior fertility when compared with the adjacent countries. The Barrens occupy chiefly the tract between the Green River and Cumberland River, on the borders of Tennessee. On the north and west the Barrens are surrounded by a more broken and hilly country, which gradually passes to the low flats which skirt the Ohio and Mississippi rivers. This tract is superior to the Barrens in fertility, but cannot be compared with the upland region.

Rivers.—Along the northern boundary runs the Ohio, which receives all the larger rivers that drain Kentucky. The most eastern is the Big Sandy River, which rises in Virginia on the western range of the Appalachian system, called the Great Flat-top Mountains, and traverses that state in a north-west direction; where it approaches the boundary-line, it turns nearly due north, and continues in that direction to its very mouth. Its course is stated to be nearly 200 miles, but it is not navigable to a great distance from its mouth, owing to some falls which occur where it issues from the mountain-region. The Licking River rises in Kentucky, and flows, with many windings, in a north-north-western direction for nearly 200 miles. Though it swells in winter and spring to a considerable height, it has but little water in the other seasons; the limestone rocks through which it passes absorb the water which it brings down from the mountains. The different branches of the Kentucky River rise in the Laurel Mountains and form by their union a considerable stream, which first flows north-west, then west, and at last nearly due north. Its course is about 280 miles, and though it is very rapid, it may be navigated by small boats for 180 miles from its mouth at the time of high-water, but at other times not higher up than Frankfort. Green River rises in the western districts of the upland region and flows for the greater part of its course westward, then declines to the north-west, and finally to the north, joining the Ohio about 50 miles above the mouth of the Cumberland River. Its course is 280 miles, and it is navigable for small river-barges to a great distance, but the navigation is interrupted by falls, about 50 miles from its mouth. Cumberland River rises in the valley between the Cumberland Mountains and the Laurel Mountains, where it is called Clove River; it traverses both the mountain and upland region generally in a western direction, but on approaching the Barrens it turns southward, and enters Tennessee, where it makes a large bend to the southward, and then re-enters Kentucky with a north-western course, continuing in that direction to its mouth, which is ten miles above that of Tennessee River. It is above 500 miles in length, and as its current is comparatively gentle, it offers an easy navigation for sloops as far up as Nashville in Tennessee, and it is stated to be navigable for river-boats 300 miles farther up. The Tennessee River flows only about 70 miles through Kentucky, and properly belongs to Tennessee. [TENNESSEE.]

Climate.—The mean annual temperature seems to be about 55°, and consequently 5° higher than that of London, but the differences in the extremes of heat and cold are much greater. The winters are long and severe: they begin about Christmas, and last three months. The thermometer annually descends as low as 25°, and has been known to sink as low as 14° of Fahr. Snow falls every winter, but not in great quantities. In summer the heat is sometimes very great, and the thermometer rises to 94° and 95°. In spring and autumn south-west winds prevail, and the weather is delightful. The north-west wind produces great cold in winter, but it seldom continues many days. Rain falls abundantly in winter and spring, but in the other seasons the weather is rather dry and constant. Some slight shocks of earthquakes have occurred.

Productions.—The cerealia which are most extensively cultivated are Indian corn, wheat, rye, and oats, and the two last-mentioned kinds of grain are said to thrive better than in the states on the shores of the Atlantic. Rye is commonly used for the distilling of whiskey. In the south-western districts, near and on the Tennessee, Cumberland, and Mississippi rivers, cotton is raised in abundance; and the tobacco which is grown in these districts and the rich lands farther east supplies a considerable article of exportation. Hemp and flax are generally cultivated. The principal fruit-trees are apples and peaches; from the former cider is made, and from the latter peach-brandy, of which there is a great consumption. Cattle are numerous, and great flocks of sheep pasture on the Barrens; the breed of sheep has been improved by crossing them with merinos.

As the greatest part of the country is covered with forests, wild animals are still numerous, as deer, panthers, bears, wolves, foxes, and hares, but the buffalo and the elk have disappeared. Beavers and otters are still found in the rivers. Among the wild birds the turkey is still abundant; it weighs from 10 to 25 pounds. Bees are common in the woods, and make their nests in hollow trees.

The forests contain many timber-trees. Those of the mountains and upland region consist of liriodendron, elm, oak, hickory, black-walnut, cherry, and others; those of the Barrens are chiefly oak, chesnut, and elm.

Bituminous coal and iron abound in the north-western district, and iron also occurs in the districts lying farther westward; but both are of inferior quality. Salt seems to be generally diffused through the country: the salt-springs are numerous, and many of them have been turned to advantage. Saltpetre exists in most of the caverns which occur in the limestone-rock of the upland region, and is most abundant in the Great Cave near Crooked Creek, the length of which is stated to be not less than ten miles.

Inhabitants.—The native tribes, which rendered the settlement of this state so difficult and dangerous seventy years ago, have entirely disappeared, and the population now consists entirely of whites and negroes, and a mixture of the two. The free population comprehended, according to the census of 1830, 523,490 individuals, and the number of slaves was 165,350, making a total of 688,840 souls. The inhabitants are almost exclusively employed in agricultural pursuits, the number of persons engaged in manufactures being comparatively very small. The most important manufacture is the construction of vessels, small and large, for the navigation of the Ohio and Mississippi.

Political Divisions and Towns. Kentucky is divided into 83 counties, but as the country has only been settled for about 70 years, it does not contain any large towns. Frankfort, the capital, is built on the right banks of the Kentucky River where it ceases to be navigable for large vessels. It contains about 2000 inhabitants. Many vessels of small size are built here. Lexington, which was formerly the capital, contained (in 1830) above 6000 inhabitants, and some manufactures of cotton, hemp, and paper. Transylvania University, at Lexington, is the most extensive literary institution in the United States west of the Appalachian Mountains. It was founded in 1798, and reorganised in 1818. A well-attended school of medicine and a school of law are connected with this university. Louisville, on the banks of the Ohio, is situated near the great rapids of that river. As these rapids cannot be passed at low water, and even at high water are dangerous, a canal has been cut along the bank, which begins above the rapids at Beargrass-creek, and terminates below them at Shippingport. This canal is 10 miles long. Louisville, which is the port of the upland region and the place from which the produce of the country is sent down the Ohio and Mississippi, contains above 10,000 inhabitants, and has some extensive distilleries of whiskey and manufactures of cordage and bagging. On the Ohio there is also Bardstown, with 1200 inhabitants; it is the seat of a Catholic bishop and a Roman Catholic college. Maysville, which has 2000 inhabitants and a considerable trade with the neighbouring states, is also on the Ohio. Besides the literary institutions already mentioned, the Methodists and Baptists have each a college, and the Presbyterians have two.

Commerce.—The articles of commerce consist of different kinds of grain, tobacco, hemp, live cattle, whiskey, and peach brandy. The greatest part is sent down the Ohio and Mississippi to New Orleans, between which place and Louisville steam-boats from 200 to 300 tons burthen and upwards are constantly plying. Since the introduction of steam-boat navigation, the commerce of Kentucky has greatly increased.

History.—It is probable that this part of America once was the seat of a nation which had made some progress in civilization. We may come to this conclusion from observing the extensive fortifications which occur in several places, but especially on the banks of the Ohio, opposite Scioto River, and are now overgrown with high forest-trees. The first Europeans arrived in Kentucky in 1767, and the first settlement was formed in 1775, though Daniel Boone is said to have settled in Kentucky some years earlier. It was then a part of Virginia, but the population having increased rapidly, Virginia consented to a separation, and in 1792, only seventeen years after the first settlement, Kentucky became one of the United States. Its constitution was settled in 1799. The legislative body consists of a senate and house of representatives. The representatives are chosen annually by all the free male citizens (negroes, mulattoes, and Indians being excepted) of 21 years of age, who have been two years resident in the state. The number of representatives may vary between 58 and 100, which latter is now the number. The senate now consists of thirty-eight members, who are elected for four years, one-fourth of the number being chosen annually. The executive power is vested in the governor, who is elected for four years by all the citizens entitled to the suffrages. Kentucky sends two members to the senate, and twelve members to the house of representatives at Washington.

(Darby's *View of the United States;* and Warden's *Account of the United States.*)

KENYON, LLOYD, LORD, the second son of Lloyd Kenyon, Esq., by Jane, daughter of Robert Eddowes of Eagle Hall in Cheshire, was born at Greddington in Flintshire, on the 5th of October, 1732. He was descended from an antient family in Lancashire, which had migrated into North Wales at the commencement of the last century. His father lived independently as a country gentleman, and belonged to the commission of the peace for his county. The education of the future chief-justice was, from the straightened means of the parent, very defective. He was sent early to the grammar-school at Ruthin, but was taken away before he had time to do more than acquire a little Latin. At the age of fourteen he was articled to Mr. Tomlinson, an attorney in large practice at Nantwich in Cheshire, with whom he remained for seven years, during which time his diligence and shrewdness procured him so much of his master's favour that he expected at the end of his clerkship to be taken into partnership. In this expectation he was however disappointed, and thereupon determined upon being called to the bar. In 1754 he took chambers at the Temple, and became a member of Lincoln's Inn. While a student he devoted himself with great earnestness to the law, and to the law only; and in doing this he made smaller sacrifices than most people. He had neither a literary taste nor a love for pleasure; and his pecuniary resources were but scanty. Mr. Kenyon was called to the bar in Hilary Term, 1761, but in consequence of the want of a professional connexion, and being of a character too honourable and independent to stoop to little artifices, many years elapsed before he obtained business. Still he laboured patiently and unceasingly, frequenting the courts both of common law and equity, but more especially the latter, and attending both circuit and sessions. His attainments in all departments appear to have been not only considerable, but exact, and he acquired by degrees the reputation of being a sound lawyer, and a neat and safe equity draftsman and conveyancer. It is stated, that having by some suggestions, as amicus curiæ, attracted the notice of Mr. Thurlow, the then attorney-general, he had the offer made to him of sharing with Mr. Hargrave in the toil and profit of assisting him. In 1773, when he had been twelve years in the profession, he married Mary, third daughter of George Kenyon of Peele in Lancashire. He now began to rise into notice. In 1779 he was retained as one of the counsel for Lord Pigot in the state-prosecution of Shelton and others for depriving him of his government; and afterwards in the same year as leading counsel for Lord George Gordon. In April, 1782, on the accession of the Fox and Rockingham administration, he was appointed attorney-general. While holding this situation his conduct evinced that official intrigue and partisanship were not at all suited to his character. On the death of the marquis of Rockingham he retained his office with Pitt as chancellor of the exchequer, and went out with the Shelburne administration in the spring of the year following. In December he was reappointed attorney-general, having through all the ministerial changes of the day asserted his independence. To the character of an orator he had no pretension, being a man of little imagination, and expressing himself not only without elegance, but occasionally with vulgarity. He was no scholar, and yet he would insert Latin words and phrases without point or taste in his discourse.

In 1784 he was raised to the office of master of the rolls, and created a baronet; and in May, 1788, he was gazetted Lord Kenyon, Baron Greddington, and succeeded Lord Mansfield as chief-justice of the King's Bench. His appointment to this important and dignified situation was at the time unpopular with the profession generally. To the opinion of his brother judges he gave a reception not only of neglect, but almost of contempt; and whenever they ventured to differ from him (which only took place some half dozen times in fourteen years), he exhibited the same feelings which another person would do upon receiving a personal affront. To the barristers, both leaders and juniors, he was equally ungracious; and whenever anything escaped them not in accordance with his sentiments, he castigated them in terms neither measured nor in character with the situation which he filled. To some leading men he would take a personal dislike, and allow no opportunity for mortifying them to escape him; Mr. Law, afterwards Lord Ellenborough, was one of them.

With the press Lord Kenyon was in high favour; for he struck sternly and with indignation at those offenders who are the peculiar objects of popular dislike. But while doing so he frequently gave too easy credit to accusation, and allowed himself to punish often with a severity not sufficiently tempered. As an instance of this we may mention the case of Mr. Lawless, a solicitor, against whom some serious charges were brought. Before the case was adjudicated, Lord Kenyon ordered Mr. Lawless to be suspended from practising until his case was disposed of. In vain did he tell him that he had eighty cases in his office, and that he should be ruined. The charges against Mr. Lawless were found to be wholly without foundation; but the blow was struck, he sunk under the unmerited disgrace, and died of a broken heart. The vices of the wealthy met with no favour from him. In actions for criminal conversation, likewise, he directed juries (over whom no judge had greater power) to give damages of very large amount, and this even in cases where the collusion of the parties or the vicious conduct of the husband ought to have made nominal damages more than sufficient. So strongly did the judge feel with regard to this crime, that he is reported thus to have expressed himself:—'There was a time in the history of this country when the laws of the Puritans, which were mixed with a great deal of virtue, if I mistake not, subjected this offence to the punishment of death. I do not look forward to a punishment so severe; but I wish some personal punishment were attached to those who inflict so dreadful and incurable a wound on the peace of private families.' Gamblers met with similar treatment from him; and he threatened that if any prosecutions were fairly brought before him, and the guilty parties convicted, whatever might be their rank or station in the country, though they were the first ladies in the land, they should certainly exhibit themselves in the pillory. As a judge, he recognised no distinction between the gamblers of St. James's and the pickpockets of the Strand. Lord Kenyon exerted himself to the utmost to put an end to duelling, and he declared that whoever was convicted of having murdered his fellow-creature in a duel should suffer the course of the law; and he on more than one occasion directed the jury to that conclusion, but without success. Flagitious libels against individuals were punished by him with merited severity.

But, of all writings, those partaking of the character of political libels were those against which he directed, with the most unflinching perseverance, all the terrors of the law. This was a more dangerous and delicate ground to tread upon, and people will approve or disapprove of his conduct in this particular according to the view which they take with regard to the liberty of speech upon these points. Certain it is, that since the time of Lord Kenyon the practice of prosecuting for political libels has gradually fallen into disuse; nor would the pillory, as part of the punishment for putting forth opinions, however mischievous or absurd, be at this time tolerated.

Lord Kenyon trusted too much to the power of the terrors of the law in guarding the rights of property from fraud or violence; and he inflicted death as the most terrible, and therefore the most preventive punishment. That this proceeded rather from a mistaken judgment—an ignorance of, or a want of power to give sufficient weight to, those circumstances which exert a more powerful influence upon human character, and not from a cold and sanguinary disposition, the following anecdote may be considered as a proof:—He passed sentence of death upon a young woman who had committed a theft; she fainted: Lord Kenyon, in great agitation, cried out, 'I don't mean to hang you—Will nobody tell her that I don't mean to hang her?'

Indeed, in behalf of poor and ignorant offenders who were the dupes or tools of knaves his kindly feelings were often displayed, and humble individuals of the working classes who were harassed by informers were sure to be shielded by him. A prosecution was commenced against a man for practising the trade of a tailor without having served an apprenticeship, and an attempt was made to punish him for several acts done in the same day. 'Prosecute the man,' said Lord Kenyon, 'for different acts in one day! Why not sue for penalties on every stitch?'

Lord Mansfield, when chief-justice, had somewhat unsettled the bounds of the courts of law; but Lord Kenyon, with much wisdom, reverted to the antient strictness, and he expressed his determination to maintain it. 'I have,' he said, 'been in this profession more than forty years, and have practised both in courts of law and equity; and if it had fallen to my lot to form a system of jurisprudence, whether or not I should have thought it advisable to establish different courts, with different jurisdictions, it is not necessary to say. But influenced as I am by certain prejudices that have become inveterate with those who comply with the systems found established, I find that in these, proceeding by different rules, a certain combined system of jurisprudence has been framed most beneficial to the people of this country, and which I hope I may be indulged in supposing has never yet been equalled in any country on earth. Our courts of law only consider legal rights—our courts of equity have other rules by which they sometimes supersede strict legal rules, and in so doing they act most beneficially for the subject.' 'I will not,' he said, in another instance, 'overturn the law of the land as it has been handed down to me.'

He wisely refused to allow the plain words of a statute to be refined away, however severe in its enactments, by any subtle sophistry. 'The arguments,' he said, 'that have been pressed upon us might have had some effect if they were addressed to the legislature; but we are sitting in a court of law, and must administer justice according to the known laws of the land. Let application be made to the legislature to amend the act: as long as it remains upon the statute-book we must enforce it.'

Mr. Charles Butler, after praising Lord Kenyon's intuitive readiness, complains 'that he seldom exhibited the intermediate patient discussion. The consequence was, that though the decision was right, the ground of it was sometimes obscure, and the objections to it in the minds of the hearers were not always removed. This lessened the merit of his adjudications; but they are most deservedly held in the highest respect, and considered of the highest authority.'

At Nisi Prius he never brought a book with him into court to refer to. The extent as well as the arrangement of his legal knowledge needed no such assistance. In performing the laborious duties of his profession he was diligent and exact, and proceeded with so much expedition as often to get through twenty-five or twenty-six causes to the entire satisfaction of the court.

He died in 1802, sorrow-stricken by the loss of his eldest son, after having accumulated a fortune of 300,000*l.*

In his private habits Lord Kenyon was temperate, frugal even to parsimony, and an early riser. For his happiness he looked to his home, being most deeply attached to his family. He entirely disregarded outward appearance: his dress was shabby, his equipage mean, while he entirely neglected to exercise the hospitality becoming his high station and large fortune. (*Law Magazine*, No. 37, p. 49.)

KEPLER, JOHN, was born at Weil in the duchy of Wirtemberg, 21st December, 1571. He was a seven months child, very weak and sickly, and survived with difficulty a severe attack of smallpox. His parents, Henry Kepler and Catherine Guldenmann, were of noble descent, although their circumstances were far from affluent. The father, at the time of his marriage, was a petty officer in the service of the duke of Wirtemberg, and joined the army in the Netherlands a few years after the birth of his eldest son John. Upon his return to Germany he learnt that an acquaintance for whom he had incautiously become security had absconded, and had left him the unexpected charge of liquidating the bond. This circumstance obliged him to dispose of his house and nearly the whole of his possessions, and to become a tavern-keeper at Elmendingen. Young Kepler had been sent in the year 1577 to a school at Elmendingen, and he continued there until the occurrence of the event to which we have just alluded, and which was the cause of a temporary interruption in his education, as it appears that he was taken home and employed in menial services until his twelfth year, when he returned to school. In 1586 he was admitted into the monastic school of Maulbronn, where the cost of his education was defrayed by the duke of Wirtemberg. The regulations of this school required that after remaining a year in the superior classes the students should offer themselves for examination at the college of Tübingen for the degree of Bachelor. On obtaining this degree they returned with the title of veterans; and having completed the prescribed course of study, they were admitted as resident students at Tübingen, whence they proceeded in about a year to the degree of Master. During his under-graduateship Kepler's studies were much interrupted by periodical returns of the disorders which had so nearly proved fatal to him during childhood, as also by the dissensions between his parents, in consequence of which his father left his home, and soon after died abroad. Notwithstanding the many disadvantages he must have laboured under from the above circumstances, and from the confused state in which they had left his domestic affairs, Kepler took the degree of Master in August, 1591, attaining the second place in the annual examination. The first name on the list was John Hippolytus Brentius.

While thus engaged at Tübingen, the astronomical lectureship of Grätz, the chief town in Styria, became vacant by the death of George Stadt, and the situation was offered to Kepler, who was forced to accept it by the authority of his tutors, although we have his own assurance that at that period he had given no particular attention to astronomy. This must have been in the year 1593-4. In 1596 he published his 'Mysterium Cosmographicum,' wherein he details the many ingenious hypotheses which he had successively formed, examined, and rejected, concerning the number, distance, and periodic times of the planets; and finally, proposes a theory which he imagines will account in a satisfactory manner for the order of the heavenly bodies, which theory rests upon the fancied analogy between the relative dimensions of the orbits of those bodies, and the diameters of circles inscribed and circumscribed about the five regular solids. In 1597 Kepler married Barbara Muller von Muhleckh, a lady who, although two years younger than himself, was already a widow for the second time. This alliance soon involved him in difficulties, which together with the troubled state of the province of Styria, arising out of the two great religious parties into which the empire was then divided, induced him to withdraw from Grätz into Hungary, whence he transmitted to a friend at Tübingen, several short treatises—'On the Magnet,' 'On the Cause of the Obliquity of the Ecliptic,' and 'On the Divine Wisdom as shown in the Creation.' In 1600 Kepler, having learned that Tycho Brahé was at Benach in Bohemia, and that his observations had led him to a more accurate determination of the eccentricities of the planets' orbits, determined on paying him a visit, and was welcomed in the kindest manner by Tycho, by whom he was introduced the following year to the emperor, and honoured with the title of imperial mathematician, on condition of assisting Tycho in his calculations. Upon the death of Tycho, which happened in the month of October of the same year, Kepler succeeded him as principal mathematician to the emperor. To this great man Kepler was under many obligations, not merely for the pecuniary assistance and hospitality which himself and family so often experienced from Tycho, and upon which at one period they entirely depended for subsistence, but still more for the sound advice which he gave him, to abandon speculation, and to apply himself to the deduction of causes from their observed effects,—advice which Kepler greatly needed, and to which, if he had adhered more closely, his fame would have been even greater than what it now is. It is to be regretted that upon several occasions the conduct of Kepler towards Tycho Brahe ill accorded with the generosity of the latter, though this appears to be attributable rather to the impetuosity of Kepler's temper, than to any want of gratitude towards his benefactor. It has been said that Kepler was appointed imperial mathematician on condition of assisting Tycho in his calculations. The object of these calculations was the formation of new astronomical tables generally, which were to be called the Rudolphine Tables, in honour of Rudolph the then emperor of Bohemia, who had promised, not merely to defray the expense of their construction, but likewise to provide Kepler with a liberal salary; neither of which his circumstances ever permitted him to fulfil. The part more particularly allotted to Kepler was the reduction of Tycho's observations relative to the planet Mars, and to this circumstance is mainly owing his grand discovery of the law of elliptic orbits, and that of the equable description of areas. The pecuniary difficulties however in which he found himself almost incessantly involved in consequence of the non-payment of his salary, greatly retarded the progress of his labours, and obliged him to seek a livelihood by casting nativities. The Rudolphine Tables were therefore postponed, and he applied himself to works of a less costly character, from which he might expect to derive more immediate remuneration. In 1602 appeared his 'Fundamental Principles of Astrology;' in 1604 his 'Supplement to Vitellion;' in 1605 'A Letter concerning the Solar Eclipse;' and in 1606 'An Account of the New Star which had appeared in 1604 in the Constellation Cassiopeia.' Of these the 'Supplement to Vitellion' was important, as containing the first consistent theory of that branch of optics termed dioptrics.

At length, in 1609, appeared his 'New Astronomy,' containing his great and extraordinary book 'On the Motion of Mars;' a work which holds the intermediate place, and is the connecting link, between the discoveries of Copernicus and those of Newton. The introduction is occupied in refuting the then commonly-received theory of gravity, and in declaring what were his own opinions upon the same subject. In the course of this discussion he states distinctly that since the attractive virtue of the moon extends as far as the earth, as is evident from its enticing up the waters of the earth, with greater reason it follows that the attractive virtue of the earth extends as far as the moon, and much farther; and he likewise asserts that if two bodies of like nature be placed in any part of the world near each other, but beyond the influence of any other body, they would approach each other like two magnets, each passing over a space reciprocally in proportion to its mass; so that if the moon and earth were not retained in their orbits by their animal force, or some other equivalent to it, the earth would approach the moon by the 54th part of their distance, and the moon would approach the earth by the remaining 53 parts. Previous to the publication of this remarkable work it was supposed that each planet moved uniformly in a small circle, called an *epicycle*, the centre of which epicycle moved with an equal angular velocity in the opposite direction round the centre of the earth, thus describing a larger circle which was called the *deferent*. Subsequent observations being found irreconcileable with the foregoing hypothesis, it was modified by supposing the uniform angular motion of the epicycle to be described about a point not coinciding with the centre of the earth, a necessary consequence of which supposition was that the linear motion of the epicycle ceased to be uniform. The work of Copernicus 'De Revolutionibus Orbium Cælestium' had appeared in 1543, wherein he considers the sun to be the fixed centre about which the planets move with uniform motions, but retains the complicated machinery of the deferent and epicycle in order to account for the variations arising from the actual inequality of the planet's motion. The system of Tycho Brahe himself was identical with one which Copernicus had rejected, and consisted in supposing the sun to revolve about the earth, carrying with it all the other planets revolving about him; and indeed Tycho not only denied the revolution of the earth about the sun, but likewise its diurnal rotation upon its axis. Such is an imperfect outline of the theory of the universe before the time of Kepler. The theory adopted by Kepler, in the early part of his discussion of Tycho's observations, appears to have been that the orbit of each planet, including the earth, was circular; that it was described with a uniform angular velocity about a point within, called the centre of the equant, and that the centre of the orbit lay in the line joining the centre of the equant and the place of the sun, but not equidistant between those points, as had been previously supposed. With respect to the earth however, in particular, he had started with the erroneous opinion, then generally entertained by all astronomers, that the centre of the earth's equant coincided with that of its orbit, and that consequently not only its angular but also its linear motion was uniform, although its distance from the sun was known to vary. After four years of laborious calculation, the non-accordance of his results with observation obliged him to fix upon the bisection of the line joining the centre of the equant and the place of the sun, for the centre of the planet's orbit; and shortly after he was led to the conclusion that one of the two other principles upon which his theory rested must be erroneous; that either the orbit of the planet was not a perfect circle, or that there was no point within it round which it moved with a uniform velocity.

Having easily proved that at the apsides, that is, the two points of the planet's orbit which are nearest to and farthest from the sun,—the times of describing equal small arcs are nearly proportional to the distances of the planet from the sun, he concluded with his accustomed precipitancy that the same relation existed at all other points of the orbit. An almost immediate consequence of this assumption was that the time of describing an arc of any length whatever would be proportional to the sum of all the lines which could be drawn from the sun to every point of that arc; but as the calculation of these distances was found to be excessively operose, he substituted the approximate area of the figure bounded by the arc and the two extreme distances for the sum of all the distances, and was thus led from erroneous principles to that beautiful law of the planetary motions by which the area described by the revolving radius vector is proportional to the time of its description. When however he came to apply this theory to the motion of Mars, the excentricity of whose orbit is much greater than that of the Earth's, he found that the circular hypothesis gave results differing from the observations of Tycho by at least eight minutes, and as he considered that difference too great to be attributed to the error of so exact an observer, he concluded that the suspicions, which, as was above stated, he had long previously entertained, relative to the form of the planets' orbits, were well founded, at least with respect to the planet Mars. At length, he deduced from observations of that planet near the quadratures, that its orbit was an oval elongated in the direction of its apsides, and was thus led to the law of elliptic motions.

The elliptic form of the orbits and the equable description of areas constitute two of the three celebrated truths known by the name of Kepler's laws. The third, viz. that the squares of the periodic times are proportional to the cubes of the mean distances from the sun, was not discovered till twelve years after, although, before the publication of his 'Mysterium Cosmographicum,' he had been speculating, as we have seen, upon finding some relation between those distances and periodic times. The final discovery resulted, far less from philosophical deduction, than from the innumerable combinations which his ever-active fancy had been calling into existence during the previous seventeen years; and indeed when he at length detected the relation which he had so long been in search of, he was only able to offer an explanation of it upon four suppositions, three of which are now known to be false.

In 1620 Kepler was visited by Sir Henry Wotton, the English ambassador at Venice, who finding him, as he was always to be found, oppressed with pecuniary difficulties, urged him to go over to England, where he assured him of a welcome and honourable reception; but Kepler could never determine on quitting the Continent. In 1624 he went to Vienna, where with difficulty he obtained 6000 florins towards completing the 'Rudolphine Tables,' together with recommendatory letters to the states of Suabia, from whom he also collected some money due to the emperor. It was not however till 1627 that these tables—the first that were calculated on the supposition that the planets move in elliptic orbits—made their appearance; and it will be sufficient to say of them, in this place, that had Kepler done nothing in the course of his whole life but construct these, he would have well earned the title of a most useful and indefatigable calculator. In 1630 he made a final attempt to obtain a liquidation of his claims upon the imperial treasury, but the fatigue and vexation of his fruitless journey brought on a fever which terminated his life in the early part of November, 1630, and in his 59th year. His body was interred in St. Peter's churchyard at Ratisbon, and a simple inscription, which has long since disappeared, was placed on his tombstone. Upon the character of Kepler, upon his failures, and on his success, Delambre has pronounced the following judgment:—'Ardent, restless, burning to distinguish himself by his discoveries, he attempted everything; and having once obtained a glimpse, no labour was too hard for him in following or verifying it. All his attempts had not the same success, and, in fact, that was impossible. Those which have failed seem to us only fanciful; those which have been more fortunate appear sublime. When in search of that which really existed, he has sometimes found it; when he devoted himself to the pursuit of a chimera, he could not but fail; but even there he unfolded the same qualities, and that obstinate perseverance that must triumph over all difficulties but those which are insurmountable.'

The following is a list of Kepler's published works. His manuscripts were purchased for the library of St. Petersburg, where Euler, Lexell, and Kraft undertook to examine them and to select the most interesting parts for publication, but the result of this examination has never appeared.

List of Kepler's published works:—'Ein Calender,' Gratz, 1594; 'Prodromus Dissertat. Cosmograph.,' Tübingæ, 1596, 4to.; 'De fundamentis Astrologiæ,' Pragæ, 1602, 4to.; 'Paralipomena ad Vitellionem,' Francofurti, 1604, 4to.; 'Epistola de Solis deliquio,' 1605; 'De Stellâ Novâ,' Pragæ, 1606, 4to.; 'Vom Kometen,' Halle, 1608, 4to.; 'Antwort an Röslin,' Pragæ, 1609, 4to.; 'Astronomia Nova,' Pragæ, 1609, fol.; 'Tertius Interveniens,' Frankfurt, 1610, 4to.; 'Dissertatio cum Nuncio Sidereo,' Francofurti, 1610, 4to.; 'Strena, seu De nive sexangulâ,' Frankfurt, 1611, 4to.; 'Dioptrica,' Francofurti, 1611, 4to.; 'Vom Geburts Jahre des Heylandes,' Strasburg, 1613, 4to.; 'Respons. ad epist. S. Calvisii,' Francofurti, 1614, 4to.; 'Eclogæ Chronicæ,' Frankfurt, 1615, 4to.; 'Nova Stereometria,' Lincii, 1615, 4to.; 'Ephemerides 1617—1620,' Lincii, 1616, 4to.; 'Epitomes Astron. Copern. Libri i. ii. iii.,' Lentiis, 1618, 8vo.; 'De Cometis,' Aug. Vindelic., 1619, 4to.; 'Harmonice Mundi,' Lincii, 1619, fol.; 'Kanones Pueriles,' Ulmæ, 1620; 'Epitomes Astron. Copern. Liber iv.,' Lentiis, 1622, 8vo.; 'Epitomes Astron. Copern. Libri v. vi. vii.,' Francofurti, 1622, 8vo.; 'Discurs von der grossen Conjunction,' Linz., 1623, 4to.; 'Chilias Logarithmorum,' Marpurgi, 1624, fol.; 'Supplementum,' Lentiis, 1625, 4to.; 'Hyperaspistes,' Francofurti, 1625, 8vo.; 'Tabulæ Rudolphinæ,' Ulmæ, 1627, fol.; 'Resp. ad epist. J. Bartschii,' Sagani, 1629, 4to.; 'De anni 1631 Phænomenis,' Lipsæ, 1629, 4to.; 'Terrentii Epistolium cum Commentatiunculâ,' Sagani, 1630, 4to.; 'Ephemerides,' Sagani, 1630, 4to.; 'Somnium,' Francofurti, 1634, 4to.; 'Tabulæ Manuales,' Argentorati, 1700, 12mo.

(Abridged from the *Life of Kepler*, in the 'Library of Useful Knowledge;' with occasional reference to the *Système du Monde* of Laplace, and other works.)

A splendid edition of Kepler's 'Correspondence' was published under the auspices of the Emperor Charles VI., in 1718, by M. G. Hansch. It is entitled 'Epistolæ ad J. Keplerum,' &c., and the title-page has no place of publication, but the preface is dated from Leipzig. It contains a Life of Kepler.

KERMAN. [PERSIA.]

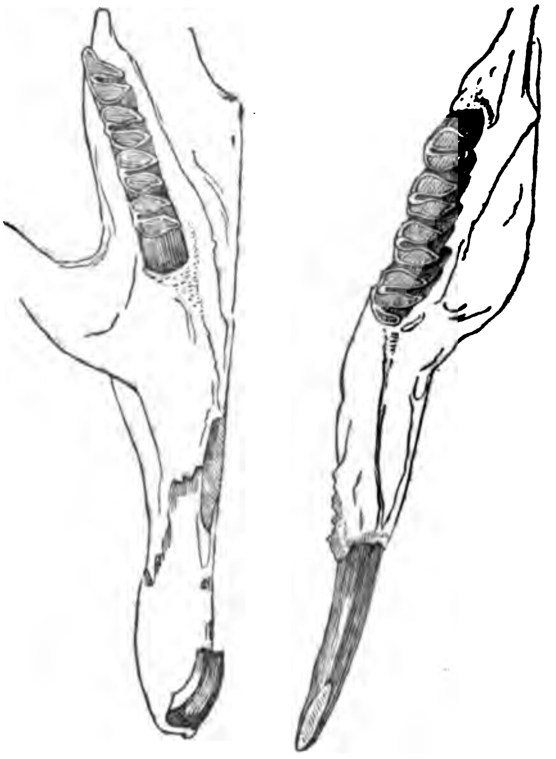
KERMANSHAW. [PERSIA.]

KERMES MINERAL, a peculiar sulphuret of antimony, formerly much, but now little used in medicine. Various processes, some in the humid and others in the dry way, have been proposed for obtaining it.

One of the best appears to be that of boiling six parts of powdered sesquisulphuret of antimony in a solution of about twenty times its weight of crystallised carbonate of soda in ten times its weight of water. After an hour's ebullition, the liquor is to be strained while hot, and allowed to cool very slowly, during which the Kermes Mineral separates in the state of a brownish-red powder, which, after due washing, is to be dried with a gentle heat.

According to Rose it is composed of sulphur 38·41 and antimony 61·59, which are very nearly in the proportion of 2½ equivalents of sulphur 40 + one equivalent of antimony 65.

KE'RODON, a genus of rodents, bearing in some respects resemblance to that of *Cavia*, but differing both in the locomotive and masticatory organs, established by M. F Cuvier. Dental formula:—Incisors $\frac{2}{2}$, molars $\frac{4-4}{4-4} = 20$



Teeth of Kerodon. (F. Cuvier.)

The molars all resemble each other, and are composed of two equal parts, each of a triangular or rather cordiform shape, united on the external side of the tooth, and separated on its internal side. These triangles or 'hearts' are each surrounded by their enamel, and filled with bony matter, and their separation produces an angular notch partly filled with cortical substance.

When M. F. Cuvier wrote, but one species, *Kerodon Moco*, was known, and this was discovered by Prince Maximilian of Neuwied, and noticed by him under the name of *Cavia rupestris*. The fur is ash-gray mixed with reddish yellow, and blackish above and whitish below. Size smaller than that of the guinea pig.

This species was found in the rocky places of the interior of Brazil near Rio San Francisco.

In 1836, Mr. Bennett exhibited to a meeting of the Zoological Society of London a rodent sent home among the animals collected by Captain Phillip Parker King, R. N., during his survey of the Straits of Magalhaens, and presented by him to the Society, which Mr. Bennett regarded as a second species of *Kerodon*, and for which he proposed the name of *Kerodon Kingii*. It was chiefly distinguishable from that discovered by Prince Maximilian by its more uniform colour. Excepting a slight dash of white behind the ear, and a longer line of the same colour marking the edge of each branch of the lower jaw, the animal is entirely gray; the upper surface being distinguished from the under by a greater depth of tint, and by the intermixture of a free grizzling of yellow and black. The crowns of the molar teeth, as in the typical species, consist of bone surrounded by two triangles of enamel, the bases of which are connected by a short line of enamel passing from one to the other, all the lines being slender and sharply defined.

This species was found at Port Desire, on the eastern coast of Patagonia. (*Zool. Proc.*, 1835.)

KERRY, a maritime county of the province of Munster, in Ireland; bounded on the east by the counties of Limerick and Cork, on the south by the county of Cork and the æstuary of the river of Kenmare, on the west by the Atlantic Ocean, and on the north by the æstuary of the river Shannon, which separates it from the county of Clare. According to the map published under the superintendence of the Society for the Diffusion of Useful Knowledge, Kerry is situated between 51° 41′ and 52° 33′ N. lat., and between 9° 7′ and 10° 30′ W. long. The greatest length in a direct line north and south is from the Priest's-leap mountain, on the Cork boundary, to Carrigfoyle on the Shannon, 54¼ statute miles; and the greatest breadth in a direct line east and west is from the Cork boundary at Lisheen to Dunmore Head, the most westerly point of the mainland of Ireland, 56 statute miles. In a direct line from south-west to north-east, between Bolus Head and the Limerick boundary at Tarbert, the distance is 69 miles. The coast line with its various indentations is above 220 miles. The area, as estimated in the above map, is 1,068,480 statute acres, or 1669 square statute miles. It has been elsewhere estimated at 1,148,720 acres, of which 581,189 acres are cultivated land, 552,862 are unprofitable mountain and bog, and 14,669 are under water. In 1831 the gross population was 263,126.

Kerry, with a small portion of Cork, forms the south-western extremity of Ireland. The coast, which is bordered by the Atlantic, is deeply indented by the æstuary of the Kenmare river, the bay of Dingle, and the bay of Tralee, the two former of which penetrate into the mainland about 30 miles in an easterly direction.

The peninsulas intercepted between these arms of the sea are occupied by the western extremities of the mountain system, which, commencing in Waterford, extends with little interruption across the entire south of Ireland. The mountains of Bear and Bantry, spreading from the south-western boundary of Cork across the south of Kerry, occupy the district between the river of Kenmare and the bay of Dingle. The peninsula intercepted between the bays of Dingle and Tralee consists in like manner of a prolongation of the mountain groups which occupy the north-western extremity of Cork and the south-west of Limerick: the heights connecting the extremities of this latter series of elevations extend across the middle of the county in a line nearly east and west. Between the above-mentioned mountain-ranges there is a considerable plain, formed by the subsidence of the high table-land, which occupies the middle portion of the Cork boundary, and spreads with a gradual declivity towards the head of Dingle or Castlemain Bay. Beyond the range of mountain which crosses the centre of the county extends a rich and generally level country, which rises into rough land in only one direction, towards Kerry Head on the Shannon.

At the head of the river Kenmare, which is in fact an arm of the sea, is a long and narrow valley, which is watered by the Roughty, the most considerable stream that falls into the Kenmare æstuary. The town of Kenmare is situated at the lower extremity of this valley in a fertile but confined tract, from which the Glancrought mountains rise on one side towards Cork, and the group of Mangerton on the other, towards that extensive mountain-tract which occupies the entire peninsula between the northern shore of Kenmare river and the bay of Dingle.

The extremity of this great peninsula, comprising the barony of Iveragh and part of the barony of Dunkerron, is divided into three principal valleys by ridges running nearly north-east by south-west. Of these valleys the first towards the north is separated from the bay of Dingle by a steep range terminating towards the head of the bay in the mountain of Drung, and prolonged westward to the coast at Dowlus Head, opposite to which the island of Valentia, half a mile from the opening of the valley, includes between it and the mainland one of the safest harbours in Ireland. The town of Cahirciveen is situated at the foot of this valley, where the river Fartagh expands into a small lake before falling into Valentia Harbour. Separated from the valley of the Fartagh by a ridge of the same mountain-group is another valley terminating towards the sea in the open bay of Ballinaskelligs, so called from the Skelligs, two remarkable rocks in the offing. The boundary of the bay of Ballinaskelligs on the north is Bolus Head, the extremity of the mountain-range above mentioned. Between this range and the Dunkerron mountains, on the south-east and east, there is a considerable extent of comparatively open country, subdivided into two valleys by the secondary ridge of Cahirbarna. Of these valleys that to the west is drained by the Inny, which has its sources about 20 miles in the interior at a great elevation, among the Iveragh mountains. On the opposite side of Cahirbarna lie three lakes, of which Loch Currane is the most considerable: it is supposed at one time to have been an arm of the sea, and, owing to an accumulation of detritus at its mouth, to have been converted into a basin for the waters descending from the lakes above. The village of Waterville is situated at the point where it discharges itself into the sea. The southern boundary of the bay of Ballinaskelligs is formed by the extremity of the Dunkerron range, which terminates in lofty mountains above Derrynane, from which point their general direction is north-east, nearly parallel to the northern shore of the æstuary of Kenmare. Between the main range and the shore of this arm of the sea there are numerous lateral valleys drained by mountain streams running nearly north and south. Of these the principal are the valleys of Sneem and the little Blackwater. Throughout this district the only spots of cultivated ground are either on the sea-coast, the banks of rivers, or along the upper margins of the bogs which universally occupy the valleys to a considerable height up the acclivities of the mountains. In the barony of Iveragh alone are 26.896 Irish, or 43,599 statute acres of bog, among which the several mountain-chains appear insulated.

The Iveragh mountains are bounded on the north-east by by the lateral valley of Glencare, which runs southward from the upper end of Dingle Bay towards the head of the similarly situated valley of Sneem, on the opposite side of the peninsula. Loch Carra, a considerable expanse of water, occupies the lower portion of the valley of Glencare, above which, in the recesses of the mountain, are the villages of Blackstones and Carramore. In the interior and opposite the extremity of the central ridge of Iveragh, is situated the great group of MacGillicuddy's Reeks, among which Carran Tual rises to the height of 3410 feet, being the highest ground in Ireland. The Reeks extend about ten miles in a direction from north-west to south-east, subsiding into the plain at the head of Dingle Bay on the north, and separated from the external range of Tomies and Glenà by a deep chasm called the Gap of Dunloe, on the north-east. In a deep hollow between the south-eastern flank of this range and the group of Mangerton, which connects the extremity of the Dunkerron chain with the Priest's-leap and Glanerought mountains, lies the Upper Lake of Killarney. This beautiful sheet of water, which is three miles in length by three-quarters of a mile in breadth, is enclosed on all sides by mountains from 2000 to 3000 feet in height, except at one point, towards its eastern extremity, where it discharges its waters by a tortuous course of three miles between the southern declivities of Glenà and the precipitous side of Turk mountain, which forms a portion of the group of Mangerton.

There are several wooded islands in the Upper Lake, the luxuriant foliage of which forms an agreeable contrast to the general sterility of the surrounding mountains. There is however a considerable tract of natural oak forest towards its southern extremity, and the channel leading to the Lower Lake passes through a thickly wooded defile. About midway between the extremities of the channel a remarkable detached rock, called the Eagle's Nest, rises over the left bank to a height of 1100 feet: the echoes here are of unusual continuance and distinctness. Emerging from this defile, the river expands into the Lower Lake of Killarney, seven miles in length by three in breadth, skirting the eastern declivities of the mountain range of Tomies and Glenà. These mountains, descending abruptly to the western verge of the lake, are clothed with the richest natural woods of oak, ash, pine, alder, and beech, intermixed with hazel, whitethorn, yew, holly, and arbutus, from a height of several hundred feet down to the water's edge through a continuous distance of six miles. O'Sullivan's river, descending by a thickly wooded ravine on this side, forms a cascade 70 feet high close to the shore of the lake. On the opposite side the low alluvial banks are everywhere broken into promontories and islands, on which the arbutus grows with uncommon luxuriance. The town of Killarney is situated on the plain about a mile from the eastern shore; half a mile south of Killarney runs the Flesk, the chief feeder of the lake. About a mile south from the embouchure of the Flesk, the richly wooded promontory of Muckruss, running into the lake about a mile and three-quarters, separates a portion of the lake which is called the Lake of Muckreefs, and sometimes Turk Lake, from its skirting the base of that mountain. Two cascades descend into Turk Lake: of these the more considerable is fed by a pool called the Devil's Punchbowl, situated at a height of 1700 feet on the ascent of Mangerton mountain, which, between the vale of Killarney and the town of Kenmare, rises to a height of 2550 feet. The castles of Dunlo and Ross, and the ruined churches of Aghadoe and Muckreefs, which are all situated on the eastern shore of the Lower Lake, add considerably to the interest and extent of the surrounding scenery. The waters of the lakes of Killarney discharge themselves at the northern extremity of the Lower Lake through the river Laune, which runs by a course of twelve miles into the head of Dingle Bay.

The remainder of the plain between Killarney and the mountains south of Tralee is drained by the river Main, which rises near the Cork boundary, and after passing the towns of Castle Island and Castlemain, discharges itself into the head of Dingle Bay, where it forms an æstuary called Castlemain Harbour.

The valley of the Main is bounded on the north by the group of the Stack mountains, which sink into comparatively low hills as they trend towards the sea, leaving a pretty open communication with Tralee from the south. Westward from this point the lofty ridge of Slievemish occupies the entire neck of the peninsula of Corkaguinny, which bounds the bay of Dingle on the north. Slievemish is interrupted by a lateral valley, beyond which the conical mountain of Cahirconree rises to a height of 2784 feet. Westward from this a minor chain of hills extends to Dingle on the southern side of the peninsula; beyond and north of Dingle the mountains rise towards the Atlantic in great masses, of which the chief is Brandon, 3150 feet in height, being the second highest ground in Ireland. The extremity of the peninsula has an abrupt coast of about six miles from north to south, formed by Sybil Head, Maran mountain, Eagle mountain, and Dunmore Head, off which lie the Blasquet Islands.

North of Tralee the country improves in facility of access and cultivation. The plain of Ardfert, between Tralee and the high ground towards Kerry Head, is rich and well improved; its drainage is towards the sea, and the streams are insignificant. The remaining district, extending from the plain of Ardfert to Tarbert on the Limerick boundary, is the most extensive tract of open country in Kerry; it is drained by the rivers Feale, Gale, and Brick, which, uniting within five miles of the sea, receive the common name of the Cashen river: the united length of their courses is about 50 miles. A rough district extends from the mouth of the Cashen to Beal Point, where the æstuary of the Shannon first assumes the character of a river. The coast is here precipitous towards the sea, and near the bathing village of Ballybunion abounds in caves which are said to be of the most magnificant description. On the Feale is situated the town of Listowel, which, with Lixnaw near the Brick, and Tarbert and Ballylongford on the Shannon, are the only other places of consequence in the county. The district of the Cashen contains a large extent of bog. The total area of the bogs of Kerry is estimated at 150,000 acres.

The harbours on the south side of the river of Kenmare are in general badly protected from westerly and northerly gales. From Dutch Island, which fronts the harbour of Ardgroom on this side, as far up as the tide runs, there is safe anchorage in eight to three fathoms water in the middle of the channel, the banks being a soft ooze on which vessels may be conveniently careened. Opposite to Ardgroom, on the north side of the æstuary, is Sneem Harbour, where vessels may lie landlocked in four fathoms water, or in the entrance may ride in ten fathoms. Vessels parting their cables in any part of the æstuary may safely run aground in Nideen Sound, which forms the upper extremity of the bay on this side. Towards the middle of the west side of Ballinaskellys Bay is a small island, between which and the mainland is anchorage in four to five fathoms, but even here in hard weather a vessel requires very strong cables; the remainder of the bay is quite unsafe in southerly or westerly winds. Between Bolus Head and Puffin Island is St. Finian's Bay, which is very much exposed to the prevalent run of the sea. The harbour of Valentia opens about a league to the north of Puffin Island; it possesses the advantage of a double entrance, so that ships may sail in or out with any wind. It is quite landlocked, but the entrances are narrow, that on the north being contracted by the islands of Beginnis and Lamb's Island, between the former of which and Valentia there is a sunken rock, which farther contracts the entrance to a cable's length. Valentia Island forms the southern boundary of the bay of Dingle towards the sea. Dingle bay is open and unsafe, being full of shoals at its upper extremity; vessels embayed here should make either for Valencia or the creek of Dingle on the opposite side of the æstuary. [Dingle.] A league west of Dingle creek is the bay of Ventry, with good anchorage and a sufficient depth of water, but open to the south. Smerwick harbour on the opposite side of the peninsula has also deep water and good holding-ground, but is exposed to the north: the bottom of the harbour consists of turf bog, which shows that a portion of this coast must have been submerged within a comparatively recent date. Under the neck of the peninsula on the northern side is the bay of Tralee, which is dry at low water, but now in process of considerable improvement by the construction of a ship canal, by which vessels of 300 tons will be able to come up to the town. [Tralee.] From Tralee northward the coast is low and encumbered with shoals and sandbanks. Vessels embayed here, if they cannot make Fenit Creek on the north of Tralee Bay, have no shelter for a distance of two leagues. Beyond Kerry Head opens the æstuary of the Shannon, in which the first sheltered anchorage is off the point of Tarbert, where ships may lie nearly landlocked in twelve fathoms water. There are piers for fishing boats and small craft at Kenmare, Ballinaskelligs, Cahirciveen, Brandon, and Barra; and considerable improvements are projected at Ballylongford and Tarbert.

The roads in the south-western part of Kerry up to the year 1820 were scarcely passable for wheel-carriages, and there are some parts of the coast between Kenmare and Cahirciveen still inaccessible, except on foot or horseback. From Cahirciveen the old line of communication was by the seaward side of Drung Mountain, at a height of 800 feet above the Bay of Dingle. The difficulty of access to the district of Glanlehy situated southward of this line induced the proprietor, Lord Headly, in 1807, to commence the construction of a road on a more eligible level through his property: the development of the resources of the district which followed the first opening of this road was remarkably rapid; and the same result in a more striking manner attended the subsequent construction of a mail-coach road, connecting Cahirciveen, by the valley south of Drung Mountain, with the low country at the head of Dingle Bay. In three years from the opening of the new road in 1821, there were upwards of twenty two-story slated houses built in Cahirciveen, together with an inn, a bridewell, a post-office, a chapel, a quay, a salt-work, and two large stores for grain. Before this time the village consisted of a few thatched cabins, and the nearest post-office was thirty miles distant. About the same time government commenced several new lines of road, which have since greatly contributed to the prosperity of the country. Of these the most important is a line 25 Irish or 32 statute miles in length, connecting the town of Listowel and the northern parts of Kerry with Newmarket in the county of Cork, by which the distance from the former town to Cork city is diminished 29 miles. Another line 25½ statute miles in length connects Castle Island with Newcastle in the county of Limerick, diminishing the former distance from Killarney and the southern parts of Kerry to Limerick city 29½ statute miles. The old roads in this direction had in some places a rise of 1 foot in 4; the present road has a maximum rise of 1 foot in 27½. It crosses the Feale River by one arch of 70 feet span, where formerly was a bridge of twenty-one arches. Before the year 1824 there was no road passable for wheel-carriages between Kenmare and the south-western part of Cork, and the car-road from Kenmare to Killarney was of the worst description. An excellent road has since been constructed between the two latter places, and the line across the mountains of Bear and Bantry is now in progress. These lines will be united at Kenmare by a suspension-bridge, to which the Marquis of Lansdowne contributes 3200*l*. This will complete a direct and very important line of communication between the Shannon at Tarbert, and the south coast of the county of Cork near Skibbereen, a total distance of 84 miles. The other roads of the county are constructed and kept in repair by grand jury presentments.

The climate is very moist from the vicinity of the Atlantic, and the south-western district is much exposed to storms. In the inland parts however, especially in the neighbourhood of Killarney, the air is mild and genial, and vegetation extremely luxuriant. There have been some remarkable instances of longevity in this county, notwithstanding the prevalent use of ardent spirits.

The geological structure of the chief mountain-chains is similar to that of the mountains in the west of

Cork, the main component being a red or grey conglomerate and sandstone supporting flanks of silicious flags, and overlaid in the low districts by fields of floetz limestone. It is observed, that the arms of the sea which penetrate this county lie within the limestone troughs, that rock appearing at the upper extremity of each, while the promontories forming their sides consist of sandstone and conglomerate. The chief limestone fields occupy the basins of the Feale, Main, and Roughty, which last runs into the head of the æstuary of Kenmare. At the Roughty it is cream-coloured, hard, slaty, and has a vitreous fracture. Along the Main it lies in strata, generally compact, much impressed with marine remains, and towards Tralee is black and dressed as marble; it is of a lighter colour and softer in the direction of Castle Island, where it burns readily for manure. From Ardfert to Listowel, and thence north to Knockanure Hill, it is of a light smoke-colour, and rises occasionally in low crags from which it is procured with great facility. Northward from Ardfert the country towards Kerry Head consists of thick beds of argillaceous sandstone, beyond which the limestone reappears in contact with beds of alum slate in the cliffs of Ballybunion. This formation, which is the most extensive at present known, extends from Ballybunion to Baltard Point in the county of Clare, a distance of 30 miles. From Tralee eastward the country rising towards the boundaries of Cork and Limerick is occupied with an extension of the great Munster coal district. The upper strata of this tract consist chiefly of an indurated clay and lias with ochreous partings covering thin beds of anthraceolite or culm: those on the eastern extremity of the district have been found alternating with good coalblende similar to that of Kilkenny, and have been wrought to a considerable extent, but not in this county.

The mountains of Glanbehy abound with iron-ore, which was formerly smelted in considerable quantities at Blackstones, in works erected by Sir William Petty, but, the supply of timber having failed, these works were given up about the year 1750. An iron bloomery was also worked at one time at Killarney, the neighbourhood of which, as appears by some verses in Nennius, has been celebrated for its mines since the ninth century. At Muckruss and Ross Island in the Lower Lake, copper-mines have been worked occasionally since about the year 1750, but are now discontinued. Lead-ore has also been found in considerable quantities in the vicinity of the lake. Copper-ore has been found at Ardfert and in Glanerought. Works for extracting copperas were at one time in operation near Castle Island, but are now given up. The slate quarry in Valentia, the working of which is carried on by the Knight of Kerry, produces flags to the amount of 1800*l.*, and slates to the amount of 500*l.* annually. The flagging, which is of a very superior description, is bought at the quarries by a stone-merchant, who transports it to London, where there is a demand for it which, it is expected, will be limited only by the power of production. In size, appearance, and strength, these flags surpass every other description of flagging in use in London.

The soil of the south-western district, where not encumbered with bogs, is an adhesive loam, fit for the reception of corn crops, and formed by the decomposition of the clay-slate rock, which, from the nearly vertical position of its strata, is readily disintegrated by the weather. Up to the year 1810 the plough was totally unknown in the more western parts of this district, and spade cultivation is still practised to a considerable extent. The improvements on the estates of Lord Headly and the Marquis of Lansdowne have latterly given an impetus to agricultural labour throughout the southern parts of the county, which has caused a marked alteration for the better in the farms and dwellings of the peasantry. The soil of the middle district is a rich loam, which produces excellent crops of grain, and when laid down in pasture yields butter of prime quality. The northern district has a stiffer soil, more retentive of wet, and inclined to run to rushes. It also is grazed to a considerable extent by dairy farmers, who find a market for their butter in Tralee. Cider is made here in large quantities, and of a superior quality. The condition of the peasantry however is inferior to that of the inhabitants of the southern districts. The average rate of labourers' wages in the south is 8*d.* per day, and in the northern parts from 6*d.* to 8*d.* The system of farming, except where the example of the great proprietors has caused some change in the rotation of crops, is not judicious. Green crops are generally unknown, and grass seeds are little in use. The native breed of cattle are very small, but well formed, good milkers, and easily fattened. They are now chiefly met with in the mountain districts: the dairy farms and low pastures are stocked with the ordinary cattle of the country. A breed of small ponies is peculiar to Kerry; they are too light for farming purposes, but answer for the saddle very well, and are sold in considerable numbers throughout the country. The peasantry of the southern districts are distinguished by the darkness of their complexion, and a peculiar cast of features which has been generally thought to indicate a Spanish origin.

The chief trade of the county consists in exports of agricultural produce, chiefly oats and butter. The returns are defective, but it is estimated that 100,000 firkins of butter are annually sold in the markets of Tralee and Killarney. The manufacture of linen is carried on with some activity in the neighbourhood of Dingle, the linens from which place were formerly in much repute. There is also a general manufacture of coarse woollens throughout the county for home consumption.

In 1836 the fisheries on this coast gave occasional employment to 1 decked boat, 44 half-decked boats, 421 open sail-boats and 610 open row-boats, manned by 6311 fishermen. The condition of the fishermen has been gradually declining for the last thirty years: many of the men have emigrated and left their families mendicants. The fish caught are turbot, haddock, gurnet, pollock, plaice, soles, dorees, mullet, mackerel, herrings, pilchards, &c., with a plentiful supply of oysters, crabs, lobsters, and scallops. Great numbers of seals formerly frequented the river of Kenmare and the caves of Ballybunion; but they have latterly become more shy, and are now rarely caught.

Kerry is divided into the baronies of Iveragh on the south-west, containing the town of Cahirciveen, population (in 1831) 1192: Dunkerron, occupying the remainder of the peninsula, containing only hamlets: Glanerought on the south-east, containing the town of Kenmare, pop. 1072: Magonihy, in the centre, containing the town of Killarney, pop. 7910: Trughenacmy, north of Magonihy, containing the borough of Tralee, pop. 9568; and the towns of Castle Island, pop. 1570; Miltown, pop. 1429; Killorglan, pop. 896; Blennerville, pop. 532; Castlemain, pop. 387: Corkaguiney, occupying the peninsula between Dingle and Tralee bays, containing the towns of Dingle, pop. 4327; Castle Gregory, pop. 970; and Stradbally, pop. 425: Clanmaurice on the north-west, containing the town of Ardfert, pop. 717: and Iraghticonnor on the north and north-east, containing the towns of Listowell, pop. 2289; Ballylongford, pop. 1300; and Tarbert, pop. 956.

Prior to the Union, Kerry sent eight members to the Irish parliament: two for the county, and two for each of the boroughs of Tralee, Dingle, and Ardfert. It is represented in the Imperial parliament by two county members, and one for Tralee borough. The county constituency in 1836 was 1212. The assizes are held at Tralee, and quarter-sessions at Tralee and Killarney; there are bridewells at

Table of Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not comprised in two preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	19,395	..	..	..	..	..	..	107,000
1813	Under Act of 1812 . . .	31,749	..	..	..	..	..	..	178,622
1821	Under Act 55 Geo. III. c. 120	35,597	38,059	..	..	..	108,617	107,568	216,185
1831	Under Act 1 Will. IV. c. 19 .	41,294	45,024	34,043	4,621	6,360	131,696	131,430	263,126

Killarney, Dingle, Kenmare, Cahirciveen, Castle Island, Miltown, Listowell, and Tarbert. The total numbers of persons committed for trial to the county goal in 1836 was 747, of whom 503 were convicted. Of the offenders, at the time of their commitment, 283 males and 3 females could read and write, 123 males and 8 females could read only, and 243 males and 87 females could neither read nor write. The constabulary force in 1835 consisted of 7 first class constables, 26 constables, 130 sub-constables, and 11 horse; the total cost of the establishment for that year was 5818*l.* 5*s.* 8*d.*, of which 2830*l.* 5*s.* 3*d.* was chargeable against the county. The county infirmary and fever hospital are at Tralee; there is also a fever hospital at Killarney, and there are dispensaries, supported by voluntary contributions and grand jury presentments, in all the minor towns. The district lunatic asylum is at Limerick; the proportion of the cost of its erection chargeable against Kerry county is 9303*l.* 16*s.* 7*d.* Kerry is entirely within the diocese of Ardfert and Aghadoe. The proportion of Roman Catholics to Protestants in this diocese is nearly 40 to 1. The proportion per cent. of the population under daily instruction is 4·63, in which respect this diocese stands last among the 32 dioceses of Ireland. There is however a very general turn for classical learning among the peasantry, many of whom have a tolerable knowledge of the Latin language.

Kerry, according to some Irish writers, had its name from Ciar, the son of Fergus, king of Ulster, and signified Ciar's kingdom; and originally formed part of the kingdom of Desmond, or South Munster, of which the Mac Carthies were sovereigns. Dermod MacCarthy, chief of this country, having invited the assistance of Raymond le Gros, one of the early Anglo-Norman adventurers, to suppress the rebellion of his son Cormac, granted him as a recompense for his services a large tract in the north of the county round Lixnaw, where Raymond, about A.D. 1177, settled his son Maurice, from whom the Fitzmaurices, lords of Kerry, draw their pedigree, and the barony of Clanmaurice takes its name. Soon after, the Fitzgeralds established themselves in the south of the county, where they rose to such power on the downfall of the MacCarthies that in 1295 Thomas Fitzmaurice Fitzgerald was captain of all Desmond, comprising the counties of Cork, Waterford, and Kerry, and lord justice of Ireland. He left two sons, John, afterwards created earl of Kildare, and Maurice, created earl of Desmond, with a royal jurisdiction over the palatinate of Kerry, A.D. 1329. The liberty of Kerry so erected included the entire county, with the exception of the church lands, for which the king appointed the sheriff. The lords of the palatinate had their own courts, judges, and great law officers, the only distinction between the liberty and a regular county being that the executive was administered by a seneschal instead of a sheriff. The possession of so great powers in a district removed from all direct control drew the succeeding earls of Desmond into frequent contempts of the royal authority, for which their territories were on several occasions wasted by the king's forces. The rebellion of Gerald, the sixteenth earl in the reign of Elizabeth [CORK], caused the final suppression of their authority and confiscation of their estates. The English knights and gentlemen who had grants from the queen of the forfeited lands in the county were—Sir William Herbert, Knt., 13,276 acres; Charles Herbert, Esq., 3768 acres; Sir Valentine Brown, Knt., 6560 acres; Sir Edward Denny, Knt., 6000 acres; Captain Conway. 5260 acres; John Chapman, Esq., 1434 acres; and John Holly, Esq., 4422 acres.

On the breaking out of the rebellion of 1641, the native Irish again took arms, and laid siege to the castle of Tralee, to which a great number of English families had fled. After a siege of six months the place surrendered, and the Irish remained in possession of the country till 1652, when Ludlow, with an army of 4000 foot and 200 horse, again reduced them. Extensive confiscations of the estates of the native Irish followed. Among the new proprietors was Sir William Petty, who obtained a large grant of lands in the neighbourhood of Kenmare, and commenced the smelting of iron, which was carried on with vigour while timber lasted. A colony of Protestants was planted by Sir William Petty round the head of Kenmare river, who were attacked by the native Irish in 1688, and compelled to abandon their possessions. A detachment of King William's army, under Brigadier Levison, entered the county in 1691 and finally reduced it. The confiscations consequent on the last rebellion amounted to 90,116 acres, of an estimated total value at that time of 47,483*l.* 12*s.* 9*d.* About 1710 the coast was harassed by French pirates, which led to the erection of a small fort on Valentia Island. The principal proprietors at present are, the Marquis of Lansdowne, in whom the Fitzmaurice and Petty estates centre; Lord Kenmare, the representative of the Brown family; Lord Headly, Lord Ventry, and the Knight of Kerry.

Kerry contains several monuments of a very remote antiquity, of which the most remarkable are the Cyclopean stone fortresses of Cahirconree, Staigue, and Cahir Donnell; and the sepulchral stones with ogham inscriptions in the neighbourhood of Dingle. Stone cells, probably of the sixth and seventh centuries, are still standing on the greater Scellig Island, at Ventry, and at Smerwick. There is a round tower at Rattoo, one in an island in Loch Currane, part of another at Aghadoe, and a fourth formerly stood near the cathedral of Ardfert. There are also the remains of thirteen religious houses and thirty feudal castles.

The county expenses are defrayed by grand jury presentments. The amount in 1835 was 30,951*l.* 4*s.* 7½*d.*, of which 19,672*l.* was for public roads, buildings, institutions, and other general county charges, and 11,279*l.* 4*s.* 7*d.* for roads charged specially to the several baronies.

(Smith's *Ancient and present State of the County of Kerry*, Dublin, 1756; *Report of the Irish Bog Commissioners*, 1811; *Transactions of the Dublin Geological Society*, vol. 1, part iv., 1838; Ainsworth's *Account of the Caves of Ballybunion*, Dublin, 1834; *Guide to Killarney*, Dublin, 1835; *Parliamentary Reports, Papers*, &c.)

KERSEY, KERSEYMERE. [WOOLLEN MANUFACTURES.]

KERTSCH. [CRIMEA.]

KESTEVEN. [LINCOLNSHIRE.]

KESTREL, or **KESTRIL**, the English name of the *Falco tinnunculus* of Linnæus, *Cresserelle* of the French, *Falchetto di Torre* of the Italians, *Cudyll côch* of the antient British. [FALCONIDÆ, vol. x., p. 182.]

KESWICK. [CUMBERLAND.]

KETCHUP. [MUSHROOMS.]

KETTERING. [NORTHAMPTONSHIRE.]

KETUPA. [OWLS.]

KEUPER, in geology, the German term for the upper portion of the new red sandstone formation. It is supposed by some geologists that certain sandstones in Warwickshire, Worcestershire, and other parts of England, correspond to this group of strata. Remains of reptiles are said to have been found in it near Warwick.

KEVEL. [ANTELOPE, vol. ii., p. 83.]

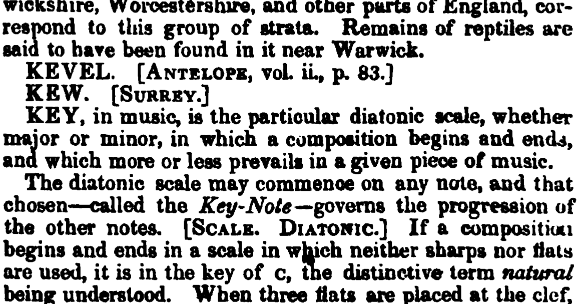
KEW. [SURREY.]

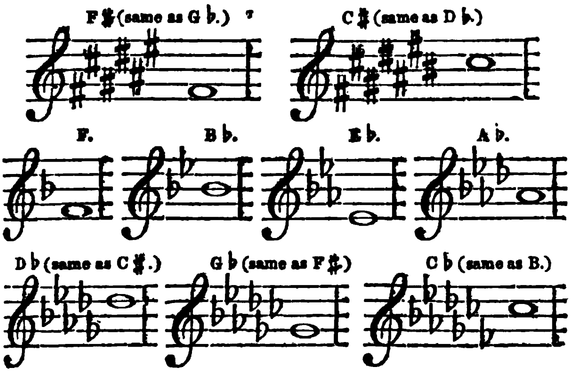
KEY, in music, is the particular diatonic scale, whether major or minor, in which a composition begins and ends, and which more or less prevails in a given piece of music.

The diatonic scale may commence on any note, and that chosen—called the *Key-Note*—governs the progression of the other notes. [SCALE. DIATONIC.] If a composition begins and ends in a scale in which neither sharps nor flats are used, it is in the key of C, the distinctive term *natural* being understood. When three flats are placed at the clef, and the last and lowest note in the piece is E ♭, the key is E ♭. If in such case the last and lowest note is C, the key is C minor, &c.

As any note in the diatonic and chromatic scales may be taken as a key-note, it follows that there are twelve keys in the major mode, and twelve in the minor; for each scale may have either a major or a minor 3rd. [MAJOR. MINOR.] Hence arise twenty-four keys. But as three major and consequently three minor keys are binominous, there are in name thirty different keys, and as many signatures are in actual use [SIGNATURE]; though, in fact, there is only the before-mentioned number of keys differing in reality.

TABLE OF MAJOR KEYS.



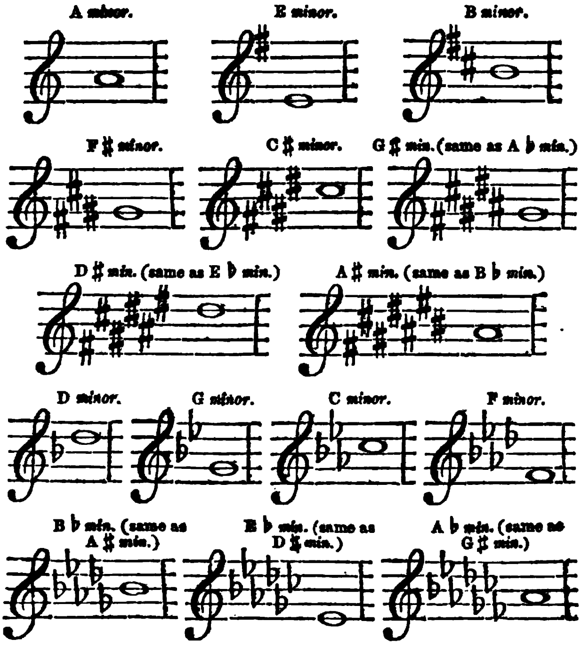


F♯ (same as G♭.) — C♯ (same as D♭.)

F. — B♭. — E♭. — A♭.

D♭ (same as C♯.) — G♭ (same as F♯.) — C♭ (same as B.)

Table of Minor Keys.



A minor. — E minor. — B minor.

F♯ minor. — C♯ minor. — G♯ min. (same as A♭ min.)

D♯ min. (same as E♭ min.) — A♯ min. (same as B♭ min.)

D minor. — G minor. — C minor. — F minor.

B♭ min. (same as A♯ min.) — E♭ min. (same as D♯ min.) — A♭ min. (same as G♯ min.)

By admitting double sharps and flats, the number of keys may be much farther, but not usefully, extended.

KHALIF. [Caliph.]

KHAIR EDDIN. [Barbarossa, Khair Eddin.]

KHAN, a word of Mongol or Turkish extraction, said to mean 'great and powerful lord,' was employed by the nations of central Asia to express the full extent of royal power. This title was assumed by Gengis when he became supreme ruler of the Mongols and Tartars, and was adopted by all his successors. The earlier monarchs of the Ottoman empire were also distinguished by this title. The word is used in Persia in a much more restricted sense, and is applied to the governors of provinces, and to all officers of a certain rank.

The original form of this word was *Khaghan;* Gengis Khan is always called Jinggis Khaghan in the Mongol language. (*Geschichte der Ost-Mongolen*, by Schmidt, Petersb., 1829.)

KHAYA, a genus of plants of the natural family of Cedrelaceæ, which is often made a tribe of the Meliaceæ. Khaya contains only a single species, *K. Senegalensis*, which has been well figured in the 'Flore de Senegambie,' i. t., 32. It forms one of the largest and handsomest of the trees which are found along the banks of the Gambia and in the valleys near Cape Verd. It attains a height of from 80 to 100 feet, and is also one of the most common of the trees of the forest, being called *Caïl* by the negroes, and *Caïl-cedra* by Europeans. The wood is of fine quality, reddish coloured like the mahogany, which belongs to the same natural family. The bark is remarkable for its bitterness and febrifuge properties, and is taken by the negroes in the form of infusion and decoction, as a cure for the fevers so prevalent in their country.

KHEMNITZER, IVAN IVANOVITCH, an admired Russian fabulist, was born in 1774, at St. Petersburg, where his father, who was a native of Saxony, held the appointment of physician at one of the hospitals. His aversion to medical and anatomical studies determined him to enter the army in preference to following the profession chosen for him; but after serving in two campaigns against the Prussians and Turks, he determined to serve in the army only as a military engineer, in which capacity he quickly won the regard of his superiors. In 1784 he was appointed consul-general at Smyrna, but had hardly arrived there when he died (March 20). Although his Fables reached a second edition in his lifetime, they did not attract much notice until a complete edition of all his pieces appeared in three volumes in 1799, with a memoir of the author and his name, which last had not been previously given to the public. Since then they have been reprinted several times, and have acquired very great popularity.

KHERASKOV, MICHAEL MATVIEVITCH, born October 25, 1733, was a Russian poet of considerable celebrity in the last century, although his reputation has since declined. His epic poem in twelve cantos, entitled the 'Rossiada,' which first appeared in 1785, celebrates the liberation of Russia from the yoke of the Tartars in the reign of Ivan Vassilievitch. Although hardly rising to the dignity of an epic, this production possesses much interest of narrative, and several very striking scenes and descriptions. 'Vladimir,' his second poem of the same class, is in eighteen cantos, and was first published in 1786. Besides these he wrote numerous other works, both in prose and verse, including an imitation of Corneille's 'Cid,' and some other tragedies and dramatic pieces. He died September 27, 1807, aged 74.

KHERSON (*Cherson*, or *Nikolajeff*), a government of European Russia, lies between 46° 12′ and 49° 4′ N. lat., and 29° 10′ and 35° 5′ E. long. It is bounded on the north-west by Podolia, on the north by Kieff, on the north-east by Pultawa, on the east by Ekaterinoslaf, on the south-east by Taurida, on the south by the Black Sea, and on the west by Bessarabia. Its area, according to Hassel and Schubert (1835), is 25,347 square miles, others make it only 19,000; but Hörschelmann (1833) makes it 34,964 square miles.

Its extreme length from east to west is about 250 miles, and its breadth from north to south about 100 miles for one-third of the length from west to east, and for the other two-thirds almost 180 miles. The province, which consists of an immense plain, lies between the Dnieper and the Dniester. A branch of the Dnieper range traverses it for a short distance on the north-east, and on the south-west a small chain belonging to the outskirts of the Carpathians runs into the country from Podolia. It is only on the north-west and north-east borders that there is some wood, and in the neighbourhood of Elizabethgrad there are considerable forests. The rest of the country is a steppe, beginning at Mirgorod and extending across the whole province, where scarcely a tree is to be seen; the soil is however covered with a luxuriant vegetation of grasses and other plants. From February to May the grass grows to such a height that the sheep are quite lost in it. During the great heat the grass gradually withers, and vegetation does not revive till the autumn. In the interior the soil is a grey clay mixed with sand, which is not very well adapted to agriculture, but produces the richest pastures. Here and there are heaths, and in the lower parts swamps: on the coast there is a red ferruginous earth, which produces little besides saline plants.

The Black Sea washes the south of the province from the Dniester to the Dnieper. The principal rivers are the Dnieper and the Dniester, of which the latter forms the boundary between Kherson and Bessarabia. The course of the rivers in the whole province is exceedingly slow, and their water bad. There are very few wells of fresh water; as, for instance, in the whole of the great steppe of Oczakow, 8600 square miles in extent, there are only about a hundred springs of sweet water. The climate is very variable; in summer the heat is from 85° to 90° of Fahrenheit. A dark yellow sky, a wind which raises the dust in clouds, and an immense torrent of rain, are the usual precursors of a thunder-storm, which is awful beyond conception. The nights are always cool. The winter is very cold: most of the rivers freeze over, though but for a short time, and not always so much as to bear a man.

The ground, when by great labour it is cleared of the roots of the grass, and when the saltpetre, which generally appears when the surface is bare of vegetation, is got rid of, will produce from ten to twenty fold, even without manure, if after being cropped for five or six years it is suffered to lie fallow for an equal time. But the inhabitants dislike agriculture, and prefer the breeding of cattle, so that they never raise corn enough for their own consumption. Almost every two years swarms of locusts desolate the country, but they seldom come farther than Kherson, about seventy miles up the Dnieper. Hemp and flax are grown only for domestic consumption. Tobacco (some of the best in the empire), mustard, and saffron are articles of commerce. There are several varieties of the vine, and the wine has been much improved of late years. Horticulture is much more attended to than agriculture. The forests, as we have said, are confined to the north of the province, and to the vicinity of Elizabethgrad; the latter for a long time furnished almost all the timber required for building the Black Sea fleet, but they are now greatly thinned. The banks of the rivers, especially of the Dnieper, are covered with strong reeds, which are used both for thatch and for fuel. For want of wood, hardly any habitations are seen but thatched clay huts; many of the inhabitants dig for themselves habitations in the earth, choosing particularly the antient tumuli, with which the plain is covered. Of tame animals the most common is the sheep. The wool of the native breed is rather coarse, but of late years great numbers of Merinos have been imported, and there is no other province that has so many sheep of the improved breed. The three provinces of Ekaterinoslaf, Taurida, and Kherson have now 500,000 Merinos. Oxen and buffaloes are numerous, and used for draught; the horses (of which many are wild) are slight, but very spirited and swift-footed. Wild animals of all kinds abound, especially wolves and wild-cats, which last are formidable beasts of prey. The fields are covered with bustards, grey partridges, ortolans, snipes, &c. Besides locusts, the country is infested by large rats, which come from Taurida. There are great numbers of water and other snakes, scolopendræ, whose bite is as venomous as that of the Tarantula, incredible numbers of lizards, and swarms of gnats. The fisheries on the sea-coast and in rivers are very important. The minerals are, fine potter's clay, freestone, slate, chalk, talc, saltpetre, agates, and garnets. The manufactures are of little importance; some however have been introduced into Kherson and Odessa. The province is most happily situated for trade. The foreign commerce of the country, which is very important and rapidly increasing, will be best described under Odessa, which, though founded only in 1796 by the Duke of Richelieu, is now the staple place for the commerce of all Southern Russia. [Odessa.]

The inhabitants, who are estimated at 607,000, consist of Great and Little Russians (among the latter are many Cossacks), Poles, Moldavians, Rascians, Bulgarians, Tartars, Greeks, Armenians, and Jews, all settled; even the Cossacks of the Bug have renounced their nomadic life, follow agriculture, and have fixed habitations. There are in this government 35,000 foreign colonists, chiefly German, in fifty-six colonies, possessing (in 1836) 284,942 dessatines (60,000 acres) of land. There are also a great many gypsies. The Greek Christians are under the archbishop of Ekaterinoslaf, Kherson, and Taurida, who resides at Ekaterinoslaf, where his cathedral is. In Kherson he has 367 parishes. [Cherson.]

KHORASSIN. [Persia.]

KHOSRU I., called Chosroes by the Greek writers, but more commonly known in the East by the name of Nushirwan, 'noble soul,' succeeded his father Kobad in the kingdom of Persia, A.D. 531. Kobad at the time of his death was engaged in a war with Justinian, the emperor of Constantinople; but Khosru, shortly after his accession, concluded a peace with Justinian, on the payment by the latter of 10,000 pounds of gold. Khosru diligently employed this interval of rest in regulating the internal affairs of his kingdom; the corrupt officers and magistrates, who had been appointed during the reign of his father, were removed; justice was impartially administered in every part of the empire; and the fanatical followers of Mazdak, who had obtained numerous proselytes to the inviting doctrine of a community of goods and women, were banished from his dominions. He divided the empire into the four great provinces of Assyria, Media, Persia, and Bactriana, and established a vizir over each; and he secured at the same time the stability of his throne by the murder of his two elder brothers. In the course of a few years he extended his dominions as far as the Indus, and compelled the nomadic hordes, who had taken possession of the northern provinces of the empire during the reign of his father, to repass the Oxus and withdraw to the central plains of Asia.

Though Khosru was successful in his wars with the people of Asia, he beheld with concern the conquests of Belisarius in Italy and Africa; and afraid lest Justinian should acquire sufficient power to attack the Persian dominions, he collected a large army, and, in violation of the truce that still subsisted, he invaded Syria in 540. His unexpected attack had given the Greeks no time for defence; the principal cities were plundered by the Persian troops, and Antioch, the capital, was taken after a short but vigorous resistance. On his return, Khosru founded, at one day's journey from Ctesiphon, a city, which he called Antioch Khosru, where he placed the numerous captives he had taken in his invasion of Syria. In the following year Belisarius was recalled to defend the East; and his superior military skill enabled him, with an army far inferior to the Persians both in discipline and numbers, to prevent Khosru from extending his conquests. In 542 Belisarius was recalled to Constantinople, and degraded from all his employments; and the generals who succeeded him were easily defeated by the Persian troops. The war continued to be carried on for many years, though with little vigour on either side, in the neighbourhood of the Black Sea, and principally in the territories of the Lagi, a Colchian people; till at length, after much delay and many negotiations, Khosru condescended to grant a peace to Justinian in 562, on the annual payment by the latter of 30,000 pieces of gold.

This peace however was only preserved for ten years. The lieutenants of Khosru had subdued the province of Yemen in Arabia, and compelled the Abyssinians, who had possessed the supreme authority for many years, to withdraw from the country. The Abyssinians were the allies of the emperors of Constantinople; and Justin, who had succeeded Justinian, having entered into an alliance with the Turks, collected a powerful army in order to avenge the cause of his allies. But his efforts were unsuccessful; his troops were everywhere defeated, and the province of Syria was again plundered by the Persian soldiers. Justin was obliged to resign the sovereignty, and his successor Tiberius obtained a truce of three years, which time was diligently employed by Tiberius in collecting an immense army from all parts of the empire. The command was given to Justinian; and a desperate battle was fought between the Greeks and Persians in the neighbourhood of Melitene, a town in the eastern part of Cappadocia, in which Khosru was completely defeated. He died in the spring of the following year, A.D. 579, after a reign of 48 years, and was succeeded by his son Hormisdas IV.

The virtues, and more particularly the justice, of this monarch form to the present day a favourite topic of Eastern panegyric; and the glories and happiness of his reign are frequently extolled by poets as the golden age of the Persian sovereignty. His reign forms an important epoch in the history of science and literature: he founded colleges and libraries in the principal towns of his dominions, and encouraged the translation of the most celebrated Greek and Sanskrit works into the Persian language. A physician at his court, of the name of Barzûyeh, is said to have brought into Persia a Pehlvi translation of those celebrated fables which are known under the name of Bidpai or Pilpay [Bidpai]; and it was from this translation of the Indian tales that these fables found their way to nearly every other nation of Western Asia and Europe. The conquests of Khosru were great and numerous; his empire extended from the shores of the Red Sea to the Indus; and the monarchs of India, China, and Tibet are represented by Oriental historians as sending ambassadors to his court with valuable presents to solicit his friendship and alliance. (See the original passage in Ewald's *Zeitschrift für die Kunde des Morgenlandes*, vol. i., p. 185.)

KHOSRU II., the grandson of Khosru I., was elevated to the throne of Persia, A.D. 590, on the deposition of his father Hormisdas by Bindoes, a noble of the royal blood. In the first year of his reign Khosru was obliged to leave his native country to escape from the treachery of Bahram, who rebelled against his sovereign and seized upon the royal power. Khosru took refuge in the dominions of Maurice, the emperor of Constantinople, who assisted the Persian monarch with a numerous army, with which he was enabled to defeat Bahram, and again to obtain possession of the sovereignty. The friendship of Maurice was however purchased by the surrender of some of the most important towns of Mesopotamia and the payment of a large sum of money. During the life of Maurice, peace was preserved between the two nations; but on his assassination by Phocas in 602, Khosru took up arms to revenge the death of his benefactor, and in the space of fourteen years subdued almost all the provinces of the Greek empire. In 611 Antioch was taken; in the following year Cæsarea, the capital of Cappadocia, fell into the hands of the Persians; in 614 the whole of Palestine was subdued; in 616 Egypt was conquered, and Alexandria taken by Khosru himself; while another Persian army subdued the whole of Asia Minor, and advanced as far as the Bosporus. The Roman empire was on the brink of ruin; the capture of Alexandria had deprived the inhabitants of Constantinople of their usual supply of corn; the northern barbarians ravaged the European provinces; while the powerful Persian army on the Bosporus was making preparations for the siege of the imperial city. Peace was earnestly solicited by Heraclius, who had succeeded Phocas in 610, but without success. Khosru however did not cross the Bosporus, and at length, in 621, he dictated the terms of an ignominious peace to the emperor. But Heraclius, who had hitherto made very few efforts for the defence of his dominions, rejected these terms; and in a series of brilliant campaigns (A.D. 622—627) recovered all the provinces he had lost, repeatedly defeated the Persian monarch, and advanced in his victorious career as far as the Tigris. Khosru was murdered in the spring of the following year, 628, by his son Siroes.

(Gibbon's *Decline and Fall;* Malcolm's *History of Persia;* D'Herbelot's *Bibliothèque Orientale.*)

KIACHTA is a place in Siberia, in the government of Irkutsk, 50° 20′ N. lat. and 121° 40′ E. long., south of the lake of Baikal, and in a sterile country, 2480 feet above the level of the sea, on a small stream also called the Kiachta. A considerable trade is carried on here, as it is the only place in which, according to agreement, the subjects of the empires of China and of Russia are permitted to exchange their merchandise. Kiachta consists of two separate parts; the fortress, called Troitsko Sawsk, where the custom-house, the imperial offices, and the military government are established, and the lower town, or Kiachta, which is nearly two miles farther south, and where the merchants live. Kiachta has one bridge, a square, one wooden church, two chapels, and thirty-seven houses, mostly belonging to merchants, elegantly built, and kept in good order. There are only 321 inhabitants (200 men, 121 women). Troitsko Sawsk contains 4541 inhabitants (2237 males, 2304 females); 648 houses, three churches, two chapels, two parish schools, attended by 105 scholars, and the Russo-Mongol School, supported at the expense of the Buriat Cossacks. Merchants from all parts of Russia have settled here—from Moscow, Kursk, Kasan, Vologda, Kaluga, Nishnei Novgorod, Tobolsk, and Irkutsk.

The commerce of this place with Maimaitchin, the Chinese emporium, which is less than a mile from the lower town, has only risen to importance in modern times. From 1727 it was conducted on account of the Russian government, and was of little importance; but in the last-mentioned year the trade was laid open to private merchants. At first it increased very slowly. In 1806 Klaproth estimated the value of all the goods sold by the Russian merchants at only eight millions of francs, or about 350,000*l.* But in 1821 Cochrane found that the profit of the merchants was equal to the value of the goods sold in 1806. The Russians bring to Kiachta furs, particularly those of the sable, black fox, and ermine; hides, woollen cloth, and other coarse woollen fabrics; glass, looking-glasses, and cattle. They receive in return from the Chinese, manufactured silks and cottons, tobacco, china, furniture, and several kinds of toys; but the principal commodity taken in exchange is tea. Cochrane estimated the quantity of tea imported in 1821 at three millions of pounds weight; and at the great fair of Nishnei Novgorod the value of the tea which was sold in 1823 amounted to twelve millions of paper roubles. The tea brought to the fair of Nishnei Novgorod in 1838 was 37,356 chests, being 5700 more than in 1837: the value was 17,399,500 roubles; to which must be added 560,000 rouhles for the value of 5000 chests of tea pressed into cakes. Chinese silks and nankeen were brought only to the amount of 32,000 roubles. The value of the rouble is 10½*d.*. The merchants of Kiachta and Maimaitchin live on a very friendly footing, and frequently meet in social parties, but only during the day; for no sooner has the tattoo beaten in Kiachta, and the fire-ball ascended from the residence of the *Sargatshei*, or governor, in Maimaitchin, than the gates of the towns are shut, and all communication between them is interrupted.

(Pallas, *Travels in Siberia*; Klaproth, *Mémoires relatifs à l'Asie;* Cochrane, *Pedestrian Journey*, &c.; Erman, *Annalen der Erdvölker und Staatskunde; Official Statements.*)

KIDDERMINSTER, a corporate town and parliamentary borough, in the hundred of Halfshire and county of Worcester. It is situated on the Stour, near the confluence of that river with the Severn; 124 miles north-west by north from London. According to Nash (*Hist. of Worcestershire*) the name of this place was antiently written *Chiderminster*, a term which has reference to the church on the brow of a hill and the water running beneath. At the time of the Conquest it was the king's property, and it remained with the crown until the reign of Henry II., who gave the manor to Manser, his favourite. At a subsequent period it became the property of Waller, the poet, by whom it was sold in 1643-4 in order to pay his fine to parliament on account of what was called Waller's plot. Kidderminster returned members to parliament as early as the 28 Edward I., but owing to disuse the privilege was afterwards lost. By the Reform Act it was again erected into a parliamentary borough, and now returns one member. The earliest charter of incorporation is that of 12 Charles I., but as it conferred upon the corporate body no power to acquire landed property, or to augment the number of magistrates, which was limited to two, they obtained from the crown in 1828 a new charter, which is now the governing charter, and bears date 7th August, 8 Geo. IV. The council consists of a mayor, six alderman, and eighteen councillors.

The town is well lighted, watched, and paved under the superintendence of commissioners appointed by a local act, and the expense is defrayed by a rate. The annual value of the real property of the borough in 1815 was estimated at 13,960*l.*; the assessed taxes in 1831 amounted to 1929*l.*, and the parochial assessments for the same year to 4586*l.* The prosperity of the town appears to be gradually increasing; it possesses considerable trade and a large manufacture of carpets. [CARPETS.] The church is a handsome Gothic structure surmounted by a fine tower: the interior contains many altar-tombs, brasses, and other antient monuments, for a particular description of which we refer the reader to Nash's *History of Worcestershire*, London, 1782, fol., ii., 48. The living is a vicarage in the patronage of Lord Foley, and has an average net income of 1107*l.* At the east end of the church is a Gothic chapel which was formerly, and we believe still is, appropriated to the use of the free grammar-school. This charity was founded prior to the charter of Charles I. The rental of the estates belonging to the school amounts to 491*l.* 19*s.* 1*d.* per annum, in addition to which there are two houses for the use of the upper and lower masters, erected in 1805 at an expense of 1800*l.* The school is divided into an upper and lower school, and the practice now is to take all boys who wish to learn Latin into the upper school. In the lower school the boys are instructed in reading, writing, and accounts, but not Latin. The salary of the upper master is 290*l.* and that of the under master 145*l.* per annum. Notwithstanding the ample endowment of this foundation, it has hitherto been of comparatively little advantage to the town. In 1835 there were but six boys in the upper school, and the average number that attended the lower school was only fifteen. Besides the free school there are several almshouses and other benevolent institutions. The population of the town in 1831 was 14,981, having been augmented by 4272 persons during the 20 years preceding, which is to be ascribed chiefly to the flourishing state of the manufactures during that period. The population of the parish is 20,865.

(Nash's *History of Worcestershire;* Carlisle's *Grammar Schools; Corporation Reports*, &c.)

KIDNAPPING is defined to be the stealing or conveying away of a man, woman, or child, and is an offence at common law, punishable by fine and imprisonment, and until the abolition of that mode of punishment by 1 Vict., c. 23, by pillory. The 9 Geo. IV., c. 21, which is directed against child-stealing, enacts that if any person shall maliciously, by force or fraud, lead, or take away, or decoy or entice away, or detain, a child under the age of ten years, with intent to deprive its parents, or any other person having the lawful care of such child, of the possession of it, or with intent to steal any article upon or about the person of such child, to whomsoever such article may belong, or shall receive and harbour with any such intent as aforesaid any such child, knowing that it has been by force or fraud led, taken, decoyed, enticed away, or detained, every such offender, and their counsellors, procurers, aiders, and abettors, shall be guilty of felony, and shall be liable to be transported for seven years, or to be imprisoned, with or without hard labour, in the common gaol or house of correction, for any time not exceeding two years; and if a male, to be once, twice, or thrice publicly or privately whipped (if the court shall so think fit) in addition to such imprisonment.

The act does not extend to a person who shall have claimed to be the father of an illegitimate child, or to have any right to the possession of such a child, on account of his getting possession of such child, or taking it out of the possession of the child's mother or other person who has the lawful charge of it.

KIDNEYS are two glands lying in the lumbar region, on each side of the spinal column. They are composed of numberless and delicate tubular ramifications, on whose walls there is a fine network of capillary arteries and veins, and which are all collected into one mass of a firm fleshy consistence, enclosed in a fibrous capsule.

The ureter, through which the urine secreted by the kidney is conveyed to the bladder, dilates at its extremity into a wide pouch, the pelvis of the kidney, which is divided into several portions called calyces. Into each calyx a nipple-like process, or papilla, projects, at whose extremity there are several minute orifices, each opening into a very fine canal, which, as it is continued into the substance of the kidney, ramifies and becomes tortuous. On all these canals, or tubuli uriniferi, minute blood-vessels ramify, and secrete the urine, which is conveyed from the tubuli into the calyces, and from them through the pelvis and the ureter into the bladder.

The papillæ, and the conical bodies called pyramids, of which they are the extremities, being chiefly composed of the excretory canals, are nearly white, and of a firm dense structure; but as the tubuli ramify, their branches separate in a somewhat radiating manner, and the blood-vessels filling the intermediate spaces between them give to all the exterior part of the kidneys a deep red colour, and a softer and more fleshy consistence. Hence the kidney is generally described as divided into a cortical, or vascular, and a medullary or tubular portion.

The general structure of the kidney may be best shown by making a section from its convex border into the pelvis. The surface of each part then presents several whiteish conical bodies, the pyramids, whose rounded apices, the papillæ, project into corresponding tubular calyces, and whose bases are surrounded by the vascular cortical substance. In the latter no distinct arrangement of vessels can be seen, but there are scattered irregularly through it minute granular bodies called the acini, or corpuscles of Malpighi, which are composed of delicate tortuous arteries.

In the early embryo of mammalia each papilla, with the tubules opening on it and its blood-vessels, forms a separate body; but during growth the several renculi are united into one mass, their original separation being however indicated by the more or less deeply lobulated form of the organ in various animals, and occasionally in man.

KIDNEYS, DISEASES OF. The principal disease to which the kidneys are liable is that which gives rise to the formation of calculi. [CALCULUS, *Renal*.] Sometimes the stone is retained in the pelvis of the kidney, where, by continued depositions, it may increase till it completely fills the pelvis and calyces; but more frequently it passes through the ureters into the bladder, producing in its passage violent spasmodic pain in the loins, sickness and nausea, hæmorrhage, &c. This affection is the most common cause of inflammation of the kidneys (nephritis), from which abscess and other morbid alterations may result. Chronic inflammation seems to be the most frequent cause of a peculiar alteration in the structure of the kidneys particularly described by Dr. Bright ('Medical Reports'), of which the chief characters are, the interstitial deposition of a pale yellowish and firm substance, and a granular or tuberculated form of the surface of the kidney, with a great decrease of its vascularity. This condition is very common in hard drinkers; it usually produces dropsy, and is indicated by a dull heavy pain in the loins, a bloated expression of the countenance, a hard pulse, and the secretion of so large a quantity of albumen with the urine that it coagulates on being heated, or on the addition of a little bichloride of mercury.

Suppression of urine may be the ultimate result of obstruction from caculi in the ureters, or it may occur as an idiopathic disease. It is a condition of great danger, for low delirium and a comatose sleepy state very often supervene on it, and soon terminate fatally. Long and often repeated attacks of retention of urine from obstruction produce dilatation of the ureters and pelvis, which sometimes acquire an enormous size. There may result from the same cause a gradual absorption of the substance of the kidney, till in an advanced stage there is found nothing but a thin sac containing urine in a single cavity, or in a number of separate pouches. The kidneys are also subject, in common with other organs, to the deposition of various morbid substances, as cancer, fungus, hæmatodes, melanosis, tubercle, &c. But the diagnosis of all the chronic affections of this organ is extremely obscure, the principal indications of each being the same, viz. the dull heavy pain in the loins, dropsy, and sometimes hæmaturia.

KIEL, the capital of the duchy of Holstein, is situated in a beautiful part of the country, and on a bay of the Baltic, called the Kielerfiord, which forms an excellent harbour, and admits even large ships of war to anchor near the town: 54° 10′ N. lat., 10° 8′ E. long. It is surrounded with walls, in which there are five gates; and is pretty regularly built, with straight well-paved streets. The university of Kiel was founded in 1665, by Christian Albert, duke of Holstein. Though the university has a library of 70,000 volumes, a revenue of 20,000 dollars, 19 regular and 10 extraordinary professors, and all the necessary appendages, the number of students is small, which is probably owing to the circumstance that living is very dear. The number has however increased of late years. The published annual accounts state that in 1818 there were 107 students, in 1825 about 390, in 1831 about 311, and in 1836 only 252, which is probably near the present amount. The inhabitants, amounting in 1837 to 11,791, including those of the village of Brunswyck, have some manufactures of linen hats, tobacco, sugar, &c., and some business in ship building. Their trade in corn, dried herrings, and sprats (which are celebrated) is considerable, and has much increased since the completion of the Holstein or Kiel Canal, which joins the Baltic and the German Ocean. [HOLSTEIN.] The most busy time of the year is at the annual fair on the three days after twelfth-day, which is attended not only by the farmers and the merchants, but by the nobility and gentry of Sleswick and Holstein. Near Kiel there is an antient castle delightfully situated, but not inhabited. It is now fitting up for the residence of the prince of Holstein-Glücksburg, who has married the Princess Wilhelmina, daughter of the king of Denmark, on her divorce from her first husband, Prince Frederick. There is a small congregation of Christians of the Greek religion at Kiel. There is also an establishment for sea-bathing, and steam-boats ply regularly between Kiel and Copenhagen.

KIEN LOONG, son of the emperor Yung Tching, and grandson of Kang He, succeeded his father on the throne of China in 1735, being then twenty-six years of age. The principal events of his long reign are: 1. The war which he carried on, from 1753 to 1759, against the Olots or Eleuts, the Kashgars, and other Tartar nations of central Asia, who, under the descendants of Galdan, or Contaish, the Tartar chief, who was subdued by the arms of Kang He in 1696, had again revolted. Kien Loong defeated them, and again established the Chinese supremacy over central Tartary, north-west of China, as far as Kashgar. In consequence of these successes a great triumph took place at Pekin, in April, 1760, on the return of the victorious army. 2. In 1770 the Turguts, a Mongolian tribe, dissatisfied with the Russian government, having removed from the banks of the Volga, after crossing the steppes of the

Kirghis and other tribes, came to place themselves under the protection of China, when Kien Loong, rejoicing at this event, gave them a part of the country of the expelled Eleuts. (Amiot, *Mémoires concernant les Chinois.*) 3. In 1773 Kien Loong attacked and conquered the Miao-tse, a race of mountaineers on the borders of the province of Koei-cheow, north-west of Canton, who had never been subdued before. By the Chinese accounts great barbarities were committed by the conquerors, and the tribe was said to be nearly exterminated; but yet we find this same tribe rising again in great numbers so late as 1832, and giving full employment to two Chinese armies commanded by the viceroys of Canton and of Hoonan. However, Kien Loong commemorated his victory over the Miao-tse by paintings, which were copied and sent to France to be engraved. 4. About the years 1790-91, the rajah of Nepaul having invaded Tibet, a Chinese army was sent against him, which obliged him to withdraw to his own dominions, and the country of Lassa or Tibet was placed under the protection of China. (Staunton's *Narrative of Lord Macartney's Embassy*, vol. ii., ch. 1.)

Among the remarkable circumstances of Kien Loong's reign may be mentioned his edict of 1753, forbidding the exercise of the Christian religion under severe penalties, in consequence of which a kind of persecution against the Christian converts took place in several of the provinces. The Jesuit missionaries at Pekin however, as men of science, continued to enjoy the favour of the emperor, who was himself fond of learning, and a poet. [AMIOT, LE PERE.] He collected an immense library of all the most interesting Chinese works, and caused a geography of China to be compiled, as well as a Chinese and Mantcheou dictionary. Another remarkable occurrence of his reign is his reception of the British embassy in 1793, the particulars of which, upon the whole, reflect credit upon the character and intellect of Kien Loong.

In February, 1796, Kien Loong, having completed the sixtieth year of his reign, abdicated in favour of his son Kea King, a very inferior man to his father. Kien Loong died in February, 1799.

KIEW (written also Kieff, Kiev, Kiow) is a government of that part of Russia in Europe which is called Little Russia, and lies between 48° 30′ and 51° 50′ N. lat., and 28° 40′ and 33° 25′ E. long. It has an area of 20,540 square miles, or somewhat more than one-third of that of England and Wales. It borders on the governments of Minsk, Tchernigow, Poltava, Kherson, Podolia, and Volhynia. The surface of the country is undulating; the hills and high lands, which follow the course of the rivers, do not in any part attain a considerable elevation. There are many pleasing rural views, but no grand or striking natural scenery; and in general there is the sameness that is usual in flat countries. The Dnieper range of hills can only be considered as the last ramification of the Carpathians, which it joins in Podolia: in the circle of Tschigri a branch of it quits the river, and traverses the whole southern part of the province in a north-western direction. The land to the north of this branch has an extremely rich and fertile soil. On the south the soil is poorer, more sandy, and like a steppe; but still there are tracts of luxuriant corn-fields and good pastures. The chief, and in fact the only navigable river is the Dnieper, which however is a frontier river, forming the entire north-eastern boundary between this province and Tchernigow and Poltava for nearly 250 miles. It is from 600 to 1200 feet wide, flows with rapidity, has hard, muddy water, and here and there blocks of stone and eddies, which however do not obstruct the navigation in this province. The chief rivers that flow into it are: 1. The Pripetz, which comes from Minsk, and is here joined by the Ush or Usza from Volhynia; 2. The Teterew, from Volhynia, which receives several streams before it falls into the Dnieper; 3. The Irpen; 4. The Stugena; 5. The Ross, which rises in the west of the province, divides into two arms, and forms a large island; and 6. The Tiasmin, which comes from Kherson. There are no lakes of any consequence in the whole province: most of the small lakes are in the southern part. The climate is extremely mild and dry, and adapted to all the productions of the temperate zone, though no vines are cultivated. The rivers freeze in December, and thaw in February; but there are some winters (though they are rare) when there is very little snow and ice: the north wind however is always severely felt. The heat in summer is often so great that the rivers are dried up. Rain seldom falls in summer. Locusts are common, and the migratory locust often does great injury.

Agriculture is the chief employment of the inhabitants. The fruitful soil produces all kinds of corn, pulse, hemp, flax, and tobacco. The millet is of a peculiar kind, bearing several ears on one stem; the grain is large, round, and of excellent quality. The gardens produce all kinds of vegetables, and likewise melons, water-melons, and various kinds of fruit. Fruit of all kind prospers, except the vine. The country-people however do not grow much fruit, but are content with their wild wood-berries.

Kiew has more and better timber than any other province of Little Russia. Next to agriculture the breeding of cattle is the chief occupation of the inhabitants. The oxen are large and of a good breed, generally of a grey colour Great numbers are fattened and sent to Austria, Germany, and the interior of Russia. The horses are small, but have many good qualities, and are very fit for light cavalry. Few sheep are kept, but great numbers of swine. In the forests there are foxes, a few wolves, fewer bears, but many deer; there are hares, partridges, quails, and ortolans. In the Dnieper there are beavers and otters, but they are rare, and in that and the other streams there are many kinds of river fish, though not sufficient for the consumption of the people. The only minerals made use of are clay, lime, chalk, stone for millstones, and bog-iron. The manufactories are unimportant; they are confined to the towns, and furnish very little for exportation. The trade consists in the exportation of the produce of the province, and the importation of salt, metal, wine, manufactured goods, and colonial produce. The population is 1,530,000. The villages are much closer together than in Great Russia, and have a very cheerful and pleasing appearance; and all the houses have gardens, in which there are at least cherry and plum trees. The houses in the country are made of brushwood and branches of trees, covered with clay within and without, all whitewashed and thatched, and kept very clean, all the rooms being regularly washed twice a week. The inhabitants are chiefly Little Russians; they are a more poetical people than the Great Russians, are passionately fond of music, and always sing at their work. The subjects of their songs are the beauties of nature, love, and brandy. In general the Little Russian sings, plays, and dances whenever he can; his dances are full of voluptuous attitudes. He is addicted to drinking, though not so much so as other Russians, and has better but very intoxicating beverages. Industry is not one of his virtues, and he only works as much as is necessary for his subsistence and the gratification of his most urgent wants. In the town of Kiew there are many Great Russians and Germans; the Poles are the chief landholders and nobles, and possess almost all the great estates. Jews are everywhere numerous; they have all the public-houses, inns, and shops, and are likewise the butchers, cattle-dealers, &c. Most of the inhabitants are of the Greek church, under the archbishop of Kiew and Galiz, whose diocese, erected in 932, is of the first class, and has under it 1304 parishes. Of the Poles, many are Roman Catholics, and some Calvinists; of the Germans, many are Lutherans. The Jews have their synagogues and rabbis. The nobility are numerous, but few families are very wealthy. In the old province of Kiew the Polish nobility amounted to 42,207 persons, and the government as now constituted probably has as many. The citizens are poor, the Jews being in possession of nearly all trades in the towns; the peasantry are almost all serfs.

KIEW, the capital of the above government, situated in 50° 27′ N. lat. and 30° 27′ 45″ E. long., is built on a hill on the right bank of the Dnieper, which has of late years so much decreased both in width and depth, that the trading barks commonly navigate the narrow channel in the middle of the stream. There is a bridge of boats across the river. The town consists of three parts, each at some wersts distant from the others, viz.: 1, the old fortress Petschersk, with celebrated caverns and catacombs, containing the bodies of 118 saints well preserved. Nestor, the most antient Russian historian, lived in this convent. 2. Old Kiew, or Sophienstadt, containing the fine cathedral of St. Sophia, and the residence of the archbishop. 3. Podol, containing most of the private houses, 20 churches, an imperial palace, and the townhall. A fourth quarter was built under Catherine II., and called Vladimirstadt; but even in 1821 it was scarcely inhabited, and later writers do not mention it. Besides its cathedral, 25 churches, 9 convents, and a Greek ecclesiastical academy, Kiew has a university, founded in 1834, called St. Vladimir's university, which has obtained the library and collections of the Volhynian Lyceum at Krzeminiec. Kiew contains the oldest Greek ecclesiastical academy in Russia, which was founded in 1588 and confirmed in 1737: it has 10 professors and above 1000 students. The troubles which agitated the provinces which now compose the district of Kiew had caused the lyceum of Krzeminiec to be transferred to that city. Some time afterwards the emperor resolved to re-organize that institution by placing it on a broader and more solid basis, chiefly with respect to the education of the youth of the governments of Kiew, Podolia, and Volhynia. The lyceum of Kiew has consequently been transformed into a university, to which the name of St. Vladimir's University was given. (Ukases of 8th November and 25th December, 1833.) It is endowed with all the revenues of the lyceum of Krzeminiec, and has the library and all the collections belonging to that institution. In 1836 there were 88 professors and masters, and 203 students. The observatory is well furnished with instruments, and the library consists of above 46,000 volumes. There are considerable manufactories of earthenware, many tanneries, and a very celebrated fair, attended by 30,000 Turks, Armenians, Germans, Swiss, English, &c. The population is about 40,000.

KILDA, ST., the most northern of the Hebrides, is situated in 59° N. lat., and consists of an uneven mountain-ridge, whose most elevated point, called Conochan, rises 1380 feet above the sea-level. Dr. MacCulloch estimates the greatest width of the island at two miles, and its length at three miles; but according to other authorities its length does not exceed two miles. With the exception of some imperfect peat upon the higher points, the whole of the surface is covered with a thick turf of the freshest verdure, and highly susceptible of cultivation, were it not for the westerly winds which limit the agriculture to the south-east declivity, where there is most shelter, and where the village is situated. The tract adjoining the village is held conjointly by the inhabitants, their respective ridges being interchanged every three years. The rest of the island is in pasture, allotted to sheep and black cattle, the average stock of which is estimated at 2000. Although the people dress in the English or Lowland style, and no trace of either kilt or tartan is to be seen, the English language is altogether unknown, and Gaelic is the only one understood. The chief part of their food consists of the flesh and eggs of the sea-birds, among which the gannet, puffin, and fulmar are most in request; and the supply furnished by these birds is so abundant that little or no attention is given to fishing, although large shoals of [illegible] ling are frequently seen. The down of the [illegible] much valued; and in 1815 the rent [illegible] averages 40*l*. per annum, was paid wh[illegible]ers of that bird. There are three principal [illegible], the largest of which, Tober-nam-buy, produces a considerable stream. The population in 1824 was distributed among twenty families, and consisted of 110 individuals. (See MacCulloch's 'Highlands,' from which this notice is chiefly drawn.)

KILDARE, an inland county of the province of Leinster, in Ireland; bounded on the north by the county of Meath, on the east by the counties of Dublin and Wicklow, on the south by the county of Carlow, and on the west by the Queen's and King's counties. According to the map published under the superintendence of the Society for the Diffusion of Useful Knowledge, it is situated between 52° 50′ and 53° 25′ N. lat., and between 6° 27′ and 7° 10′ W. long. Its greatest length from north to south is 32 Irish or 40¼ statute miles, and its greatest breadth from east to west is 21 Irish or 26¾ statute miles. According to the above map, it has an area of 381,818 statute acres, or 597 statute square miles. The area is elsewhere estimated at 392,435 statute acres, of which 325,988 are cultivated ground, and 66,447 acres are unprofitable bog and mountain. The population in 1831 was 108,424.

The surface is more flat than that of any other county of Ireland. The only considerable elevations are the hills of Rathcoole, which form the western extremity of the range of the Dublin mountains, and a detached group which occupies part of the southern margin of the Bog of Allen in the central northern division of the county. This group consists of the Red-hill, Dunmurry-hill, Grange-hill, and the Hill of Allen, which last is detached from the others, and terminates the range on the north-east. It is a conical hill nearly insulated by tracts of bog, and rises about 300 feet above the level of the surrounding country, which is here about 260 feet above the level of the sea. An open table-land extends from the southern base of this group to the acclivities of the Wicklow mountains on the south-east, and divides the middle and southern parts of Kildare into two districts, of which the one slopes gradually towards the river Liffey on the east, and the other towards the river Barrow on the west. North from the Dunmurry range the upland district spreads east and west, forming the southern boundary of the basin of the river Boyne on the west, and the western and northern boundary of the valley of the Liffey on the east. It is here overlaid to an extent of 50,000 statute acres by a portion of the vast tract of peat bog called the Bog of Allen. This part of the county is traversed by the Grand and Royal canals in nearly parallel lines from east to west.

The district which slopes towards the Barrow, comprising the western part of the county from the Bog of Allen to the county of Carlow, is divided into three open vales by low ranges of undulating ground extending in parallel directions from the central table-land towards the south-west. The declivity in each of these is very gradual, the channel of the Barrow being not more than 100 feet below the general level of the upland district. The most northern of these vales, included between the summit level of the Bog of Allen on the north and the range of the Dunmurry hills on the south and south-east, is drained by the Feagile and Little Barrow or Rathangan rivers, which, uniting at the lower extremity of the valley, join the Barrow where that river, changing its course from an eastern to a southern direction, becomes the boundary of Kildare. The northern side of the valley is greatly encumbered with bog; the southern side is open and arable. About midway between the source of the Little Barrow and its junction with the Great Barrow is the thriving market-town of Rathangan, through which a branch of the Grand Canal, diverging from the main trunk at the head of the valley, is carried in a direction parallel to the tributary river to join the Barrow Navigation at Athy. The length of this line from Lowtown on the summit level to Athy is 27 miles 7 furlongs. Monasterevan, situated near the junction of the lesser and greater Barrows, also possesses great advantages as a station for carrying on traffic. The Barrow is here crossed by the above canal, which from Monasterevan to Athy is carried along the western bank of the river. From the level at Monasterevan another branch canal is carried westward to the towns of Portarlington and Mountmellick, in the Queen's County, a distance of 11½ miles. The country about Monasterevan on both sides of the river is well improved. Moore Abbey, an antient seat of the Loftus family, and latterly the residence of the Marquis of Drogheda, is situated on the east bank. The present mansion, which is surrounded by a well timbered tract of country, occupies the site of an abbey founded here by St. Abban in the seventh century, and re-edified by O'Dempsy and O'Connor in the twelfth century. Ten miles south from Monasterevan on both banks of the Barrow is Athy, at the junction of the Barrow Navigation with the above-mentioned branch of the Grand Canal. Athy was formerly a place of importance as a frontier town of the English Pale. It had greatly declined prior to the opening of these lines of navigation, but is now the chief point of traffic between Dublin and Carlow. A series of low detached hills, extending from Athy in a north-easterly direction to Old Kilcullen, includes an open tract of country about eight miles square, watered by the river Finnery. The lower part of this district is chiefly occupied by bogs. The town of Kildare, at present a small place, is situated on the elevated tract at the upper end of the vale. It is a town of great antiquity, and still possesses numerous remains of former importance, including the ruins of a cathedral, castle, and several religious houses, with a very high and perfect round tower. The surrounding country is open, and generally under tillage, with the exception of the Curragh of Kildare, a common containing upwards of 3000 Irish acres, which extends six statute miles along the crest of the table-land between the towns of Kildare and Kilcullen. This is a celebrated race-ground; the turf throughout is close and elastic, and the surface smoothly undulating. Old Kilcullen is situated on a hill a mile and a half from the eastern extremity of the Curragh. It was formerly a walled town, and is said to have had seven gates. The erection of a bridge over the Liffey, in 1309, at New

Kilcullen, about two miles to the north, led to its decay; it is now an insignificant place. Southward and eastward from the range of hills extending from Kilcullen to Athy lies a fertile tract watered by the rivers Greece and Leir, which fall into the Barrow at the southern extremity of the county. The upper portion of the valley of the Greece is highly cultivated, and to a great extent in demesne lands. On this river, near its source, is the neat and prosperous village of Ballytore, the principal inhabitants of which are Quakers. Farther south are the villages of Timolin and Moone, the latter on the Greece, near Belan, a seat of the earl of Aldborough. Belan House, at the time of its erection in the beginning of the eighteenth century, was considered the most splendid modern mansion in Ireland. It is however a plain structure which would now rate among residences of the second class. The great southern road from Dublin, passing through Ballytore and Timolin, leads to Castledermot, a tolerably well-built town on the river Leir, near the southern extremity of the county. Prior to the arrival of the English, this was the seat of the O'Tooles, princes of Hy-Mail, a territory extending out of Wicklow into the southern parts of Kildare. During the Anglo-Norman period it was a place of importance in the Pale: there still remain numerous ruins of its ecclesiastical and military buildings, including a round tower in good preservation. The country is here open and under tillage, but bare of timber.

That part of the valley of the Liffey which is included within this county is formed by the western slope of the Dublin mountains on the one side, and by the subsidence of the table-land of Kildare on the other. Naas, the most considerable town in the county, is situated about two miles east from the river, in the centre of the plain included between it and the range of the Dublin mountains. A branch of the Grand Canal is carried from Newbridge to Naas, and thence to Corbally Harbour, within 1½ miles of Kilcullen Bridge. On the great southern road from Dublin to Naas, about a mile north from the latter, is Johnstown, a remarkably neat village in the vicinity of Palmerstown, the residence of Lord Mayo. The country in this neighbourhood is in a high state of cultivation, and much of it in demesne. The western bank of the river particularly, from the point where it enters the county to Leixlip on the Dublin boundary, is almost wholly occupied by a succession of demesne-lands, including numerous residences of the best class. Among these the most remarkable are Killadoon, the seat of the earl of Leitrim, Castletown, that of Colonel Conolly, and on the opposite side of the river, near the line of the Grand Canal, Lyons Castle, the residence of Lord Cloncurry. Celbridge, on the western bank of the Liffey, is a well-built town, and was, until recently, the seat of an extensive woollen manufacture. It is now declining in consequence of the cessation of these works. Leixlip, at the point where the Liffey enters the county of Dublin, is a picturesque village, much visited by pleasure parties from the metropolis. The banks of the Liffey are here steep and well wooded, and the river for a considerable distance runs in a series of rapids. A ledge of rock, about ten feet in height, stretching across the channel, forms a pleasing waterfall, called the Salmon Leap, which is the chief object of attraction. From Celbridge and Leixlip to Maynooth, situated three miles farther westward, the country is to a great extent in demesne. Maynooth, on the Ryewater, a tributary of the Liffey, which runs into the river at Leixlip, was formerly the chief seat of the earls of Kildare, considerable remains of whose castle are still standing. The town is neatly built, consisting of one main street, at the western end of which is the entrance to the Roman Catholic College, flanked by the ruins of the castle. Near the other extremity of the main street is the entrance to Carton, the residence of the duke of Leinster. This demesne is finely timbered: in the arrangement of the plantations regard has been had to the most pleasing combination of autumnal tints. The house consists of a centre of grand proportions connected by colonnades with pavilions, and contains a good collection of pictures and other works of art. The Royal Canal, crossing the Ryewater by an aqueduct a little above Leixlip, passes Maynooth, and so westward by Kilcock, a thriving market-town on the borders of Meath. Westward from Kilcock, the Royal Canal crosses the Blackwater and Boyne rivers by aqueducts within this county. The district traversed by this canal is, for the most part, open and arable, rising southward towards the Bog of Allen, the borders of which in one place approach within a mile of the line of navigation. The Grand Canal, which crosses the Liffey by an aqueduct near Naas, and runs nearly parallel to the Royal Canal across this county, is carried through the above-mentioned bogs at a distance of about ten miles farther south. The tract which it traverses comprises about 40,000 statute acres of peat-moss, in some places 40 feet deep, reposing on limestone gravel, which rises in low cultivable ridges between the principal fields of morass. The Island of Allen is an elevated tract of this kind, surrounded by bog, between the summit level of the canal and the town of Kildare. The summit level is supplied by two lateral branches, one of which, 5 miles in length, extends to Milltown, near Kildare in the south; and the other, 3¼ miles in length, is carried through the bogs of Cushlea to the Blackwood Reservoir on the north. A subsidence of 20 feet in the substance of the bog has been caused in some places by the opening of these extensive drains, and great tracts have been made available for purposes of turbary which were before inaccessible. Large quantities of peat are now cut all along the line, for sale in Dublin. The huts of the turf-cutters are excavated from the banks of the morass and covered with sods, and are the only habitations through successive tracts of several miles. The decayed village of Prosperous is situated near the eastern extremity of this dreary tract. An attempt was made to establish the cotton manufacture here in the latter end of the last century, and much money was expended on buildings; but the enterprise entirely failed.

The north-western part of the county, extending from the Bog of Allen to the Boyne, is open and chiefly in pasture. The towns here are Carberry and Johnston's Bridge.

The great southern and western mail-coach roads pass through Kildare: the former by Naas, where it divides, one branch going by Kilcullen Bridge to Carlow, and another by Newbridge to Maryborough; and the latter by the Meath boundary through Kilcock to Athlone. The remainder of the county is well provided with roads made and kept in repair by grand jury presentments.

The climate, from the quantity of boggy surface exposed, is more moist than that of the neighbouring counties on the north and south. In the central district the air is pure and keen; and milder and more salubrious in the valleys of the Liffey and Greece.

Geology.—The clay-slate, which flanks the granite axis of the Dublin and Wicklow mountains, occupies about one-fourth part of the surface of Kildare. It extends from the extremity of the Rathcoole group in the county of Dublin across the valley of the Liffey, whence it runs in a south-west direction towards Athy, forming the Kilcullen group, and occupies the entire valley of the Greece, with the exception of its lower extremity, where the verge of the limestone plain is interposed between it and the line of the Barrow. The granite tract of Carlow extends into the south-eastern extremity of Kildare as far as Castle Dermot, where the clay-slate passes into mica-slate along the eastern portion of their line of junction. The remainder of the county is occupied with the floetz limestone of the great central plain, broken only by the group of Dunmurry and the Hill of Allen. The Hill of Allen is composed of a mass of granular compact greenstone and greenstone porphyry protruded through the floetz limestone. Large crystals of hornblende and felspar occur throughout the greenstone. Red Hill, Dunmurry Hill, and the western foot of Grange Hill consist of alternating beds of fine-grained grauwacke, grauwacke slate, and clay-slate, with a general dip of 60° towards the south-east, but in some places vertical. A small patch of red sandstone conglomerate occurs on the northern declivity of Red Hill. These strata, which have been quarried for millstones, range east and west, and dip 17° north. Between Dunmurry Hill and Grange Hill, which consists of trap, the floetz limestone is interposed, and again between Grange Hill and the Hill of Allen. At the northern extremity of the Hill of Allen is a slight eminence called the Leap of Allen, composed of red sandstone conglomerate, which is quarried for millstones. Indications of copper have been observed on Dunmurry Hill, but hitherto there have not been any mining operations actually carried on within this county.

Soil and Agriculture.—The soil is generally a rich loam, resting on limestone or clay-slate. Calcareous gravel, which is found through the greater part of the county, was profusely used as a manure during the last century; but from its exhausting effects on the soil it has been generally discontinued. The opening of the Grand and Royal canals has given facilities for obtaining manure of the best description from Dublin, by means of which the lands of the central and western districts are now in much better heart than they were at the beginning of the present century. The chief tract of pasture-land in this county is the Curragh, which is used as a sheep-walk. There are rich fattening lands in the baronies of Carberry, Clane, and North and South Salt, which occupy the north-western and north-eastern portions of the county. An improved system of agriculture has been introduced by the resident proprietors, and is practised to some extent by the smaller farmers. Oxen are in general use both for draught and the plough. The character of the stock has been much bettered of late years by the introduction of the best English breeds of sheep and black cattle. The late and present duke of Leinster have been mainly instrumental in promoting these improvements. The grain raised in Kildare is generally of prime quality: the quantity sold at the different market-towns in the years 1833 and 1835 appears from the following table:—

	Wheat. (barrels.)		Oats. (barrels.)		Barley. (barrels.)		Bere. (barrels.)	
	1833.	1835.	1833.	1835.	1833.	1835.	1833.	1835.
Naas . .	941	750	16,085	12,796	50	50	1412	1125
Kilcock . .	40,000	40,000	12,000	12,000	1000	1000	7000	7000
Athy . .	57,720	37,811	19,472	19,878	8075	5797	..	..
Rathangan .	13,500	14,500	..	..	..	..	..	..
Kildare . .	1,090	1,113	1,152	1,230	380	145	150	388
Robertstown	..	..	3,000	3,000	..	..	..	..

There is no return from Kilcullen, which is also a considerable market for grain. Besides the grain disposed of in market, large quantities are sold by sample at the different mills and corn-stores within the county, or sent by the canals to Dublin. The milling trade is extensively carried on.

The only other manufactures carried on within the county are, a manufacture of cotton, on an extensive scale, lately commenced at Inchyguire, near Ballytore, and a small manufacture of woollens still continued at Celbridge.

The condition of the working-classes is somewhat better than in most of the neighbouring counties. The average rate of wages for agricultural labourers is 10*d.* per day, for about 110 working days in the year. The appearance of the peasantry is generally decent: and they use the English language universally.

Civil Divisions.—Kildare is divided into the baronies of Carberry on the north-west; Ikeathy and Oughterany on the north, containing the town of Kilcock, population (in 1821) 1730; Salt North on the north-east, containing the towns of Maynooth (pop. 2053), Celbridge (pop. 1647), and Leixlip (pop. 1159); Salt South; Naas North on the east, containing the town of Naas (pop. 3808) and the villages of Sallins (pop. 419) and Johnstown (pop. 101); Naas South; Kilcullen, also on the east, containing the town of Kilcullen Bridge (pop. 699); Narragh and Rheban East, containing the town of Ballytore (pop. 933); Narragh and Rheban West, containing the town of Athy (pop. 4494); Kilkea and Moone on the south, containing the town of Castledermot (pop. 1835), and the village of Moone (pop. 244); Ophaly East, containing the town of Kildare (pop. 1753); Ophaly West, containing the towns of Monasterevan (pop. 1441) and Rathangan (pop. 1165); Clane in the northern centre, containing the towns of Clane (pop. 1216) and Prosperous (pop. 1038); and Connell in the southern centre, containing the town of Newbridge (pop. 377) and the village of Robertstown (pop. 281).

Athy is incorporated by charter of 11 James I. The governing body consists of sovereign, bailiffs, and burgesses. The sovereign holds a court having jurisdiction to the amount of 40*s* Irish. The revenue of the corporation is 154*l.* per annum. Naas is incorporated by charter of 11 Elizabeth and 7 James I.; but no court has existed here for several years. The corporation of Kildare, created by charter of Henry VIII., is now extinct; so also is that of Harristown, incorporated by charter of 33 Charles II.

Prior to the Union Kildare was represented in the Irish Parliament by ten members; two for the county, and two members for each of the above corporate towns. It is now represented in the Imperial Parliament by two county members only. In 1836 the county constituency was 1382. The assizes are held alternately at Naas and Athy, in each of which there is a county court-house and gaol. The general quarter-sessions are held at Athy, Maynooth, Kildare, and Naas. The constabulary force in the year 1835 consisted of 1 resident magistrate, 4 chief constables, 40 constables, 205 sub-constables, and 3 horse. The cost of maintaining this force for the year was 9079*l.* 18*s.* 10*d.*, of which 4695*l.* 9*s.* 7*d.* was chargeable against the county. The total number of criminals committed to Naas gaol in 1836 was 399, of whom 328 were males and 71 females. Of these 72 males and 5 females could read and write, 92 males and 19 females could read only, 155 males and 44 females could neither read nor write, and of 9 males and 3 females the instruction could not be ascertained. The total number of offenders committed to Athy gaol in the same year was 328, of whom 184 were males and 54 were females. Of these 65 males and 6 females could read and write, 58 males and 5 females could read only, 57 males and 41 females could neither read nor write, and of 4 females and 2 females the instruction could not be ascertained. The district lunatic asylum for Kildare is at Carlow. There is a county infirmary at Kildare, and fever hospitals at Celbridge, Naas, and Kilcullen; dispensaries are established in all the towns and chief villages. There are extensive cavalry barracks at Newbridge, and infantry barracks at Naas and Athy.

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	11,205	..	..	..	..	..	..	56,000
1813	Under Act of 1812 . . .	14,564	..	..	..	..	..	..	85,133
1821	Under Act 55 Geo. III. c. 120	16,478	19,180	..	..	..	49,988	49,077	99,065
1831	Under Act 1 Will. IV. c. 19 .	17,155	18,711	11,880	3,315	3,576	54,472	53,952	108,424

History and Antiquities.—In the antient division of Ireland the south-eastern portion of Kildare was included in the territory of Hy-Mail, of which O'Toole was prince; the south-western portion formed part of O'Connor's territory of Hy-Failge; the western division belonged to Hy-Ceallan, and a small portion of the north to the kingdom of Meath; with the exception of which last part the whole was included in the kingdom of Leinster. Leinster coming to Earl Strongbow by his marriage with Eva the daughter of Dermot MacMurrogh, was inherited by William Marshal, earl Pembroke, who married Isabel, only daughter and heir of Strongbow. He had issue five daughters, among whom the principality of Leinster was divided, A.D 1247. In this partition the county of Kildare was allotted to Sibilla, the fourth daughter, who married William earl Ferrers and Darby. Agnes, the eldest daughter of this marriage, was wife of William de Vesey, lord of Kildare and Rathangan, *jure uxoris*, and lord justice of Ireland. A dispute having arisen between him and Henry FitzThomas FitzGerald, lord of Ophaly, in A.D. 1293, it was awarded to be settled by single combat; but Vescy, having fled into France to avoid the duel, was attainted of treason, and his estates bestowed on his antagonist. In 1296 Kildare, which up to this time had been under the jurisdiction of the sheriff of Dublin, was erected into a separate county. The Fitzgerald family, having subsequently adopted the pernicious system of Irish exactions, and usurped on the authority of the crown by trying all pleas before their own seneschals, to the exclusion of the king's sheriff, excited the hostility of the English government. Gerald earl of Kildare, being summoned to England to answer various charges of this nature to which he had exposed himself in his capacity of lord justice, left his son Lord Thomas Fitzgerald, a rash youth of twenty, his deputy. A report shortly after reached Ireland that the earl had been put to death, which so incensed Lord Thomas that he threw up his office of deputy, A.D. 1534, and entered into open rebellion, in which he was joined by the five brothers of the earl. Fitzgerald had at this time in his possession the six principal castles of Maynooth, Rathangan, Portlester, Athy, Leix in the present Queen's County, and Carlow. Maynooth and Rathangan being taken in 1534, he and his uncles submitted in the ensuing year. They were sent to England, and executed at Tyburn, Feb. 3, 1537. The earl had already died a prisoner in the tower of London. A younger brother of Lord Thomas, called Gerald, escaped during these disasters to the Continent, where he distinguished himself in the service of the Knights of Malta, and afterwards became master of the horse to the Grand-Duke of Tuscany. In 1552 he was reconciled to the English government, and restored to his possessions.

This county was the theatre of various military operations during the wars which succeeded the rebellion of 1641. Of these the most important was the battle of Kilrush, fought 15th April, 1642, between the royalists under the earl of Ormond, and the Roman Catholic army under Lord Mountgarret, which latter party suffered a signal defeat. The number engaged on both sides amounted to about 15,000 men. The Kildare family were active in bringing about the Restoration, and espoused the Protestant cause in the subsequent wars of the Revolution of 1688. The forfeitures within this county attending on the latter event comprised 44,281 acres, valued at that time at 205,175*l.* 0*s.* 6*d.* The principal persons attainted were of the families of Eustace, Tyrrell, Lawless, and Trant. Several sanguinary engagements took place between the king's troops and the insurgents in this county in 1798. At Old Kilcullen the rebels had a temporary advantage, but were finally defeated here, as in various other parts of the county.

Numerous earthen works, partly military and partly sepulchral, remain in this county. Of the first class, the most remarkable are the rath of Knockawley, the antient palace of Allen, about a mile west from Old Kilcullen, the moat of Mullamast, the antient Carmon, near Ballytore, and Rath-Ardscull near Athy. There are numerous sepulchral mounds on the Curragh; and here in the time of Giraldus Cambrensis was a stone monument similar to Stonehenge. Pillar stones of large dimensions are still standing at Mullamast, Kilgowan, Forenaghts, Punch's Town and Harristown. There are round towers at Kildare, Taghadoe, Kilcullen, Castledermot, and Oughterard. Among the ruins of the numerous religious houses of this county, the most remarkable are those of the cathedral church at Kildare, the Franciscan abbeys at Castledermot and Clane, Great Connell Abbey on the bank of the Liffey near Newbridge, and the remains of several religious establishments in Naas. At Castledermot, Moone, and Old Kilcullen are stone crosses ornamented with curious sculptures. The castles of Athy, Maynooth, Kilkea, Rheban, Castledermot, Kilberry, Woodstock, Castle Carberry, Ballyteague, Clane, Lackagh, Donadea, Kildare, Leixlip, Timolin, Corifig, and Morristown Nenagh are still standing. The castles of Kilkea, Donadea, and Leixlip are still inhabited.

This county is partly in the diocese of Dublin, but chiefly in that of Kildare, which, in point of education, rank respectively 19th and 8th among the 32 dioceses of Ireland. It contains the two principal Roman Catholic Educational Establishments in Ireland, at Maynooth and Clongowes-wood. The Royal College of St. Patrick, Maynooth, was founded pursuant to an act of the Irish parliament passed in 1795. The object of the institution is to provide a home-education for the Irish priesthood of the Roman Catholic Church, who were formerly obliged to resort to the Continental colleges. It was first opened for the reception of fifty students, in October, 1795. A lay-college was shortly after attached; but this was discontinued in 1817. The buildings now accommodate 450 students. Of this number 250 are free students, who are selected by the bishops of the several dioceses at yearly provincial examinations; and pay eight guineas at entrance, which is their only expense. The remainder are either pensioners who pay twenty-one guineas per annum and four guineas entrance, or half pensioners who pay only half the annual sum. The establishment is supported by these payments, by private bequests, and by a parliamentary grant of 8,928*l.* per annum. The college is governed by a president, vice-president, dean, and procurator, or bursar: there are professors of the sacred scriptures, of dogmatic theology, of moral theology, of natural and experimental philosophy, of logic, of belles lettres, Hebrew, Greek, and Latin, English elocution, and of the Irish and French languages. The students rise at half-past five o'clock, and retire to rest at half-past nine in the evening. The period of study is usually five years, of which two are devoted to humanity, logic, and mathematics, and three to divinity, but the course is sometimes shortened by the omission of mathematics. The building consists of a plain centre with extensive returning wings. The cost of its erection, before some late additions had been commenced, was about 32,000*l.* There are fifty-four acres of land attached, which are laid out as a park for the recreation of the students.

The lay-school at Clongowes, near Clane, was opened as a seminary for the sons of the Roman Catholic nobility and gentry in 1814. It is conducted by Jesuits, of whom there are forty-five resident in the institution. The building is a spacious quadrangle flanked by round towers, and has an imposing appearance. There is a museum, library, and theatre for lectures in natural and experimental philosophy. The institution is governed by a president, dean, and procurator, or bursar. There are six professors of various branches of the classics, a professor of mathematics, and a professor of natural philosophy. The course of education is more extended in classics than in the sciences.

The county expenses are defrayed by grand jury presentment. The amount levied in the year 1835 was 19,554*l.* 18*s.* 9*d.*, of which 1221*l.* 7*s.* 10*d.*, for public roads, was charged to the county at large; 6051*l.* 12*s.* 5*d.*, for public roads, was charged to the several baronies; 5206*l.* 7*s.* 8*d.* was for the public establishments of the county; 4713*l.* 15*s.* 10½*d.* for police, and 2304*l.* 14*s.* 11½*d.* in repayment of loans advanced by government.

(*Statistical Survey of Kildare; Transactions of the Geological Society*, vol. v.; Cox's *History of Ireland;* Brewer's *Beauties of Ireland; Parliamentary Reports, Papers*, &c.)

KILDARE, a bishop's see in the archiepiscopal province of Dublin, in Ireland. It comprises parts of the three counties of Kildare, King's County, and Queen's County, extending from east to west 46 statute miles, and from north to south 29 statute miles. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, 4 prebendaries, and 4 minor canons.

In 1792 there were in this diocese 81 parishes, constituting 31 benefices, having 28 churches of the establishment. In 1834 the numbers were, parishes 80, benefices 41, churches of the establishment 35, other places of Protestant worship 4, Roman Catholic places of worship 110. In the latter year the gross population of the diocese was 134,356, of whom there were 13,907 members of the Established Church, 9 Presbyterians, 384 other Protestant Dissenters, and 120,056 Roman Catholics, being in the proportion of 8⅓ Roman Catholics to 1 Protestant nearly. In the same year there were in this diocese 215 daily schools, educating 12,633 young persons of both sexes, being in the proportion of 9·4 per cent. of the entire population under daily instruction, in which respect Kildare ranks eighth among the 32 dioceses of Ireland. Of the above schools 44 were, in 1834, in connection with the National Board of Education.

The foundation of this see is ascribed to St. Conlæth, a follower of St. Brigid, by whose assistance he is said to have founded the original cathedral in the beginning of the sixth century. Aodh Dubh, who died A.D. 638, is the next bishop whose name has been preserved. He had been king of Leinster, but retired from secular affairs and became successively monk, abbot, and bishop of Kildare. The see was for seven years vacant between the death of Simon of Kilkenny, A.D. 1272, and the succession of Nicholas Cusack, declared bishop by Pope Nicholas III., to whom a dispute respecting the election of two other candidates had been referred. William Miagh, who succeeded in 1540, was reckoned among the prelates who wished well to the Reformation His successor Thomas Lancaster was the first Protestant bishop; he was consecrated by Browne, archbishop of Dublin, July, 1550. The revenues of the see were greatly diminished by Alexander Craik, who was bishop from 1560 to 1564: he exchanged most of the lands and manors of the bishopric with one Sarsfield, taking some tithes of little value in return. On account of the poverty of the bishopric so caused, the bishops of Kildare have continued, since the year 1681, to hold the deanery of Christ Church in Dublin, and the preceptory of Tully in the county of Kildare in commendam. The quantity of land belonging to the see is 911 acres, and the gross annual revenue of the bishop, on an average of three years ending December 31, 1831, was 6451*l.* 13*s.* 3*d.* By the 3rd and 4th Will. IV., c. 37, this see when vacant becomes united to the see of Dublin, and the deanery of Christ Church and preceptory of Tully become united with the deanery of St. Patrick's, Dublin. The temporalities will then vest in the Ecclesiastical Commissioners. The bishop has no residence within the diocese. The choir of the cathedral is the only part now in use; the nave and transepts having been reduced to ruins in the parliamentary war. Near the cathedral are the ruins of a small building where the sacred fire of St. Brigid was formerly kept burning. This superstitious practice was suppressed by Henry de Loundres, archbishop of Dublin, in the 13th century, but was subsequently revived, and only ceased finally at the time of the Reformation.

(Ware's *Bishops;* Beaufort's *Memoir of a Map of Ireland; Parliamentary Returns.*)

KILKENNY, an inland county of the province of Leinster in Ireland; bounded on the north by Queen's County, on the east by the counties of Carlow and Wexford, on the south by the county of Waterford, and on the west by the county of Tipperary. Its southern and western limits are also those of the province of Leinster, of which this county forms the south-western extremity. According to the map constructed under the superintendence of the Society for the Diffusion of Useful Knowledge it lies between 52° 13′ and 52° 53′ N. lat., and between 6° 55′ and 7° 38′ W. long. Its greatest length from the Slienmargie Hills on the north to the river Suir on the south is 36 Irish or 45¾ statute miles. Its breadth varies from 15 statute miles at its southern extremity to 24 across the northern districts. The area, according to the above map, is 469,170 statute acres, or 733 statute square miles. It is estimated by Mr. Griffith at 536,686 statute acres, of which 417,177 are cultivated land and 96,569 unprofitable bog and mountain. The population in 1831 was 169,945, exclusive of the city of Kilkenny, the total population being 193,685.

The navigable rivers Barrow and Suir form the greater part of the eastern and the whole of the southern boundary of Kilkenny, and the partly navigable Nore traverses its entire length from north to south-east. The northern part of the district between the rivers Nore and Barrow, including portions of the Queen's County and county of Carlow, is occupied by a hilly tract of country, extending 15 statute miles by 20. In Carlow and Queen's County these elevations form a continuous range. On the Kilkenny side they spread into numerous lateral groups, the general direction of which is from north-north-east to south-south-west. The principal valley on this side is watered by the Dian river, which rises in the north-eastern extremity of the county, and passes through the village of Clogh and the town of Castlecomer. Being joined by the Dineen and Dubhglass rivers from the east, it runs into the Nore five miles north of Kilkenny city. The valley of the Nore, from the northern extremity of the county to this point, is confined between the declivities of the Castlecomer Hills on the east and two groups of similar formation rising from the right bank of the river towards Tipperary on the west. Between the two latter groups the low ground spreads westward by the neat town of Freshford, expanding into a rich plain which occupies the north-western extremity of the county, and contains the towns of Urlingford, Johnstown, and the village of Ballyspellan, famous for its spa. In a detached portion of this plain, surrounded by the lands of the Queen's County, is the well built town of Durrow, situated on a small stream running eastward to the Nore. The town is built in the form of an oblong square. most of the houses are slated, and many of them are occupied by genteel private families, led to reside here from the convenience of the situation, which is central to the places o chief importance in Kilkenny and Queen's County. This insulated district, containing about 2000 acres, originally formed a portion of the lordship of Ossory in the Queen's County, and was annexed to Kilkenny by act of parliament at the instance of the Earl of Ormonde. The object was to repress the outrages committed against the Earl's tenantry by the sept of the Fitzpatricks, who, when tried in the Queen's County, were always acquitted, but rarely escaped conviction when brought to Kilkenny. In the neighbourhood of Durrow is the residence of Viscount Ashbrook, and between it and Ballyragget on the road to Kilkenny is Ballycondra, the antient seat of the Viscount Mountgarret, whose descendants now possess the earldom of Ormonde. Ballyragget, another seat of the Butler family, is now a thriving town on the left bank of the Nore, 9½ miles north of Kilkenny city. Here is an old castle of the lords Mountgarret, which has been converted into a barrack. Five miles south-east of Ballyragget, near the road from Castlecomer to Kilkenny, is the remarkable cave of Dunmore. The entrance is by a picturesque hollow clothed with brushwood, at the extremity of which the cavern opens by a natural arch fifty feet high. There are several chambers within encrusted with stalactites and traversed by a subterranean stream. Southward from these hilly districts, the plain, which to this extent is confined to a narrow strip on each side of the Nore, expands across the entire central part of the county, spreading into Tipperary on one side and Carlow on the other, with an open undulating surface characteristic of the great limestone field of which it forms a part. The city of Kilkenny [KILKENNY, *City*] is situated on both sides of the Nore where that river enters the more open district. The Nore divides this central plain into two nearly equal portions. The chief drainage of the eastern portion is towards the Barrow, on one of the streams running into which the town of Gowran is situated. This place gave title successively to branches of the families of Butler and Fitzpatrick, and was in the fourteenth century the principal residence of the Earl of Ormonde, who had a very strong castle here. It was greatly decayed about the beginning of the present century, but is now improving. It is principally the property of Viscount Clifden, whose mansion, Gowran Castle, is in the vicinity. The demesne and deer-park are extensive and well timbered, and the house is a fine edifice. Thomastown, situated on the Nore 10½ miles south from Kilkenny, derives it name from Thomas FitzAnthony Walsh, seneschal of Leinster, by whom it was founded. The town has an appearance of antiquity, and is well situated for trade, the Nore being navigable up to this point. Mount-Juliet, the residence of the Earl of Carrick, is finely seated on the banks of the Nore near Thomastown. The banks of the river are steep and wooded, and the open country on each side to a great extent under demesne. The open district to the west is traversed by a considerable river called the Owenree, running eastward from the Tipperary boundary to the Nore, which it joins 3½ miles above Thomastown: the Munster river, which joins the Owenree from the north, forms the boundary between Tipperary and Kilkenny counties for several miles. Near the Tipperary boundary on the Owenree is Callan, a corporate town of some extent, but much decayed [CALLAN], and farther down the stream, the villages of Kells and Innisnag. Bennet's Bridge, a thriving village, is situated on the Nore 3½ miles above its junction with the Owenree. Beyond this central district the entire southern part of the county, with the exception of a strip of level land along the northern bank of the Suir, is occupied with hilly and mountainous tracts, connected on the east with the granite group of Carlow, and the west with the sandstone range of Slievenaman in Tipperary. On entering this district, the Nore, which from Durrow to Thomastown divides the county into two nearly equal portions, changes its course from south to south-east and runs by a deep valley to the Barrow, which it joins about 15 miles above the junction of their united streams with the Suir. The hilly district included between the two former rivers and the open country extending from Gowran to Thomas town is bounded towards the Barrow by a lofty range of hills terminated on the north by Brandon Mountain, which rises to a height of 1696 feet over the town of Graigue-na-managh on the Barrow. The range of Coppinagh bounds the district towards the open country on the west, extending from Mount Loftus near the Barrow to the heights above Innistioge on the Nore. Innistioge is a well built village of the larger class, having a handsome bridge ornamented with Ionic pilasters, and some remains of antient fortifications. From Innistioge eastward the banks of the river are clothed for several miles with the woods of Mr. Tighe's beautiful demesne of Woodstock. The scenery on both sides of this river from Thomastown to the Barrow, a distance of 13 miles, is in the highest degree picturesque. Between the ranges of Coppinagh and Brandon are several extensive valleys opening towards the Nore, which receives the Clodagh river from this side. A tongue of alluvial land called the Roer, extending above two miles in length, occupies the south-eastern extremity of the district at the point of junction of the Nore and Barrow; with the exception of this spot the western bank of the Barrow from Graigue to the Nore is precipitous, and in some places clothed with natural wood. South from the Nore the banks of the Ross river (by which name the united streams are known from New Ross to the harbour of Waterford) slope more gradually, and are highly cultivated. The hilly district west of the Nore and Ross rivers rises into mountains of considerable height and extent, of which the principal group, called the Walsh Mountains, lies between the Argula river running northward into the Nore above Innistioge, and the Kilmacow river running southward into the Suir above Waterford, and covers a space about ten miles in length by six in breadth. The pasturable part of this district is wholly occupied by dairy-farmers. The space between the southern declivities of the Walsh Mountains and other groups ranging towards Tipperary and the Suir is occupied to a breadth of from two to five miles by a level tract of rich land in which is situated the small but remarkably neat town of Pilltown, and the villages of Poleroan, Fiddown, and Kilmacow. In the vicinity of Pilltown are Bessborough, the seat of the Earl of Bessborough, a fine mansion containing some excellent specimens of the Italian and Flemish schools of painting, and Belline, a seat of the Walsh family, from whom the neighbouring district is named, where there is another good collection of pictures. A taste for art was very prevalent in this district in the beginning of the present century. The keeper of the village inn of Pilltown at that time possessed a cabinet collection, including pieces by Rubens, Vandyck, and Tintoretto. At the northern extremity of the hilly district is the village of Knocktopher, an antient seat of the Ormonde family, the ruins of whose castle are still standing. The fine mansion of Castlemorris, formerly the seat of the family of Montmorency-Morris, occupies a commanding site on the acclivity of the hill called King's Mountain near Knocktopher, in the vicinity of which is also a handsome residence of the Langrishe family.

The Suir is navigable for vessels of 120 tons up to the bridge of Carrick, which is situated in Tipperary close to the western limits of this county. At the bridge of Waterford it is in some places eight fathoms deep at low water. Ships of 800 tons ascend the Barrow to New Ross, and small vessels can ply as high as St. Mullins, about midway between Ross and Graigue, where the tide ends, and the Barrow navigation for lighters commences. The Nore throughout the upper part of its course from Durrow to Thomastown runs rapidly, and is subject to violent floods, having a fall of about 13 feet in a mile. From Thomastown to the Barrow it is navigable for boats carrying 10 to 15 tons. Vessels of 80 tons and upwards have been built at and below Innistioge. A canal from Thomastown to Kilkenny was commenced in 1755, and executed to a distance of four miles, but after the expenditure of large sums of money the works were abandoned.

Climate.—The general slope of the surface is to the south-east, which is the best aspect both for sun and shelter. Surface waters run off rapidly, and there is very little bog; the air is consequently dry and healthy. The substratum in general is either limestone or brittle schist, both conducing to a light mellow soil and early vegetation. Myrtles grow luxuriantly in the southern parts of the county; and an arbutus at Kilmacow in 1801 measured two feet seven inches round the stem, and covered a circuit of thirty yards.

Geology.—With the exception of the mountain groups of the south, the entire surface of Kilkenny is occupied by the floetz limestone of the central plain overlaid in the hilly districts north of Kilkenny city by the shale and sandstone of the Castlecomer and Killenaule coal-tracts. The coal formations are nearly co-extensive with the hilly districts; the limestone, where it forms the surface-rock, spreads into undulating plains sweeping round the hilly tracts, and occupying the intermediate valleys. The strata composing the coal districts consist of alternations of shale with argillaceous ironstone, compact quartzy sandstone, and sand stone slate. Each tract constitutes a separate basin, the strata in that of Castlecomer dipping from the edge towards the centre, so that the undermost strata appear on the outer edge, and the uppermost in the interior of the district. The coal raised from these beds is anthracite, or non-flaming coal, called also mineral charcoal, from its containing 94 to 96 per cent. of pure carbon. It is accompanied with culm, which is used extensively for burning lime; the coal itself is used for domestic purposes and malting. The Castlecomer district contains seven workable beds of different thickness, arranged one over the other. Of these the uppermost beds, being nearly free from sulphur, are the most valuable, and are now nearly exhausted. But the three lowest beds, containing an abundant supply, have never been worked except when they occur near the surface. The beds, in ascending order, consist of, 1st, a bed little more than one foot in thickness occurring at the height of about 800 feet above the limestone substratum; it has never been worked. Second bed, divided into two parts, each about one foot thick, by a layer of fine clay. The coal is somewhat slaty, particularly that of the lower member. This bed has been partially worked near the surface, but never to any considerable extent. The third bed, which is rather thicker and more solid than the second, is worked only in a few places. Fourth bed, usually composed of four feet of solid coal, and two feet of slaty coal; occurs over a great extent of the interior of the district, and is at present worked in several places. Fifth bed, one foot in thickness; not much worked. Sixth bed, the three-foot coal, which has supplied the principal demand for upwards of a century, now nearly exhausted. The principal works are at Castlecomer, Clough, and Newtown. In 1836 the produce was 42,554 tons of coal, at from 15*s.* to 20*s.* per ton, and 53,354 tons of culm at 4*s.* to 5*s.* per ton. Workings are also carried on at Feroda and other places in the district for culm and coal, the produce of which, in 1836, was 18,500 tons of culm, at from 4*s.* to 6*s.* 8*d.* per ton. The stratum on which the three-foot bed rests has been found to answer remarkably well for fire-bricks and other articles which are exposed in use to a great degree of heat. That portion of the Killenaule, or Slieve Arda district, which extends out of Tipperary into this county, is not at present worked. The isolated tract north of Freshford produces nothing but culm. The limestone border generally follows the foot of these hills, but in some places it rises halfway up the acclivity, and in one or two instances forms considerable hills on the exterior. A deposit of limestone-gravel, including boulders of large dimensions, generally occupies the exterior hollows of these hills, which towards the south and south-east slope gradually to the central plain. The general colour of the limestone is a bluish-grey; the best for burning is of a blackish colour, and is found near Kilkenny and Thomastown. Iron, manganese, and silex are generally diffused through the limestone rock towards the borders of the coal tract, and prevent it from burning. Near Kilkenny it passes into a fine black marble, containing a great variety of impressions of madrepores and of bivalve and turbinate shells. These beds are extensively quarried, and the blocks dressed on the spot by a saw-mill driven by the Nore. The marble, which is sometimes procured of a jet-black, is manufactured into chimney-pieces, tombstones, &c.; it bears a very high polish, and can be raised in large blocks. The hall at Bessborough is supported by four Ionic columns, the shafts of which are each formed of a single block of marble from this quarry, ten feet six inches in height. Black primitive limestone also occurs at Ballyragget. The tract of limestone skirting the northern bank of the Suir is decomposed, along its northern boundary for a distance of several miles, into a friable marly rubble, which is extensively used for manure. The surface heats and slacks under rain as if it had been subjected to the action of fire, which appearance is confirmed by the fact of detached pieces of quartzy sandstone having been found among the decomposed calcareous strata in a vitrified state. Marl is found in large deposits in various other parts of the county. The mountain tract occupying the south of Kilkenny, with the exception of the primitive group of Brandon, consists of a nucleus of clay-slate surrounded by sandstone. The latter rock extends over the greater part of that portion of the Slievenaman group included in Kilkenny, and constitutes the entire tract of the Walsh mountains. The clay-slate again rises beyond the valley of the Argula, from which it extends eastward to the Ross river, and northward beyond the Nore, constituting the range of Coppinagh, and occupying the tract included between that range and the western declivities of the Brandon group. A margin of sandstone extends along the western foot of Coppinagh, so that the clay-slate is nowhere in contact with the field of limestone.

Minerals.—The chalybeate spa at Ballyspellin was much celebrated in the last century for its efficacy in the cure of cutaneous and scrofulous diseases. It is still visited by invalids, who derive considerable benefit from the waters; but its celebrity at present chiefly arises from the humorous verses of which Dean Swift and Mr. Sheridan have made it the subject. The water contains fixed air, iron, and probably fossil alkali. Essays concerning its properties, and in commendation of the air of the neighbourhood, were published in 1724 and 1725. There are chalybeates at Kilkenny city, Castlecomer, Coolcullen, and several other places in the county, but the waters have little efficacy.

Soil and Agriculture.—There is but a small portion of Kilkenny unfit for tillage. The hills of the northern district are round-backed and accessible; and the Walsh mountains are for the most part pasturable. The group of Brandon is the only considerable extent of rough land in this county. In the northern part of the Castlecomer coal-tract the soil is a moory turf lying over a stiff whitish clay, which is the poorest district out of the mountain region. From Castlecomer southward the soil is light and friable as far as Kilkenny, and becomes deep, rich, and capable of any tillage towards Gowran and thence to Thomastown. The neighbourhoods of Durrow and Johnstown are good tillage lands, and the valley of Freshford has some of the best ground in the county. The soil of the hilly tract south of Freshford is fitter for pasture, and this is also the character of the right bank of the Nore from Kilkenny to Bennet's Bridge. The district watered by the Owenree has an excellent soil, and yields great crops of wheat. The soil of the hilly country on the south is dry and kind, but it is badly enclosed and destitute of shelter. Some of the best wheat and meadow lands in the south of Ireland are situated in the level tract along the Suir.

About one-third of the level districts is in tillage. In the poor soil of the Castlecomer tract the proportion of tillage land is about five acres in the hundred, and in the Walsh Mountain district about nine. The total productive tillage of the county in 1802 was estimated at 66,361 acres, producing 156,000 barrels of wheat, 80,000 barrels of barley, and 19,500 barrels of bere, 100,000 barrels of oats, and 1,030,000 barrels of potatoes. The sales of grain in the several market-towns in 1826 and 1836 appear from the following table:—

	Barrels of Wheat of 20 stone.		Barrels of Barley of 16 stone		Barrels of Oats of 14 stone.	
	1826.	1836.	1826.	1836.	1826.	1836.
Kilkenny . .	34,000	36,350	1,146	1,909	18,000	36,800
Gowran, Goresbridge, & Graigue	20,396	27,746	10,206	10,676	19,756	7,646
Castlecomer, Ballyragget, & Durrow	3,262	6,522	1,200	26	1,060	1,250
Thomastown, Bennetsbridge, Ennisuag, & Kells	42,054	57,632	4,660	5,262	24,000	6,019
Callan . . .	7,460	11,010	1,390	2,090	3,260	5,827

There are two districts almost wholly occupied by dairy-farmers, the Walsh Mountains and the southern part of the Castlecomer tract. In the southern dairy district the sour milk is used for fattening pigs for the Waterford market: in the northern district the milk is sold, there being no convenient market for pork. More attention is paid to cleanliness by the dairy-farmers of the Walsh Mountains than by the others. Their strainers are usually of hemp, and sometimes of tin: among the northern dairies woollen strainers are generally in use. The wages of agricultural labourers are 8*d.* in winter, and, during the rest of the year, 10*d.* The average number of working days in the year is 145.

Manufactures.—The manufacture of carpets, diapers, and tapestry was introduced into the county by the Countess of Ormonde in 1359. James duke of Ormonde, about the middle of the seventeenth century, established and encouraged, at a great expense, both linen and woollen manufactures; and about the close of the same century the Bessborough family introduced the manufacture of linen into the southern parts of the county. None of these branches of trade however succeeded for any considerable length of time. The manufacture of blankets, which was carried on with great activity at Kilkenny from about 1745 to the beginning of the present century, has also declined. In 1822 there were, in the districts of Cork, Kilkenny, Moate, and Carrick-on-Suir, 3184 persons engaged in this manufacture, 9876 depending on them, 19,322 pieces annually manufactured, of the value of 199,100*l.*, with capital invested in buildings and machinery to the amount of 116,700*l.* At present all these districts do not manufacture to the extent of 20,000*l.* In 1831 the number of weavers of every fabric in Kilkenny county was 502, and of wool-combers two. A coarse frieze for home consumption is made among the peasantry.

In 1792 there were in Kilkenny 37 mills employed in the grinding of wheat and making of flour. The number is at present about the same; but the establishments are greatly increased in size and grinding power. They are chiefly on the Nore, which, between Durrow and Innistioge, drives 22 mills.

Civil Division.—Kilkenny is divided into the baronies of Fassadining, on the north-east, containing the towns of Castlecomer, population in 1831, 2436; Ballyragget, pop. 1629; and Clough, pop. 582: Galmoy, on the north-west, containing the towns of Durrow, pop. 1298; Urlingford, pop. 1366; and Johnstown, pop. 875: Gowran, on the east, containing the towns of Thomastown, pop. 2871; Graigue, pop. 2130; Gowran, pop. 1009; Innistioge, pop. 906; part of Bennet's-bridge, total pop. 426; and Goresbridge, pop. 634: Cranagh, on the west, containing the town of Freshford, pop. 2175: Shillelogher, also on the west, containing part of the town and liberties of Callan, total pop. 6111: Kells, on the south-west, containing the remainder of Callan, the town of Kilmaganny, pop. 514; and the village of Kells, pop. 402: Knocktopher, in the southern centre, containing the villages of Knocktopher, pop. 475, and Stoneyford, pop. 445: Ida, on the south-east, containing the village of Rossbercon, a suburb of New Ross, pop. 369: and Iverk, on the south, containing the town of Pilltown, pop. 634, and several villages. The county of the city of Kilkenny forms a separate division, containing 4 parishes, with a population of 23,741.

Of the above towns the following are corporate:—Callan, said to be by prescription; Gowran, by charter of 6 James I.; Innistioge, by 6 James I.; Kilkenny and Irishtown, by 3 and 7 James I. [Kilkenny, *City*]; and Thomastown, by 1 Mary and 13 James I. Prior to the Union each of the above towns and Knocktopher sent two members to the Irish parliament. The representation is at present limited to two county members and one for the county of the city. In 1836 the county constituency was 1477. The assizes are held at Kilkenny, and the general quarter-sessions at Kilkenny, Castlecomer, and Thomastown. The county court-house and gaol are at Kilkenny, and there is a bridewell at Thomastown. The number of criminal offenders committed to the county gaol in 1836 was 480, of whom 409 were males and 71 females. Of these 175 males and 5 females could read and write, 64 males and 9 females could read only, and 169 males and 57 females could neither read nor write. The police force in 1836 consisted of one resident magistrate, 10 chief constables, 51 constables, 341 sub-constables, and 22 horse of the constabulary; and 2 resident magistrates, 3 chief constables, 18 constables, 122 sub-constables, and 2 horse of the Peace Preservation police; the expense of maintaining whom during the year 1835 amounted to 21,167*l.* 11*s.* 8*d.*, of which 11,284*l.* 18*s.* 3½*d.* was chargeable to the county. The district Lunatic Asylum is at Carlow. The county infirmary and fever hospital are at Kilkenny, and there are also fever hospitals at Freshford, Kells, Kilmaganny, and Rossbercon, with dispensaries in all the towns and chief villages.

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	17,569	..	..	..	..	..	..	97,500
1813	Under Act of 1812 . . .	23,414	..	..	..	..	..	..	134,664
1821	Under Act 55 Geo. III. c. 120	25,949	27,958	..	..	..	77,630	81,086	158,716
1831	Under Act 1 Will. IV. c. 19 .	27,248	28,823	19,727	4,271	4,825	83,090	86,855	169,945

History and Antiquities.—On the partition of Leinster among the daughters of William earl of Pembroke, A.D. 1247 [KILDARE], Kilkenny was allotted to Isabella, the third daughter, who married Gilbert de Clare, earl of Gloucester and Hertford; by him she had issue, among other children, Eleanor, who married Hugh le Despenser the younger, whose grandson Thomas le Spenser sold his castle and manor of Kilkenny to James Butler, third earl of Ormonde, in 1391. The other great proprietors were the families of Grace and Walsh, who possessed the districts of Grace's Country (nearly co-extensive with the barony of Cranagh) and the Walsh Mountains respectively. The former family descend from Raymond le Gros, one of the most distinguished of the Anglo-Norman invaders, who obtained this district with his wife Basilia, sister of Earl Strongbow. The latter are descended from other companions of Strongbow called Walshes or Welshes (in Irish *Brennagh*), from their having originally come from Wales; they were seneschals of the palatinate of Leinster under the De Clares. Both families lost their estates in the war of the Revolution of 1688. The early history of the county is chiefly occupied with the feuds of the family of Ormonde against the houses of Desmond or Kildare, which led to the abolition of their respective war-cries of *Butler-aboo* and *Crom-aboo* by act of parliament in A.D. 1494. The Graces also during this period were engaged in perpetual hostilities with the Fitzpatricks, Kavanaghs, and other Irish families, the tradition of which events still survives among the peasantry of Grace's Country. On the breaking out of the rebellion of 1641 the county of Kilkenny fell into the hands of the Irish with little opposition, Lord Mountgarret, an influential member of the Butler family, taking the lead among the insurgents. Many others of that family espoused the same cause, and suffered extensively by the subsequent confiscations. The bulk of the Butler possessions was however for a time preserved to the family by James earl of Ormonde, who conducted the royalist cause throughout these wars with the highest ability. He was raised to the dignity of a duke after the Restoration, which event he had been very instrumental in bringing about, and was three times lord-lieutenant of Ireland. On the attainder of James, the third duke of Ormonde, in 1715, the title fell into abeyance. The dukedom has not been revived, but the earldom is now enjoyed by a descendant of Butler of Kilcash, brother to the first, or, as he is commonly called, the great duke of Ormonde.

The defection in this county on the accession of King William III. was very general. The forfeitures comprised 30,152 acres of profitable land, of a total estimated value, at that time, of 68,161*l.* 5*s.* 6*d.* The chief attainted persons were Lord Galmoy, Oliver Grace, Robert Walsh, Edmund Morris, and various members of the families of Fitzgerald, Archer, Rothe, Dalton, Shee, Purcell, and Lawless. The chief landed proprietors at present are the earl of Ormonde and Ossory, earl of Carrick, marquis of Lansdowne, earl of Bessborough, Lord Viscount Clifden, Lord Callan, Lord Viscount Mountmorris, Lord Viscount Ashbrooke, earl of Courtown, Sir Edward Loftus, Bart., Sir William Morris, Sir J. Cuffe, Bart., and the families of Flood, St. George, Tighe, Bryan, Murphy, Bunbury, Walsh, Aylward, and Rothe.

Circular stone enclosures of the Pagan æra remain on the summits of the hills of Cloghmanta near Freshford, and Tory Hill, or Slieve Grian, near Kilmacow. The latter appears to have been a sepulchral cairn, enclosing a kistvœn, or stone chamber, on one side of the covering stone of which there is an inscription long supposed to have reference to Baal, but which is now believed to be of a modern date. The covering stone of the cromlech at Kilmogue, in the barony of Knocktopher, is 45 feet in circumference, and is elevated at one end 15 feet from the ground. Another cromlech at Ballyheniberry, in the barony of Iverk, has a covering stone 16 feet long, 10 feet broad, and 3 feet thick. There are numerous similar monuments of smaller dimensions throughout the county. The remains of raths and earthen tumuli are also of frequent occurrence. There are five round towers, one adjoining the cathedral church of St. Canice in Kilkenny, the others at Kilree, Tullocherin, Fertagh, and Aghaviller. Of the monastic ruins, the most extensive and interesting are those of Jerpoint Abbey on the Nore, two miles from Thomastown. This abbey was founded by Donogh, king of Ossory, in 1180, for Cistercian monks, and was liberally endowed. The abbot was a lord of parliament. The ruins occupy three acres, and are a fine specimen of the mixed Anglo-Norman and early English architecture. The more modern portions of the building are in the pointed style of the thirteenth century, and are distinguished by their elegance and lightness. The tombs of the founder and of several ecclesiastics still remain. At Graigue are the extensive remains of a Cistercian abbey, founded in 1212 by William Marshal, earl of Pembroke. A portion of the building has been lately roofed in and converted into a Roman Catholic chapel. There are considerable remains of the Dominican convent at Thomastown, of the Augustinian monastery at Innistioge, and of the Augustinian friaries at Kells and Callan. Of the numerous castles founded by the Anglo-Norman lords, the most considerable is Grandison Castle in Iverk, an antient seat of the Butlers. It has three round towers towards the Suir and two courtyards. The castles of Balleen, Ballyragget, Knocktopher, Gowran, Callan, Urlingford, and several others, belong to the same family. Courtstown Castle, the chief seat of the Graces, was a building of great extent and splendour; but the ruins have now nearly disappeared. There are numerous castles in the barony of Gowran founded by the Purcells. In Knocktopher fifteen castles of the Walshes are enumerated; and throughout the county are the remains of various other fortalices belonging to the families of Brennan, Cantwell, Morris, Curry, Shortall, and Fitzgerald.

Kilkenny is situated in the dioceses of Ossory, Cashel, and Leighlin, under which titles the educational statistics of the district will be found.

The county expenses are defrayed by grand-jury presentments. The amount levied in 1835 was 29,793*l.* 14*s.* 8¼*d.* Of this a sum of 2603*l.* 11*s.* 6*d.* was for the public roads of the county at large; 5907*l.* 19*s.* 1*d.* was for the public roads, being the baronial charge; 7609*l.* 19*s.* 1*d.* was for the public establishments and salaries; 11,284*l.* 18*s.* 3¼*d.* was for police; and 2387*l.* 6*s.* 9*d.* for repayment of loans advanced by government.

(*Statistical Survey of Kilkenny*, Dublin, 1802; Brewer's *Beauties of Ireland*; Griffith's *Report on the Leinster Coal Tract*; *Transactions of the Geological Society*, vol. v. Lewis's *Topographical Dictionary of Ireland*, 1838; *Parliamentary Reports and Papers*.)

KILKENNY, a city and county of a city, included in the county of Kilkenny, in Ireland. The county of the city comprises 14,903 Irish or 24,140 statute acres on both sides of the Nore, about midway between Thomastown and Durrow. The city occupies an area of 235 Irish or 380 statute acres, of which about two-thirds are under cultivation. According to the map of the Society for the Diffusion of Useful Knowledge, it is situated in 58° 37′ N. lat and 7° 13′ W. long., and is distant from Dublin 57½ Irish or 73½ statute miles.

Kilkenny, signifying the church of Kenny or Canice, takes its name from the cathedral church of the diocese of Ossory, founded here about the end of the twelfth century. The place was selected by the early Anglo-Norman invaders for the site of a castle, which, when partly built, was destroyed by Donald O'Brien, king of Thomond, A.D. 1193. As part of the territory acquired by Strongbow by his marriage with the daughter of Dermot MacMurrogh, it devolved on William Marshal, Earl Pembroke, who founded the present castle, A.D. 1195. The castle occupies a commanding site on the west bank of the Nore, which is here about 40 feet high and faced with masonry. The cathedral is seated on a gentle eminence on the same side of the river, at the opposite or northern extremity of the city. The small river Bregah running into the Nore about midway between these points divides the city of Kilkenny Proper from the separate corporation of Irishtown or St. Canice, the former having originally been a dependency on the castle, the latter on the cathedral. A large suburb occupies the opposite side of the river, and is connected with Kilkenny Proper and Irishtown by two handsome bridges. Besides the castle, William Marshal the elder founded the hospital and abbey of St. John, in John's Street, Kilkenny, A.D 1211; and William Marshal the younger founded the Dominican or Black abbey in Irishtown, A.D. 1225. The Franciscan abbey on the bank of the river was also founded by the same family, and completed in 1347. At this time Kilkenny was a place of great importance as a frontier town of the Pale and a place of assembly for councils of the nobility and parliaments. At the parliament held here A.D. 1367, before Lionel, duke of Clarence, was passed the celebrated statute of Kilkenny, by which the Brehon law was legally abolished, although it continued practically in operation until the time of James I. In 1391 James Butler, third earl of Ormonde, purchased the castle and manor from Thomas Le Spenser, to whom the possessions of the family of Marshal had descended; and the title and estate still continue in the family of the purchaser. In 1399 the earl of Ormonde received King Richard II. here, and entertained him with great splendour for fourteen days. In 1400 Robert Talbot, a nephew of the earl, walled in the town, and various grants for murage, pavage, &c. were made to the citizens during the succeeding century. Parliaments and vice-royal courts continued to be held in Kilkenny until the breaking out of the rebellion of 1641, when it became the head-quarters of the Roman Catholic party and the seat of the supreme council appointed to manage their affairs. The council was modelled on the plan of a parliament, consisting of two houses, one composed of temporal peers and prelates, the other of members delegated from counties and borough towns. Both sat in the same chamber, but the lords had a retiring-room for occasional consultation. The meeting was at the house of a Mr. Shee, in the Coal-market, which was standing in 1802. On the 23rd March, 1650, the parliamentary army, commanded by Oliver Cromwell, appeared before the town, which was garrisoned for the Roman Catholic party by Colonel Walter Butler. An attempt was made next day to carry the place by assault, but it failed, and on the 25th a battery was opened on the castle. A breach being effected, the assault was made twice that evening, but without success, and the breach was quickly repaired. Cromwell was about to abandon the siege when the mayor and townsmen admitted his forces into Irishtown. Here the besiegers were again repulsed in endeavouring to make their way through the Franciscan abbey into Kilkenny Proper. On the 28th however Ireton came up with 1500 men, on which the garrison surrendered on honourable terms, Cromwell himself complimenting them on their gallantry. In 1652 Cromwell's first high court of justice sat here, and occupied the same chamber which had been used by the supreme council.

The chief object of antiquity is the cathedral church of St. Canice. It is a cruciform building, surmounted by a low tower: it extends from east to west 226 feet, and from north to south 123 feet, dimensions greater than those of any other church in Ireland, except St. Patrick's and Christ Church, Dublin. The chapel of St. Mary in the north transept serves as parish church. The oldest parts of the building appear to be of the architecture of the early part of the thirteenth century. The nave is divided from the side aisles by pointed arches springing from black marble columns, between which are numerous altar-monuments. The choir with the chancel is 77 feet in length. It is fitted up with varnished oak, and has a noble east window. The whole building had fallen greatly to decay in the beginning of the eighteenth century, but was repaired by Bishop Poocke in 1756, and is now in good preservation. Of the original castle there remain three massive towers worked into large additions, in the French taste of the seventeenth century, made by James, duke of Ormonde, in 1682. The building occupies three sides of a quadrangle, having a garden and fountain in front and a lofty terrace towards the Nore. The principal apartment is the picture gallery 180 feet in length, which contains numerous portraits of historical interest, and commands magnificent views of Kilkenny and the valley of the Nore. The abbey-church of St. John's has been converted into a parish church, and retains a good deal of the character of the original building, which was remarkable for its tall and slender windows pierced so close to one another that the intervals were nearly mullions, from which peculiarity it had the name of 'the lantern of Kilkenny.' Black Abbey has been partly restored and converted into a church for Roman Catholics. The architecture of the western part and of the south transept ranks among the best examples of the modified pointed style of the fourteenth century to be met with in Ireland. The body and tower of the Franciscan friary are still standing, but roofless, and the former has latterly been used as a tennis-court.

Kilkenny was first incorporated by William Marshal the elder, and Irishtown by King Edward IV. Their governing charters are of the 7th and 3rd James I. respectively. The governing body of the corporation of Kilkenny consists of a mayor, aldermen, and 36 common councilmen, by favour of whom the freemen are admitted, and latterly by birth, servitude, and marriage also. The recorder is elected by the governing body. His court has a civil jurisdiction unlimited in amount in causes arising within the precincts of the corporation. The annual revenue of the corporation arises from tithes producing 987*l.* 13*s.* 9¾*d.*, lands producing 830*l.* 17*s.* 9½*d.*, and customs producing about 200*l.* per annum. The annual expenditure is about 1350*l.* The constitution of the corporation, which was originally of a popular character, has been gradually altered, until almost all power is vested in a select body. The governing body of Irishtown consists of a portreeve and burgesses. The burgesses have nominally the election of the portreeve, but he is in reality appointed by the bishop of Ossory. The jurisdiction of the recorder's court does not exceed 40*s.* Irish. The revenue of the corporation, which is about equal to its expenditure, is only 15*l.* per annum. Prior to the Union, Kilkenny and Irishtown returned two members each to the Irish parliament. The representation is now confined to one member for Kilkenny city. In 1836 the number of voters was 808. The right of voting is regulated by 2nd William IV., c. 88. Assizes for the county of the city are held twice a year, and quarter-sessions in rotation with the towns of Castlecomer, Thomastown, and Urlingford. The county and city court-houses are built on the site of an antient castle of the Graces. The city gaol is a small building badly arranged; but that for the county, situated on the west of the town, is spacious and well constructed.

The town is well built, and has a busy and cheerful appearance, particularly that portion of it constituting Kilkenny Proper. The building material is usually stone whitened or dashed with rough-cast. The duties of police are discharged by a Peace Preservation force of one chief constable, three constables, and seventeen sub-constables, the cost of maintaining whom, in 1835, was 712*l.* 15*s.* 10*d.* Up to the year 1836 the provisions of the Lighting and Cleansing Act of 9 George IV., c. 82, had not been put in force in Kilkenny. The environs are of a very pleasing character, and the Mall, extending a mile along the back of the unfinished canal, is an elegant promenade.

The blanket manufacture, although much decayed, is still carried on to a considerable extent. There is a small manufacture of coarse woollen cloth and linens; but the chief trade is in grinding, malting, brewing, and distilling. Tanning and the provision trade are also carried on extensively, and there are great fairs twice a year for wool and black cattle. In 1689 the number of houses in Kilkenny city was 507; in Kilkenny city, including Irishtown, the number of houses in 1777 was 2274; in 1788 the number was 2689, and 2870 in 1802. The following table is for the county of the city —

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort . . .	(in 1788) 2689	..	..	..	..	..	..	16,000
1821	Under Act 55 Geo. III. c. 20 . .	3840	..	..	..	..	10,833	12,397	23,230
1831	Under Act 1 William IV. c. 19 . .	3759	4785	1501	1918	1366	10,887	12,854	23,741

The grammar-school or college of Kilkenny is an antient foundation of Pierce Butler, earl of Ormonde and Ossory, and his wife, the Lady Margaret Fitzgerald, in the sixteenth century; and further endowed by the duke of Ormonde in 1684. By the charter granted on the latter occasion the children of the retainers of the duke of Ormonde may be presented for instruction in Latin, Greek, Hebrew, poetry, and oratory, gratis, and the children of townsmen of Kilkenny at half-price; all others to be received according to the rates of the chief schools of Dublin. On the attainder of James, third duke of Ormonde, the privilege of presentation lapsed to the provost and fellows of Trinity College, Dublin. At present the head-master receives an annuity of 140*l.* per annum from the Ormonde family. The number of scholars is about 45. A poor-school for about 150 children of both sexes is supported in St. Mary's parish by a bequest of 100*l.* per annum left by Mr. Evans, and by other contributions amounting to about 60*l.* annually. In the same parish is a poor-school, kept by nuns, for 400 females. A Mechanics' Friend Society, established in 1835, has a library of 700 volumes and a public lecture-room. A subscription library, containing 4000 volumes, with a news-room attached, has been open since 1811. The deposits in the Savings' Bank, established in 1815, amounted in 1835 to 23,784*l.*

(*Statistical Survey of Kilkenny;* Ledwich's *Essay on the Antiquities of Kilkenny;* Brewer's *Beauties of Ireland; Parliamentary Reports and Papers.*)

KILLALLA, a bishop's see in the archdiocese of Tuam, in Ireland. It comprises a large part of the county of Mayo, and a portion of the county of Sligo, extending from east to west 57 statute miles, and from north to south 27 miles. The chapter consists of a dean, precentor, and archdeacon, with five prebendaries. In 1792 there were in the diocese 25 parishes, constituting 11 benefices, having 12 churches of the Establishment. In 1834 the numbers were—parishes 27, benefices 13, churches of the Establishment 13, other places of Protestant worship 2, Roman Catholic places of worship 30. In the latter year the gross population of the diocese was 144,289, of whom there were 7729 members of the Established Church, 38 Presbyterians, 139 other Protestant Dissenters, and 136,383 Roman Catholics, being in the proportion of 18¼ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 129 daily schools, educating 7413 young persons of both sexes, being in the proportion of 5·13 per cent. of the entire population under daily instruction, in which respect Killalla ranks twenty-seventh among the 32 dioceses of Ireland. Of the above schools, in 1834, there were four in connection with the National Board of Education.

St. Muredach, the son of Eochard, was consecrated first bishop of the see by St. Patrick, about A.D. 440. It has been held in commendam with that of Achonry since the accession of Meyler Magrath to the bishopric, A.D. 1607. The last bishop of the united diocese was Doctor James Verschoyle, on whose death in 1833 these sees became annexed to the archiepiscopal see of Tuam, according to the provisions of the 3 & 4 William IV., c. 37. The see lands, now vested in the Ecclesiastical Commissioners, comprise 33,668½ statute acres; the gross annual revenue, on an average of three years ending December, 1833, was 2600*l.* 11*s.* 10½*d.*

Killalla is situated at the mouth of the river Moy, and has a population of 1125. It is a place of some trade in the export of grain and the manufacture of coarse linen, but from its vicinity to the more thriving town of Ballina [MAYO], it has latterly declined. The cathedral, which was repaired in 1817, is an old building, and is used also as the parish church.

The diocese of Achonry extends from north-east to south-west 35 statute miles, and is 27 statute miles broad. It comprises a large portion of the county of Sligo, and a part of the county of Mayo, and bounds the diocese of Killalla on the south and east. The chapter consists of a dean, precentor, and archdeacon, with three prebendaries. In 1792 there were in the diocese 27 parishes, constituting nine benefices, having eight churches of the Establishment. In 1834 the numbers were—parishes 25, benefices 13, churches of the Establishment 11, Roman Catholic places of worship 35. In the latter year the gross population of the diocese was 114,422, of whom there were 5417 members of the Established Church, 143 Presbyterians, 27 other Protestant Dissenters, and 108,835 Roman Catholics, being in the proportion of 19½ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 107 daily schools, educating 8498 young persons of both sexes, being in the proportion of 7·43 per cent. of the entire population under daily instruction, in which respect Achonry ranks seventeenth among the 32 dioceses of Ireland. Of the above schools, in 1834, 14 were in connection with the National Board of Education.

Achonry is a mean hamlet, in the barony of Leney, in the county of Sligo. The cathedral is used as the parish church. The see lands comprise 11,784 acres, from which the annual average income is 1481*l.* 6*s.* 9½*d.*

(Ware's *Bishops;* Beaufort's *Memoir of a Map of Ireland; Parliamentary Returns.*)

KILLALOE, a bishop's see in the archiepiscopal province of Cashel, in Ireland. The diocese extends upwards of 80 Irish or 100 statute miles, through the counties of Clare and Tipperary into the King's County; and includes also a small part of Queen's County, Galway, and Limerick. It varies in breadth from 7 to 25 miles Irish. The chapter consists of a dean, precentor, chancellor, treasurer, and archdeacon, and five prebendaries. In 1792 there were in the diocese 119 parishes, constituting 42 benefices, having 35 churches of the Establishment. In 1834 the numbers were—parishes 108, benefices 60, churches of the Establishment 56, other places of Protestant worship 5, places of Roman Catholic worship 111. In the latter year the gross population of the diocese was 379,076, of whom there were 19,149 members of the Established Church, 16 Presbyterians, 326 other Protestant Dissenters, and 359,585 Roman Catholics, being in the proportion of 18¾ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 349 daily schools, educating 23,452 young persons of both sexes, being in the proportion of 6·19 per cent. of the entire population under daily instruction, in which respect Killaloe ranks twenty-fourth among the 32 dioceses of Ireland. Of the above schools, in 1834, 13 were in connection with the National Board of Education.

Killaloe, a small town on the Shannon, near the southern extremity of Loch Derg, takes its name from St. Lua, called Mo-Lua, who founded a cell there about the beginning of the seventh century. St. Flannan, his disciple, was consecrated first bishop of this see, at Rome, about A.D. 639. About A.D. 1195 the antient sees of Innis-Cathy and Roscrea were annexed to Killaloe, and in 1752 Killfenora was added. The united diocese of Clonfert and Kilmacduagh, having become vacant, is now, by the 3 & 4 William IV., c. 37, also annexed to Killaloe. The see lands of the diocese comprise 7528 acres, of an average annual value in 1831 of 4532*l.* 9*s.* 1*d.* The cathedral, which was erected by Donald O'Brian, king of Limerick, in 1160, is a cruciform building with a square tower. The episcopal palace is a handsome residence in a well planted demesne overlooking the Shannon, which here runs rapidly over a rocky channel. The stone-roofed cell of St. Molua stands near the cathedral. It is remarkable as a specimen of the building of the seventh century.

(Ware's *Bishops*; Beaufort's *Memoir*; *Parliamentary Returns*.)

KILLARNEY, a market and post-town in the barony of Magonihy and county of Kerry, in Ireland; distant from Dublin 147 Irish or 187 statute miles.

The establishment of Iron works by Sir William Petty on the eastern shore of the Lower Lake of Killarney led to the erection of the town, which is distant from the lake about a mile and a half. It continued a small place till about the middle of the last century, when the proprietor, Lord Kenmare, invited several respectable families to settle there, and erected some houses for the linen manufacture in the vicinity. Soon after a new street, now the High Street of the town, was built, and a commodious hotel erected for the accommodation of the numerous visitors who about this time began to be attracted by the beauty of the neighbouring scenery. The working of the copper-mines at Ross and Muckruss contributed to the increasing prosperity of the town; and it has now become a place of permanent residence for many inhabitants of the better class, as well as a favourite resort for great numbers of tourists each summer and autumn. It consists of two principal streets at right angles, with several smaller streets leading from them. At the southern end of the main street is the best part of the town, called Kenmare Place, near which is the entrance to Lord Kenmare's demesne, a finely timbered park, which greatly ornaments the approach to Killarney on this side. In the main street are two excellent hotels. Besides the church, which is a respectable old building, there is a large Roman Catholic chapel, a nunnery, and two subscription reading-rooms. The general appearance of the town is neat, and, during the summer and autumn, very animated.

Quarter-sessions are held here four times in the year, besides weekly petty-sessions. The court-house is a handsome stone edifice, having a bridewell attached. The old court-house has been converted into a theatre. Balls are occasionally given in the upper part of the market-house, which is an old building, now chiefly appropriated to the sale of linens. There are a fever-hospital, dispensary, and almshouse for the aged women, the last supported by the countess of Kenmare. There is a free-school for 400 males, under the superintendence of the Roman Catholic clergymen, and another for 300 females, attached to the nunnery, both of which are liberally patronized by the Kenmare family. There is also a free-school for 44 males and 34 females, under the superintendence of the clergymen of the Established Church, and a national school.

The number of inhabited houses in Killarney, in 1831, was 936; and of inhabitants 7910, of whom 6715 were in the parish of Killarney, and 1195 in the parish of Aghadoe.

(Smith's *Antient and Present State of the County of Kerry*; Frazer's *Guide-book for Ireland*, Dublin, 1838; *Parliamentary Reports and Papers*.)

KILLARNEY LAKES. [Kerry.]

KILLAS, the local name of a group of rocks in Cornwall, ranked by geologists with the clay-slate, or grauwacke slate of other countries. The term is perhaps most properly applied to denote fissile argillaceous rocks, such as are usually called clay-slate; but it is often extended to other earthy compounds allied to these by geological position. (See Rev. J. Conybeare, *Ann. Phil.*, new series, vol. vi.) Near granite the killas is supposed by many geologists to undergo great alterations of character, to become 'metamorphic,' so as to assume more or less of the characters of pyrogenous rocks. In these 'altered' rocks lies a great part of the mineral wealth of Cornwall; tin and copper veins abound in them, as well as in the contiguous granite, to whose influence their mineral characters are ascribed. Dr. Borlase, in his work 'On the Geology of Cornwall,' assigns to these rocks the title of Cornubianite.

KILLENITE, a mineral which occurs both crystallised and massive. The crystals are imperfect: the primary form appears to be a rhombic prism. Cleavage parallel to the lateral faces and short diagonal; fracture uneven; structure lamellar; colour greenish and brownish yellow; streak yellowish-white; lustre glimmering, dull, vitreous; translucent; opaque; specific gravity 2·698; hardness 4·0; scratched by the knife; frangible.

By the blow-pipe becomes white, swells up, and fuses into a colourless enamel.

It occurs in granite veins at Killeny near Dublin, and is stated by Dr. Thomson to consist of

Silica . . .	49·08
Alumina . . .	30·60
Potash . . .	6·72
Oxide of iron . .	2·27
Water . . .	10·
	98·67

KILLFENORA, a bishop's see in the archiepiscopal province of Cashel, in Ireland. It is confined to the baronies of Burrin and Corcomroe, in the county of Clare, and extends only 23 statute miles by 11. The chapter is the same with that of Killaloe, excepting the prebendaries. In 1792 it contained 19 parishes, constituting eight benefices, having three churches of the Establishment. In 1834 the numbers were—parishes 19, benefices 6, churches of the Establishment 3, other places of Protestant worship 1, Roman Catholic places of worship 15. In the latter year the gross population of the diocese was 36,405, of whom there were 235 members of the Established Church, 4 Presbyterians, and 36,166 Roman Catholics, being in the proportion of 151¼ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 28 day-schools, educating 2256 young persons of both sexes, being in the proportion of 6·14 per cent. of the entire population under daily instruction, in which respect Killfenora ranks twenty-fifth among the 32 dioceses of Ireland. Of the above schools, in 1834, there were not any in connection with the National Board of Education.

There are no authentic accounts of this see, which was antiently called Fenabore and Cellumabrach, till A.D. 1265, when one Christian was bishop. Killfenora was first united to Clonfert A.D. 1741, and subsequently to Killaloe A.D. 1752, which union still subsists. The see lands comprise 9237 acres. The income is included in that of Killaloe. The cathedral serves as a parish church; it is a respectable building, with a massive square tower.

(Ware's *Bishops*; Beaufort's *Memoir*; *Parliamentary Returns*.)

KILLINEY, a village near Dublin, where the junction of the granite and schist of the Wicklow mountains may be advantageously observed. The granite is hard, and contains plumose mica. The edges of the schistose strata repose on a basis of granite. 'The schist is much contorted, and sometimes so convoluted as to form concentric crusts. At the line of junction the schist abounds in crystals of andalusite grouped in a stelliform manner. Numerous veins issue from the granite, and intersect the micaceous schist. These veins frequently contain fragments of micaceous schist.' (Dr. Scouler, *Memoranda of Objects of Geological Interest in the Vicinity of Dublin*, 1835.)

KILMACDUAGH, a bishop's see in the archiepiscopal province of Tuam, in Ireland. It lies wholly within the county of Galway, extending along the south-western boundary of that county 23 statute miles by 15. The chapter consists of a dean, provost, chancellor, archdeacon, and two prebendaries. In 1792 it was divided into 60 parishes, constituting 15 benefices, having 14 churches of the Establishment. In 1834 the numbers were—parishes 21, benefices 4, churches of the Establishment 4, other places of Protestant worship 1, places of Roman Catholic worship 14. In the latter year the gross population of the diocese was 46,132, of whom 656 were members of the Established Church, and 45,476 were Roman Catholics, being in the proportion of 69¼ Roman Catholics to one Protestant nearly. In the same year there were in the diocese 53 schools, educating 3551 young persons of both sexes, being in the proportion of 7·70 per cent. of the entire population under daily instruction, in which respect Kilmacduagh stands sixteenth among the 32 dioceses of Ireland. Of the above schools, in 1834, there were not any in connection with the National Board of Education.

The see was founded by Colman, the son of Duach, a relative of Guair, king of Connaught, who endowed the bishopric with large possessions about the end of the sixth century. Stephen Kerovan, bishop of Kilmacduagh, was translated to Clonfert A.D. 1582, since which time these sees have been united. By the 3 & 4 William IV., c. 37, the united dioceses are now annexed to the see of Killaloe and Killfenora, and their temporalities vested in the Ecclesiastical Commissioners. The see lands consist of 3950½ statute acres, producing an average annual income of 875*l.* The cathedral, a modern edifice, is situated in the town of Gort. There are some remains of the abbey founded by St. Colman at Kilmacduagh, and a round tower which leans remarkably from the perpendicular.

(Ware's *Bishops;* Beaufort's *Memoir; Parliamentary Returns.*)

KILMARNOCK, a market-town and parish in the district of Cunningham and shire of Ayr, 65 miles south-west by west from Edinburgh. It is surrounded by a fertile and populous district, and is well supplied with coal from the neighbouring mines. Its situation however is low, and up to the beginning of the present century it was considered the most irregularly-built town in this part of Scotland. During this century acts of parliament have been passed for cleansing, lighting, and paving the streets, and at present it contains some handsome modern houses, a bank, bridewell, workhouse, and commodious grammar-school. Kilmarnock is the principal manufacturing town of Ayrshire for woollen and cotton goods, and is more particularly noted for the weaving of shawls and carpets, of which it exports so large a quantity, that the annual value of these two branches of manufacture is alone estimated at 100,000*l.*

Kilmarnock was erected into a free burgh of barony by the charter of James VI. in 1591, and anew by the charter of Charles II. in 1672. The property of the burgh is valued at 7892*l.*, its revenue at 380*l.*, its expenditure at 256*l.*, and its debt at 3675*l.* The population of the burgh and parish in 1831 was 18,093, having been increased by 5324 persons in the ten preceding years, in consequence of the general improvement which had taken place in the trade and manufacture of the town within that period. In union with Port Glasgow, Kilmarnock now returns one member to parliament. (*Local Reports of Commissioners on Scotch Corporations; Beauties of Scotland,* &c.)

KILMORE, a bishop's see in the archiepiscopal province of Armagh, in Ireland. It comprises portions of the counties of Fermanagh, Leitrim, and Cavan, and a small part of the county of Meath, and extends 74 statute miles in length by from 13 to 25 in breadth. It has a dean and archdeacon, but no chapter. In 1792 it was divided into 39 parishes, constituting 30 benefices, having 36 churches. In 1834 the numbers were—parishes 37, benefices 38, churches of the Establishment 45, other places of Protestant worship 5, places of Roman Catholic worship 76. In the latter year the gross population of this diocese was 296,305, of whom there were 46,879 members of the Established Church, 8736 Presbyterians, 97 other Protestant Dissenters, and 240,593 Roman Catholics, being in the proportion of 4⅓ Roman Catholics to one Protestant nearly. In the same year there were in this diocese 446 schools educating 30,623 young persons of both sexes, being in the proportion of 10·33 per cent. of the entire population under daily instruction, in which respect Kilmore ranks second among the 32 dioceses of Ireland. Of the above schools 23 were, in 1834, in connection with the National Board of Education.

Prior to A.D. 1454 the bishops of this district took their title from Triburna, an obscure village of the territory of Brefre. In that year Andrew MacBrady, bishop of Triburna, by the consent of Pope Nicholas V., erected the parish church of St. Feliney of Kilmore into a cathedral; from which time he and his successors have had the present title. John Garvey, who was promoted to this see in 1585, was the first Protestant bishop. After his death in 1589, the see lay vacant until 1603. From 1629 to 1641 it was filled by William Bedell, a prelate of great piety and learning. [BEDELL.] By the 3rd and 4th William IV., c. 37, this diocese becomes united with that of Elphin on either falling vacant. On this union, the temporalities of Elphin vest in the Ecclesiastical Commissioners. On the archiepiscopal see of Tuam becoming void, the bishopric of Ardagh, hitherto united to it, will also be annexed to Kilmore. The see lands comprise 28,531 acres, producing an average annual income of 7477*l.* 17*s.* 0½*d.* The antient parish church of Kilmore serves as the cathedral. The bishop's palace is a large mansion situated in a fine demesne near the town of Cavan.

(Ware's *Bishops;* Beaufort's *Memoir; Parliamentary Returns.*)

KIMBOLTON [HUNTINGDONSHIRE.]

KIMCHI, DAVID, a very celebrated Jewish rabbi, was born in the twelfth century, in the south of France, and passed the greater part of his life at Narbonne. His father, Joseph Kimchi, and his brother Moses Kimchi, also enjoyed much reputation among their contemporaries: they both wrote several works on Hebrew grammar and commentaries on the Scriptures; but none of them have been printed with the exception of 'A Commentary on the Life of Ezra,' by Moses Kimchi, printed in the Rabbinical Bible of Venice, 1549; and also a Hebrew Grammar by the same author, Venice, 1624.

David Kimchi has always been regarded by the Jews as one of their most illustrious rabbis. He possessed such great influence among his contemporaries, that he was chosen, in 1232, arbiter of the controversy which had subsisted for some years between the Spanish and French rabbis respecting the opinions of Maimonides. He died about the year 1240.

The most important of his works are:—a Hebrew Grammar, entitled מכלול (*Michlol*), that is, 'Perfection,' Venice, 1545; Leyden, 1631; and frequently reprinted; 'A Dictionary of Hebrew Roots,' Naples, 1490; Venice, 1529, 1552; &c. Kimchi also wrote commentaries on almost all the books of the Old Testament: the most valuable are said to be those upon Isaiah. Many of these commentaries have been printed separately; the whole of them were published by Breithaupt, Gotha, 1713, 3 vols. 4to.

KINCARDINESHIRE, or the **MEARNS**, as it is commonly called, is a maritime county of Scotland, situated between 56° 47′ and 57° 8′ N. lat., and between 2° 5′ and 2° 45′ W. long. On the north and north-west it is bounded by Aberdeenshire; on the south and south-west by Forfarshire, and on the east by the ocean. Its greatest length from the bay of Aberdeen on the north to the mouth of the Esk on the south is about 30 miles; and its greatest breadth from Dunnotar Castle on the east to Mount Battock on the west is rather less than 20 miles. It contains 382 square miles, or 244,480 acres, of which 1280 are water: half the county is supposed to consist of cultivated land, woodland, improvable moor, &c., and half of mountains, hills, &c.

The Grampian range, whose extremity forms the promontory of Girdleness in this county, occupies the western, central, and more northern parts of Kincardineshire. Mount Caerloch, the highest summit in this county, rises 1890 feet above the sea level. To the south of the Grampians the county descends into what is locally termed the 'How or Hollow of the Mearns,' which is the eastern extremity of Strathmore. Strathmore commences at Stonehaven in this county and extends in a south-westerly direction as far as the Frith of Clyde. It contains about 50,000 acres of comparatively low, fertile, and generally well-cultivated land, comprising about 7000 acres of thriving plantations. Along the coast, from the North Esk river to Stonehaven, the soil consists chiefly of a deep strong loam on a clay bottom, and about 32,000 acres of this district are in a high state of cultivation, the remainder being occupied with pasture, moor, and woodland. A third arable district is comprised within the narrow valley of the Dee. In 1807 the stock of cattle was estimated at 24,825 head; of which 6236 were milch cows, and 5280 calves; and the sheep stock at 24,957, exclusive of lambs. The average rent of land in 1810 was 13*s.* 2*d.* an acre, and the annual value of real property as assessed in 1815 was 94,861*l.*; but since then many improvements have been introduced, and prosecuted with extraordinary spirit, and the value of the land proportionally augmented; thus in the parish of Bervie, the rent of the *Haugh* lands adjoining the sea is about 5*l.* per acre. The average rate of wages in the parish of Garvock for married servants employed in agriculture by the half-year is, for a man 5*l.* 10*s.*, and for a boy 1*l.* 15*s.*, both summer and winter. The practice of cutting down the crops at a fixed price per acre, usually 10*s.*, is becoming very prevalent. The ordinary duration of leases is 19 years. The tenant is bound to good husbandry, though generally allowed to consult his own interest, except where very unfair dealing appears. Farm buildings are but indifferent, and there is a general want of enclosures throughout the county. The people are for the most part cleanly in their persons, orderly in their conduct, and regular in their religious duties.

The mineralogy of this county is not of great importance. In the parish of Laurencekirk and many other places there are lime-quarries, and as the stone is of excellent quality, a more abundant supply of fuel is all that is wanted to render them of great value.

The principal rivers are the Dee on the north, and the North Esk [FORFAR] on the south. The other streams, the Dye, Cowie, Carron, Bervie, and Luther, are small, but several of them contain valuable salmon fisheries. The cod and ling fishery along the coast commences in October and closes in July; and the haddock, skate, and turbot fishery, which is carried on with great activity, usually begins on the first of May, and closes about the middle of July. The herring-fishery has declined, in consequence, it is said, of the fish having forsaken that part of the coast. The weaving of dowlas, household linen, &c. is the chief manufacture of the county, and employs about 700 men. The county is divided into 21 parishes, the aggregate population of which in 1831 was 31,431, forming 7136 families, whereof 2976 were employed in agriculture, 2281 in trade, handicraft, &c., and 1879 not comprised in the preceding classes. In all the parishes there are, beside the parochial-school, several unendowed private schools, wherein writing, arithmetic, and English grammar are taught. The county returns one member to Parliament. The principal towns are Stonehaven, the county town, Bervie [BERVIE], Johnshaven, and Laurencekirk. Of these towns, Bervie unites with Montrose, Aberdeen, Brechin, and Aberbrothwick in returning one member to parliament.

The old town of Stonehaven is reputed a burgh of barony, but the charter of erection is not known to exist, neither has its date been ascertained. It is conveniently situated near the mouth of the Carron river, and possesses an excellent harbour, sheltered on the south-east by a high rock, which runs out into the sea, and on the north-east by a quay, well adapted for the loading and unloading of goods. To the north of the old town, but adjoining to it, is the new town of Stonehaven, which in point of wealth and population is of much greater importance than the other. It has risen suddenly, and is rapidly increasing, but it is neither lighted nor watched, and very imperfectly cleaned, from want of power to remove the dunghills kept at the doors of the inhabitants. The old town has long been supplied with water from private wells, and a company has been formed within the last few years for the supply of the new town. According to the local reports of Commissioners in 1836, the wealthier part of the inhabitants were then very anxious to adopt the new Police Act, but the majority of the town were opposed to all assessment. The population, which in 1835 was estimated at 3050, is rapidly increasing. This is attributed partly to the cultivation of waste lands and partly to the increase of manufactures.

(*New Statistical Account of Scotland; Beauties of Scotland; Parliamentary Papers*, &c.)

KING. The primary use of this word is to denote a person in whom is vested the higher executive functions in an independent state, together with a share, more or less limited, of the sovereign power. The state may consist of a vast assemblage of persons, like the French or the Spanish nation, or the British people, in which several nations are included; or it may be small, like the Danes, or like one of the states while in England there were seven states independent of each other; yet if the chief executive functions are vested in some one person who has also a share in the sovereign power, the idea represented by the word *king* seems to be complete. It is even used for those chiefs of savage tribes who are a *state* only in a certain loose and colloquial sense of the term.

It signifies nothing whether the power of such a person is limited only by his own conscience and will, or whether his power be limited by certain immemorial usages and written laws, or in any other way; still such a person is a king.

Nor does it signify whether he succeed to the *throne*, the seat on which he sits when in the exercise of his royal authority, by descent and inheritance on the death of his predecessor, just as the eldest son of a peer succeeds to his father's rank and title on the death of the parent, or is elected to fill the office by some council or body of persons selected out of the nation he is to govern, or by the suffrages of the whole nation. Thus there was a king of Poland, who was an elected king; a king of England, who succeeded by hereditary right.

Still in countries where the kingly office is hereditary, some form has always been gone through on the accession of a new king, in which there was a recognition on the part of the people of his right, a claim from them that he should pledge himself to the performance of certain duties, and generally a religious ceremony performed, in which anointing him with oil and placing a crown upon his head were conspicuous acts. By this last act is symbolised his supremacy; and by the anointing a certain sacredness is thrown around his person. These kinds of ceremonies, we believe, are found in all countries in which the sovereign, or the person sharing in the sovereign power, is known as king; and these ceremonies seem to make a distinction between the succession of an hereditary king to his throne and the succession of an hereditary peer to his rank.

The distinction between a king and an emperor is not very clearly defined. *Emperor* comes from *imperator*, a title used by the sovereigns of the Roman empire. When that empire became divided, each sovereign, that of the West and that of the East, called himself an emperor. These emperors claimed a kind of supremacy over other sovereigns. The emperor of Germany was regarded as a kind of successor to the emperors of the West, and the emperor of Russia (who was and is often called the Czar), is, with less pretension to the honour, sometimes spoken of as successor to the emperor of the East. But we speak of the emperor of China, where emperor is clearly nothing more than king, and we use emperor rather than king only out of regard to the vast extent of his dominions. Napoleon called himself an emperor; and we sometimes speak of the British empire. [EMPEROR.]

The word *king* is of pure Teutonic origin, and is found slightly varied in its literal elements in most of the languages which are sprung from the Teutonic The French, the Italian, the Spanish, and the Portuguese, on the other hand, have chosen to continue the use of the Latin word *rex*, only slightly varying the orthography according to the analogies of each particular language. *King*, traced to its origin, seems to denote one to whom superior knowledge had given superior power, allied, as it seems to be, to *know*, *con*, *can*; but on the etymology, or what is the same thing, the remote origin of the word, different opinions have been held, and the question may still be considered undetermined.

There are two or three other words employed to designate the sovereigns of particular states, in using which we adopt the word which the people of those states use, instead of the word *king*. Thus there is the *Shah* of Persia, the *Dey* of Algiers, and the grand *Sultan*. In the United States of America very limited powers are given to one person, who is elected to enjoy them for a short period with the title of *President*. A *Regent* is a temporary king.

A personage in whom such extraordinary powers have been vested must of necessity have had very much to do with the progress and welfare of particular nations, and with the progress of human society at large. When held by a person of a tyrannical turn of mind, they might be made use of to repress all that was great and generous in the masses who were governed, and to introduce among them all the evils and miseries of slavery. Possessed by a person of an ambitious spirit, they might introduce unnecessary quarrelling among nations to open the way for conquest, so that whole nations might suffer for the gratification of the personal ambition of one. The lover of peace and truth, and human improvement and security, may have found in the possession of kingly power the means of benefiting a people to an extent that might satisfy the most benevolent heart. But it must now by the long experience of mankind have become sufficiently apparent that for the king himself and for his people it is best that there should be strong checks in the frame of society on the mere personal and private disposition of kings, in the forms of courts of justice, councils, parliaments, and other bodies or single persons whose concurrence must be obtained before anything is undertaken in which the interests of the community are extensively involved. In most countries, as in England, there are controlling powers such as these, and even in countries in which the executive and legislative power are nominally in some one person absolutely, the acts of that person are virtually controlled, if by nothing else, by the opinion of the people, a power constantly increasing as the facilities of communication and the knowledge of a people advance.

Nothing can be more various than the constitutional checks in different states on the kingly power, or, as it is more usually called in England, the royal *prerogative*. Such a subject must be passed over in an article of confined limits such as this must be, else in speaking of the kingly dignity it might have been proper to exhibit how diversely power is distributed in different states, each having at its head a king. But the subject must not be dismissed without a few observations on the kingly office (now by hereditary descent discharged by a queen) [Queen], as it exists among ourselves.

The dawn of the English kingly power is to be perceived in the establishment of Egbert, at the close of the eighth century, as king of the English. His family is illustrated by the talents and virtues of Alfred, and the peacefulness and piety of Edward. On his death there ensued a struggle for the succession between the representative of the Danish kings, who for awhile had usurped upon the posterity of Egbert, and William then duke of Normandy. It ended with the success of William.

This is generally regarded as a kind of new beginning of the race of English kings, for William was but remotely allied to any of the Saxon kings. In his descendants the kingly office has ever since continued; but though the English throne is hereditary, it is not hereditary in a sense perfectly absolute, nor does it seem to have been ever so considered. For when Henry I. was dead, leaving only a daughter, named Maud, she did not succeed to the throne; and when Stephen died, his son did not succeed, but the crown passed to the son of Maud. Again, on the death of Richard I. a younger brother succeeded, to the exclusion of the son and daughter of an elder brother deceased. Then ensued a long series of regular and undisputed successions; but when Richard II. was deposed, the crown passed to his cousin Henry of Lancaster, son of John of Gaunt, son of Edward III., though there were descendants living of Lionel, duke of Clarence, who was older than John among the children of Edward III. When the rule of Henry VI. became weak, the issue of Lionel advanced their claim. The struggle was long and bloody. It ended in a kind of compromise, the chief of the Lancastrian party taking to wife the heiress of the Yorkists. From that marriage have sprung all the later sovereigns, and the principle of hereditary succession remained undisturbed till the reign of King William III., who was called to the throne on the abdication of James II., when an act was passed excluding the male issue of James, the issue of his sister the duchess of Orleans, and the issue of his aunt the queen of Bohemia, with the exception of her youngest daughter the Princess Sophia and her issue, who were Protestants. On the death of Queen Anne this law of the succession took effect in favour of King George I., son of the Princess Sophia.

Now the heir succeeds to the throne immediately on the decease of his predecessor, so that the king, as the phrase is, never dies. But it is supposed that antiently there was a short intermission, and that the whole of the royal power was not possessed till there had been some kind of recognition on the part of the people.

At the coronation of the king he makes oath to three things:—that he will govern according to law; that he will cause justice to be administered; and that he will maintain the Protestant church.

His person is sacred. He cannot by any process of law be called to account for any of his acts. His concurrence is necessary to every legislative enactment. He sends embassies, makes treaties, and even enters into wars without any previous consultation with parliament. He nominates the judges and the other high officers of state, the officers of the army and navy, the governors of colonies and dependencies, the bishops, deans, and some other dignitaries of the church. He calls parliament together, and can at his pleasure prorogue or dissolve it. He is the fountain of honour: all hereditary titles are derived from his grant. He can also grant privileges of an inferior kind, such as rights of exclusive trading, and of markets and fairs.

This is but a very slight sketch of the power inherent in the kings of England; but the exercise of any or all of these powers is limited by two circumstances: first, the king cannot act politically without an agent, and this agent is not protected by that irresponsibility which belongs to the king himself, but may be brought to account for his acts if he transgress the law; and, secondly, the constant necessity which arises of applying to parliament for supplies of money gives to that body virtually such a control over the exercise of the royal prerogative, as amounts to a necessity of obtaining its concurrence in any public measure of importance. [Parliament.]

KING, WILLIAM, born 1650, died 1729, a native of Ireland, and a bishop and afterwards an archbishop in the Irish church. He is the author of two works on subjects of deep importance. One of these, 'The Inventions of Men in the Worship of God,' was intended to reconcile the Presbyterians of Ireland to the episcopal form of church order. But his greater work is his treatise on that difficult subject the Origin of Evil, which is written in Latin. His great object is to show that the existence of evil may be accounted for consistently with still acknowledging that God is great and good. These works excited much attention when they appeared, and the latter was attacked by two eminent foreigners, Bayle and Leibnitz, to whom he made no reply. But he left among his papers notes of answers to their arguments, and these were given to the world after his death by Dr. Edmund Law, bishop of Carlisle, together with a translation of the treatise itself. He printed also a sermon on the consistency of Divine Predestination and Fore-knowledge with the Freedom of Man's Will.

In politics he was a true friend to the Revolution. He was made dean of St. Patrick's, the first considerable piece of preferment which he enjoyed, in 1688. In 1691 he was made bishop of Derry, and in 1702 archbishop of Dublin. He was through life held in high esteem as a man, as well as in his character of a prelate and writer on theology.

KING GEORGE'S SOUND is situated on the south coast of Australia, not far from the south-western extremity of that continent, in 35° 6′ 20″ S. lat. and 118° 1′ E. long. It consists of an outer sound and two inner basins or harbours, which are perfectly land-locked and afford every security for ships. The northern basin, called Oyster Harbour, though spacious, is full of shoals, and has scarcely water enough to allow an approach to the beach: there is also a bar of sand fronting the entrance, which has never more than thirteen feet and a half of water. The other basin, called Princess Royal Harbour, is situated on the west side of the Sound; vessels of a considerable size may enter it, and ride at anchor close to the shore in perfect security. As there is no harbour within a great distance of it, either on the southern or western coast of Australia, which offers such advantages as King George's Sound, colonists were sent there from Sidney as early as 1826, and this settlement has been of great advantage to the colony of the Swan River, which was settled at a later date. It is very conveniently situated for the purposes of refreshment and refitting vessels bound to Cook's Land (New South Wales) and Tasmania (Van Diemen's Land), and is frequently resorted to by sealing vessels. The neighbouring coast to the eastward is fringed with numerous rocks and islands, upon which many seals of the black furred species are found. The country about it is partly hilly and partly level, and covered with swamps; it is of moderate fertility, but enjoys a fine climate and a sufficiency of rain for all the purposes of vegetation. The natives resemble those in the neighbourhood of Sidney, and are friendly disposed to the settlers. (Flinders; Nind, in *Journal of London Geogr. Society*, vol. i.)

KINGFISHERS, *Halcyonidæ*, a family of the *Fissirostral* tribe, of the order *Insessores*, or Perching Birds, according to the system of Mr. Vigors. [Insessores.]

In Willughby's 'Ornithology,' edited by John Ray, the 'Kingfisher—*Ispida an veterum Alcyon?*' is placed at the head of 'Land-Birds that feed upon Fish.'

Ray, in his 'Synopsis,' gives the bird the same title and position; but the heading varies a little from that of Willughby; for Ray makes the Kingfisher the first of his *Aves terrestres, aquas frequentantes, rostris longis, piscivoræ.*

Brisson arranged the Kingfishers (*Martin-pêcheurs*) in company with the Todies, as the two genera forming the third section of his fourteenth order, consisting of those birds which have the middle of the three anterior toes united to the external one up to the third joint, and to the internal one up to the first.

Linnæus placed the Kingfishers under his order *Picæ*, between *Todus* and *Merops*, with the generic appellation of *Alcedo*, and the following definition:—'*Bill* trigonal, thick, straight, and long. *Tongue* fleshy, very short, flat, and acute. *Feet* gressorial in most.'

Latham's second order, *Picæ*, is divided into three sections. The third of these consists of birds with gressorial feet, and consists of the Motmots, the Hornbills, the Kingfishers, the Todies, and the Bee-eaters.

Lacépède's thirteenth subdivision consists of birds whose external toes are united almost throughout their length (*Platypodes*): his seventeenth order (which, with the sixteenth, eighteenth, nineteenth, and twentieth, comes under this subdivision), consists of the genera *Alcedo* and *Ceyx*.

The tenth and last family of M. Duméril's second order (*Passereaux*) consists of the *Tenuirostres* or *Leptorhamphes*. It contains many genera, the Kingfishers, the Todies, the Bee-eaters, the Humming-birds, the Creepers, the Hoopoes, &c.

The fourth order in the method of M. Meyer comprises the genera *Merops* and *Alcedo* only.

Illiger's *Ambulatores* form his second order, the first division of which, the sixth in relation to the consecutive numbers, is termed *Angulirostres*. This division comprehends the genera *Alcedo* and *Merops* only. It is preceded by the *Syndactyli*, the last division of his first order, *Scansores*, and the *Syndactyli* consist but of one genus, *Galbula*. It is immediately succeeded by the *Suspensi*; and *Trochilus* is the only genus of this division.

Cuvier's *Syndactyles*, the fifth division of his second order, *Passereaux*, comprise the genera *Merops*, *Prionites*, (Motmots), *Alcedo*, *Ceyx*, *Todus*, and *Buceros*.

M. Vieillot makes the *Sylvicolæ* the second order in his arrangement. The second tribe of this order (*Anisodactyli*) is made up of numerous families. The twenty-fourth consists of the Bee-eaters and Kingfishers. It is immediately preceded by the *Epopsides*, and immediately succeeded by the *Antriades* (*Rupicola*), the twenty-sixth (*Prionotes*) consisting of the Motmots and *Calao* (Hornbills).

The *Alcyons*, the seventh order of M. Temminck, consist of the Bee-eaters, the Kingfishers (*Martin-pêcheurs*), and the King-hunters (*Martin-chasseurs*).

In the method of M. de Blainville his *Scansores* are divided into the *Hètérodactyles*, the *Zygodactyles*. and the *Syndactyles*. *Alcedo* (Linn.) is the representative of the latter. In the method of the same zoologist, as developed by M. Lherminier, the Kingfishers (*Martin-pêcheurs*—*Alcedo*, Linn.) are placed in the first or normal subclass, and form the thirteenth family, coming between *Merops* and *Buceros*.

Mr. Vigors, in his paper 'On the Natural Affinities that connect the Orders and Families of Birds,' observes, that if the genus *Todus* of authors be examined with reference to its general affinities, an intimate resemblance will be found between it and the succeeding group of *Halcyonidæ*; since the only species known when he wrote exhibits the exact representation of a Kingfisher, with the exception of a shorter and more depressed bill. He is of opinion that we are thus conducted to the *Halcyon* of Mr. Swainson, a genus which he thinks extremely distinct and well-defined (regretting however—and with justice—that the name had not been retained for that group of the family which includes the European Kingfisher, the bird known to the antients under that name), and from that genus to the *Dacelo* of Dr. Leach, until, in the more slender bill of *Alcedo*, is found an approaching conformity to the more delicately-shaped bills of the succeeding family of *Meropidæ*. In the group of *Halcyonidæ* he places the *Galbula* of Brisson, which, though distinguished from the groups of which Mr. Vigors is treating by its zygodactyle feet, and as such arranged by modern writers among the true *Scansores*, was, Mr. Vigors observes in continuation, originally included in the genus *Alcedo* by that great master of natural affinities, Linnæus, on account of the identity of the general structure and economy of both groups. Here Mr. Vigors thinks that it must necessarily be placed, if we look to natural affinity rather than the strict dictates of artificial arrangement; and with it he fancies may be placed some apparently conterminous groups, *Capito* of Vieillot, and some of its affinities, &c., of which the toes are equally disposed in pairs. The relationship of all to the true *Scansores* may, he says, be accounted for by the consideration of that tendency which opposite sides of a circle of affinity generally evince to approach each other. The very difference however between the feet of *Alcedo* and *Galbula* (which two groups, at the same time, he adds, it must be remarked, agree more intimately in every particular of the leg and foot, except the scansorial disposition of the toes, than *Galbula* accords with any of the *Scansores* in the same characters) is lost in a species of *Galbula* which Mr. Vigors had lately inspected from Brazil, where one of the hind toes is wanting, and where the foot thus exactly corresponds with that of the three-toed *Halcyonidæ*, or the genus *Ceyx* of M. Lacépède. The singular and beautiful species of the Linnæan *Alcedo*, the *Ternate Kingfisher*, which Mr. Vigors characterises as a genus under the name of *Tanysiptera*, shows, in his opinion, the equal approximation of that genus to *Galbula*, and a deviation from its own type, its tail deserting the shortened character of that of the true *Kingfisher*, and assuming the lengthened and graduated conformation of the same member in the *Paradise Jacamar* and the other long-tailed *Galbulæ*. Having now arrived at the last family of the tribe, Mr. Vigors directs us to look for that connecting affinity which will lead us back to that other family of it with which he commenced his observations. Here again, he remarks, the universally-acknowledged relationship between the *Halcyonidæ* and the *Meropidæ* leaves him nothing to observe. He refers to the gradually-attenuated bills of *Alcedo* and *Galbula*, and the increasing length of the tail in the latter genus, as softening down the differences by which these families, united by general habits and economy, alone appear to be separated. Thus the circular succession of affinities by which the tribe of *Fissirostres* returns into itself appears to Mr. Vigors to be complete.

The fifth and last family of M. Latreille's second order (*Passereaux*) consists of the Bee-eaters, Motmots, Todies, Kingfishers, the genus *Ceyx*, and the Hornbills. The fourth family comprises the *Tenuirostres*, and the *Scansores* (*Grimpeurs*) form the order which immediately follows the *Passereaux*.

The Prince of Musignano (C. L. Bonaparte), in his 'Tabella analitica de' Generi' (*Specchio Comparativo*, 1827), makes the tribe *Ambulatores* immediately follow the tribe *Scansores*. The first family of the *Ambulatores* consists of the genera *Alcedo* and *Merops*.

In M. Lesson's 'Projet' the third tribe (*Syndactyles*) of the first order, *Insessores* or *Scansores* (Grimpeurs), includes four families, in the following order:—*Meropidæ*, *Halcyonidæ* (Alcyonées), *Rupicolidæ* (Rupicolées), and *Buceridæ*.

In the 'Table Méthodique,' at the end of his 'Manuel,' he makes the family *Meropidæ* comprise the genera *Merops*, *Alcedo*, *Dacelo*, *Ceyx*, *Syma*, *Todiramphus*, *Momotus*, and *Buceros*.

Mr. Eyton, in his arrangement, published in his 'History of the Rarer Species of British Birds (1836), makes his fourth family (*Tenuirostres*, Cuv.) of his second order (*Passeres*, Linn.) consist of three divisions:—1st, the *Anisodactyli*, Temm.; 2nd, the *Syndactyli*, Cuv.; and 3rd, the *Alcyones*, Temm. The latter division contains the genus *Alcedo*, Ray, whilst *Merops* is arranged under the *Syndactyli*.

Mr. Swainson, in the 1st volume of his 'Classification of Birds' (1836), when treating of the *Syndactyle* foot, allows the term to be good, if limited to such feet, with united toes, *as are of a different formation to all others*, and would not, even if the toes were free, come under any of the definitions which he had previously given. Such a form of foot, he says, will be found in the genera *Merops* and *Alcedo*, containing the Bee-eaters and Kingfishers, to whose feet, '*par excellence*,' he limits the term *Syndactyle*. 'The habits of these two groups,' continues Mr. Swainson, 'as far as concerns the use of their feet, are nearly the same, for in neither are these members ever employed but to rest the body. The Kingfisher watches patiently from a fixed station, generally a naked twig overhanging the water, for such fish as come within its reach, and then, after a time, flies to another station, where it alights and remains. The feet, from not being used for walking or standing, are consequently very small, and the toes imperfectly developed; there are three in front and one behind, but two of the former might be almost reckoned as only one, since they are united together even to the commencement of their respective claws; the inner toe is not half the length of the others, and seems rudimentary: it has a claw, and is rather more detached at its tip than the other two; in some, as in the three-toed Kingfishers, this inner toe disappears. The hinder toe is very short, and scarcely longer than the inner one; the scales of the whole foot are so thin and transparent that they can scarcely be seen in the small species by the naked eye. Those who have seen so much of the true Kingfishers, so scarce in England, but so common in Tropical America, know that they never perch upon any other than small or slender branches; and this we may infer from the shape of the foot. The two outer anterior toes are very long, so that they would completely clasp two-thirds of the circumference of a small branch, the other third being embraced by the hinder toe. This fact is further confirmed by the unusual flatness of the soles of all, and by the acuteness of the claws, which, from being but slightly curved, would not upon a small branch come into contact with the wood; the union of the three anterior toes, by producing considerable breadth of sole, gives an unusual degree of steadiness to the bird, highly conducive to its remaining very long in one position. Thus we see that the foot of the Kingfisher, which at first appears so very imperfect, and so totally useless for ordinary purposes, is that which is most of all suited to the habits and the wants of the bird. The Bee-eaters, like the Swallows, feed upon the wing, yet, unlike those birds, they never perch upon the ground; at least we can affirm this of the European species (*Merops Apiaster*), which visits the island of Sicily every year in great numbers, and remains for near a month, on its passage from Africa to middle and southern Europe. During this period we have sought for many years every opportunity of detecting these birds in their resting position, but never were successful in finding them otherwise than on the tops of the olive-trees, where they rest immoveable until they again dart off for another long excursion. It is indeed obvious that they could not walk, for their feet are much the same as the Wood Kingfishers (*Dacelo*), with this only difference, that the three anterior toes are divided the whole length of their last joint, the scales being rather more conspicuous.'

In the second volume of the same work Mr. Swainson speaks of the *Halcyonidæ*, or Kingfishers, as obviously connected with the *Meropidæ*, next to which he arranges them. These comprise, he observes, several well-marked genera, agreeing among themselves in the great length of their bill and in the extreme shortness of their feet. These characters, he adds, it is true, belong also to the true Bee-eater; but a remarkable difference in economy is developed in the Kingfisher. 'We have seen,' continues Mr. Swainson, 'that the Goatsuckers, Swallows, and Bee-eaters traverse the air to search after and pursue their prey; their wings are consequently adapted for long and continued flight; but the family before us have a different economy, and therefore a different organization. The whole of the genera are sedentary, *watching* for their food from a fixed station, which they only quit as soon as their prey approaches sufficiently near to come within the sweep of their wings; if unsuccessful in their first attack, they do not pursue their game, but return again to their post, and patiently wait for another luckless straggler; if their first attack is successful, they return with their victim to the same station, and then proceed to swallow it. Every one knows that these are the habits of the European Kingfisher (*Alcedo ispida*), and travellers affirm that the Kinghunters (*Halcyon*) pursue the same method in the forests of the Old World. But it has unfortunately happened that systematic naturalists totally unacquainted with the natural habits of the other genera (nearly all of which are confined to Tropical America) have fancied they were climbing-birds, and have consequently placed them in other orders whose organization and economy are widely different. Thus the Jacamars, in the *Règne Animal*, are placed after the Hornbills, and the Puff-birds (*Tamatia*) are associated with the Cuckoos.'

The following characters are assigned by Mr. Swainson to the *Halcyonidæ* :—

Wings rounded, not formed for rapid flight. *Feet* very feeble. *Toes* in pairs.

And he makes the family consist of the following genera and subgenera:—Genus Tamatia, comprising *Tamatia*, Cuv.; *Capito*, Vieill.; *Lypornix*, Wagler; *Monassa*, Vieill.; and *Brachypetes*, Sw.—Genus Halcyon, Sw., including *Dacelo*, Leach; *Halcyon*, Sw.; *Syma*, Lesson; *Todirumphus*, Lesson; and *Ceyx*, Lacépède.—Genus Alcedo, Linn., comprehending *Alcedo; Ispida*, Sw.; *Tanysiptera*, Vigors; and *Alcyone*, Sw.—Genus Lamprotila, Sw.—Genus *Galbula*, Linn. (Brisson, we suppose, is meant; Linnæus has no such genus).

Tamatia. (Puff-Birds.)

Generic Character.—*Bill* straight, compressed. *Nostrils* defended by long, stiff, incurved feathers and bristles. *Rictus* strongly bristled. Toes versatile, as in *Cuculus* (Swainson).

Under the article BARBETS, vol. iii., p. 434, the reader will find a figure of *Tamatia macrorhynchos*, and Mr. Swainson's description of the habits of the *Puff-birds* in general. In his 'Classification of Birds,' vol. ii., the same author states that the Hermit Birds (*Monassa*) have similar habits, and frequently rise up perpendicularly in the air, make a swoop, and return again to their former station.

The subgenera he characterises as follows :—

Tamatia.—*Bill* moderate, thick, conic; the tip but slightly bent. *Tail* narrow. Conirostral (*T. maculata*, 'Braz. Birds,' pl. 11.)

Capito.—*Bill* long; the tip abruptly bent, so as to form a hook. *Tail* narrow, Dentirostral. (*C. leucotis*, 'Brazil. Birds,' pl. 11; *C. somnolentus*, *Ib.*, pl. 9.)

Lypornix.—*Bill* moderate, defended by very long bristles. Both mandibles nearly equal. *Wings* very short, rounded. *Tail* narrow. Tenuirostral. (*L. striata*, 'Brazil. Birds,' pl. 34; *L. rubicula*, *Ib.*, pl. 25.)

Monassa.—*Bill* as in *Lypornix*, without the basal bristles, but with short setaceous feathers. *Wings* short. *Tail* lengthened, and very broad. Scansorial. (*M. leucops*, 'Braz. Birds,' pl. 12.)

Brachypetes.—*Bill* as in *Lypornix*, but shorter, higher, and more curved; the margins greatly inflexed. *Wings* long. *Tail* short and even. Fissirostral. (*B. tenebrosa*, 'Braz. Birds,' pl. 35.)

Geographical distribution.—All these are inhabitants of the New World.

Halcyon.

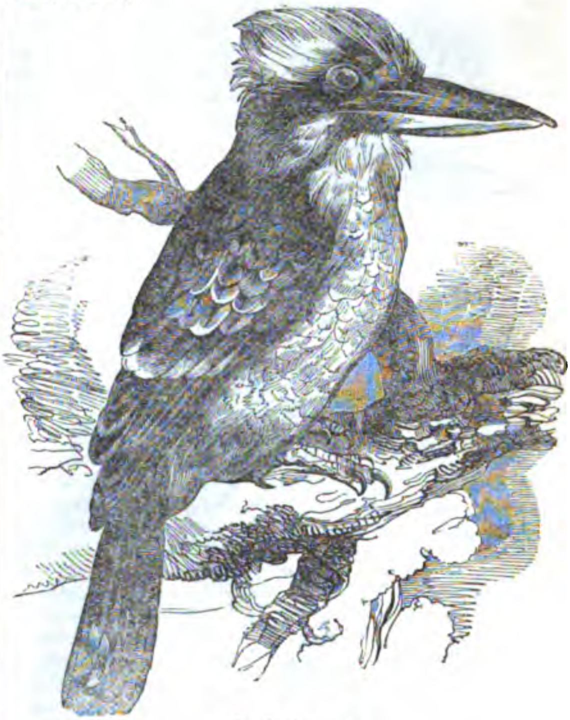
Generic Character.—*Bill* long, very straight, cylindrical; the sides widened; the base more or less depressed; gonys ascending. *Feet* syndactyle. (Swainson.)

The following subgenera are thus characterized :—

Dacelo.—Margin of the upper *mandible* considerably sinuated near the tip. *Wings* lengthened; the quills slightly mucronate. *Tarsus* covered with rough scales. Australian range. (Sw.)

Example, *Dacelo gigantea*. White's 'Voy.,' pl. 2. (Sw.)

Dr. Leach thus describes *Dacelo gigantea*, the *Gigantic Dacelo*, *Alcedo gigantea* of Latham, *Alcedo fusca* of Gmelin. *Body* olive-brown, beneath whitish; tail banded with black and ferruginous, the tip white; upper mandible blackish, under one whitish with a blackish base. *Male*, with its head slightly crested, the crest fuscous; legs yellow; belly banded with blackish. *Female*, with the crown of the head brown, without a crest; legs brown. (*Zool. Misc.*, vol. 2.)



Dacelo gigantea.

Locality.—Dr. Leach gives New Holland as the habitat, where, he adds, it is a very common bird; and he says that it is known by the appellation of *Gigantic* or *Great Brown Kingfisher*. In Governor Phillip's 'Voyage to Botany Bay'

(Lond. 4to., 1789), the *Great Brown Kingfisher* is described at length, with the observation that these birds vary much, the colours being more or less brilliant, and in some of them the tail is stated to be wholly barred with white and black, and the legs brown or blackish. The species is there said to inhabit various places in the South Seas, being pretty common in New Guinea; but the specimen, from which the figure given in the work was taken, was sent from Port Jackson, where it is said to be not unfrequently met with. It is the 'Laughing Jackass' of the colonists of Sydney; and *cuck'unda* of the natives, according to Lesson, who says it is very common on the banks of Fish River, where he killed a great number.

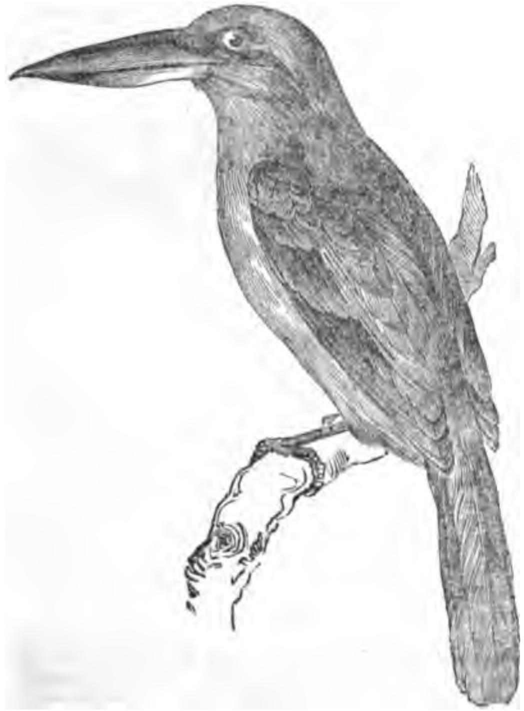
Hálcyon.—*Bill* long, straight, broad, nearly quadrangular; culmen slightly inclining towards the tip, near which the margin is slightly sinuated; gape smooth. *Wings* broad, short, rounded. *Tail* very short. *Feet* syndactyle; scales of the *tarsus* obsolete. (Sw.)

Example, *Halcyon cinnamomina.* (Sw.)

The generic character above given appears in Mr. Swainson's 'Classification of Birds.' In his 'Zoological Illustrations' (1st series), he states that the two extreme points of difference in the Linnæan Kingfishers are seen in *Alcedo ispida* and *A. gigantea*, 'the last of which has been made into the genus *Dacelo*. It will nevertheless be found that from among the birds left in the old genus there are a great number (of which indeed this bird, *Halcyon cinnamominus*, as it is there named, 'is a striking example'), which are much nearer allied to *Dacelo* than to *Alcedo*, where they now stand. It will appear therefore more natural to consider *Halcyon* and *Dacelo* as one genus, which may be called by either name, but which must be distinguished by the characters herein given to *Halcyon*, inasmuch as the generic definition of *Dacelo* (founded on one bird) will be found too restricted to comprehend all.'

Mr. Swainson then proceeds to give the following description of '*Halcyon cinnamominus*, Cinnamon Crab-eater,' from a bird in the possession of Mr. Leadbeater, by whom it was received from New Zealand, and who gave Mr. Swainson the opportunity of publishing his figure and description.

Total length ten inches; bill two and a half from the gape, and one and a half from the nostrils; the tip of the upper mandible with a slight inclination downwards, and with an appearance of a notch; the whole head, neck, and under plumage of a delicate fawn colour; under wing covers the same; the remaining upper plumage with the wings and tail changeable blue-green; ears sea-green and dusky united to a narrow black nuchal collar; wings four inches long, and the tail, which is even, three and a quarter; the hind head is slightly crested, and the feet pale-brown.' (Sw.)



Halcyon cinnamomina. (Swainson.)

N. B. The sub-genus *Halcyon*, as given in Mr. Swainson's 'Classification of Birds,' vol. ii., consists of many species, and has a wide geographical distribution in the Old World.

Syma.—*Bill* long, enlarged at the base, compressed and thin on the sides towards its extremity, upper mandible slightly curved from the base to the point (which is very sharp), and longer than the lower mandible, which is carinated below and convex, and very sharp at its point, which is lodged in the groove (rainure) of the upper mandible; edges of both mandibles furnished for two-thirds of their length with sharp serrated teeth, strong and numerous, and directed from before backwards. Lower space around the eye naked. Third and fourth quills equal, long, the first short. *Tarsi* moderate, the three anterior *toes* united, the external toe shortest. *Wings* short. *Tail* moderate with unequal feathers to the number of ten great ones, and two external small ones. (Lesson.)

Example, *Syma Torotoro*, Less.; *Alcedo ruficeps*, Cuv.

Description.—*Length* seven inches from the tip of the bill to the extremity of the tail. The *Bill* two inches from the commissure to the point, and the tail twenty-seven lines. *Colour.*—Bill entirely of a brilliant golden yellow; head and cheeks of a bright uniform cinnamon yellow separated by a brighter tint in the form of a collar from the mantle (*manteau*) by two spots of a deep black, which do not entirely unite upon the neck. Around the eye a black circle; feathers of the mantle velvet-black, those of the wing-coverts uniform blue-green, rump bright green; quills brown within and bordered with metallic greenish externally; tail-feathers equal, of a rather deep-blue above and brown below. Throat of a light but very clear yellowish, which becomes deeper on the sides of the belly and breast, to become lighter and pass into whitish on the abdomen (bas-ventre). Feet rather strong, of a bright yellow; nails black. (Lesson.)

M. Lesson, who established this genus, states that it haunts the banks of the sea, among the Mangroves—*palétuviers*—(*Bruguiera*). He says that it skims the shores (grêves) for the purpose of seizing as it flies the small fishes which its strongly dentilated bill secures. He also observed many individuals skimming in their flight the waters of the small streams which are discharged into the harbour of Doréry at New Guinea, and he says that the Papuans name the bird '*torotoro*,' doubtless from its cry.

Todiramphus.—*Bill* straight (the lower mandible very slightly swollen or convex), very much depressed, wider than it is high, without any *arête*, the mandibles equal, obtuse at the end and flattened, the edges being entirely smooth. *Nostrils* basal, the fissure oblique and hardly apparent, bordered by the frontal feathers. *Wings* short, rounded; first quill shortest, and the fourth longest. *Tail* long, the feathers equal, and twelve in number. *Tarsi* elongated, moderate, and reticulated. (Lesson.)

Geographical Distribution and Habits of Todiramphus.—M. Lesson, who established this natural group, states that they live in the islands of the South Seas. They inhabit the woods, and perch almost constantly on the cocoa-palms (*Cocotiers*). Their nourishment is only composed of small flies (*moucherons*), which they seize when the insects come to pitch on the spathes charged with the flowers of the palm. The Islanders name them *O-tataré*. They were sacred birds, and it was forbidden to kill them under severe penalties. Their skins were offered to the great god *Oro*.

Example, *Todiramphus sacer: Alcedo tuta*, Gm. and Lath.; *Alcedo sacra*, Gm. and Lath.; *Sacred King's-fisher*, Lath.

Description.—Total *length*, eight inches six lines; bill, twenty-one lines from the commissure to the point; tail, three inches. *Bill* black, white at the origin of the lower mandible; summit of the head covered with brownish-green feathers, which form a sort of hood (*calotte*), separated by a large white streak which rises on the front, passes above the eyes, and continues behind the occiput. A large black line (*trait*) springs from the eye, and taking a tinge of green and then of brown, forms a border to the white line and circumscribes it. Throat, breast, and all the upper part of the body pure white; a very large, whitish, demicollar, waved (*sinuolé*) with light brown and very light chesnut, occupies the upper part of the mantle and is bordered with black; the back, coverts of the wings, rump, upper part of the tail and wings, are uniform bluish-green;

the greater quills are brown and blue on their external border; the other quills (*remiges moyennes*) terminated with brown. Tail brown below. *Tarsi* black. The *wings* extend to the upper third of the tail.

M. Lesson, whose description we have selected, says that the species is very common in the Islands of Otaheite, or Taheite, and Borabora. It perches on the cocoa-palms, and the natives call it *Otataré*. Its flight is short, and it is not timid. It lives on the insects which the honied exudations of the cocoa-flowers attract. This species and *Psittacus Tahitensis* remain constantly on the cocoa-nut trees, which form girdles on the shores of all those islands.

Dr. Latham remarks that his *Sacred King's-fisher* has been found in Dusky Bay, New Zealand, where it is called *Ghotaré*.

Todiramphus sacer (Sacred King's-fisher).

Ceyx.—*Bill* entirely straight, long, a little flattened vertically, the mandibles of equal height, smooth on their edges, having each a rounded *arête* on their middle and the points equal and blunt; *nostrils* basal, oblique, and small. Third *quill* the longest. *Tail* very short, the feathers slightly unequal. *Tarsi* short, delicate, with only three slender toes, of which the two anterior are strongly united, and the hind toe free. (Lesson.)

M. Lesson remarks that the genus is founded on the *Alcedo tridactyla* of Latham, of which the *Martin-pêcheur de l'Isle de Luçon* of Sonnerat is only regarded as a variety. He also notices the *Ceyx azurea*, *Alcedo azurea* of Latham, and the *Ceyx Meninting* (*Alcedo Biru* of Horsfield?). He remarks that *C. azurea* was killed on the edge of the harbour of Doréry, in New Guinea, and that Latham indicates Norfolk Island, and Lewin, Port Jackson, as its habitats. The *C. Meninting* (*Meninting-watu*, or *Burung-Biru* of the Javanese), which he considers identical with *Alcedo Bengalensis* of Edwards, inhabits, he says, the banks of the small streams round the harbour of Doréry, at New Guinea.

Dr. Horsfield describes the *Burung-Biru* as by no means uncommon in Java. He observed it chiefly in the interior, in low situations; but it was also found in the maritime districts. Its habits and manners were those of the European Kingfisher. It darts in short rapid flights along the surface among rivulets and lakes, emitting as it moves shrill sounds in a high key. These sounds are so strong and acute, that when the bird is near they strike the ear in an unpleasant manner. It is not unfrequently observed perched on trees on the banks of rivulets, and its food consists of small fishes and of aquatic insects. (*Zool. Researches in Java.*)

Sonnerat describes his second species of Kingfisher, from the Isle of Luçon, as about one-third less than the Kingfisher of Europe, and as one of the most brilliant of birds. The whole head, the neck behind, the sides of the neck, the back, the rump, and tail, are of a deep lilac; the wings indigo-blue, approaching to black, but a bright and shining border of blue surrounds each feather; the throat, the neck, the belly, and the under part of the tail are white; the bill is very long, of a carmine-red, 'dont la nuance est foible;' the feet are red; 'that,' adds Sonnerat, 'which especially characterizes it, is that it has but three toes upon each foot, two before and one behind.' (*Voyage à la Nouvelle Guinée.*)

Meninting-watu, or Burung-Biru. (Horsfield.)

Le Martin Pêcheur de l'Isle de Luçon, 2nd species (copied from Sonnerat's plate, which was apparently taken from an ill-stuffed specimen).

Mr. Swainson refers to this plate, only under the name of *Ceyx tridactyla*, as an example of the genus.

Alcedo.

Generic Character.—*Bill* very straight, compressed its whole length; the tip of both mandibles acute, and the upper one not inclined, commissure perfectly straight. *Feet* syndactyle, all the tarsal scales obsolete. (Sw.)

Alcedo.—*Tail* very short. *Feet* with three toes before and one behind, claws simple. Culmen of the *bill* sharp, carinated, and simple. Inner and hinder toes of equal length. (Sw.)

Locality.—Inhabits only the Only World. (Swainson.)

Example, *Alcedo Ispida*, Linn. This is the *Martin-Pêcheur* of the French; and also *Pescheur*, *Martinet Pescheur*, *Tartarin*, *Artre*, and *Mounier*, according to Belon; *Piumbino*, *Ucello del Paradiso*, *Pescatore*, *Pescatore del Re*, *Martino Pescatore*, *Ucello di Sancta Maria*, and *Vitriolo* of the Italians, according to Belon; *Uccello della Madonna*, *Uccello Santa Maria*, *Piombino*, and *Alcione* of the same, according to the Prince of Musignano; *Gemeine Eisvogel* (Bechstein) and *Grosser, Kleiner und Fremder Eisvogel* (Brehm) of the Germans; *Glâs y dorlan* of the antient British, and *Common Kingfisher* of the modern British.

Whether this species is one of the birds named ἁλκυών (Halcyon) or ἀλκυών (Alcyon)—for some of the learned doubt whether the word should be aspirated or not—of Aristotle and the Greeks, is by no means satisfactorily made out, though the better opinion seems to be that it is the Ἁλκυών ἄφωνος of the Greek zoologist. Belon and Pennant think that it is; Klein and M. De Bomare, on the contrary (and Camus seems to agree with them), consider it as doubtful which of our birds was meant by the *Halcyon* of the antients, whose seven placid days while brooding over its poetical floating nest have become proverbial.

Description.—Bill blackish-brown, reddish at the base. Behind each eye is a patch of light orange-brown, succeeded by a white one. From each corner of the under mandible proceeds a streak of verditer-blue, tinged with verdigris-green. Crown of the head deep olive-green, the feathers tipped with verdigris-green. From the nape of the neck to the tail is a strip of verditer-blue feathers, tinged in some shades with verdigris-green. Chin and throat yellowish-white. Breast, belly, and vent orange-brown, palest towards the under tail-coverts. Tail greenish-blue; the shafts of the feathers black. Legs pale tile-red. (Selby.)

The irides are hazel. The bill of the *female* is not so long as in the other sex. The colours also are deeper and more of a green shade.

Reproduction, Habits, Food.—Setting aside the fable of the floating cradle in which during the Halcyon days the bird was said to rear its young, we shall find that ornithologists have differed not a little as to the actual nest of this brilliant bird. Pennant says that it makes its nest in holes in the sides of cliffs, which it scoops to the depth of three feet, and in holes in the banks of rivers, chiefly those which before belonged to the water-rat; and he states the number of the eggs to be from five to nine, of a most beautiful transparent white. The nest, he adds, is very fetid. Pennant then refers to Aristotle's description of the nest of the ἀλκυών ἄφωνος, or Mute Halcyon, in which the latter states that it resembled those spherical concretions that are formed by the sea-water (ἁλοσάχνη), that it was hollow within, that the entrance was very narrow, so that if it should upset, the sea would not enter; that it resisted any violence from iron, but yielded to a blow of the hand, and when thus broken was soon reduced to powder, and that it was composed of the bones of the βελόνη (Belone)—a sea-fish so named,—for the bird lives on fish. Aristotle then states the number of eggs at five or thereabouts (*Hist. Anim.*, ix. 14). Pennant, who, as we have observed, considers the Mute Halcyon of Aristotle to be our common kingfisher, observes that much of the description above quoted seems to be founded on truth. The form of the nest, he remarks, agrees almost exactly with the curious account of it by Count Zinnani. 'The materials, which Aristotle says it (the nest) was composed of, are not entirely of his own invention. Whoever has seen the nest of the kingfisher will observe it strewed with the bones and scales of fish, the fragments of the food of the owner and its young; and those who deny that it is a bird which frequents the sea must not confine their ideas to our northern shores, but reflect, that birds inhabiting a sheltered place in the more rigorous latitudes may endure exposed ones in a milder climate. Aristotle made his observations in the East, and allows that the Halcyon sometimes ascended rivers, possibly to breed, for we learn from Zinnani, that in his soft climate, Italy, it breeds in May, in banks of streams that are near the sea; and having brought up the first hatch, returns to the same place to lay a second time.' Now, it will be observed that Pennant, in his own description of the nest, speaks of nothing but the hole and the fetid remains; and though Zinnani gives a very good description of the excavated hole, he speaks with caution of the collection of fish-remains therein; for though, he says, of the 'scaglie di pesci' with which the nest was covered, 'restrano vagamente intrecciate,' he adds, 'ma forse non sono cosi disposte ad arte, bensì per accidente,' showing that he thought their disposition about the nest was probably more the result of accident than design.

Montagu, in his *Ornithological Dictionary*, says that the bird generally takes possession of a rat's hole to deposit its eggs; he then proceeds as follows: 'The many curious accounts which have been given of the nest of this bird induced us to take some pains to discover the fact. The result of our researches are (is), that the hole chosen to breed in is always ascending, and generally two or three feet in the bank; at the end is scooped a hollow, at the bottom of which is a quantity of small fish-bones, nearly half an inch thick, mixed in with the earth. This is undoubtedly the castings of the parent birds, and not the young, for we have found it even before they have eggs, and have every reason to believe that both male and female go to that spot, for no other purpose than to eject this matter, for some time before the female begins to lay, and that they dry it by the heat of their bodies, as they are frequently known to continue in the hole for hours, long before they have eggs. On this disgorged matter the female lays to the number of seven eggs, which are perfectly white and transparent, of a short oval form, weighing about one dram. The hole in which they breed is by no means fouled by the castings; but before the young are able to fly it becomes extremely fetid by the fæces of the brood, which is (are) of a watery nature, and cannot be carried away by the parent birds, as is common with most of the smaller species. In defect of which, instinct has taught them to have the entrance of their habitation ascending, by which means the filthy matter runs off, and may frequently be seen on the outside. We never could observe the old birds with anything in their bills when they went to feed their young; from which it may be concluded they eject from their stomach for that purpose.'

Mr. Selby, after noticing the ejection of bones and other indigestible parts, in pellets, by the mouth of these birds, goes on to state that they breed in the banks of the streams they haunt, either digging a hole themselves, or taking possession of that of a water-rat, which they afterwards enlarge to suit their convenience. He then proceeds as follows:—'The bearing of the hole is always diagonally upwards, and it pierces two or three feet into the bank. The nest is composed of the above-mentioned pellets of fish-bones, ejected into a small cavity at the farther end of this retreat, and upon which the eggs are laid, to the number of six or seven, of a transparent pinkish white.' He then quotes the remarks of Montagu on the sloping direction of the hole, and the use of that direction in carrying away offensive matter. (*Illustrations of British Ornithology*, vol. i.)

Mr. Rennie, in his edition of Montagu's 'Dictionary,' observes, that from the high authority of Montagu, the description above given has been copied by every recent writer, with the exception of Temminck,[*] who says nothing on the subject, and Wilson, who says (*Am. Orn.*, iii. 60), of his belted kingfisher (*Alcedo Alcyon*), that 'its nest is neither constructed of glue nor fish-bones.' Mr. Rennie then proceeds thus:—'We are certain of the fact that this will apply equally to our own kingfisher. In the bank of a stream at Lee in Kent, we have been acquainted with one of these nests in the same hole for several successive summers, but so far from the exuviæ of fish-bones ejected, as is done by all birds of prey, being dried on purpose to form the nest, they are scattered about the floor of the hole in all directions, from its entrance to its termination, without the least order or working up with the earth, and all moist and fetid. That the eggs may by accident be laid upon portions of these fish-bones is highly probable, as the floor is so thickly strewed with them that no vacant spot might be found, but they assuredly are not by design built up into a nest. The hole is from two to four feet long, sloping upwards, narrow at the entrance, but widening in the interior, in order perhaps to give the birds room to turn, and for the same apparent reason the eggs are not placed at the extremity. I am not a little sceptical as to its sometimes selecting the old hole of a water-rat, which is the deadly enemy to its eggs and young; but it seems to indicate a dislike to the labour of digging. It frequents the same hole for a series of years, and will not abandon it, though the nest be repeatedly plundered of the eggs or young. The accumulation of cast-bones in one of these old holes has perhaps given origin to the notion of the nest being formed of them.'

Mr. Gould, in his *Birds of Europe*, states that the eggs are deposited in a hole, such as those above alluded to, by the female, without making any nest.

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[*] But Temminck ('Manuel,' 1820) says that the bird nestles in holes in the earth, most frequently in those abandoned by the water-rats, along the abrupt banks of rivers, often under the roots of trees, in the hollows of trees, and sometimes in the holes of rocks, and that it lays from six to eight eggs, of a lustrous white.

Small fish, such as Sticklebacks and Minnows, form the food of the Kingfisher principally, but M. Temminck and Mr. Rennie say that the bird will also eat fry or spawn (frai), slugs, worms, and leeches.

It sits immoveable on some overhanging twig, watching for its prey, and when it has secured a passing fish by a sudden dash, beats it to death against a stone on the ground, and then swallows it. At other times it will hover suspended over the water and dart on its prey, but the bird usually makes its attack from a station. The editor of the last edition of Pennant states that it has been seen balancing itself over the water in which a great many of the small, round, shining beetles were swimming swiftly in circles (*gyrinus natator ?*), and which it makes its prey.

This species, when adult, appears to be mute except at the season of pairing; but the young are very clamorous, and frequently betray their retreat before they leave the nest —which they do not quit till they are fully fledged—by their cries. Before they provide for themselves, which they soon do, they sit on some branch while the parents fish for them, and on their approach with food are very noisy.

The flight of this bird is most rapid; it darts by like an iridescent gleam.

Locality.—Temminck states that *Alcedo ispida* occurs more in the south of Europe than in the north. In Holland, he says that it is not widely spread. Mr. Selby says that it is generally dispersed through Europe, and that our birds differ in no respect from those of the same species in Asia and Africa, as he has had an opportunity of examining specimens from both continents. M. Temminck observes that the most common of the three species of Kingfisher must not be confounded with our *Alcedo ispida*, though it differs but little from it. The common Kingfisher is a resident with us, as it is in Italy and other European countries. Mr. Gould says that the young in the British Islands appear to have habits of partial migration, as they wander from the interior along the rivers to the coasts, frequenting, in the autumnal and winter months, the mouths of small rivulets and dykes near the sea; but more particularly along the line of the southern coast and the shores of adjacent inlets. We may here remark, that in the 'Portraits d'Oyseaux' of Belon, the following quatrain is printed under the cut of the common Kingfisher:—

> 'Le Martinet-pescheur fait sa demeure
> En tomps d'hyver, au bord de l'ocean:
> Et en esté, sur riviere ou ostan:
> Et de poissou se repaist à toute heure.

It may be imagined that a bird of which so many marvellous stories have been told, under the idea of its being the Halcyon of the antients, whose so-called nest, the *Halcyoneum*, was supposed to be endowed with medical properties, did not entirely escape the attention of the superstitious moderns. Thus its dried body was said to preserve woollen cloth from the moth, and if suspended by a thread from the ceiling of a room with doors and windows closed, to turn its bill towards the quarter whence the wind blew.

Barabas, in Marlowe's 'Jew of Malta,' says—

> 'Bnt now how stands the wind?
> Into what corner peers my Halcyon's bill?
> Ha! to the east? yes.'

Kent ('King Lear'), when, in his answer to Cornwall, he is rebuking such 'slaves' as the 'Steward,' declares that they

> 'Renege, affirm, and turn their Halcyon beaks
> With every gale and vary of their masters.'

Mrs. Charlotte Smith states that she once or twice saw a stuffed bird of this species hanging from the beam of a cottage-room as a weather-vane to show the way of the wind. It has lately been seen in a similar position at Botley near Southampton. In the same part of the country some of the common people fancy that if a dead kingfisher be suspended by the bill it will turn its breast according to the ebb and flow of the tide. The bird was also supposed to be a protection against thunder, to increase hidden treasure, to bestow grace and beauty on the person who carried it, and to renew its plumage, dead as it was, every season by moulting.

With reference to the question as to what species was meant by Aristotle, the reader should be aware that another Kingfisher, *Alcedo rudis* of Linnæus (*Ispida ?* Swainson), occurs in the islands of the Grecian Archipelago, though Africa and Asia appear to be its more particular localities. The species is figured in Mr. Gould's beautiful work on the Birds of Europe.'

Alcedo ispida.

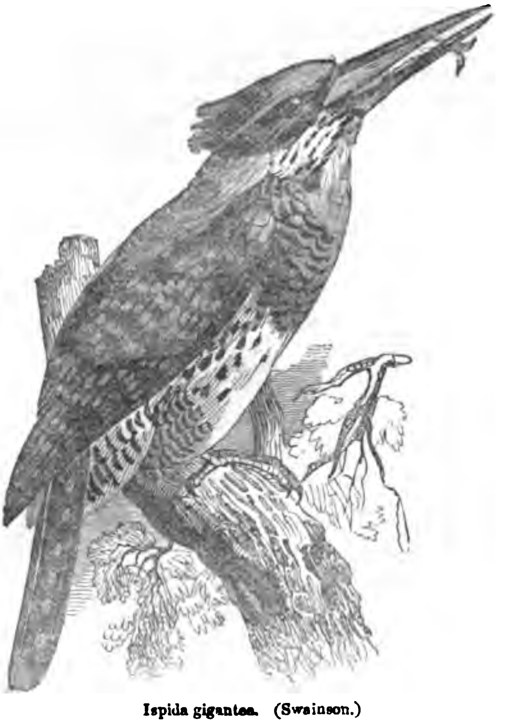
Ispida. Habit of *Alcedo.*—Culmen obtuse, somewhat flattened, and margined on each side by an indented groove. *Tail* lengthened, rounded. Inner toe much longer than the hinder. *Claws* either deeply notched, or cleft so as to present two acute unequal points. (Sw.)

Geographical Distribution.—Chiefly the New World. (Swainson.)

Mr. Swainson, who, in his 'Classification of Birds,' gives the habitat above stated, describes two species, *Ispida gigantea*, and *Ispida bicincta*, in his birds of Western Africa. He states, and with reason, that among the largest sized Kingfishers that have long been imperfectly known and incorporated in our systems, there is the greatest confusion, not only as to the characters of the birds themselves, but likewise in regard to their native countries. We have therefore, knowing the accuracy of Mr. Swainson's pencil, copied his figures of *Halcyon cinnamomina*, *Ispida gigantea*, and *Alcyone Australis* (the latter from Mr. Swainson's figure in the Zoological Illustrations, with the aid of a specimen in the Museum of the Zoological Society of London), as the best, if not the only mode of conveying to the reader the forms that he would designate under the names of *Halcyon*, *Ispida*, and *Alcyone*.

Description.—Above cinereous, spotted with white; chin and cheeks white, immaculate; breast with a broad rufous collar; head above black, crested behind.

Locality, Senegal.



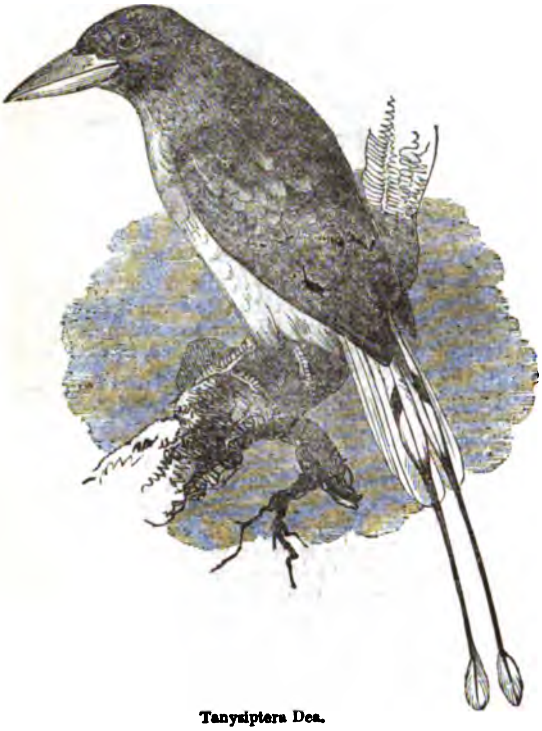
Ispida gigantea. (Swainson.)

Tanysiptera.—*Bill* rather short, somewhat thick, straight, acute; *nostrils* oval. *Tail* graduated; two middle tail-

feathers longest. (Vigors.) Mr. Swainson gives India as the *Locality*.

Example, *Tanysiptera Dea; Alcedo Dea*, Linn., *Ispida Ternatana*, Briss.

Description.—Above intense black-azure, white beneath; head and wing-coverts cærulean; tail-feathers white margined with cærulean, the two middle ones cærulean, with their apices club-shaped and white. (Vigors.)



Tanysiptera Dea.

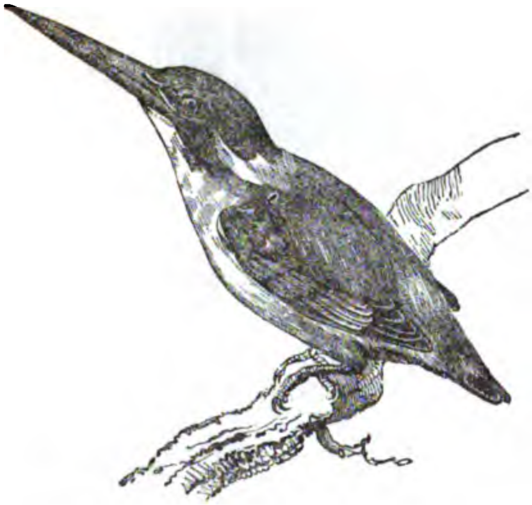
Alcyone.—*Bill* as in *Alcedo;* but the *feet* with only three toes. Australia. (Swainson.)

Example, *Alcyone Australis.*

Description.—Body above, sides of the head and neck, shining mazarine blue; beneath rufous; chin and throat whitish; wings blackish; inner fore-toe wanting. (Swainson, *Zool. Ill.*, 1st series, where it is figured and described as *Alcedo azurea.*)

Locality, New Holland.

Habits.—Lewin, who has figured this Kingfisher in his 'Birds of New Holland,' states that it inhabits heads of rivers, visiting dead trees, from the branches of which it darts on its prey in the water beneath, and is sometimes completely immersed by the velocity of its descent.

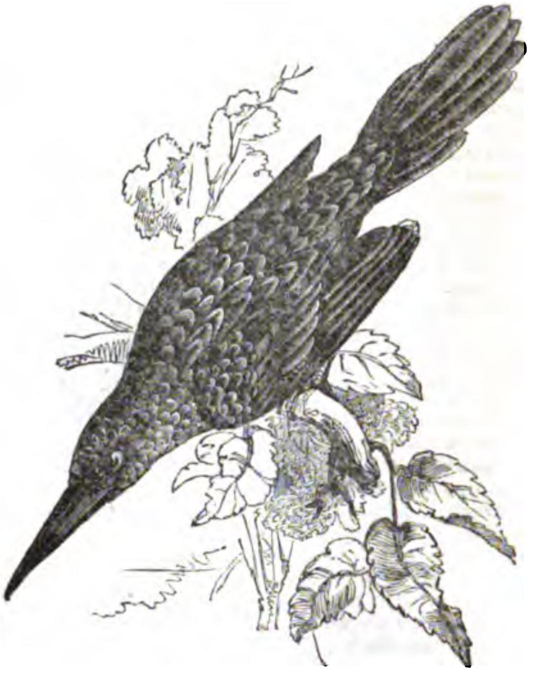


Alcyone Australis.

Lamprotila.

Generic Character.—Plumage metallic green and gold. *Bill* very broad, dilated; the commissure and culmen curved; the upper margins folding over the lower. *Nostrils* membranaceous; the aperture round, protected by feathers. *Wings* as in *Galbula*, but longer; the third and fifth quills equal. (Sw.)

Example, *Lamprotila platyrhyncha.*

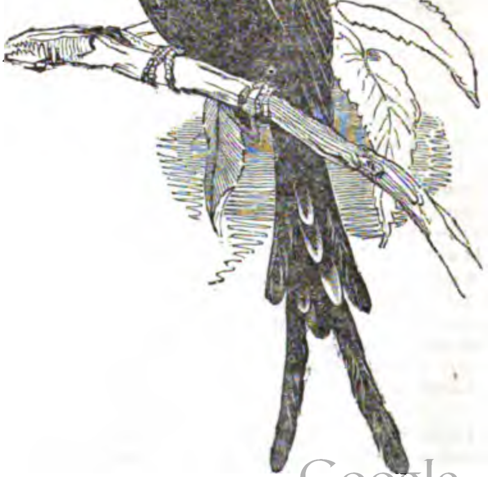


Lamprotila platyrhyncha.

Galbula.

Generic Character.—Plumage metallic. *Bill* very long, perfectly straight, greatly compressed; the culmen sharp; the tip not bent. *Wings* short. *Tail* lengthened, graduated. *Toes* in pairs, or with the *Hallux* wanting. *Nostrils* with a few strong bristles. (Sw.)

Habits.—Mr. Swainson remarks (*Classification of Birds*, vol. ii.) that the habits of the *Jacamars* and those of the *Puff-birds* and *Hermit-Birds* are similar, although the flight of the latter is weaker. 'The Jacamars,' he says, 'generally sit on low naked branches in the forest paths, from whence they dart upon butterflies, spearing them with



Galbula paradisea.

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their long bill: their haunts, indeed, may frequently be known by the ground being strewed with the beautiful wings of their victims, the body of which they alone devour.'

Mr. Swainson further observes that in all the groups of this family previously noticed the bill is invariably compressed on the sides, and generally of considerable length; but in *Galbula grandis* a change from this structure is first discovered, and we see a bill considerably broad and depressed; that character, in short, which is in unison with the next family, according to Mr. Swainson's arrangement, viz. the *Trogonidæ*.

Example, *Galbula paradisea; Swallow-tailed Kingfisher*, Edw., *Paradise Jacamar*, Lath.

Description.—Size of a lark; colour golden green; throat, neck, and lesser wing-coverts white; head violaceous brown. Bill and feet, the latter of which are feathered to the toes, black; two intermediate tail-feathers longest.

Locality, Surinam.

KING'S COUNTY, an inland county of the province of Leinster, in Ireland, bounded on the north by the county of West Meath, on the east by the county of Kildare, on the south by Queen's County and the county of Tipperary, and on the west by the river Shannon, which separates it from the counties of Galway and Roscommon. From the boundary of Kildare, near Edenderry, on the east, to the Shannon at Shannon Bridge, on the west, it extends 32 Irish or 41 statute miles; and from the boundary of Tipperary, near Moneygale, on the south, to the boundary of West Meath, near Clara, on the north, 31 Irish or 39½ statute miles. According to the map published under the superintendence of the Society for the Diffusion of Useful Knowledge it contains 456,960 statute acres, or 714 square statute miles. The area has elsewhere been estimated at 528,166 statute acres, of which 394,569 are cultivated land, 133,349 are unprofitable, chiefly bog, and 248 are under water. The population in 1831 was 144,225.

The outline of the county is very irregular, extending east and west from Kildare to the Shannon, and thence stretching southward between that river and the range of the Slieve Bloom Mountains. A series of low limestone hills, running in a north-easterly direction from the northern extremity of the Slieve Bloom range, by Geashil, divides the northern portion of the county into two districts of unequal area, of which the one discharges its waters eastward to the Barrow; and the other, which is of about double the extent of the former, westward into the Shannon. This range of eminences terminates in the north-eastern part of the county, in the conical hill of Croghan, which rises 500 feet above the surrounding country, and forms the most prominent object within a circuit of twenty miles in diameter. From the northern and eastern declivities of Croghan Hill the ground slopes towards the basin of the Boyne, one branch of which, the Yellow River, has its source in the small lake of Loch Rushnel, situated in a morass at the northern foot of the hills.

From Croghan and the Yellow River to the Boyne, which forms the north-eastern boundary of the county, separating it from the barony of Carberry in Kildare, is a tract of well-cultivated country, containing the flourishing market-town of Edenderry, an antient seat of the Cooley or Cowley family, who settled here in the reign of Queen Elizabeth. A branch from the Grand Canal is carried to the town, which is situated above half a mile north from the main line. The Marquis of Downshire is the proprietor, and has contributed liberally to the construction of the canal and to the erection of a handsome and commodious market-house. South from the line of the Grand Canal, the district included between the heights of Geashil and the county of Kildare is to a great extent occupied by peat-bog, forming a portion of the great bog of Allen. This tract, extending about twelve miles every way, is divided into two principal valleys by the Philipstown and Cushina rivers, which, running from north-west to south-east, discharge themselves, through the Feagile and Little Barrow rivers, into the Great Barrow, which last forms the southern boundary of the district. The Philipstown river, which runs in a very tortuous course between undulating banks, which are generally arable for a distance of half a mile to a mile on each side of the stream, has its source on the eastern side of the bog of Ballycommon, a tract of peat-bog occupying the summit level of the central northern district of the county The highest part of the bog is 286 feet above the level of the sea, and the waters issuing from its eastern and western borders run respectively to the Barrow and the Shannon. Between the Philipstown river and the Grand Canal are included the detached bogs of Cloncrane, Esker, and Down, covering, with the bog of Ballycommon, a total area of 9499 statute acres. South of the Philipstown river, between it and the Cushina, the bogs of Mount Lucas, Clonsast, and Ballykeane, extend over 16,592 acres; and the bog of Portarlington covers a tract of 4916 acres between the Cushina and the Barrow. The highest elevation of the bogs on this side of Ballycommon is about 250 feet. The Barrow, at its junction with the Little Barrow, where it receives their waters, is 185 feet above the level of the sea, so that their drainage could be effected with unusual facility. It is estimated that the entire bogs on this side of the heights of Geashil, comprising a total of 33,656 acres, which includes some smaller tracts not specified above, could be drained at an expense of about 50,000*l.* Each of the rivers above mentioned has a margin of arable land varying from half a mile to two and three miles in breadth. The valley of the Barrow, which consists on the King's County side of such a margin interposed between it and the bog of Portarlington, is highly cultivated, and to a considerable extent occupied by the demesnes of the resident gentry. About midway between the point where it becomes the boundary of the county and its junction with the Little Barrow is Portarlington, a very well-built and respectably inhabited town, partly situated on the northern bank of the Barrow, in this county, but chiefly in Queen's County. [QUEEN'S COUNTY.] The Barrow here is shallow and comparatively rapid, having a fall of ’6 feet from Portarlington to its junction with the Little Barrow. North-west from Portarlington, near the head of the Cushina river, is the small town of Geashil, formerly a seat of the O'Dempsys. The upland tract, on which the town is situated, is said to have been one of the first places cleared of wood by the early colonists of Ireland. Agriculture is however but little advanced in the immediate vicinity of the town. Between Geashil and Croghan Hill the high ground has more of the character of a flat table-land, on the summit-level of which, nearly surrounded by the bog of Ballycommon, is Philipstown, formerly Dangin, a seat of the O'Connors, and, from 1557 to 1833, the shire town of the county. The transfer of the assizes to the neighbouring town of Tullamore in the latter year has reduced Philipstown, which was never a place of much importance, to the condition of a village. It is situated on the summit-level of the Grand Canal, the surface-water of which is 264 feet above the level of the sea.

West from the range of Geashil the country slopes to the valley of the Brosna, which, flowing from Loch Ennil in West Meath, traverses the north-western portion of the county in a direction from north of east to south of west; and, after receiving the Clodagh and Frankford rivers from the district between Geashil and the Shannon, flows into that river at Shannon Harbour. The line of the Grand Canal, which joins the Shannon at the same point, is nearly parallel to the course of the Brosna after its junction with the Clodagh. The latter river rises in Loch Annagh, a pool of marsh water on the confines of Queen's County, and receives the drainage of about 4000 acres of bog lying between Geashil and Tullamore. Tullamore, the assize town of the county, is situated on the southern bank of the Grand Canal, on a stream running into the Clodagh. [TULLAMORE.] The demesne of Lord Charleville, comprising 1500 acres, extends from the western outskirts of the town to the junction of the Tullamore and Clodagh rivers, the latter of which forms several beautiful cascades in its descent through a wooded glen in the demesne. The mansion is in the baronial style, on a scale corresponding to the extent of the grounds, and is by much the finest residence in this part of Ireland. Higher up, on the Clodagh at Clonad, is a considerable tract of wood, which, with the extensive plantations of Charleville Forest and the cultivated tract round Tullamore, forms a pleasing contrast to the boggy districts on each side. The bogs on the western side of Tullamore, lying along the southern side of the Grand Canal, occupy an area of 11,588 acres. They are disposed in three principal tracts, separated from one another by low hills of limestone gravel, and bounded on the south by the hill of Cloghan, which separates the bogs immediately bordering on the canal from the more extensive tract lying between its southern declivity and the range of Slieve Bloom. This latter tract, consisting of five principal fields, extends over 23,986 acres, and by its drainage forms the chief supply of the Frankford or Silver river. This river has its source on the north-western declivity of Slieve Bloom, near the small town of Kinnitty, which, previous to the forfeitures of 1641, was the residence of a branch of the O'Carrol family, petty princes of Ely O'Carrol.

About five miles from Kinnitty, lower on the river, is Frankford, a thriving market-town for grain, situated in the district which was antiently possessed by the O'Molloys, the ruins of whose castle of Broghill are still standing in the neighbourhood. The Frankford river, passing under the Grand Canal at the Macartney aqueduct, runs into the Brosna, about three miles below the junction of the latter river with the Clodagh, which also passes under the canal. The valley of the Brosna is the best cultivated portion of the north-western division of the county. The river winds between undulating banks, which form a margin of considerable breadth on each side free from bog, and towards West Meath spread into a well-cultivated open country about the town of Clara, which is situated on the river near the county bounds. Clara is well built, and, prior to the opening of the Grand Canal, was the chief manufacturing town of the county: the linen and cotton manufactures are now the principal branches of trade carried on in it. Below Clara, on the Brosna, are the village of Ballycumber and the town of Ferbane, the latter very pleasingly situated on the wooded banks of the river near its junction with the Shannon. The district included between the Brosna and the county of West Meath, with the exception of the arable margin of the river, is almost wholly occupied by bogs. These are of greatest extent towards the Shannon, covering an area of 17,800 acres along the banks of that river. The Blackwater stream drains this tract, and gives its name to the principal field of bog, which covers 12,105 acres. A margin of arable land borders the Shannon also, and elevated tracts of limestone gravel extend from it into the interior of this part of the county, separating the several bogs. The remainder of the bogs of this district, extending from the field drained by the Blackwater to the north of Clara, cover 11,055 acres. The most eastern of the four tracts comprised in this division is the bog of Kilmaleady, now generally known as the 'moving bog,' which in the year 1821 burst its bounds and flowed nearly a mile and a half down an adjoining valley.

The remaining portion of the county, included between the western declivities of the Slieve Bloom Mountains, Tipperary, and the Shannon, has a general slope towards the Little Brosna, which forms the boundary between King's County and Tipperary. This division of the county, with the exception of that part immediately bordering on the Shannon, lies south of the boggy region, and is little encumbered either with rough land or morass. The portion which slopes immediately to the Shannon, north of the junction of the little Brosna with that river, is bleak and moory, comprising a considerable portion of the bogs lying south of Cloghan hill. These are drained by two streams running westward to the Shannon, the more considerable of which has its source in Loch Coura, a small lake south of Cloghan. On the bank of the Shannon, between these streams, is situated the thriving town of Banagher, commanding an important pass into Connaught. The bridge which here crosses the Shannon is old and narrow, and it is proposed to erect a new one better fitted for so great a thoroughfare. There are fortifications at both ends of the bridge, commanding the approaches, and about a quarter of a mile farther down, on the King's County side, there is a circular redoubt mounting six pieces of cannon. Banagher is well situated for trade, and has several thriving manufactures. The banks of the Shannon are here richly clothed with meadow, but liable to frequent floods. The valley of the Little Brosna from the Shannon to Birr [Birr], and thence to the range of Slieve Bloom and the borders of the county of Tipperary and Queen's County, is an undulating well inhabited district, containing extensive tracts of pasture, and towards the mountains abounding with varied and pleasing scenery. The small towns of Shinrone and Moneygale are situated in this part of the county, the latter within a few miles of Roscrea, on the northern border of Tipperary. The highest elevation of the Slieve Bloom Mountains is 1689 feet. They extend in a line from north-east to south-west, through a distance of 15 miles along the Queen's County border of this county, lying principally within the latter. A narrow pass, called the Gap of Glandine, is the only point of communication throughout this line available for purposes of general traffic. It lies near the northern extremity of the range, on the road from Frankford to Mountrath in Queen's County. A continuation of the Devil's Bit range forms the more southerly part of the boundary-line bordering on Tipperary. Through the interval between these ranges is carried the line of communication between Roscrea and Birr. These mountains, although of no great altitude, present a varied and picturesque outline, and abound with scenes of much natural beauty.

That part of the river Shannon which borders on this county is included within the division of the Middle Shannon, on which the Grand Canal Company have a jurisdiction, extending from the north end of the canal at Athlone to the north end of Loch Derg below Portumna Bridge, a total distance of 39 miles. The navigation is partly by the river and partly by lateral cuts. There are three such, with locks on that part of the Middle Shannon bordering King's County, viz. at Meelick, Banagher, and Shannon Bridge. Five steam-boats employed by the Ireland Navigation Company in connection with the City of Dublin Steam Packet Company ply on this part of the river. The largest of these steam-boats is of 282 tons burthen. The number of boats plying on the same part of the river in 1829 was 342, having a gross tonnage of 9252 tons; and in 1835 was 467, having a gross tonnage of 15,482 tons. Various improvements have been recommended by the commissioners of the Shannon Navigation, which are likely to be soon put in execution. These contemplated improvements include new bridges at Shannon Bridge and Banagher, and a foot-bridge near Meelick. [Shannon.] The Little Brosna is navigable for small boats to a distance of about two miles from its junction with the Shannon, and it is proposed to make it navigable as far as Birr.

Climate.—Notwithstanding the great extent of wet ground on the surface of King's County, the climate is neither damp nor unwholesome. This is partly accounted for by the antiseptic quality of the peat-bog, and partly by the fact of the county lying comparatively high and open. The Queen's County side of the Slieve Bloom range is however much more favourably situated for sun and shelter than that declivity of the chain which spreads into the south-western district of this county.

Geology.—The floetz limestone of the central plain spreads over the entire area of the county, with the exception of the portions occupied by the protruded masses of the Slieve Bloom chain and the hill of Croghan. The range of Slieve Bloom consists of a nucleus of clay-slate, supporting flanks of sandstone in which the clay-slate is enveloped on all the declivities. The clay-slate is generally of a quartzy and flinty character, approaching to fine-grained grauwacke. The rock ranges 20° south of east and 15° north of west, and dips 70° towards the south. The strata are generally from one foot to three in thickness, and in some places afford excellent flags from one to five inches thick, and seven and eight feet square. The surrounding sandstone, which lies conformably on the supporting rock, is yellowish-white or grey, composed of granular particles of quartz, and very compact. It is rarely found of the red cast which characterizes the sandstone formation farther south, nor has it much of the conglomerate character. Croghan Hill consists of a protruded mass of trap conglomerate rising about 500 feet above the level of the surrounding country, with steep declivities towards the south. The limestone of the surrounding plain appears tilted up and supported on the north-western and south-western sides of the greenstone tabular masses. Calcareous matter is generally diffused through this rock, which varies from a pale lavender colour to a greyish-black, consisting, where it assumes the former appearance, of an intimate mixture of compact felspar and carbonate of lime; and where it has the latter characteristic tint, of a mixture of hornblende and felspar, containing minute disseminated particles of hornblende, calcareous-spar, quartz, and iron-pyrites. These, the calcareous fragments especially, are often found embedded in the greenstone in rounded lumps. The rock is consequently very easily decomposed, and forms an uncommonly rich and friable soil. The hill is almost all under cultivation, and yields the most abundant white and green crops without any manure whatever. Massy strata of greenstone appear also between Croghan Hill and Philipstown, about a quarter of a mile from the latter place, whence it seems probable that the floetz limestone of the vicinity reposes immediately on the trap-rock. Granular limestone occurs at the Seven Churches in the north-west of the county, and has been quarried to the extent of 3000 cubic feet of good grey marble. Banks of rolled-limestone gravel, called eskers, occur frequently throughout the floetz limestone district. Continuous ridges of these gravel-banks surround the principal divisions of the bogs above enumerated. The eskers afford an interesting subject of study to the geologist, as from their structure they appear to have been deposited from water in violent action, and their external configuration affords an index to the direction of the current.

Soil, &c.—The bogs, which occupy so large a portion of the county, generally repose on limestone-gravel. The peat, although apparently spongy and easily permeable, is very retentive of water, as shown by the remarkable fact of surface pools existing in the bogs within short distances of each other, on different levels. The soil in general is not naturally fertile, but can be made to yield very good crops in the arable districts by manuring with the lime and bog-stuff which abound throughout the county. The soil of that side of the Slieve Bloom range included in King's County is cold and gritty, with the exception of one portion near the middle of the range, where the limestone reaches high up the declivities of Knocknaman, Castletown, and Cumber hills. This part of the range affords fertile and extensive pastures, which are grazed throughout the year with flocks of sheep and young cattle. In the district lying between these mountains and that portion of Tipperary which intervenes between them and the Shannon the soil is generally a light gravel, easily tilled, and tolerably fertile. Farther north on this side of the county it becomes stiff and moory; and throughout a great part of the barony of Garrycastle, which stretches along the entire line of the Shannon, the rock is covered only by a thin stratum of poor clayey moor. The banks of the Shannon however, where they are occasionally overflowed, afford considerable tracts of fine meadow, and the eskers and derries, as the open spots of dry ground in and between the bogs are termed, have generally a rich friable soil. The chief grazing districts in the county lie on the borders of West Meath, where the pastures are considered very favourable to wool-growing. Throughout the central division the soil, where unencumbered with bog, is almost wholly in tillage. In the south-eastern districts bordering on Queen's County and Kildare tillage is not so much attended to, the insulated tracts between the bogs being better calculated for grazing. The best ground in the county is in the north-western division, from Croghan Hill to the boundary of Meath. It is equal to fattening bullocks of any weight, and is consequently little broken up by tillage. Forest-trees flourish here, the ash especially, with peculiar vigour, and the hedge-rows of white thorn are remarkably luxuriant. The average sales of grain for each of the ten years preceding 1836 in the principal market-towns of King's County appear from the following table:—

	Barrels of Wheat, of 26 stone.	Barrels of Oats, of 16 stone.	Barrels of Barley, of 16 stone,
Tullamore	45,000	35,000	20,000
Philipstown	100	9,000	6,000
Clara	16,000	16,600	none.
Ferbane	60,000	30,000	300
Cloghan	5,800	300	none.
Banagher	25,000	40,000	1,000
Birr	5,600	15,100	13,000
Edenderry	20,000	30,000	25,000

The linen manufacture was carried on about the beginning of the present century with considerable activity in the west of the county, but has latterly declined. There is a small manufacture of friezes, stuffs, and serges for home consumption. Distilling, brewing, and the grinding of corn are carried on at Birr and in other parts of the county, but not to any great extent. In 1831 there were 699 weavers, 13 tanners, and 18 brewers in the county.

The condition of the working classes is somewhat better in the northern and central districts of King's County than in most of the neighbouring parts of Ireland. Wages vary from 6*d.* to 10*d.* per day, on an average of 100 working days each year. The cabins of the labouring peasantry are commonly of a very bad description, particularly in the boggy districts. There is however a good number of comfortable farmers, and the people generally are of industrious and decent habits. The English language is spoken universally.

King's County is divided into the baronies of Warrenstown, on the north-east; Coolestown, on the east, containing the town of Edenderry (population in 1831, 1283); Philipstown, Lower, on the north, containing the town of Philipstown (population, 1454); Philipstown, Upper, containing part of the town of Portarlington (total population, 3091); Geashil, in the centre; Kilcoursey, on the north-west, containing the town of Clara (population, 1149); Ballycowen, west of Geashil, containing the town of Tullamore (population, 6342); Ballyboy, south of Ballycowen, containing the town of Frankford (population, 373); Garrycastle, on the west, containing the towns of Banagher (population, 2636), Shannonbridge (population, 559), and Ferbane (population 501); Eglish, south of Garrycastle; Ballybrit, south of Eglish, containing the towns of Birr or Parsonstown (population, 6594) and Crinkle (population, 531); and Clonlisk, on the south-west, containing the town of Shinrone (population, 1287) and the village of Moneygale (population, 379).

Philipstown was incorporated as a borough by charter of the 12th Elizabeth, but the corporation is now extinct; Banagher also, incorporated as a borough by charter of the 4th Charles I., has no longer any traces of a governing body: and these are the only towns in the county which have at any time had corporations.

Prior to the Union, King's County was represented in the Irish parliament by two county members, and two for each of the above boroughs. The representation of the Imperial Parliament is now limited to two county members. The constituency in 1836 consisted of 1694 voters.

The assizes are held at Tullamore. General quarter-sessions are held at Tullamore, Birr, and Philipstown, in each of which is a court-house and gaol, that at Tullamore being the county-gaol and the others bridewells. On the 1st January, 1836, the police force of this county consisted of 5 chief constables, 45 constables, 225 sub-constables, and 6 horse, supported at a cost, for the year 1835, of 9548*l.* 3*s.* 8*d.*, of which 4838*l.* 5*s.* 11*d.* was chargeable against the county. The total number of criminal offenders committed to the county-gaol in the year 1836 was 672 males and 94 females, of whom 254 males and 13 females could read and write at the time of their committal, 272 males and 38 females could read only, and 146 males and 43 females could neither read nor write.

The district lunatic asylum for King's County is at Maryborough in Queen's County. There is a county infirmary at Tullamore, fever hospitals at Shinrone and Birr, and dispensaries in all the chief towns and villages. There are barracks at Banagher, Birr, Shannon-harbour, Tullamore, and Philipstown.

Population Table.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort	15,536	..	..	..	..	..	..	74,500
1813	Under Act of 1812	19,705	..	..	..	..	..	..	113,2[illegible]6
1821	Under Act 55 Geo. III., c. 120	22,564	25,374	..	..	..	65,558	65,530	31,08[illegible]
1831	Under Act 1 Will. IV., c. 19	24,256	26,072	17,163	3,984	4,926	71,287	72,938	144,22[illegible]

History and Antiquities.—Although not reduced to shire-ground as one county until the time of Mary, King's County was partially included in other shires at a very early period. It appears from sundry Pipe Rolls of the reign of Edward III. that the portion which at present borders on West Meath was in those days accounted a part of the shire of Meath, and as such was charged with royal service. The manor of Geashil, now forming the central district of the county, was, in the reign of Edward II., in like manner accounted a part of Kildare, being an antient inheritance of the Fitzgeralds. Offaly also, a part of which now lies within the bounds of King's County, was included in Kildare from the first division of Leinster into counties. But the western and south-western portions of the county, including Ely O'Carrol [Birr] and MacCoghlan's County, although stated to have formed part of Offaly, and consequently to have been included in the first limits of the county of Kildare, do not appear to have been reduced for practical purposes to the authority of English law until the year 1557, when the act was passed which erected the whole into one county under its present name. Before that period it was generally designated Western Glenmalery, to distinguish it from Eastern Glenmalery, the present Queen's County. [Queen's County.] The fort of Dangin, an old seat of the O'Connors, the chief family of Offaly, was at the same time made the shire town, and called Philipstown, in compliment to the king consort. The native chieftains for a length of time struggled against the new settlement, until A.D. 1600, when the Lord Deputy Mountjoy, having joined his forces with those of Sir Oliver Lambert, succeeded, after a deplorable destruction of life and property, in finally reducing them. An account of the military operations of which this county was the theatre, during the rebellion of 1641 and the ensuing wars, is given under the heads of the chief towns. [Birr; Tullamore.] The forfeitures consequent on that rebellion and on the subsequent war of the Revolution were very extensive. On the latter occasion the number of acres of profitable land confiscated was 30,459, of a total value at that time of 89,321*l.* 14*s.* The families of Coghlan, Geoghegan, Carrol, and Grace were the most considerable among those attainted.

The ruins of the seven churches of Clonmacnoise, situated on the bank of the Shannon, in the north-western part of this county, form one of the most interesting groups of ecclesiastical remains to be met with in the island. The buildings are of various dates, from, probably, the seventh century to the twelfth. St. Kieran of Clonard founded the abbey A.D. 548. It was subsequently, but at an uncertain date, raised to the rank of a cathedral church, and so continued till A.D. 1568, when the see of Clonmacnoise was united to that of Meath. Surrounding the abbey is the antient burying-ground, containing about two Irish acres, and occupied with the sites and ruins of various religious houses. The whole is enclosed with a wall, at two of the angles of which are antient round towers, said to have been erected by O'Rourk and MacCarthy respectively. The buildings within the precincts are chiefly chapels, erected over family burying-places by the various Irish kings and chieftains, who, 'although at perpetual war in their lives, were contented to lie here peaceably in death.' They are:—Temple-Righ, built by O'Melaughlin, king of Meath; Temple-Connor, built by O'Connor Dunn; Temple-MacDermot, founded by MacDermot, prince of Coolavin; and two others, founded by O'Kelly and MacCarthy More. The place was for many centuries the Iona of Ireland, and still continues to exhibit more numerous remains of antient monuments than any other cemetery in the country. Two monumental crosses, richly carved, stand near the western door of the Temple-MacDermot. One of these, fifteen feet in height, is formed of a single stone. There are the remains of several other religious houses in the immediate vicinity. The entire group occupies a gently swelling bank, rising from the Shannon about midway between Shannon Harbour and Athlone. The place is shut in on the north and east by a vast tract of bog, and has a peculiarly lovely and picturesque appearance. Twenty-eight other religious houses are enumerated in this county, of which the chief were:—Birr; Durrow, founded A.D. 550; Gallen on the Brosna, founded in the fifth century; Monastereoras, near Edenderry, founded by John Bermingham, earl of Louth, in the year 1325; and Seirkeiran, near Birr, founded A.D 402, by St. Kiaran the Elder, and for some time a cathedral church. There are numerous remains of feudal castles, chiefly of the Elizabethan æra. Leap Castle, situated on a declivity of Slieve Bloom, in a strong and commanding position, is still inhabited; so also are Cloghan Castle and the castle of Birr. There are no very remarkable monuments of the earlier æra.

The county expenses are defrayed by grand-jury presentments. The sum levied in the year 1835 was 21,060*l.* 19*s.* 8*d.*, of which 4739*l.* 14*s.* 4*d.* was for public works, roads, &c.; 11,179*l.* 16*s.* 6*d.* was for public buildings, charities, &c.; and 5141*l.* 8*s.* 10*d.* for police and the administration of justice.

King's County embraces a portion of each of the four archiepiscopal provinces, extending into the dioceses of Clonfert, Ossory, Killaloe, Meath, and Kildare, under which the educational statistics of the county are included.

(*Statistical Survey of King's County*, Dublin, 1801; *Transactions of the Geological Society*, vol. v.; Brewer's *Beauties of Ireland; Parliamentary Reports and Papers.*)

KING'S EVIL. [Scrofula.]

KING'S LYNN. [Lynn.]

KING'S YELLOW, the name given to orpiment, or the yellow sulphuret of arsenic, when used as a pigment. [Arsenic.]

KINGS, THE BOOKS OF, the name of two books of the Old Testament. They originally formed only one book in the Hebrew text, and are entitled מלכים, that is, 'kings.' In the Septuagint they are divided into two books, and are entitled 'the third and fourth books of reigns' or kingdoms (*βασιλειῶν τρίτη καὶ τετάρτη*); since the first and second books of Samuel are called in this translation the first and second books of Kings.

These books contain an account of Jewish history from the death of David to that of Solomon (1 *Kings*, i.-xi.); an account of the division of the kingdom under his successor Rehoboam, and the history of the two kingdoms of Israel and Judah, to the conquest of the former by the Assyrians under Shalmaneser (1 *Kings*, xii.—2 *Kings*, xvii.); and the separate history of the tribes of Judah and Benjamin, till they were carried away captive to Babylon by Nebuchadnezzar in the reign of Jehoiachin. (2 *Kings*, xviii.-xxv.)

These books, in common with the books of *Chronicles* and many others of the Old Testament, are generally ascribed to Ezra; but neither the author nor the time in which they were written can be determined with any degree of certainty. It is evident from many passages, and especially from the last chapter of these books, that a portion of them must have been written in the time of the Babylonian captivity; but there are also other passages which must have been written before the destruction of the kingdom of Israel, and while the temple at Jerusalem was still standing. (1 *Kings*, viii. 8; ix. 13, 21; x. 12; xii. 19; 2 *Kings*, viii. 22; x. 27; xiv. 7; xvii. 23, 34, 41.) It is therefore probable that these books are only a collection of different documents written by persons present at the events narrated, and that the compiler only wrote such portions as were necessary to connect the different documents, and to form one continuous narrative.

There are many great discrepancies between these books and the books of *Chronicles*, which are mentioned and discussed in the article Chronicles.

(The *Introductions* of Eichhorn, Jahn, De Wette, Bertholdt, Augusti, and Horne; Rosenmüller's *Scholia*.)

KINGSCLERE, a village in Hampshire, remarkable for the exhibition of the green sand formation in the midst of the elevated chalk downs, on the line of an anticlinal axis passing east and west. The anticlinal axis passes through the middle of a valley (hence called a 'valley of elevation') in which the green sand appears; and it might seem on a first view that the discontinuity of the chalk was simply owing to elevation and fracture, but by considering the areas and slopes of the strata, in plans and sections on a true scale, it will immediately appear that a considerable mass of chalk must have been removed by denudation. For the knowledge of this interesting 'valley of elevation' we are indebted to Dr. Buckland. (*Geol. Trans.*, 2nd series, vol. ii.) Mr. Lyell has contemplated it in connexion with the more extensive denudation of the Weald of Kent and Sussex. (*Principles of Geol.*, book iv., ch. xxii.)

KINGSTON. [Jamaica.]

KINGSTON-ON-HULL. [Hull.]

KINGSTON-ON-THAMES. [SURREY.]

KINIC ACID, a peculiar vegetable acid, sometimes called cinchonic acid, which was discovered in 1790 by Hoffman in cinchona bark, in which it exists in combination with the vegetable alkalis cinchonia and quina, and also with lime, forming the kinates of these bases. When an infusion of bark is evaporated till an extract is left, and that is treated with alcohol, a viscid substance remains, containing kinate of lime mixed with mucilaginous matters; if this be dissolved in water, and the solution be suffered to evaporate gradually, crystals of kinate of lime are formed in rhombic prisms; when this salt is dissolved in water, and treated with oxalic acid, oxalate of lime is precipitated, and the kinic acid remains in solution; by evaporation in a warm atmosphere this acid is deposited in crystals.

Kinic acid has a very sour, but when pure not a bitter taste; it reddens litmus paper strongly; is unalterable in the air, dissolves in 2½ times its weight of water at 48°, and is also soluble in alcohol. When heated in a retort it readily fuses, boils up, decomposes, blackens, and yields an empyreumatic oil, with pungent vapours of pyrokinic acid, one portion of which condenses into a liquid, and another crystallizes. Sulphuric acid renders kinic acid first green, and then carbonizes it; by the addition of a small portion of nitric acid it is converted into an acid resembling the pyrokinic acid, which may be sublimed; but a large quantity of nitric acid changes it into oxalic acid.

According to the analysis of Liebig anhydrous kinic acid consists of—

Nine equivalents of hydrogen	9	or	5·26
Fifteen „ carbon	90		52·63
Nine „ oxygen	72		42·11
Equivalent	171		100·

The crystals contain one equivalent of water.

The natural kinates, except that of lime already described, are only obtained by complicated processes from the bark; but by artificial means they are readily procured, either by saturating the acid with the bases, or by the double decomposition of kinate of barytes and the sulphates of such bases as form soluble sulphates. We shall describe only a few kinates, and chiefly those which exist in the cinchona, and first we shall notice the most important of them, the

Kinate of Quina.—The natural salt crystallizes with difficulty, on account of the admixture of yellow colouring and other matters, and these have prevented the determination of its crystalline form. This salt is very bitter, readily soluble in water, and but slightly in alcohol of sp. gr. 0·837. It is decomposable by heat, without residue. By evaporation the solution is reduced to a viscid paste, which when moistened and exposed to the air exhibits rudiments of crystallization. It is, like other salts of quina, decomposed by the alkalis ammonia, potash, and soda, which precipitate the quina. Kinate of quina may be formed artificially by dissolving quina recently precipitated from the sulphate in a solution of kinic acid, with a gentle heat. By exposure to the air the liquid becomes a mammellated mass, containing small brilliant rhombic crystals of kinate of quina.

This salt is a dikinate, composed of—

One equivalent of kinic acid	.	171
Two equivalents of quina	.	324
Equivalent		495

Kinate of Cinchona.—The natural compound very much resembles that of quina; the artificial salt yields crystals by exposure to the air, which are like, but are more distinct than those of the kinate of quina obtained in the same way. This salt is bitter, and very soluble in water, slightly in alcohol of sp. gr. 0·837.

This is a dikinate also, consisting of—

One equivalent of kinic acid	.	171
Two equivalents of cinchona	.	304
Equivalent		475

Kinate of Lime.—This salt crystallizes in rhomboids and hexagonal plates; it has but little taste; it is soluble in six times its weight of water at 60°, and much more so in boiling water. It is insoluble in alcohol. It is decomposed by oxalic acid and sulphuric acid, and also by the alkaline carbonates. According to Berzelius, a small quantity of kinate of lime may be obtained from the alburnum of the fir-tree.

This salt is composed of—

One equivalent of kinic acid	.	171
One equivalent of lime	.	28
Ten equivalents of water	.	90
Equivalent		289

The properties of the artificial kinates are thus, with slight alterations, given by Berzelius. *Kinate of potash*, bitter and deliquescent. *Kinate of soda* crystallizes in hexahedral prisms; it appears to contain no water of crystallization, and does not alter by exposure to the air. *Kinate of ammonia*, deliquescent. By evaporation a portion of its acid is set free. *Kinate of barytes* crystallizes in dodecahedrons with triangular faces; becomes opaque by exposure to the air; is very soluble in water, but slightly in alcohol of 0·830. *Kinate of magnesia*, very soluble, and forms crystalline excrescences similar to cauliflowers. *Kinate of manganese* crystallizes in rose-coloured lamellar crystals. *Kinate of zinc* crystallizes in laminæ, or in cauliflower-like aggregations. *Kinate of nickel*, a green gummy mass, very soluble in water. *Perkinate of iron*, a reddish-yellow gummy mass, soluble in water. *Kinate of lead* crystallizes in slender needles, which do not alter by exposure to the air, and are soluble in alcohol. *Subkinate of lead*, a white powder insoluble in water. *Kinate of copper* crystallizes in green needles, or rhombic laminæ; the surface becomes white by exposure to the air. *Perkinate of mercury*, a colourless salt which does not crystallize. *Kinate of silver* forms mammellated crystals, which readily blacken in the light.

KINKAJOU. [POTTO.]

KINO, an astringent substance, the concrete juice of one or more plants. Nothing certain is known respecting the plants which produce the best kino, and several very inferior sorts exist in commerce, the origin of which is likewise far from being ascertained. It is generally stated that the best African kino is obtained from a tree, native of Gambia, called Pterocarpus erinaceus (Linn.), P. Senegalensis (Hooker). But it is confidently affirmed by Mr. Pereira that the substance commonly regarded as African kino is the juice of the Nauclea (Uncaria) Gambeer, a kind of catechu, with which it agrees in every respect. The East Indian kino is alleged to be obtained from the Butea frondosa (Roxb.), and differs considerably from the so-called African kind. In New Holland a sort of kino is procured from the Eucalyptus resinifera (White), which finds its way to the East Indies, where it is used as a cotton-dye, as indeed the other kinds are also, giving to cotton the yellowish-brown colour known as nankeen; the colour varies with the different sort of kino used.

In the West Indies the juice of the Coccoloba uvifera is called American kino, or American extract of rhatany, or false rhatany extract. These different extracts differ in their chemical habitudes with re-agents, but they all agree in possessing a strong astringent power. Kino most commonly occurs in grains of a shining aspect and rich ruby-red colour; they are easily reduced to powder. It is nearly entirely soluble in water and in alcohol. Vauquelin analyzed that sort which is termed African, and found it to consist of 75 per cent. of tannin, 24 of red mucilage, and 1 of woody fibre.

In a paper lately read before the Royal Asiatic Society, Dr. Royle has adduced satisfactory evidence to prove that some of the *Kino* of commerce is no doubt produced by *Butea frondosa*, which is common as a tree or shrub in every part of India. On comparing together specimens of the astringent gum of this plant, contained in his collection, with some brought from North-western India by Mr. Beckett, and both these with some sent from Bombay as the *Kino* of the Butea frondosa, they were all three found to be identically the same kind of gum; but Mr. Beckett's, from being the freshest specimen, was the most highly coloured. These were all moreover found to correspond, especially the specimens from Bombay, with some astringent gum found by Mr. Pereira in one of the old 'druggists' shops of this city, under the name of *Gummi* *rubrum astringens*, which was the name by which Kino was known. It was introduced into practice by Dr. Fothergill as *Gummi astringens Gambiense*, and has been always considered to be a product of the west coast of Africa, and the tree yielding it to be *Pterocarpus erinaceus*. It is remarkable that the Sanscrit name of *Butea frondosa* is *kinsuka*. From its gum being labelled by a druggist as Gummi rubrum astringens, it is evident it must have been among the earliest substitutes for the African kind, of which so little has ever been imported into this country. Analyzed by Mr. E. Solly, junr., the Butea kino was found to contain between 60 and 70 per cent. of tannin with gum. It is curious that Dr. Roxburgh remarks of the gum of the *Butea frondosa*, that it is so like that of his *Pterocarpus marsupium* that one description might suffice for both, with respect as well to appearance as to the action of chemical re-agents.

KINOSTERNON. [TORTOISES.]

KINROSS, the capital of the county, is situated on the western bank of Loch Leven, in 56° 15′ N. lat. and 3° 10′ W. long., and is distant 19 miles north-north-west from Edinburgh.

The lower part of the town has a mean appearance, but as it rises to the north it has a cheerful look, and many handsome houses are built there, together with two excellent inns, equally remarkable for good accommodation and good keeping.

The church, which is new, and kept in good repair, is in the presbytery of Dunfermline and synod of Fife. There are four annual fairs, which are much frequented for the sale and purchase of horses and cattle. The chief manufacture of the town now consists in the weaving of coarse linen and cotton, although it was once famed for the manufacture of cutlery. The school is said to be well conducted. The master receives an annual salary of 300 marks, with the use of a house and adjoining land. The population of the town and parish of Kinross in 1831 was 2917.

KINROSS-SHIRE, a small inland county of Scotland, bounded on the east and south by Fifeshire, and on the west and north by the county of Perth, lying between 56° 8′ and 56° 17′ N. lat., and between 3° 15′ and 3° 35′ W. long. Its greatest length from Fossaway Church on the west to Auchmore Bridge on the east is 11 miles, and its greatest width from Damhead on the north to Kelty Bridge on the south, is 10 miles. The area of the county is 79 square miles, or 50,560 acres, of which 4149 are lakes. Its western boundary is in the Cleish and Ochil hills; the northern boundary is in the Ochil and Lomond hills; and the eastern boundary runs partly along the summit of the hill of Beunarty and partly along the flat ground to a point on Kelty Burn, a little below Blair-Adam bridge, which stream, deriving its source in the Cleish hills, forms the southern boundary.

The boundaries of the county are chiefly hilly, but there is a level opening from the south at Kelty Bridge, and at Blair-Adam bridge an opening to the south-east, through which the great north road passes. There is a similar level opening to the west towards Stirling, at the Crook of Devon; and a third level to the north-east between the Ochil and Lomond hills, leading towards Cupar in Fife. There is, in addition to these valleys, a narrow passage on the east, through which the river Leven flows from Loch Leven.

The borders of the county are hilly, but the interior, comprising about one-half of the whole, may be regarded as a plain slightly varied by gentle undulations. The soil is various, chiefly inclining to gravel. To the north and west of Loch Leven it is clayey, sandy, and tolerably fertile, and, according to Sinclair, produces rich and early crops, but in the more elevated parts it consists of moor and moss, though even here it forms excellent pastures. The climate, though cold and wet, owing to the general elevation of the land, has been wonderfully improved by an extensive system of drainage. Upon the whole the air is considered healthy, and the people are vigorous, and subject to few distempers. The frost sets in sooner and continues longer than in the adjacent country to the south, but notwithstanding these disadvantages agriculture has of late years been greatly improved, so that the seed-time and harvest are seldom behind those of the neighbouring districts. Enclosures of hedges and stone walls are greatly upon the increase, and it is said that the enclosed lands may usually be let from year to year for pasture at a rent equal to that for tillage upon a lease of nineteen years. The average rent of land in 1810 was 9*s*. 10*d*. per acre, and has no doubt increased considerably since that time, as the farms are mostly occupied by resident owners who are feuars of the estate of Kinross. Oats are the principal grain cultivated. The district is peculiarly well suited for turnip husbandry and rearing sheep stock, which has been lately much attended to. The plantations upon the estate of Blair-Adam are particularly deserving of mention. They were begun in 1733, and at the present time cover upwards of 1300 acres, consisting of the oak, ash, larch, elm, and beech. The Scotch fir does not grow well in exposed situations, but the spruce and silver fir grow vigorously throughout the estate.

There is some coal on the south, where the county joins the borders of Fifeshire. There are freestone quarries of good quality in that quarter, and to the north of Kinross red freestone is the geological formation of the district. The higher hills are whinstone or basalt.

This county contains several fresh-water lakes, some of which are well stocked with pike, and the rest with perch, eel, and other fish. Of these lakes the principal is Loch Leven, which, although inferior in magnitude and picturesque beauty to Loch Lomond, is still a noble piece of water, covering a surface of near 3300 acres. Its height above the level of the sea is about 300 feet. Its greatest depth is from 80 to 90 feet. It contains four islands, the largest of which is called the Inch. The lake abounds in fish, particularly trouts, pikes, perches, and eels. The trouts of Loch Leven are considered a great delicacy, and are regularly sent to the Edinburgh market. The quantity of water poured into the lake by the different feeders, and drawn out by evaporation, is subject to great variation; and the surface of the lake is in consequence elevated and depressed to the extent of two feet and a half. The level of this lake has been lately reduced by a canal made for that purpose, but the undertaking is said to have hitherto proved unprofitable.

Upon a small island at the north-west end of Loch Leven are the ruins of the castle of Loch Leven, a fortress of great antiquity, which was once the property of the Douglasses of Loch Leven, and is noted as the prison wherein Queen Mary was confined, and from which she made her escape in 1568. The antient monastery of Portmoak, on the north side of the Leven, near the lake, is said to have been built by a Pictish king, and to have been the first place in Scotland given to the Culdees after the conversion of the Picts to Christianity. On the Inch in Loch Leven, antiently called St. Serf's Isle, are the remains of an old priory built by Achaius, king of the Scots, 'in honorem et ad gloriam Dei omnipotens et Sancti Servani.'

The chief streams are the Garny, and South and North Queich. The first rises among the Cleish Hills; the two latter have their source among the Ochil Mountains, and all three fall into Loch Leven. The waters which flow from Loch Leven form the river Leven, which, after a course of about 14 miles, passing through a part of Fifeshire, falls into the Frith of Forth at Largo Bay. This river gives motion to about fifty mills.

The county is well provided with roads, which are kept in good repair, and is intersected from south to north by the great north road, for which the country is indebted to the exertions of the venerable Chief Commissioner Adam, of the Jury Court. There is one large distillery, and cotton is woven at Kinross and Milnathort, chiefly for the Glasgow market.

The population of the county in 1831 was 9072. A considerable increase had taken place in the population of several of the parishes during the preceding ten years, which was attributed to the number of labourers who had been employed during that period in ditching and bringing the waste lands into cultivation. The annual value of real property in 1815 was 25,805*l*. Kinross-shire unites with the county of Clackmannan and certain parishes in the southern part of Perthshire in returning one member to parliament.

(Rev. David Ure's *View of the Agriculture of Kinross-shire; MacCulloch's Statistical Account of the British Empire; Beauties of Scotland; Population Returns*, &c.)

KINSALE, a sea-port town and borough in the barony of Kinsale and county of Cork, on the south coast of Ireland, situated on the river Bandon, about four miles from the sea, and about 178 English miles from Dublin. The borough and liberties constitute a barony. The river forms a safe and commodious harbour for vessels of considerable burthen, which can come close up to the town, in which respect it has an advantage over the city of Cork, from which it is distant about 12 miles. Owing to the windings of the river, the harbour is completely land-locked, and the town is defended by Fort Charles, which stands opposite to it, and about a mile lower down the river. The town is composed of one principal street by the river side, and several narrow lanes ascending a steep hill in the rear, besides some blocks of buildings at the head of the harbour. At the census of 1831 there were 967 houses, inhabited by 1512 families, comprising 7312 individuals, of whom 3148 were males and 4164 were females. The population of the whole barony was 13,997. Of the males 20 years old and upwards, 1562 in number, 22 were engaged in agricultural pursuits, 547 were employed in retail trade or handicraft, 153 were capitalists, bankers, professional and other educated men; 680 were laoourers employed in labour not agricultural; and 72 were male servants: the occupations of the remaining 88 are not given. There were besides 37 male servants under 20 years of age, and 413 female servants.

Kinsale (in Irish *cean-tail*, or 'the head of the sea') early became a place of importance to the English settlers. John de Courcy, inheriting the surrounding tract of country by intermarriage with the family of Cogan, built a castle on the promontory called the Old Head of Kinsale, at the mouth of the Bandon river, in the twelfth century. This probably led to the commencement of a town farther up the river, where a land-locked and capacious creek offered the advantages of a secure roadstead for ships of any burthen. A charter of incorporation was granted to the inhabitants A.D. 1333, and various grants of customs, &c. are subsequently on record. The place has been the scene of numerous engagements, both by sea and land. Here De Courcy defeated MacCarthy More with great slaughter of the Irish. In 1380 a battle was fought in the harbour between the English fleet and the combined fleets of France and Spain, in which the latter were signally defeated. On the 23rd September, 1601, a body of Spaniards, under the command of Don Juan D'Aquila, landed here, and seized the town for the Roman Catholic party, who were then in arms under the Earl of Tyrone and other Irish chieftains. On the 17th October the English, under the Lord Deputy Montjoy and Sir George Carew, the president of Munster, arrived before the town, and invested it on both sides of the Bandon. The siege lasted till the 28th December, when the Spaniards surrendered in consequence of the defeat of the united armies of O'Neill and O'Donnell before the town on the preceding 23rd. This defeat, attended with the loss of 1200 men killed and 800 wounded, completely broke the spirit of the insurgents, and led the way to the immediate pacification of Munster. During the wars of 1641 the town was a place of refuge for the English Protestants of the neighbouring country. It fell into the hands of the Jacobite party in the succeeding war of the Revolution, and was held by a combined French and Irish garrison for James II. from March, 1689, to the latter end of the following year, when it was taken possession of by the Protestant army under Brigadier-General Churchill, afterwards duke of Marlborough.

The governing charters bear date 7th January, 7th Edward III. and 10th May, 31st Elizabeth. The corporation is governed by a council, consisting of sovereign, burgesses, and common speaker, which last represents the freemen. The freedom is obtained by grant of the council. The criminal jurisdiction extends to all offences, treason excepted: the civil jurisdiction of the recorder's court of pleas is unlimited in all personal actions. The annual revenue averages 550*l*., and the average expenditure is 360*l*.

During the late continental war there was a government dockyard at Kinsale, in which ships of war were repaired, and the harbour was much resorted to by the king's ships as a place of refuge. This occasioned a considerable expenditure of money, which having ceased at the peace, the town is now in a declining and impoverished condition. Of all the houses which it contained in 1831, there were only 301 which were rated as being worth 10 . per annum and upwards, and only 402 having more than six windows each. It is observed that many of the houses have balconies in the Spanish style. The town is pretty well paved, and has a good supply of water. A large portion of the population obtain a livelihood by fishing, in which they are very expert. The boats employed in the fishery are called *hookers;* they are well-built vessels of 20 tons burthen, and go to sea in all weathers. The men are often serviceable as pilots to strange vessels that are driven on the coast. The greater part of the fish which they take is sold in the markets of Cork. In a return of the tonnage and estimated value of the exports and imports of the several ports of Ireland in the year 1835, as given in the Appendix to the Second Report of the Commissioners appointed to consider and recommend a general system of Railways for Ireland, the trade of Kinsale, including its coasting trade, is stated to be as follows:—

Imports.

			Value.
Coals, culm, and cinders	13,500	Tons,	£12,150
Iron	161	„	1,771
Corn, meal, and flour	6,613	Cwts.	2,829
Salt	11,800	Bushels,	222
Other articles			1,290
Total Value of Imports			£18,262

Exports.

			Value.
Corn, meal, and flour	18,012	Cwts.	£9,897
Potatoes	4,240	„	362
Feathers	10	„	60
Cows and oxen	10	Number,	70
Horses	6	„	80
Sheep	840	„	1,010
Swine	1,071	„	2,000
Total Value of Exports			£13,479

The fish, which, as already mentioned, are taken by the Kinsale fishermen to Cork, are not included in this statement, being taken direct to the market of consumption without being landed at Kinsale.

The borough of Kinsale returns one member to parliament. The number of persons qualified to vote in 1835 was 221, and the number who voted was 155. At the registration of 1836 the number of qualified electors was increased to 270, and the actual voters at the last general election in 1837 were 199.

(Wakefield's *Statistical and Political Account of Ireland;* Smith's *History of the County of Cork; Report of Railway Commissioners; Reports of Commissioners for the Extension of Public Works in Ireland.*)

KINTYRE, or CANTIRE. [ARGYLESHIRE.]

KINYXIS. [TORTOISES.]

KIOOSIOO. [JAPAN.]

KIPPIS, ANDREW, D.D., F.R.S., born 1725, died 1795, a nonconformist divine, held in great estimation both among the members of his own communion and generally in the world of literature and science.

He was descended of ministers who had left the church in 1662, on the passing of the Act of Uniformity, and was educated in one of those academies which the dissenters established for the education of their ministers in university learning. This academy was at Northampton; and in the time of Dr. Kippis there was at the head of it a very pious and learned tutor, Dr. Doddridge. After a few years spent in the exercise of his ministry at Boston in Lincolnshire, and at Dorking in Surrey, he settled in London, in 1753, as pastor of a congregation of Presbyterian dissenters in Westminster, of which Dr. Edmund Calamy, a name of note among the dissenters, had formerly been the minister.

Dr. Kippis continued connected with this society till his death.

The duties arising out of this connection did not preclude him from seeking other means of public usefulness. In 1763 he became a tutor in an academy for the education of dissenting ministers in London, on a plan similar to that on which the academy at Northampton had been conducted. In 1771 he was elected a Fellow of the Society of Antiquaries, and in the next year a Fellow of the Royal Society.

Dr. Kippis was a principal contributor to the 'Monthly Review' at a time when it was considered as the leading periodical work of the day. He had also much to do with the conduct of 'The New Annual Register.' There are several pamphlets of his on the claims of the dissenters and on other topics of temporary interest. But the work with which his name is most honourably connected is the republication of the 'Biographia Britannica,' with a large addition of new lives, and a more extended account of many persons whose lives are in the former edition of that work. The design was too vast to be accomplished by any one person, however well assisted. Five large folio volumes were printed of the work, and yet it had proceeded no farther than to the name of Fastolf. Part of a sixth volume, it is understood, was printed; but it has not been given to the world.

Many of the new lives were written by Dr. Kippis himself, and particularly that of Captain Cook, which was printed in a separate form also.

Dr. Kippis's was a literary life of great industry. He was the editor of the collected edition of the works of Dr. Nathaniel Lardner, a minister of the denomination of dissenters to which he himself belonged, to which he prefixed a Life of that eminent theological scholar. He published also the ethical and theological lectures of his tutor Dr. Doddridge, with a large collection of references to authors on the various topics to which they relate, in two octavo volumes. A volume of his sermons was also published.

Dr. Kippis, like his friend Dr. Lardner, belonged to the Unitarian school of divines. He was through life distinguished by the amenity of his disposition, his active and business-like habits, his benevolence, and his piety.

KIRCHER, ATHANASIUS, born at Goysen, near Fulda, in 1602, entered at an early age the order of Jesuits, made great progress in various branches of learning, especially in the study of Hebrew and other Eastern languages, and was made professor of philosophy and Oriental languages in the college of Würzburg. He afterwards went to Avignon, where he became acquainted with the learned Peiresc, and he there applied himself to the study of antiquities. From Avignon he went to Rome, visited Naples, Sicily, and Malta, and on his return was made professor of mathematics in the Roman or Gregorian college at Rome. He filled this chair for eight years, and resigned it in order to devote himself entirely to his favourite studies. He collected a valuable museum of antiquities, which he left to the Roman college, and which has been repeatedly illustrated. (Sepi, *Romani Collegii Soc. Jesu Musæum Athanasii Kircheri novis et raris inventis locupletatum*, fol., Amsterdam, 1678, with a complete list of all the works of Kircher, published and republished; Bonanni, *Musæum Kircherianum*, fol., Rome, 1709; republished by Battara, Rome, 1773; Contucci, *Musæi Kircheriani Ærea notis illustrata*, 2 vols. fol., Rome, 1763-65.) Kircher was liberally assisted by several princes and noblemen, German, Italian, and Spanish. He died at Rome, in November, 1680. He was a man of very extensive and varied erudition, and a very copious writer; but his judgment was defective; he wanted criticism, and jumped too hastily at conclusions, fancying that he could resolve any question. He was also very credulous, as his works amply testify. He wrote on mathematical and physical sciences; on philology and hieroglyphics, and also upon history and antiquities. His principal works are: 1. 'Magnes, seu de Arte Magnetica,' libri iii.; 2. 'Primitiæ Gnomonicæ Catoptricæ, hoc est, Horologiographiæ novæ specularis;' 3. 'Ars magna Lucis et Umbræ;' 4. Prodromus Coptus;' 5. 'Institutiones Grammaticales et Lexicon Copticum.' In these two last works he gave the best information up to that time concerning the Coptic language. 6. 'Œdipus Ægyptiacus, hoc est, Universalis Hieroglyphicæ Veterum Doctrinæ Temporum Injuria abolitæ Instauratio,' 4 vols. fol., Rome, 1652-4. Kircher dedicated this work to the Emperor Ferdinand III., whose eulogium is prefixed, written in 20 languages of Europe and Asia. The work is full of quotations from Rabbinical, Arabian, and Syriac writers. 7. 'China illustrata.' 8. 'De prodigiosis Crucibus quæ post ultimum Incendium Vesuvii Montis Neapoli comparuerunt. 9. 'Scrutinium Pestis.' 10. 'Latium, i.e., nova et parallela Latii tum veteris tum novi Descriptio, qua quæcumque vel natura, vel veterum Romanorum ingenium admiranda efficit, geographico-historico-physico Ratiocinio, juxta rerum gestarum temporumque seriem exponitur et enucleatur,' fol., Amsterdam, 1671, with maps and figures, and a minute description of Hadrian's villa, with a plan of it. This work of Kircher is one of his best, and may still be read with profit.

KIRGHIS. [TURKISTAN.]

KIRKALDY, together with Burntisland, Dysart, and Kinghorn, returns a member to parliament. For details respecting the town see FIFESHIRE.

KIRKBY LONSDALE. [WESTMORELAND.]

KIRKCUDBRIGHT, THE STEWARTRY OF, is a maritime county in Scotland, bounded on the north and north-west by Ayrshire; on the east and north-east by Dumfriesshire, from which it is in part separated by the river Nith; on the south-west by the county of Wigton and Wigton Bay; and on the south and south-east by the Solway Frith, being comprised between 54° 45′ and 55° 20′ N. lat., and between 3° 35′ and 4° 40′ W. long. The figure of the county is nearly that of a rectangle, of which the greatest length, reckoning from Southerness Point to the north-west extremity of the shire, is 42 miles, and the greatest width, from the river Nith to Wigton Bay, about 30 miles. The area is about 864 square miles, or 552,960 imperial acres, and comprises the greater portion of the antient district of Galloway. [GALLOWAY.] The lands of this county, together with those of the adjoining shire of Wigton, were enclosed in the early part of the last century by stone walls, known throughout the country by the name of Galloway dykes. The introduction of this system of enclosing brought with it the necessity of throwing several of the smaller farms into one, and occasioned an insurrection among the peasantry, which was quelled with difficulty. The system has now stood the test of more than a century, and has tended greatly to promote the interest of the district and the increase of its population.

The coast, except in the upper part of Wigton Bay, is generally bold and precipitous. The surface of the county is rugged and barren, more particularly towards the sea-coast; but within the last forty years great improvements have taken place in the arable husbandry of the shire, and considerable tracts of land which were formerly unproductive have been brought into cultivation. 'The land towards the Frith,' says Mr James Webster, in his 'View of the Agriculture of Galloway,' Edinb., 1794, 'abounding in little hills or knolls full of stones and projecting rocks, presents a surface of the roughest aspect, which, together with the almost total want of wood, renders the prospect unpleasing to the eye of the traveller.' Now however, according to the more recent account of Mr. MacCulloch (*Statistical Account of the British Empire*), the arable lands form about one-fourth of the entire surface, and are principally situated south of a line drawn from Dumfries to Gatehouse, a village on the river Fleet, the most fertile lying near the sea-coast and along the banks of the rivers Dee and Nith. The chief elevations are Blacklarg in the north, which rises to the height of 1950 feet; Cairnsmuir in the west (2598 feet); and Criffel, a detached mountain on the shore of the Solway Frith, whose summit is 1831 feet above the sea-level.

The prevailing soil is a thin brown earth resting either upon a gravel bottom, or else upon a rock of a rotten slaty substance, which is readily pulverized. It is but slightly retentive of moisture, and its average depth does not exceed four inches. Oats are the grain chiefly cultivated. The potato crops are considerable, and constitute a principal article of export to England, after supplying the inhabitants and feeding a great number of swine. The turnip crops are less extensive, although the soil is peculiarly fitted for them. The principal manures employed are lime and sea-shells, in addition to the dung produced upon the farm. The farms, which are let on leases of nineteen years, are for the most part small; for although the enclosing of the district occasioned a considerable diminution in the number of small farms, the lands are still more subdivided here than in most of the other counties of Scotland. There are however some large estates, and the principal farms are provided with threshing-mills. The average rent of land in 1810 was 7*s.* 3*d.* per acre, and the annual value of the real property of the county in 1815 was about 213,308*l.* The peculiar breed of horses which this and the adjoining county of Wigton formerly possessed, and which was known by the name of the Galloway breed, is now almost entirely unknown, its place having been supplied by horses of a larger size and better adapted to draught. The sheep upon the moors and high grounds are mostly of the black-faced breed, but those which have been introduced into the lower districts are for the most part Cheviots, South Downs, and New Leicesters. The attention of the farmer is chiefly directed to the rearing of cattle for the Norfolk fairs, where they are sold to graziers, by whom they are fattened for the London market. The absence of plantations for the protection of the grazing districts was formerly, and still is in a less degree, a subject of regret; for although the climate in the lower districts is comparatively mild, and the continued rains which prevail along the west coast of Scotland are less frequent in Kirkcudbrightshire than in the adjoining county to the north, the easterly winds which usually set in during the spring months are most severe, and are said to retard vegetation, and to do more material injury to the cattle than all the storms of winter. This circumstance, added to the common practice of leaving the full-grown cattle exposed in the open air during the greater part of the year, has already led to the raising of plantations on some few estates, which the proprietors are now actively employed in extending. The woods of the earl of Galloway, which consist chiefly of oak and ash, have been found eminently useful in protecting the lands from the cold winds.

The county contains a variety of minerals, but they have been only in few instances turned to any profitable account, which is mainly owing to the total absence of coal and the general scarcity of other fuel. The lead-mines which were wrought some years since near Newtownstewart, and which produced on an average about 400 tons of ore annually, have been abandoned for the reason above stated; and the working of a rich iron-mine in the parish of Rerrick, which was conducted for several years by an English company, has been discontinued, partly for the same reason, and partly on account of the inconvenience attending the shipping of the ore.

Lime, coal, and freestone are all imported from the opposite coast of Cumberland. The only port of any note is the harbour of Kirkcudbright. Besides the numerous lakes distributed over the stewartry, all which are of small extent, there are two principal streams, the Dee and Urr. The former has its source near the north-western boundary of the shire, and after contributing its waters to those of Loch Ken, it issues from the southern extremity of the loch, and finally falls into the Bay of Kirkcudbright. The salmon-fisheries on this river are valuable. The Urr rises in a lake of the same name on the borders of Dumfriesshire, and discharges itself into the Solway Frith. Previous to the middle of the last century the roads, with the exception of that from Dumfries to Newtownstewart, were impassable for carriages, but at present the county is in most parts intersected with well-made and tolerably level roads, which are kept in excellent repair.

Cotton-works upon a large scale were erected some years back at Gatehouse, but having proved unprofitable to the proprietors, they were suffered to decline from year to year, and are now probably altogether discontinued. Besides this the county is said to possess no manufactures of importance, although it is remarked in the population returns for 1831 that the number of weavers was greater than could be entirely ascribed to the local consumption of the article produced.

The county is divided into 28 parishes, the united population of which in 1831 was 40,590, namely 18,969 males and 21,621 females; which were distributed among 8283 families, whereof 2826 were occupied in agricultural pursuits, and 2293 in trade and handicraft.

The chief towns are Kirkcudbright and New Galloway, the latter of which, although a royal burgh, is of inconsiderable extent and population, without funds or property of any description. The county sends one member to the imperial parliament.

KIRKCUDBRIGHT, the county town, is agreeably situated on the eastern bank of the æstuary of the Dee, about five miles from the mouth of the Bay of Kirkcudbright, and 85 miles south by west from Edinburgh. It was antiently a burgh of barony under the Douglasses when they were lords of Galloway, but upon the fall of that family it was erected by James II. into a burgh of regality by a charter dated Perth, 26th of October, 1455. The town is irregularly built, and consists of two principal streets at right angles to each other. The public buildings are a court-house, school-house, and gaol. The streets are lighted, cleansed, and protected by a police, the expense of which is defrayed from the burghal revenue, the inhabitants being subjected to no local tax whatever. The property of the burgh consists of landed property, fisheries, and ferryage, which produced in 1832 a revenue of 936*l.* The debt of the burgh at that time amounted to 4343*l.*, and its annual expenditure to 864*l.* The living is in the presbytery of Kirkcudbright and synod of Galloway. The school is conducted by the rector and other masters, and the arrangements for promoting the improvement of the scholars are said to have been judicious and successful.

In the vicinity of the town are the vestiges of several of the fortresses of the antient lords of Galloway, among which may be mentioned the castle of Kirkcudbright, erected by the Maclellans, who still continue to derive the title of baron from this place. The harbour, which is considered the best on the south coast of Scotland, affords good anchorage and shelter. At the head of it is a beautiful and nearly insulated spot called St. Mary's Isle, the seat of the earl of Selkirk. The population of the burgh in 1831 was 2690. This town unites with Dumfries, Annan, Lochmaben, and Sanquhar in returning one member to parliament.

(Sinclair's *Account of the Agriculture of Scotland*, 4to., Edinb., 1795; MacCulloch's *Statistical Account of the British Empire; Beauties of Scotland; Parliamentary Papers*, &c.)

KIRKDALE, a parish of some extent, near Kirkby Moorside in Yorkshire, remarkable for a very antient church, with an Anglo-Saxon inscription of the date of Edward the Confessor, accompanying a rude representation of a sun-dial. Still more worthy of attention is a cavern in the oolitic limestone, not far from the church, which yielded a great quantity of bones, chiefly of extinct animals, and gave occasion to the publication of Dr. Buckland's valuable work the 'Reliquiæ Diluvianæ.'

This cave had a nearly level floor (parallel to the limestone strata); its extent, according to Young and Bird, was 245 feet; the height varied from 3 to 6 feet or more. On the rocky floor was generally a bed of mud, covered over by an irregular layer of sparry stalagmite, formed by the dropping of water containing carbonate of lime in solution; and it was in this stalagmite and in the mud below it that the bones were found.

Of the animals to which the bones belonged six were Carnivora, viz. hyæna, felis, bear, wolf, fox, weasel; four Pachydermata, viz. elephant, rhinoceros, hippopotamus, horse; four Ruminantia, viz. ox, and three species of deer; four Rodentia, viz. hare, rabbit, water-rat, mouse; five Birds, raven, pigeon, lark, duck, snipe.

The bones were almost universally broken; the fragments exhibited no marks of rolling in water, but a few were corroded; some worn and polished on the convex surface; many indented, as if by the canine teeth of carnivorous animals. In the cave the peculiar excrement of hyænas ('album græcum') was common; the remains of these predacious beasts were the most abundant of all the bones; their teeth were found in every condition, from the milk-tooth to the old worn stump: and from the whole evidence, Dr. Buckland adopted the conclusion, in which almost every subsequent writer has acquiesced, that Kirkdale Cave was a den of hyænas, during the period when elephants and hippopotami (not of existing species) lived in the northern regions of the globe, and that they dragged into it for food the bodies of animals which frequented the vicinity. (Buckland, in *Reliquiæ Diluvianæ*.)

KIRKHAM. [LANCASHIRE.]

KIRK SESSIONS. [SESSIONS, KIRK.]

KIRWAN, RICHARD, a chemical philosopher of considerable eminence, was born in Ireland about the middle of the last century, and died in 1812. He was intended for the profession either of law or medicine, and was sent to be educated by the Jesuits of St. Omer's. On the death of his brother however he succeeded to the family estate, left St. Omer's, and abandoned all thoughts of a profession. His whole life was devoted to the cause of philosophy, and he has also written on some subjects not immediately connected with it. His knowledge was extensive and his memory accurate; but though he lived at a time when Black, Cavendish, Priestley, and Scheele were greatly extending chemical science by their experiments, he does not appear to have contributed any very remarkable original discovery:

he was nevertheless usefully employed in many investigations.

About the year 1779, when he was residing either in London or its neighbourhood, he read before the Royal Society, of which he became a Fellow, several papers, and in 1781 the Copley medal was awarded to him. In 1789 he returned to Ireland, and was for some time president of the Royal Irish Academy, and he was elected member or associate of most of the literary societies of Europe.

It would be useless to attempt an analysis of the memoirs and works of Kirwan; they include not merely chemical subjects, but meteorology and mineralogy, and are diffused through the 'Transactions' of the Royal Society of London, those of the Royal Irish Academy, and other publications. One of his most remarkable separate works was 'An Essay on the Constitution of Acids,' in which he attempted to reconcile the antient chemical philosophy with modern discoveries. This work was translated into French by Lavoisier, with notes in refutation of its doctrines by Guyton-Morveau and Lavoisier, &c.

In this publication Kirwan regards inflammable air as the true phlogiston, and in every case as the principle of inflammability, and he supposes that combustion can be no other than the combination of vital air with phlogiston. Without disputing the experiment of the decomposition of water, he is of opinion that the inflammable air which is disengaged might be derived from the red-hot metal. His reasonings were completely refuted by the French philosophers whom we have named, and Kirwan had the candour, too rarely exhibited, of admitting the erroneousness of his views.

In 1794 he published 'Elements of Mineralogy,' in two volumes 8vo. This work, though now of course obsolete, was unquestionably useful in extending the boundaries of the science of which it treated. His 'Geological Essays' have never been considered as equally useful; but his 'Essay on the Analysis of Mineral Waters' contained a collection of what had been previously done on the subject, with new, and, in many cases, useful directions for conducting the requisite processes.

In 1809 he published a work on logic, which furnished ample materials for critical severity.

KISTNA. [HINDUSTAN, p. 209.]

KITCHEN-GARDEN. Every one knows what is generally understood by this name, a kitchen-garden forming a sort of inseparable adjunct to every country-house, to the mansion of the rich as well as to the humble cottage. In laying out the grounds of a country residence provision should be made for the site of the kitchen-garden. Though it should not obtrude on the ornamental ground immediately adjoining the house, the design of the whole should be so formed as to leave the kitchen-garden in the most favourable situation with regard to aspect, soil, and water. The aspect should be open to the south, but sheltered on other sides, more especially from northerly and easterly winds, by rising ground or lofty trees at some distance. The surface should be nearly level, or in some cases, according to the pervious nature of the subsoil, it may be quite so; but, generally speaking, a gentle slope from north to south is best. The soil should consist of a rich loam, neither too light nor so adhesive as to be liable to bind strongly in dry weather. The depth of soil ought not to be less than two feet, and more is absolutely necessary for some kinds of vegetables. If the subsoil be very impervious it should be sub-trenched; and in doing this the undisturbed bottom of the whole area should form a regularly inclined plane towards a proper drain; or if more convenient the bottom may form several planes so inclined as to allow the water a descent to a drain running through the lowest points. In the formation of gardens this is frequently not sufficiently attended to; while care is taken that the surface of the soil should be fair to the eye, a comparatively unimportant circumstance. If the bottom be made as above directed, the most important and difficult part of the groundwork is accomplished.

Water is very frequently obtained by means of pumps placed in convenient situations throughout the garden; but this is not the best mode of supply, nor should it be resorted to except where there is no alternative. Much injury is done to vegetation by watering with cold spring water, or indeed with any water that is much colder than the soil and atmosphere in which the plants are placed. Plants, when not watered at all in dry weather, if they are only kept alive, succeed better when rain does come than others that are watered, or rather chilled with water at a comparatively low temperature. The injurious effects of chilling plants by the application of very cold water is often visible in plants of the cabbage kind. After being transplanted from the seed-beds a quantity of cold water is immediately poured round their roots, the surrounding dry soil absorbs a great portion of this supply, the remainder is soon exhaled by evaporation, and the process is again repeated. Sudden extremes of heat and cold, moisture and dryness, derange the functions of the spongioles and roots; obstructions supervene, and occasion an accumulation of matter in the thicker parts of the root, which is the principal cause of what is called *clubbing*, or the formation of protuberances in cabbage-roots, a disease which proves a check to their future development by incapacitating their roots for a due transmission of nourishment. Water for the kitchen-garden should therefore be derived from ponds or large reservoirs fully exposed to the sun, and even these should be supplied by open rather than underground channels; they should also be shallow, for the following reason—the deeper the water the longer will a considerable portion next the bottom retain the temperature of its greatest density, about 40° Fahr. When the general temperature of water is above this the warmest is next the surface; and therefore the flow of water for the garden should be from the surface of the pond or reservoir. This may easily be effected by means of a floating or float-controlled sluice. When a broad sheet of water cannot be obtained for the supply of a garden some advantage will be gained by providing large cisterns in which water raised by pumps may be exposed to the air for some time previous to its being used.

The quantity of ground which a kitchen-garden should contain must be regulated according to the number of individuals which it is required to supply. An acre is calculated to afford a tolerable supply for sixteen individuals, but much depends on the nature of the vegetables required. Potatoes, turnips, peas, and carrots are frequently obtained of better quality and at less expense from a field than from a garden. With respect to potatoes in particular, only early varieties are now generally cultivated in gardens. If the mansion be only fully occupied for a part of the season, the quantity of ground will require to be nearly as much as if the supply were required throughout the year. Thus for example, a considerable breadth may be found necessary for peas in spring, and the same may be occupied with broccoli in autumn; so that the ground which would be sufficient for a few months' demand may be made equally so for the whole season by a proper succession of crops. For similar reasons it will be found that where a steady supply is required, proportionably less ground will be requisite than when the demand alternately exceeds and falls short of the mean.

A moderate establishment will require two acres of kitchen-garden, and a large one five or six; and in either case it may be found necessary to have recourse to field culture for those productions to which that mode of rearing is more especially adapted.

The form of a kitchen-garden should be composed of straight lines. If rectangular, it will prove a saving of labour; for it is practically known that more time is required to trench a piece of ground of a triangular form, than if the same extent were in the shape of a square or parallelogram; and besides, labourers who may not happen to be accustomed to the method of working such figures as have inclined sides are liable to make the surface irregular. A range of forcing-houses is generally placed on the north side; and as the wall on that side is the most valuable for fruit-trees on account of its direct south aspect, it becomes desirable that it should be extended as much as possible on each or both ends of the range. The form of the kitchen-garden is consequently determined to be that of a parallelogram with the two long sides running due east and west. The melon-ground, containing also pits for culinary forcing, should form an adjoining compartment well sheltered and excluded from the view on account of the quantities of litter and other fermenting substances which it must necessarily contain.

It is found that grapes ripen better against a very high wall than they do when trained on a low one. The conclusion to be drawn from this fact must be, that a greater accumulation of heat will take place in front of a wall 12 feet high than where the height is less, and consequently the trees, whilst they have space for a greater extension, enjoy an increased degree of warmth. Therefore it will be desirable that the walls of a kitchen-garden should not be less than the height above mentioned, with the exception of the one on the south, which may be only 10 feet, because it will occasion less shade; and if the wall on the opposite or north side be made 14 feet high instead of 12 feet, greater utility and a better effect will result. Once erected, walls are too valuable to be left unoccupied, and a border should accordingly be formed outside, as well as inside, for the reception of fruit-trees to be trained against them. This requires the enclosure of a slip, containing the wall-border, a walk, and a border between the latter and the outside fence. If this outside or *ring-fence* were formed of materials on which young trees could be trained, so as to fill any accidental vacancy that may occur on the principal walls, great advantages would accrue, for then the walls would always appear filled with trees in a bearing state. Such nursery trees should be carefully moved every second year, so that they may always be in a proper condition for their final destination.

The interior departments of the kitchen-garden are usually bounded by fruit-trees planted within two or three feet of the walks. Not only are bushes, such as gooseberries, currants, and raspberries, used for this purpose, but fruit-trees of various kinds. The latter are trained either as dwarfs by grafting apples on paradise stocks, and pears on quinces, and causing their branches to proceed from near the ground; or as espaliers. The latter were formerly more in use for training fruit-trees in kitchen-gardens than they are at the present time. Some object to their appearance, others to their expense compared with their utility. Their appearance is certainly not unsightly if they are not made too high; and although the old varieties of fruit-trees trained upon this plan were unprofitable, yet many of the new kinds will produce abundantly. They occupy very little space, and their shade, if not made higher than six feet, can be scarcely injurious, especially as it can be made to fall chiefly on the walk.

Very few of the subjects of kitchen-garden cultivation are indigenous; they are chiefly varieties of luxuriant habits, which are artificially maintained and augmented by the art of the cultivator. The principal means employed for rendering the soil of the kitchen-garden subservient to this purpose are,—the application of abundance of manure; trenching, digging, and otherwise stirring the soil; and a due rotation of crops. Manure supplied in abundance will generally produce luxuriance in vegetables, although sometimes a disagreeable rankness is communicated to the flavour. This is in a great measure corrected by trenching, which becomes occasionally highly necessary; and although expensive, it will always repay the cost, if judiciously performed, particularly if the soil be of a consolidating nature. Trenching exposes fresh soil, and gives rest to that which has been partially exhausted on the surface; it renders the soil pervious to water and air, and likewise for the roots of the plants; in wet weather the latter are free from stagnant moisture; and in drought they seldom suffer, because they have been able to penetrate the soil so far as to be beyond the reach of dryness. Moreover, if a thermometer is plunged in well loosened soil, after a few days of hot sun in March, it will be found to indicate a temperature many degrees above that in more compact earth, or where the soil has not been stirred for several years. The advantage of this communication of heat is obvious, especially when it is borne in mind that a number of kitchen-garden plants are natives of countries possessing a warmer soil and climate than those of Britain.

It is always advantageous to attend to a proper rotation of crops, especially where manure is not abundantly applied, nor trenching performed. One kind of plant should not immediately follow another of the same nature, or one closely allied.

The following arrangement of Vegetables, according to the natural orders to which they belong, will exhibit at one view the changes which may be made, more concisely and yet more perfectly than could be done in any other way: thus No. 2 or 3 may succeed No. 1, and the contrary. In short, the plants of any one order may alternate with those of another, as is found most convenient.

1. *Brassicaceæ*, including the Cabbage tribe, Turnip, Radish, Sea-kale, Mustard, Garden-cress, Water-cress, Horse-radish, and Scurvy-grass.

2. *Fabaceæ, or Leguminosæ.* Pea, Bean, Kidney-bean.

3. *Solanaceæ.* Potatoe, Love-apple, Egg-plant, Capsicum.

4. *Compositæ.* Jerusalem-artichoke, Artichoke, Cardoon.

5. *Apiaceæ, or Umbelliferæ.* Carrot, Parsnip, Skirret, Celery, Parsley, Fennel, Dill, Chervil, Anise, Caraway, Coriander.

6. *Chenopodiaceæ.* Beet, Spinach, Orach.

7. *Cichoraceæ.* Lettuce, Endive, Succory, Salsify, Scorzonera.

8. *Polygonaceæ.* Rhubarb, Sorrel.

9. *Liliaceæ.* Onion, Leek, Garlic, Shallot, Rocambole, Chives, Asparagus.

10. *Cucurbitaceæ.* Cucumber, Gourd.

11. *Lamiaceæ, or Labiatæ.* Thyme, Sage, Mint, Savory, Basil, Marjoram, Lavender, Hyssop, Rosemary, Balm, Clary.

The limits of this article will not admit of a detailed account of the various modes of culture; those who wish for extensive information upon this subject are referred to 'Loudon's Encyclopædia of Gardening,' or to the 'Guide to the Orchard and Kitchen-Garden.'

The following list will however show what description of plants a kitchen-garden should contain, and the different purposes to which they are applied:—

1.—*Oleraceous Plants*, consisting chiefly of the Cabbage tribe; 1. *White close-headed* (Early Dwarf, Early York, Early Battersea, Vanack, Portugal, or Cove Tronchuda). 2. *Red Cabbage* (Large Red, Small dark Red). 3. *Cauliflower* (Early, Late). 4. *Broccoli* (Purple Cape, Early White, Grange's Early Cauliflower, Cream-coloured or Portsmouth, Sulphur-coloured, Late Green or Siberian). 5. *Savoy* (Early Dwarf, Yellow, Large Green). 6. *Borecole* (Large Curled, Dwarf Curled, or Scotch-kale, Purple-kale, Variegated Borecole, chiefly used for garnishing, Buda-kale, Egyptian-kale). 7. *Brussels Sprouts*, the finest and hardiest of Winter Greens; they have been known to withstand the most intense frost that has ever occurred in Britain.

Sea-kale and *Asparagus* may also be included in this division.

2. *Roots or Tubers.*—1. *Potatoes* (Ash-leaved Kidney, Early Manly, Champion, Shaw's Early, Red-nosed Kidney, Lancashire Red, or Scotch Pink-eye, Bread-fruit; for a general supply in winter and spring the two last-mentioned sorts probably cannot be excelled). 2. *Turnips* (Early Flat White, Early Stone, Teltow, Maltese). 3. *Jerusalem Artichoke.* 4. *Carrots* (Early Horn, Long Orange, Long Red, Altringham). 5. *Parsnips* (Hollow-crowned). 6. *Beet, Beetroot, or Betterave* (Red Castelnaudari, Yellow Castelnaudari). *Skirret.* 8. *Salsify.* 9. *Scorzonera.* 10. *Radishes* (Scarlet, Salmon-coloured, Early White Turnip-rooted, Crimson Turnip-rooted, White Spanish, Black Spanish).

3. *Pulse.*—1. *Peas* (Early Dwarf, Early Frame, Early Charlton, D'Auvergne, Knight's Dwarf Marrow, Knight's Tall Marrow, Blue Prussian, White Prussian, Large Crooked Sugar, Groom's Superb Dwarf Blue). 2. *Beans* (Early Mazagan, Green Long-pod, Windsor, Dutch Long-pod). 3. *Kidney-beans and Runners* (Early Cream-coloured, Negro; these two sorts are very proper for forcing; Black-speckled, Red-speckled; Scarlet Runner, White Dutch Runner).

4. *Salads.*—1. *Lettuce* (Hardy Hammersmith, Tennis-ball, Large White Malta, or White Silesian; the preceding are varieties of Cabbage Lettuces, the following are Cos, or upright-growing sorts, Egyptian, or Early Green, Brown, Paris Cove, Alphange). 2. *Endive* (Broad-leaved Batavian, Small Batavian, Small Green-curled, Large Green-curled). 3. *Succory.* 4. *Celery* (White solid, Red solid, Violet). The following plants of a pungent nature are also used as salads: 5. *Mustard* (White). 6. *Garden-cress.* 7. *American-cress.* 8. *Water-cress.* 9. *Scurvy-grass.* 10. *Wood-sorrel.* 11. *Radishes.*

5. *Alliaceous Plants.*—1. *Onions* (Early Silver-skinned, Yellow or Straw coloured; these are esteemed the best sorts for pickling; Strasburg, Ognon pyriforme, or James's Keeping, Blood-red, Flat or Round Tripoli, Deptford, Globe).

2. *Leek* (London Flag). 3. *Garlic.* 4. *Shallot* (Long-keeping). 5. *Rocambole.* 6. *Chives.*

6. *Spinaceous Plants.*—1. *Spinach* (Round-leaved, Flanders, the former for summer and the latter for winter use). 2. *New Zealand Spinach* (Tetragonia expansa), useful in dry summers as a substitute for the Round-leaved. 3. *Leaf-beet* (Green, White, Yellow, Red). 4. *Orach* (Pale Green, Purple).

7. *Condiments.*—1. *Parsley* (Curled). 2. Fennel (Common, Dwarf, or *Finochio*). 3. *Dill.* 4. *Chervil.* 5. *Taragon.* 6. *Caraway.* 7. *Anise.* 8. *Coriander.* 9. *Savory* (Winter, Summer). 10. *Basil* (Sweet, Bush). 11. *Marjoram* (Winter, Sweet, Pot). 12. *Thyme* (Common, Lemon). 13. *Sage* (Green, Purple, Broad-leaved, Narrow-leaved). 14. *Tansy.* 15. *Horse-radish.* 16. *Nasturtium* or *Indian Cress.* 17. *Mint* (Spearmint, Peppermint)

8. *Fruits.*—1. *Cucumbers* (Russian, Long Prickly, Short Prickly). These are sorts proper for ridging out in the open ground for the purpose of pickling. 2. *Gourds* (Vegetable Marrow, Large Yellow). 3. *Love Apples,* or *Tomatoes* (Large Red, Large Yellow). 4. *Egg Plants* (White, Purple). 5. *Capsicums* (Cayenne Pepper, Cherry Pepper, Large Tomato Capsicum, Chillies, those with very hot, upright pods; there are red, yellow, and black varieties).

9. *Miscellaneous.*—1. *Artichoke* (Globe, Conical). 2. *Cardoon* (Spanish). 3. *Rhubarb* (Buck's, Siberian, Elford, Hybrid). 4. *Sorrel* (French). 5. *Lavender.* 6. *Hyssop.* 7. *Rosemary.* 8. *Balm.* 9. *Clary.* 10. *Marigold.* 11. *Chamomile.* 12. *Liquorice.* Of these the Rhubarb is certainly the most useful: several of the others, though generally considered as belonging to kitchen-gardens, are seldom required.

KITE. [FALCONIDÆ, vol. x., p. 187.]

KITTIWAKE. [LARIDÆ.]

KIVA. [TURKISTAN.]

KIZIL IRMA'K, or ERMA'K (the Red River), is a river in Asia Minor, known to the antients under the name of Halys. Though traversing a country which has been known to Europeans for more than 2000 years, the course of this river has only very recently been accurately laid down on our maps. Brant, in 1835, found that the source of the Kizil Irmák is not in a range west of the town of Sivas, but runs down to that town from the range called the Ak Dagh, in a southern direction. Though Sivas is not far from its source, it is a considerable river at that town, and timber for building and fuel are brought down by it from the mountains in which it rises. (*London Geogr. Journ.*, vi. 214.) After watering the fertile plain of Sivas, which is from 15 to 20 miles in length, it turns to the westward, and in approaching Kaisariyeh it is joined by the Kará-su river, which brings to it the waters collected on the mountains near that town, and particularly those from the snow-capped mountain-mass of Argæus. The Kizil Irmak, continuing its general western course, enters the arid plains of the table-land of Asia Minor, but does not appear to receive any considerable river from the south, and the stream which, in most maps, falls into it from the south near 34° E. long., seems to be imaginary. Between 33° and 34° E. long. the river makes a great bend, by which its western course is changed into a north-eastern. It afterwards turns to the north, and in approaching the Black Sea suddenly directs its course to the east, until it again resumes its north-eastern course a short distance from its mouth, which is less than 10 miles below Bafra. The whole course of the Kizil Irmak is not much short of 500 miles. Nothing is known respecting the extent to which it is navigable, nor where it descends from the table-land, nor whether it forms any cataracts in its descent.

(Brant and Hamilton, in *London Geogr. Journal*, vi. and viii.)

KLAPROTH, MARTIN HENRY, a distinguished analytical chemist, was born at Wernegerode in Upper Saxony on the 1st December, 1743. It was his intention to study theology; but the severe treatment which he met with at school disinclining him to study, he preferred the profession of an apothecary, and he accordingly spent seven years in the public laboratory at Quedlinburg, where he learnt little else than how to manipulate in pharmaceutical operations.

After spending two years in the public laboratory at Hanover, he went to Berlin, and in 1770 to Danzig, in both which places he was an assistant in a laboratory; he afterwards returned to Berlin as an assistant to Valentine Rose, one of the most distinguished chemists of the day, and on his death in 1771 he succeeded him, having, at the request of Rose, undertaken the superintendence of his office and the education of his two sons. In 1780 he underwent the necessary forms and examinations for the profession of an apothecary with great applause. His thesis 'On Phosphorus and Distilled Waters' was printed in the 'Berlin Memoirs' for 1782.

His various analyses and contributions to chemical science were diffused through periodical publications till 1796, when he began to collect and publish them. This work, under the title of 'Contributions to the Chemical Knowledge of Mineral Bodies,' was published in German; the last and sixth volume appeared in 1815, about a year before the death of the author. Besides this work, which contained 207 treatises, he published a Chemical Dictionary jointly with Professor Wolff, and he superintended a new edition of Gren's 'Manual of Chemistry.'

To enumerate the various minerals which he analyzed by processes perfectly new and peculiar, and with greater accuracy than had ever before been practised, would be tedious; we may however mention, as the results of these labours, the discovery of the peculiar metal uranium in pechblende, and the earth zirconia in the hyacinth; he also more perfectly detailed the properties of titanium, which had previously been discovered by Gregor in Cornwall, and of tellurium, which had been noticed by Müller as a peculiar metal.

There were many minerals which, when Klaproth began their analysis, he found it extremely difficult to render soluble in acids, and without this it was in many cases impossible to arrive at a correct result; among these bodies was the corundum, or adamantine spar. This substance, though consisting almost entirely of clay or alumina, so long resisted all previously known means of analysis, that Klaproth at first regarded it as a peculiar and distinct earth. He found however that by treatment with caustic potash, instead of the carbonate, in a silver crucible, this refractory mineral was at length rendered soluble in acids, and was in fact alumina.

Numerous other improvements were introduced by this laborious and accurate analyst, into the processes of the chemist; the above is not the least important, and has therefore been referred to as a specimen of the value of his contributions to science.

The above process was of itself sufficient to alter the face of mineralogy, and indeed it is hardly asserting too much when we state that of all analyses previously performed scarcely half a dozen were correct. The great services thus rendered to chemistry and mineralogy were duly appreciated; about 1787 he was elected a member of the Royal Academy of Arts; and the year following he was chosen a member of the Royal Berlin Academy of Sciences. In 1782, he was made assessor in the Supreme College of Medicine and Health, and he was professor of chemistry in the Royal Mining Institute; he had also other honourable appointments; and in 1811 the king of Prussia added the Order of the Red Eagle of the third class.

Klaproth married about 1783; his wife died in 1803, and they had three daughters and a son, who survived their parents. Klaproth died at Berlin on the 1st of January, 1817, in the 74th year of his age.

KLEENEBOK. [ANTELOPE, vol. ii., p. 82.]

KLEIST. [GERMANY, *Literature*.]

KLIPSPRINGER. [ANTELOPE, vol. ii., p. 77.]

KLOPSTOCK, FRIEDRICH GOTTLIEB, was born at Quedlinburg, in the year 1724, of respectable parents, and frequented the gymnasium of that place. In his sixteenth year he went to the school at Naumburg, where his poetical character was first developed. Here he perfected himself in the antient languages, and even at this early age resolved to compose a long epic poem, though he had not yet made up his mind as to the subject. At first he thought of making the Emperor Henry I., commonly called 'the Fowler,' the hero of his work, and some odes by him on this sovereign show that he was then uppermost in his mind. In 1745 he studied theology at Jena, where he seems to have decided on making the Redeemer the subject of his epic, for it was then that he projected the first canto of his 'Messiah,' and in 1748 the first three cantos appeared. The excitement created by this poem was surprising; some regarded him as an ectype of the antient prophets, while others deemed his poetical treatment of so sacred a subject profane and presumptuous. In the same year he went to Langensalza to superintend the education of the children of a relation named Weiss, with whose daughter he fell in love, but without a return of his passion. This lady was the 'Fanny' of his odes. Bodmer, the Swiss poet, invited him to Switzerland, where his poem had made a great impression. In Switzerland he was received with a reverence that bordered on adoration (1750). While in this country his mind seems to have taken a patriotic tendency: the antient Hermann (the Arminius of Tacitus) became his favourite hero, whose deeds he afterwards celebrated in some dramatic works. In Denmark the minister Bernstoff had become acquainted with the three cantos of the 'Messiah,' and Klopstock was offered a pension of 400 dollars on condition of coming to Copenhagen and there finishing his poem. He set off in 1751, travelled through Brunswick and Hamburg, and at the latter place formed an intimacy with Margaretha Moller, daughter of a respectable merchant. At Copenhagen he was received by Bernstoff with the greatest respect, and introduced to the king, Frederick V., whom he accompanied on his travels. In 1754 he went to Hamburg, and there married his beloved Margaretha, who in 1758 died in childbed. From 1759 to 1763 he lived alternately in Brunswick, Quedlinburg, and Blankenburg, but afterwards returned to Copenhagen. He composed in 1764 his drama 'Hermannsschlacht' (the battle of Arminius), the subject of which is the defeat of the Roman general Varus by the antient Germans, and which is scarcely so much a drama, as a lyric poem in a dramatic form. His other dramas are of a similar character. In 1771 he left Copenhagen and settled at Hamburg, where he completed his 'Messiah,' and in 1792 married a second wife. He died in 1803.

Though Klopstock is still read and admired as a classic author, that adoration which was paid him has long since evaporated, and many have questioned whether he was a poet at all in the genuine sense of the word. Both in his 'Messiah' and his odes he is dignified and sublime, but his rhapsodical manner contrasts strangely with the pedantry which is always apparent. Goethe, in his conversations with Eckermann, expressed his opinion that German literature was greatly indebted to Klopstock, who was in advance of his times, but that the times had since advanced beyond Klopstock, and that a modern poet would do wrong to take him as a model. The young Hardenberg (who wrote under the name of 'Novalis') has happily said that Klopstock's works always resemble translations from some unknown poet, done by a clever but unpoetical philologist. Notwithstanding the grandeur of his 'Messiah,' it is exceedingly tedious to read; and even at the time of Klopstock's greatest popularity this seems to have been felt, for Lessing (his contemporary) observes, in an epigram, that everybody praises Klopstock, but few read him. His odes are valued by his own countrymen more than his epic, and some are truly sublime; but the construction of the language is so singular, and the connection of the thoughts so often non-apparent, that these odes are reckoned among the most difficult in the language.

KNARESBOROUGH. [YORKSHIRE.

KNELLER, GODFREY, was born in 1648, in the city of Lübeck, and received his first instruction in the art of painting in the school of Rembrandt. He afterwards became a pupil of Ferdinand Bol. Having acquired sufficient acquaintance with his profession to qualify him to travel with advantage, he went first to Rome and afterwards to Venice, where he painted several portraits of noble families, and some historical pictures, with such success as to gain him considerable reputation, even in Italy. Leaving Venice, he went to Hamburg, where he met with extraordinary encouragement, and lastly came to London. Being patronised by the duke of Monmouth, he was introduced to King Charles II., whose portrait he painted several times. The death of Sir Peter Lely leaving him without a competitor, the remainder of his life was a career of fame and fortune. He had incessant employment, and was distinguished by many public marks of honour. He was state painter to Charles II., James II., William III., Queen Anne, and George I. The emperor Leopold made him a Knight of the Roman Empire, the grand-duke of Tuscany asked for his portrait to place it in the Gallery at Florence, and his works were celebrated by the first poets of his time.

Kneller had much of the freedom of Vandyck, but less nature. His outline is bold, his attitudes are easy and not without dignity; his colouring is lively, the air of his heads generally graceful, and there is a pleasing simplicity in his portraits combined with a considerable degree of elegance. But there is also a monotony in the countenances and a want of spirit in his figures. Thus the beauties of the court of William III., painted by order of the queen, are very inferior and tame, in comparison with Sir Peter Lely's beauties of the court of Charles II. In the collection of the marquis of Bute at Luton House there is a portrait of Sir John Robinson by Kneller, which, says Dr. Waagen, is far more elevated and free in the conception than usual, more carefully finished, and so warm in the colouring, that we recognise the scholar of Rembrandt. Sir Godfrey died in 1726, at the age of 78.

KNIGHT, KNIGHTHOOD. During the prevalence of the feudal system, when the military strength of the nation was measured by the number and efficiency of the knights whom the sovereign was able to summon to the field, a regular supply of persons qualified to perform in an effectual manner the services annexed to their tenures was a matter in which the public as well as the crown were deeply interested; and the common law adopted that part of the feudal system which enabled the king, by process of distress [DISTRESS], to compel those who held knight's fees [KNIGHT'S FEES] to take upon themselves the order of knighthood, or, in other words, to prove, by their reception into that order, that they had received the training and possessed the arms and accoutrements, and were, as to other requisites, qualified to take the field as knights. The statute, or rather the grant of 1 Edward II. enrolled in parliament, called 'Statutum de Militibus,' appears to have been made, partly as an indulgence upon the commencement of a new reign, and partly for the purpose of removing some doubts which existed as to the persons liable to be called upon to receive knighthood. The king thereby, in the first place, granted a respite until the following Christmas to all those who ought to have become, but were not knights, and were then distrained ad arma militaria suscipienda. Further, it directed that if any complained in chancery that he was distrained and had not land to the value of forty pounds in fee, or for term of his life, and was ready to verify that by the country (i.e. by the decision of a jury), then some discreet and lawful knights of the county should be written to, in order to make inquisition of the matter, and if they found it to be so, he was to have redress, and the distress was to cease. Again, where a person was impleaded for the whole of his land, or for so much of it that the remainder was not of the value of forty pounds, and he could verify the fact, then also the distress was to cease till that plea was determined. Again, where a person was bound in certain debts atterminated in the exchequer at a certain sum to be received thereof annually (i.e. respited, subject to payment by instalments), and the remainder of his land was not worth forty pounds per annum, the distress was to cease till the debt was paid. No one was to be distrained ad arma militaria suscipienda till the age of twenty-one, or on account of land which he held in manors of the antient demesne of the crown as a sokeman, inasmuch as those lands were liable to pay a tallage when the king's lands were tallaged. With respect to those who held land in socage of other manors, and who performed no servitium forinsecum, or service due upon the tenure, though not expressed in the grant, the rolls of chancery in the times of the king's predecessors were to be searched, and it was to be ordered according to the former custom; the same of clerks in holy orders holding any lay fee, who would, if laymen, have been liable to become knights. No one was to be distrained in respect of property of burgage tenure. Persons under obligation to become knights, who had held their land only a short time, were extremely old, or had an infirmity in their limbs, or had some incurable disease, or the impediment of children, or law-suits, or other necessary excuses, were to appear and make fine before two commissioners named in the act, who were to take discretionary fines from such disabled persons by way of composition. Under this regulation those who were distrained upon as holding land of the value of 40*l.* per annum either received knighthood or made fine to the king. The alteration in the nominal value of money occasioned by the increased quantity of the precious metals, and still more by successive fraudulent degradations of the standard, gradually widened the circle within which estates were subjected to this burthen; and in the sixteenth and seventeenth centuries lands which, in the reign of Edward II., were not perhaps worth 4*l.* per annum, had risen in nominal value to 40*l.*, and were often held by persons belonging to a totally different class from those who were designated by 1 Edward II., stat. 1, as persons having 40 libratas terræ.

That power of compelling those who refused to take upon themselves the order of knighthood, or rather of distraining them till they received knighthood, or compounded with the king by way of fine, which originally was a means of enforcing the performance of a duty to the crown and to the public, by persons holding a certain position and having a certain stake in the country, was perverted into a process for extorting money from those who would have been exempt at common law, which regulated the amount of a knight's fee by the sufficiency of the land to support a knight, and not by its fluctuating nominal value in a debased currency. This oppressive, if not dishonest proceeding, which was occasionally resorted to in the reigns of Edward VI. and Elizabeth, was reduced into a system by the rash advisers of Charles I., and was adopted by that unfortunate prince as one of the modes by which money might be raised without resorting to a parliament for assistance. The undisguised manner in which this antient prerogative was thus abused, led to its total abolition. By 16 and 17 Car. I., c. 20, it is enacted, that none shall be compelled, by writ or otherwise, to take upon him the order of knighthood, and that all proceedings concerning the same shall be void.

Persons have been required to take upon themselves the order of knighthood as a qualification for the performance of honourable services at coronations, in respect of the lands which they held by grand serjeanty.

Knighthood in England is now conferred by the king (or queen when the throne is filled by a female) by simple verbal declaration attended with a slight form, without any patent or other written instrument. Sometimes, but rarely, knighthood is conferred on persons who do not come into the presence of royalty. This is occasionally done to governors of colonies, and other persons in prominent stations abroad. The lord-lieutenant of Ireland has a delegated authority of conferring this honour, which is very sparingly exercised.

Knighthood gives to the party precedence over esquires and other untitled gentlemen. 'Sir' is prefixed to the baptismal name of knights and baronets, and their wives have the legal designation of 'Dame,' which is ordinarily converted into 'Lady.'

A rank correspondent to our rank of knighthood has been found in all Christian countries. Some regard it as a kind of continuation of the equestrian order among the Romans. But it is safer to regard it as originating in Christian times; and the eleventh and twelfth centuries have been named as the period to which the order of knighthood as now existing may be traced. In such an inquiry there are two difficulties: first, to state with sufficient precision what is the thing to be proved; and, secondly, to obtain evidence of the commencement of an institution which probably grew, almost insensibly, out of a state of society common to the whole of civilized Europe.

It was a military institution, but there appears to have been something of a religious character belonging to it, and the order of knighthood, like the orders of the clergy, could be conferred only by persons who were themselves members of the order.

In early times some knights undertook the protection of pilgrims; others were vowed to the defence or recovery of the Holy Sepulchre. Some, knights-errant, roved about 'seeking adventures,' a phrase not confined to books of romance, of which there are many on this subject, but found in serious and authentic documents.

There is a treatise by Bishop Hurd on chivalry.

But besides those who are simply knights, there are knights who are members of particular orders or classes.

These orders are found in most of the kingdoms of modern Europe, and have had generally for their founder a sovereign prince. Such are the order of the Golden Fleece, instituted by Philip duke of Burgundy; the order of the Holy Ghost, instituted by Henry the Third of France; the order of St. Michael, instituted by Louis the Eleventh of France. Of the foreign orders, which are very numerous, a full account may be found in a work in two volumes octavo, entitled 'An Accurate Historical Account of all the Orders of Knighthood at present existing in Europe,' a work printed abroad, the author of which was Sir Levet Hanson, an Englishman. Each of these orders has its peculiar badge, ribbons, and other decorations of the person. The three great British orders, the Garter, the Thistle, and Saint Patrick, belong to this class.

The Garter may claim to be considered as the most antient, and is indisputably the most illustrious order existing. It was founded by King Edward the Third soon after his return from his expedition to France and his victory at Cressy. The persons admitted into it were for the most part the soldiers who had most distinguished themselves in the expedition. The number of persons admitted was twenty-five, besides the king himself. It had a bishop for its prelate, and other officers. It has flourished in unabated splendour from the time of its foundation, the knights having been the most eminent persons of the English nation, together with many illustrious foreigners, of whom the greater part have been sovereign princes. The number was strictly confined to twenty-five, and so continued till the reign of George the Third, when a new statute was made that the knights should be twenty-five, exclusive of any members of the royal family who should be admitted into the order. Another statute has since been made that the number should be twenty-five, without reckoning the illustrious foreigners who might be admitted into the order. The history of the Order of the Garter has been treated of in a work by Elias Ashmole, a herald of the reign of Charles the Second; and there is a later and more important work on the same subject by John Anstis, who was the Garter King at Arms.

The Order of the Thistle was instituted in 1540, by James the Fifth, king of Scotland; but it fell into decay, till in the reign of Queen Anne, 1703, it was revived. The number of knights was limited to thirteen, but in 1827 the number was increased to sixteen, all of whom are nobility of Scotland.

The Order of St. Patrick was instituted in 1783. The knights were fifteen, increased in 1833 to twenty-two, who are peers of Ireland.

The order of the Bath differs in some respects from those just spoken of. Knights of the Bath are found in the early history of the English sovereignty, being persons, in number indefinite, who were made knights in some peculiar manner, of which *bathing* constituted a part of the ceremonies, a coronation, royal marriages, or when the king's eldest son was made a knight. Such were the knights of the Bath till the reign of King George I., who cast them into an order consisting of thirty-six knights with a grand master at their head. The order so continued till the close of the war with Napoleon, when, during the regency (1815), the order was greatly extended, and the persons composing it were thrown into three classes: the Knights Grand Crosses, the number of whom is not to exceed seventy-two; the Knights Commanders, the number of whom is not absolutely limited, but at the beginning not exceeding one hundred and eighty Englishmen and ten foreigners; and the Companions.

There are also knights of the Guelphic order, and knights of the Ionian order of Saint Michael and Saint George.

KNIGHT OF THE SHIRE is the designation given to the representative in parliament of English counties at large, as distinguished from such cities and towns as are counties of themselves (which are seldom, if ever, called shires), and the representatives of which, as well as the members for other cities and towns, are denominated citizens or burgesses. Though the knights of the shire always sat with the citizens and burgesses as jointly representing the third estate of the realm, as well during the time that the three estates, viz. the spiritualty, the lords temporal, and the commons, sat together, as since, we find that grants were occasionally made by the knights to be levied on the counties, whilst separate grants were made by the citizens and burgesses to be levied upon the cities and boroughs. (*Rot. Parl.*) The wages payable to knights of the shire for their attendance in parliament, including a reasonable time for their going up and coming down, were four shillings a day, being double what was received by citizens and burgesses. At the close of every session of parliament the course was for the king, in dismissing them to their homes, to inform them that they might sue out writs for their wages, upon which each knight separately obtained a writ out of Chancery directed to the sheriff, mentioning the number of days and the sum to be paid, and commanding the sheriff to levy the amount. Upon this the sheriff, in a public county court, divided the burthen amongst the different hundreds and townships, and issued process to levy the amount, which, to the extent of the money levied, he paid over to the knight. The lands of the clergy, as well regular as secular, were exempted from contributing towards these expenses, because the clergy formed a distinct estate, and were represented in parliament by their prelates and the procuratores cleri, although the latter were, as Lord Coke expresses it, voiceless assistants only. All lay fees within the county were liable to contribute, except lands belonging to the lords and their men. The lords insisted that this exemption extended to every freeholder who held land within their baronies, seigniories, or manors, alleging that they served in parliament at their own expense for themselves and their tenants. And such was undoubtedly the practice; as by the Parliament Roll it appears that the commons frequently petitioned that the exemption should be confined to such lands as the lords kept in their own hands and occupied by their farmers or by their bond-tenants, or villeins. These requests however were met either by a simple refusal or by a statement by the king that he did not mean to lessen the liberties of the lords. If however a lord purchased land which had previously been contributory to the knight's wages, the liability continued. Freehold lands, held either by knight's service or in common socage, were liable to this burthen, but customary tenures in antient demesne and tenures in burgage were exempt. In the county of Kent no socage land was contributable, the whole burthen being thrown upon those who held knight's fees, an anomaly against which the commons preferred many ineffectual petitions. Knights of the shire, and also their choosers, were formerly required to be persons either resident or having a household in the county. This regulation, though confirmed by several statutes, had fallen into neglect, and was formally abrogated in both its branches by 14 George III., c. 58. The removal of the latter part of the restriction has greatly added to the expense of county elections; and though the Reform Act, 2 Will. IV., c. 45, disfranchises out-voters in boroughs, it does not restore the old law as to non-resident county electors. (*Rot. Parl.*, vol. ii., 258, 287; iii., 25, 44, 53, 64, 212; iv., 352.)

KNIGHT'S FEE was land of sufficient extent and value to support the dignity of a knight, granted by the king, or some inferior lord, upon the condition that the grantee and his heirs should either perform the service of a knight to the grantor and his heirs, or find some other person to do such service. The quantity of land capable of supporting a knight naturally varied according to its quality and situation; and even the amount of income sufficient to meet the charges of a knight would fluctuate according to time and place. It is not therefore surprising that we find a knight's fee sometimes described as consisting of 800 acres, sometimes of 680; sometimes estimated at 15*l.*, sometimes at 20*l.*, and in later times at 40*l.* per annum. If the owner of a knight's fee deprived himself of the possession of part of his land by subinfeudation he remained liable to the feudal burthen attached to the tenure of the whole.

KNIGHT'S SERVICE, TENURE BY, otherwise called tenure in chivalry, or per service de chivaler, per servitium militare, was, from the times immediately succeeding the Norman Conquest in the eleventh century to the period of the civil war in the seventeenth, considered the first and the most important, as it was also the most general, mode of holding land and other immoveable property in England. The land held by this species of tenure was said to consist of so many knight's fees, feoda militis, *i.e.* so many portions of land capable of supporting the dignity of a knight. [Knight's Fee.] He who held an entire knight's fee was bound by his tenure, when called upon so to do, to follow his lord to the wars (under certain restrictions as to the place at which the service was to be performed), and to remain with him forty days in every year, or to send some other knight duly qualified to perform the services. From the owner of half a knight's fee twenty days' attendance only could be required; and the obligation attaching to the quarter of a knight's fee was satisfied by the performance of ten days' service. On the other hand, a person holding several knight's fees, whether forming one or several estates, was bound to furnish a knight in respect of each.

Besides this permanent liability to military service, the tenant was subject to other occasional burthens. The principal of these are the following incidental services:—First, *Aids*, or payments which the vassal holding by knight's service was bound to make for ransoming his lord's person if taken prisoner; for making the lord's eldest son a knight; and for marrying, *i.e.* providing a marriage portion for the lord's eldest daughter. Secondly, *Reliefs*, being a payment made by the heir in the nature of a composition for leave to enter upon land descending to him after he had attained his full age. Thirdly, *Primer Seisin*, or the right of the crown, where the lands were held of the king, to a year's profit of land descending to an heir who was of full age at the time of the death of his ancestor. Fourthly, *Wardship*, or the right to the custody of the body and lands of an heir to whom the land had descended during his minority, the king or other lord in such case taking the profits of the land during the minority to his own use, or selling the wardship to a stranger if he thought proper. Fifthly, *Marriage*, or a right in the lord, where the land descended to an heir within age, to tender to him or her a wife or a husband; and if the heir refused a match without disparagement, *i.e.* without disparity of rank, crime, or bodily infirmity, the lord became entitled to hold the land as a security for payment by the heir of the amount for which the lord had sold or which he might have obtained for the marriage. Sixthly, *Fines upon Alienation*. To these Blackstone adds a seventh, *Escheat*, or the returning of the land to the lord upon the felony or forfeiture of the tenant, or his dying without heirs. [Escheat.] But escheat is not peculiar to tenure by knight's service.

This system, which Blackstone justly characterizes as a complicated and extensive slavery, fell to the ground during the existence of the Commonwealth; and the abolition of this species of tenure was confirmed upon the Restoration, as it would have been absurd and dangerous to attempt a renewal of such oppressive burthens. Accordingly the 12th Car. II., c. 24, takes away tenure by knight's service, whether the lands are held of the crown or of a subject, together with all its oppressive fruits and peculiar consequences, and converts every such tenure into free and common socage. [Socage.] Nothing can be more comprehensive than the terms of this act; besides generally abolishing tenure by knight's service, and its consequences, it descends into particulars, with a redundancy of words, which appear to indicate an extreme anxiety to extirpate completely all the evils which the legislature had under contemplation. The statute, after taking away the court of wards and liveries, enumerates wardships, liveries, primer seisins or ousterlemains, values and forfeitures of marriages, and fines, seisures, and pardons for alienation, and sweeps away the whole. But rents certain, heriots [Heriot], suit of court and other services incident to common socage, and fealty [Distress], and also fines for alienation due by the customs of particular manors, are preserved. Reliefs for lands, of which the tenure is converted into common socage, are saved in cases where a quit-rent is also payable.

KNIGHT, RICHARD PAYNE, eldest son of the Reverend Thomas Knight, of Wormesley Grange, in the county of Hereford, was born in 1750. He was a weak and sickly child, and his father did not send him to school, or suffer him to learn either Greek or Latin at home. Soon after his father's death, which took place in 1764, he was sent to a grammar-school in the neighbourhood, where he made a very rapid progress in the Latin language. After leaving school he did not go to a university, but at the age of eighteen he commenced the study of Greek, which he pursued with great diligence, and which became one of the chief occupations of his life. Shortly afterwards he visited Italy, principally on account of his health; and here he seems to have formed the taste for the fine arts, and especially for the productions of the Greek sculptors, which was his most prominent characteristic. Subsequently to his father's death he inherited the large estate of Downton, near Ludlow, from his grandfather, on which, after his return from Italy, he built a mansion, and he devoted much time to improving and ornamenting his grounds. In

1780 he was elected to serve in parliament for the borough of Leominster, and in the following parliament of 1784, for the borough of Ludlow, for which he continued to sit until the year 1806, when he retired from parliament. While a member of the House of Commons he acted with Mr. Fox, but he never took any part in debate, nor did he ever interest himself about politics. In 1814 he was appointed a trustee of the British Museum, as the representative of the Townley family.

Early in his life he commenced the formation of a collection of antiques and other works of art, to which his large fortune enabled him to make constant additions. It consisted principally of antient bronzes and Greek coins; and it was preserved in his London house in Soho Square, which contained a large room fitted up for the purpose. He bequeathed his collection (the value of which was estimated at 50,000*l.*) to the British Museum. He had originally intended to bequeath it to the Royal Academy. [BRITISH MUSEUM, p. 453.] The bill legalizing the acceptance of this collection by the trustees of the British Museum received the royal assent on the 17th of June, 1824. Mr. Knight died in his house in London, on the 24th of April, 1824, and he was buried at Wormesley church, in Herefordshire, where there is a monument to his memory, with a Latin epitaph written by Dr. Cornwall, bishop of Worcester.

Mr. Payne Knight began at an early age to admire the remains of Grecian art; and hence in his studies of Greek literature his attention was mainly directed to those subjects which illustrate Greek sculptures and coins, viz. mythology, and the archaic Greek language. Accordingly his first work was 'An Account of the Remains of the Worship of Priapus lately existing at Isernia, in the kingdom of Naples: to which is added a Discourse on the Worship of Priapus, and its connexion with the Mystic Theology of the Antients,' 4to, 1786. (Distributed by the Dilettanti Society.) This illustration of the obscene worship of Priapus was severely censured by the author of the 'Pursuits of Literature;' but although it may be doubted whether the subject was worthy of investigation, it is certain that Mr. Knight had no other object in view than the purely scientific one of elucidating an obscure part of the Greek theology.

His next production was 'An Analytical Essay on the Greek Alphabet,' 4to., London, 1791. This work (which was reviewed by Porson in the 'Monthly Review' for 1794: see his article reprinted in Porson's 'Tracts,' p. 108, 'Museum Criticum,' vol. i., p. 489) was chiefly remarkable for an exposure of the forgery of certain Greek inscriptions which Fourmont professed to have found in Laconia. These inscriptions had deceived the most eminent scholars, among whom it is sufficient to name Winckelmann, Villoison, Valckenaer, and Heyne; and their genuineness was first questioned by Payne Knight, who supported his opinion with an elaborate argument. A feeble attempt has been subsequently made by Raoul Rochette to defend them; but their spuriousness is now universally admitted. (See Boeckh, *Corp. Inscript. Græc.*, vol. i., p. 61-104, whose dissertation has completely exhausted the subject.) Mr. Knight next attempted poetry, for which the character of his mind did not at all fit him. In 1794 he published the 'Landscape,' a didactic poem, in three books, addressed to Uvedale Price, Esq. This poem contains many precepts, marked by sound judgment and good taste, on the subject to which it relates; and at the end are some sagacious remarks on the French Revolution, the event of which was still undetermined. It appears from the preface to Mr. Price's 'Essay on the Picturesque' (published in 1794), that Mr. Knight proposed to Mr. Price that the papers written by the latter on rural improvement should be published with his poem of the 'Landscape,' in the same manner as Sir J. Reynolds's notes were published with Mr. Mason's 'Du Fresnoy;' but that the proposal came too late to enable Mr. Price to accept it. Mr. Knight published three other metrical works at subsequent periods of his life. The first was a didactic poem, in six books, entitled 'The Progress of Civil Society,' 4to., London, 1796, now only known by the witty parody in the 'Antijacobin' (supposed to have been written by Mr. Canning). The second was 'A Monody on the Death of the Right Honourable C. J. Fox,' 8vo., London, 1806-7. The third was entitled 'Alfred, a Romance in rhyme,' 8vo., London, 1823.

In 1805 Mr. Payne Knight published 'An Analytical Enquiry into the Principles of Taste,' 8vo., London, which passed through several editions. This work is characterized by originality and acuteness of thought, and is the only production of Mr. Knight's which is interesting to the general reader. It was reviewed with some severity in the 'Edinburgh Review' for January, 1806. (See also some remarks on it in Mackintosh's 'Life,' vol. i., p. 371.) Mr. Knight afterwards contributed to the 'Edinburgh Review' (Number for July, 1809) a critique of Falconer's 'Strabo,' a work published at the Clarendon Press. In the following year Mr. Copleston, then a tutor of Oriel College, Oxford, and now bishop of Llandaff, published a defence of the University of Oxford against the strictures of the 'Edinburgh Review.' This defence related not only to Mr Knight's critique of Falconer's 'Strabo,' but also to passages in other articles ascribed to Mr. Playfair and Mr. Sydney Smith. An article in reply, contributed by the three reviewers, appeared in the 'Edinburgh Review' for April, 1810: Mr. Knight's share of it extends from p. 169 to p. 177. Mr. Copleston afterwards rejoined, and the controversy with Mr. Knight ended in a grammatical discussion totally foreign to the question at issue. Mr. Knight erred in making the University of Oxford responsible for the defects of a work published at the Clarendon Press; but he was unquestionably right in representing classical literature as being at a low ebb in Oxford at that time. In 1809 were published 'Specimens of Antient Sculpture, selected from different Collections of Great Britain, by the Society of Dilettanti,' fol., and a second volume was published in 1835. This magnificent work was chiefly due to Mr. Knight's industry and taste; the subjects were chosen by him, and he wrote the prefaces and descriptions of the plates.

In 1816 Mr. Knight was examined by a select committee of the House of Commons on the Elgin Marbles. The evidence which he gave upon this occasion was not marked with his usual good taste as to the merits of the remains of Greek art; an examination of it, written in a hostile spirit, may be seen in the 'Quarterly Review,' vol. xiv., pp. 533-543. See also a political squib reprinted in the 'Whig Guide.' Mr. Knight distributed a short Answer to the 'Quarterly Review' among his literary friends in explanation of the parts of his evidence which he considered had been misrepresented.

In 1820 Mr. Knight published an edition of the Iliad and Odyssey, with prolegomena. His object in this edition was to restore the text of Homer to its original state. He rejected the Wolfian hypothesis concerning the origin of the Homeric poems, and supposed the Iliad and Odyssey to have been each the work of a single poet; the poet of the Odyssey being posterior to the poet of the Iliad. The process by which he attempted to restore the text of these two poems to their original state was twofold: 1. The remodelling of the language, by the introduction of forms disused in later times, and of the antient letter styled the *digamma*. 2. The rejection of verses interpolated by later rhapsodists and poets. Many forms are restored, and many verses are rejected, on exceedingly doubtful and merely conjectural grounds: and indeed the subject is one which does not in general admit of any close approach to certainty. The work however bears marks of considerable acuteness and originality of thought, and it furnishes much assistance towards conceiving the earliest form of the Greek language. A superficial notice of this work is contained in the 'Quarterly Review' for April, 1822, in an article said to have been written by Ugo Foscolo. After Mr. Knight's death his catalogue of his coins was published by the trustees of the British Museum. (*Nummi Veteres, &c.*, 4to., Lond., 1830.) A notice of this publication may be seen in the 'Philological Museum,' vol. i., pp. 122-5. Besides the works above mentioned, Mr. Knight wrote several papers in the 'Classical Journal' and the 'Archæologia' (see vols. xv. 393, xvii. 220, xix. 369): the article on the works and life of Barry, in the 'Edinburgh Review' for August, 1810, is also by him. To these may be added a paper on the Homeric Palace, published after his death in the 'Philological Museum,' vol. ii., pp. 645-9. He likewise first published the celebrated Elean Inscription, concerning which see Boeckh, 'Corp. Inscript. Gr.,' No. 11.

KNIGHT, THOMAS ANDREW, brother of the subject of the preceding article, was born on the 10th of October, 1758. The grandfather of these eminent men had amassed a large fortune as an ironmaster at a period long before steam machinery was introduced in the smelting and manufacture of iron, and when those works were necessarily situated on the banks of running streams. One of his principal forges was at Downton on the river Teme, a little below the site of the noble mansion afterwards erected by Mr. Payne Knight, and where malleable iron of superior quality was manufactured, its locality being particularly favourable for a supply of charcoal.

When young, Mr. Knight's education was so much neglected, that when, at the age of nine years, he was sent to school at Ludlow, he was scarcely able to do more than read. But the days of his childhood had not been passed without employment. He had a great turn for the observation of natural phenomena, and having been left to occupy himself in the country in what way he pleased, he had already formed a close practical acquaintance with such plants and animals as Herefordshire could furnish. Eventually he graduated at Baliol College, Oxford, and subsequently occupied himself with researches into various points of vegetable and animal physiology. One of the most remarkable of his early investigations was contained in a paper read before the Royal Society in 1795, upon the inheritance of disease among fruit-trees, and upon the propagation of debility by grafting. The county of Hereford had long been celebrated for the produce of its orchards, and the cider made therefrom was in high esteem; but towards the latter part of the last century the trees of the most esteemed sorts, which had been eulogized by the county poet, Philips, became gradually less productive, their vitality being nearly exhausted. Still the old practice of grafting young stocks with the debilitated shoots of these trees generally prevailed, till Mr. Knight, after a long course of interesting experiments, satisfied himself that there is no renewal of vitality by the process of grafting, but merely a continuation of declining life, and that young grafted stocks soon became as much diseased as the old parent trees. He then commenced a course of experiments by fertilising the blossoms of some hardy crabs or apples with the pollen taken from the flowers of the most celebrated dessert and cider fruits, and sowing the seeds thus artificially impregnated. From that time Mr. Knight was looked up to in this country as a vegetable physiologist of a high order; a character which he ably sustained by various experimental researches into vegetable fecundation, the ascent and descent of sap in trees, the phenomena of germination, the influence of light upon leaves, and a variety of similar subjects. In 1797 he published a small work called 'A Treatise on the Culture of the Apple and Pear, and on the Manufacture of Cider and Perry;' in which he recommends raising new kinds from seed, and suiting the sorts produced to the peculiarities of soil and climate, which are found to have so great an influence on the quality of cider. Mr. Knight did not confine his experiments to the improvement of the apple only, but he raised many pears most valuable for the dessert, and so hardy as not to require the warmth and shelter of walls, and consequently capable of being cultivated by every farmer and cottager in the country. His seedling plums, strawberries, nectarines, and potatoes are also of great value, and an important addition to the luxuries and necessaries of life.

The great object of this distinguished man seems to have been in all cases utility. It was chiefly to questions which he thought likely to lead to important practical results that his attention was directed, and the numerous papers communicated by him to the Transactions of the Horticultural Society, in the chair of which he succeeded his friend Sir Joseph Banks, have all this distinguishing feature. No one who has traced the progress of horticultural skill for the last twenty or thirty years can be ignorant that it is mainly due to the writings and practice of Mr. Knight; he was probably the best practical gardener of his day. It is however not a little remarkable that with so very extensive a knowledge of the facts of vegetable physiology, he should have been so unfortunate as he certainly was in many of his explanations of them. This arose no doubt from his unacquaintance with vegetable anatomy, and consequently with the minute means by which Nature brings about her results in organised matter. Mr. Knight's experiments were not confined to vegetable physiology. He was a close observer of the habits of animals, and one of his last communications to the Royal Society was on the subject of animal instinct. At a late period of his life he also made some attempts to improve the breed of draught horses, by crossing the large London dray-horse with the strong and compact Norwegian mare, the result of which was not ascertained at the time of his death, but was expected, from the appearance of the colts, to be attended with success. He died in London on the 11th of May, 1838, in the 80th year of his age.

KNIGHTON, HENRY, an English historian of the close of the fourteenth and beginning of the fifteenth century, was a canon-regular of Leicester abbey. The time neither of his birth nor death is known. His 'Compilatio de Eventibus Angliæ, à tempore Regis Edgari usque mortem Regis Ricardi Secundi,' was published by Twysden in the 'Decem Scriptores,' fol., London, 1652, col. 2311-2741. (Selden's notice of him, prefixed to the *Decem Scriptores*, pp. 46, 47; Tanner, *Bibl. Brit. Hib.*, p. 458.)

KNISTENEAUX. [ALGONQUINS.]

KNOT. [SCOLOPACIDÆ.]

KNOX, JOHN, the son of obscure parents, was born in 1505: there is some doubt respecting his birth-place, which was probably the village of Gifford in East Lothian, although it has been asserted that he was born at Haddington. His education was more liberal than was then common. In his youth he was put to the grammar-school at Haddington, and about 1524 removed to the University of St. Andrew's, where the learning principally taught was the philosophy of Aristotle, scholastic theology, civil and canon law, and the Latin language; Greek and Hebrew were at that time little understood in Scotland, and Knox did not acquire the knowledge of them until somewhat later in his life. 'After he was created Master of Arts he taught philosophy, most probably as an assistant or private lecturer in the university, and his class became celebrated.' 'He was ordained a priest before he reached the age fixed by the canons of the church, which must have taken place previous to the year 1530, at which time he had attained his 25th year, the canonical age for receiving ordination.' (M'Crie's *Life*, vol. i., p. 12.) His first instruction in theology was received from John Major, the professor of theology in the university, but the opinions founded upon it were not long retained; the writings of Jerome and Augustin attracted his attention, and the examination of them led to a complete revolution in his sentiments. It was about the year 1535 that his secession from Roman Catholic doctrines and discipline commenced, but he did not declare himself a Protestant until 1542.

The Reformed doctrines had made considerable progress in Scotland before this time. Knox was not the first reformer, there were many persons, 'earls, barons, gentlemen, honest burgesses, and craftsmen,' who already professed the new creed though they durst not avow it; it was to the avowal, extension, and establishment of the Reformed religion that his zeal and knowledge so powerfully contributed. His reprehension of the prevalent corruptions made him regarded as a heretic; for which reason he could not safely remain in St. Andrew's, which was wholly in the power of Cardinal Beaton, a determined supporter of the church of Rome, and he retired to the south of Scotland, where he avowed his apostacy. He was condemned as a heretic, degraded from the priesthood, and it is said by Beza that Beaton employed assassins to waylay him. He now for a time frequented the preaching of the Reformed teachers, Williams and Wishart, who gave additional strength to opinions already pretty firmly rooted; and having relinquished all thoughts of officiating in the Roman Catholic church, he became tutor to the sons of Hugh Douglas of Langniddrie, a gentleman of East Lothian, who had embraced the Reformed doctrines. After the murder of Cardinal Beaton, Knox removed with his pupils from Langniddrie to St. Andrew's (1547), where he conducted their education in his accustomed manner, catechising and reading to them in the church belonging to the city. There were many hearers of these instructions, who urged him and finally called upon him to become a public preacher. Diffident and reluctant at first, upon consideration he consented to their request. In his preaching, far more than the reformed teachers who had preceded him, he struck at the very foundations of popery, and challenged his opponents to argument, to be delivered either in writing or from the pulpit, and so successful were his labours that many of the inhabitants were converted to his doctrines.

It was not long before an event took place by which his efforts received a temporary check. The murder of Cardinal Beaton had given great offence, and created great excitement through the kingdom. It was a severe blow to the

Roman Catholic religion and the French interest in Scotland, both of which he had zealously supported, and vengeance was loudly called for upon the conspirators by whom he had been murdered. These conspirators had fortified St. Andrew's, and the art of attacking fortified places was then so imperfectly understood in Scotland that for five months they resisted the efforts of Arran, the Regent. From their long wars in Italy and Germany, the French had become as experienced in the conduct of sieges as the Scotch were ignorant. The French were allies of Scotland; to France therefore Arran sent for assistance. About the end of June, 1547, a French fleet, with a considerable body of land forces, appeared before the town. (Robertson, vol. i., 314.) The garrison capitulated, and Knox, among many others, was taken prisoner, and conveyed to Rouen, where he was confined on board the galleys. After nineteen months' close imprisonment he was liberated, with his health greatly injured by the rigour with which he had been treated (1549). Knox now repaired to England, and though he had never received ordination as a Protestant, Cranmer did not hesitate to send him from London to preach in Berwick. In Berwick and the North of England he followed his arduous undertaking of conversion until 1551, when he was made one of King Edward's chaplains, with a salary of 40*l.* a year. While his friends in the English administration offered him further preferment, which he declined, his enemies brought charges against him before the council, of which he was soon afterwards acquitted. He was in London at the time of Edward's death, but thought it prudent to fly the kingdom as soon as Mary's policy towards the Protestants became apparent. In January, 1554, he landed at Dieppe; from Dieppe he went to Geneva; and from Geneva to Frankfort, where Calvin requested him to take charge of a congregation of English refugees. In consequence of some disputes he returned from Frankfort to Geneva, and, after a few months' residence there, to Scotland, where he again zealously promulgated his doctrines. The English congregation at Geneva having appointed him their preacher, he thought right to make another journey to the Continent (1556), which he quitted finally in 1559. During these the quietest years of his life he published 'The First Blast of the Trumpet against the monstrous Regiment of Women,' in which he vehemently attacked the admission of females to the government of nations. Its first sentence runs thus: 'To promote a woman to bear rule, superiority, dominion, or empire, above any realm, nation, or city, is repugnant to nature, contumely to God, a thing most contrarious to his revealed will and approved ordinance, and finally it is the subversion of all equity and justice.' This inflammatory composition, as might have been expected, excited fresh hostility against its author. At the time of its publication both England and Scotland were governed by females; Mary of Guise, the queen-dowager of Scotland, was likewise regent of that kingdom, while the Princess Mary was heiress of its throne: and in England Mary was queen, and her sister Elizabeth the next in succession to the crown. It hardly admits of wonder then that when, in 1559, Knox was desirous of returning to England, Queen Elizabeth's ministers would not permit him to do so, and he was compelled to land at Leith.

The Protestants in Scotland were by this time nearly equal to the Roman Catholics, both in power and in number; but their condition had lately been changed somewhat for the worse. The queen regent, who from motives of policy had found it desirable to conciliate and uphold them, from similar motives had become their opponent and oppressor; and many of the preachers of the 'Congregation' (the name by which the body of Protestants was then called) were summoned for various causes to take their trial. It was on a day not long previous to these trials that Knox returned to his country to resume the labours of his ministry: hearing of the condition of his associates, 'he hurried instantly (says Robertson, i. 375) to Perth, to share with his brethren in the common danger, or to assist them in the common cause. While their minds were in that ferment which the queen's perfidiousness (she had broken a promise to stop the trial) and their own danger occasioned, he mounted the pulpit, and, by a vehement harangue against idolatry, inflamed the multitude with the utmost rage.' The indiscretion of a priest, who, immediately after Knox's sermon, was preparing to celebrate mass, caused a violent tumult. The churches in the city were broken open, altars were overturned, pictures defaced, images destroyed, and the monasteries levelled with the ground. The insurrection, which was not the effect of any concert or previous deliberation, was censured by the Reformed preachers; and it affixes no blame to the character of Knox. The queen regent sent troops to quell this rebellion; troops were also raised by the Protestants, but a treaty was entered into before any blood was shed.

The promotion of the Reformation in his own country was now Knox's sole object; he was reinstated in his pulpit at St. Andrew's, and preached there in his usual rough, vehement, zealous, and powerful manner, until the Lords of the Congregation took possession of Edinburgh, where he was immediately chosen minister. His efforts gave great offence and alarm to the Roman Catholic clergy, especially during a circuit that he made of Scotland. Armies were maintained and sent into the field by both parties, for treaties were no sooner made than they were violated; French troops again came to succour the Roman Catholic clergy; and to oppose them Knox entered into correspondence with Cecil, and obtained for his party the assistance of some forces from England. The 'Congregation' however had many difficulties and disasters to struggle with. A messenger whom they had sent to receive a remittance of money from the English was intercepted and rifled; their soldiers mutinied for want of pay, their numbers decreased, and their arms were unsuccessful. Under these circumstances it required all the zeal and the courage of Knox to sustain the animation of his dispirited colleagues; his addresses from the pulpit were continual and persevering. As the treaty by which the civil war was concluded made no settlement in religion, the reformers found no fresh obstacle to the continuance of their efforts; and Knox resumed his office of minister in Edinburgh. In this year (1560) the queen regent died, and in the following Queen Mary took possession of the throne of Scotland; her religious opinions were Roman Catholic, but she employed Protestant counsellors. The preaching of Knox and his denunciations of her religious practice attracted her attention. At different times he had interviews with her (which at first gave rise to much speculation), but neither her artifices produced much effect, nor his arguments; so stern was he, and so rough in his rebukes, that he once drove her into tears. At her instigation Knox was accused of treason, and was tried, but the whole convention of counsellors, excepting the immediate dependants of the court, pronounced that he had not been guilty of any breach of the laws (1563).

Knox continued his exertions, with difficulties of different kinds constantly besetting him. At one time he was prohibited from preaching, at another he was refused entrance into Edinburgh after a temporary absence, but on the whole his influence was little impaired, and his opposition to popery successful. His health however was affected by continual exertion: in 1570 he was struck with apoplexy, from which he so far recovered as to renew his labours for more than a year; but in 1572 his exhausted constitution gave way, and he died on the 24th of November. He was buried in Edinburgh, in the church then called St. Giles's, now the Old Church.

Knox was twice married; first in 1553, to Marjory, daughter of Sir Robert Bowes; afterwards, in 1564, to Margaret Stewart, daughter of Lord Ochiltree; he had sons only by his first marriage; they all died without issue. He had three daughters by his second wife; the youngest, Mrs. Welch, appears to have been a remarkable person.

The doctrines of Knox were those of the English reformers impregnated to a certain extent with Calvinism. His opinions respecting the sacraments coincided with those of the English Protestants: he preached that all sacrifices which men offered for sin were blasphemous; that it was incumbent to make an open profession of the doctrine of Christ, and to avoid idolatry, superstition, and every way of worship unauthorized by the Scriptures; he was altogether opposed to Episcopacy. His views were more austere than those promulgated in England; and it would be curious to trace in what degree the present greater severity of the Scotch Presbyterians, compared with that of the English Protestants, is attributable to this reformer.

The opposition of Knox as well to Episcopacy as to Papacy has caused his reputation to be severely dealt with by many writers of contrary opinions on these points. A most elaborate character of him has been drawn at some length by

Dr. M'Crie, and though it may perhaps be well to inform the reader that Dr. M'Crie was a rigid Presbyterian, we think it on the whole a just representation. We subjoin a brief summary of it: Knox possessed strong talents; was inquisitive, ardent, acute, vigorous, and bold in his conceptions. He was a stranger to none of the branches of learning cultivated in that age by persons of his profession, and he felt an irresistible desire to impart his knowledge to others. Intrepidity, independence, and elevation of mind, indefatigable activity, and constancy which no disappointments could shake, eminently qualified him for the post which he occupied. In private life he was loved and revered by his friends and domestics: when free from depression of spirits, the result of ill health, he was accustomed to unbend his mind, and was often witty and humorous. Most of his faults may be traced to his natural temperament and the character of the age and country in which he lived. His passions were strong, and as he felt he expressed himself without reserve or disguise. His zeal made him intemperate: he was obstinate, austere, stern, and vehement. These defects, which would have been inexcusable in most other persons, may be more easily forgiven in him, for they were among the most successful weapons in his warfare.

(M'Crie's *Life of Knox; Reviews of* M'Crie's *Life of Knox*, in the *British Critic of* 1813, in the *Edinburgh Review*, vol. xx., p. 1, and in the *Quarterly Review*, vol. ix., p. 418; Robertson's *History of Scotland;* Bayle's *Dictionary*, &c.)

KNUTSFORD. [CHESHIRE.]

KOALA. [MARSUPIALIA.]

KOBA. [ANTELOPE, vol. ii., p. 79.]

KOKAN. [TURKISTAN.]

KONG MOUNTAINS, THE, are situated in the western parts of Northern Africa. Mungo Park, in his first journey, saw from a distance an elevated range between 3° and 4° W. long. and about 11° N. lat., and was told that it was called Kong, which in the Mandingo language signifies mountains. This elevated range, whose direction, length, width, and position, are otherwise unknown, seems to be the principal chain of the extensive mountain-system which, with its offsets, extends from east to west over the whole country lying between the most eastern bend of the Quorra river (7° E. long.) and the coast of Sierra Leone (13° W. long.), and from south to north reaches from the coast of Guinea (about 5° N. lat.) to the very borders of the Sahara (about 16° N. lat.). The width of this extensive mountain-system between 13° W. long. and 0° seems to be about 800 miles, but to the east of the meridian of Greenwich it grows narrower, and in the bend of the Quorra it hardly exceeds 70 or 80 miles. The whole system covers an area of much more than 800,000 square miles, and is divided from the elevated table-land of Southern Africa by the valley of the Quorra, which between 7° and 8° E. long. is comparatively narrow, so that in this part the two elevated mountain-systems approach close to another. Very little is known respecting the elevation of any part of it. Clapperton and the Landers, who traversed the most eastern offset in their journey from Badagry to Katunga, crossed a range about 2500 feet above the sea. The Kong Mountains seen by Mungo Park however must attain a much higher elevation, as they are seen from a great distance. According to the information obtained by Mollien from the natives, mountains occur between 7° and 10° W. long. and 8° and 9° N. lat., which are covered with snow all the year round. But Caillié, who traversed them from west to east, near 10° N. lat., did not observe snow on the mountains; he found that the moderate ridges which lay in his way were separated from one another by fertile, well watered, and extensive plains, and that the valleys were not numerous, and comparatively short. Mungo Park, who on his return from Sego traversed the mountain-region from east to west between 12° and 13° N. lat., seems to have travelled not far from a more elevated tract situated to the south of his route. He went over a succession of elevated ridges and deep but generally wide valleys, the water-courses of which were branches of the Senegal, and ran off to the northward, until he came to a rocky and woody desert, the Iallonkadoo Wilderness, which the caffila was four days in traversing. This elevated tract constitutes the watershed between the streams which run into the Senegal and Gambia, and is the western extremity of the high land which in this part traverses the mountain-region from east to west. Having passed it, Mungo Park found that the rivers ran southward into the Gambia. As the mountains, and the plains and valleys enclosed by them, have the advantage of abundant rains during the season when the sun is in the northern hemisphere, they are everywhere covered with high trees and luxuriant vegetation where the ground has not been cleared for cultivation; but the botanical products of this tract have not been examined by a naturalist. It seems to abound in metallic wealth, at least it is known that gold is found in almost every part, and iron-ore occurs in numerous places. The native tribes, especially the Mandingos and Foulahs, collect large quantities of gold-dust, and know how to turn the iron-ore to advantage.

(Mungo Park's (*First*) *Travels into the Interior of Africa;* Mollien's *Travels in Africa;* Clapperton's and Lander's *Travels in Africa;* and Caillié's *Travels through Central Africa.*)

KÖNIGSBERG is one of the two governments which constitute the province of East Prussia, and is part of the antient kingdom of that name, which is now divided into East and West Prussia. It is the most north-easterly part of the Prussian dominions, and is bounded on the north by the Baltic, on the north-east by Russia, on the east by the government of Gumbinnen, on the south by Poland, and on the west by the governments of Marienwerder and Danzig. Its area is 8627 square miles, including the large bay called the Frische Haff, and the population at the end of 1837 was 746,462, of whom 3943 were Jews. The government is divided into 20 circles. [PRUSSIA, EAST.]

KÖNIGSBERG, the capital of the two provinces of East and West Prussia, and the second city in the Prussian dominions, lies in 54° 42′ 12″ N. lat. and 20° 29′ 15″ E. long. It is situated on the navigable river Pregel, which falls into the Frische Haff about four miles below the city. The river, which runs from east to west, approaches the city in two arms, which uniting form an island. Königsberg is built on both sides of the river, and on the island. It consists of three parts, called the Old Town, Löbenicht, and the Kneiphof, besides the royal palace and the citadel Friedericksberg, and four large suburbs and ten smaller ones called Liberties. The Old Town and Löbenicht, both of which are on the north side of the river, are built on seven hills, and the Kneiphof on the island, the soil of which is swampy, and the houses are erected on piles.

The origin of Königsberg was in the thirteenth century, when Ottokar, king of Bohemia, and other princes, having, by the command of the pope, assisted the knights of the Teutonic order in conquering the province of Samland in 1254, advised the knights to build a fort on the eminence, near the Pregel, where the palace now stands. Accordingly they erected a wooden fort in 1255, and in 1257 another fort of stone, surrounded with double walls, nine towers, and a moat. The infant town was plundered and burned in 1264, and the inhabitants who escaped death or slavery settled in the valley between the palace and the river. This was the origin of the present Old Town. In 1300 the Löbenicht, till then a village, obtained the privilege of a town, and in 1327 the Kneiphof was founded. Thus Königsberg consisted originally of three towns, each of which had its own magistrates and jurisdiction. The suburbs were gradually added, and the city became one of the most important commercial places of the north. In 1365 it joined the Hanseatic League, and in 1457, when Marienberg was betrayed to the Poles, Königsberg was chosen for the residence of the grand master of the Teutonic order, and so remained till Prussia was transformed into a duchy in 1528, some time previous to which the Reformation had made great progress in that province. In 1657 Prussia was ceded by the peace of Wehlau to the elector of Brandenburg, who built the citadel to overawe the citizens. In 1701 Frederick III. was crowned here as the first king of Prussia. In the Seven Years' War Königsberg was occupied from 1758 to 1764 by the Russians, who governed the country in the name of the Empress Elizabeth; and it again suffered severely from the exactions of the French, who occupied it in 1807, after the disastrous battle of Friedland, and imposed heavy contributions. It was again visited by the French in the Russian campaign, large bodies of whom passed through it after their defeat.

The impression, says Preuss, which the interior of the city makes on a stranger cannot be called favourable, notwithstanding the scene of busy life which it presents, on account of the want of regularity in the place, and the mean appearance of the streets, which are generally narrow and often crooked: the few handsome public and private edifices are scattered over the whole city. There are seven wooden bridges over the Pregel. The castle, or royal palace, originally built, as we have said, in 1255, has been gradually altered, enlarged, and beautified till it has obtained its present form. The most interesting parts of it are the church, the Muscovite hall 274 feet long and 59 wide, without pillars, and the tower 240 feet high (278 above the Pregel), from the top of which there is a fine prospect of the city and environs. The most remarkable building is the cathedral, founded in 1332. It has a fine organ with 5000 pipes, many excellent paintings by Lucas Cranach and others; the Wallemodt Library, in which are several autograph letters from Luther to Catherine Bora, and the original of the summons and the safe conduct which Luther received to appear at the diet at Worms. Among the numerous public institutions is the university, founded by Duke Albert in 1544. It has now 27 ordinary and 11 extraordinary professors, and 18 private lecturers, in all 56, and about 450 students. With the university are combined the most important scientific institutions, such as a theological seminary (in two divisions), one philological, one historical, one homiletic, one Polish, one Lithuanian seminary, a library 4 of 6000 volumes, a botanic garden (founded in 1809, with between 5000 and 6000 species of plants), and an observatory, which has of late years attained great celebrity from the astronomical observations of Professor Bessel. There are likewise three gymnasia, and very numerous schools, with many charitable institutions. Königsberg has many manufactories, but not on an extensive scale, of woollen, linen, silk, cloth, leather, tobacco, and sugar; it has celebrated breweries and brandy distilleries, &c. Its geographical position has long made it an important place of trade. Its most flourishing period was from 1783 to 1789, when nearly 2000 ships arrived and as many left the port every year. Its most unfortunate period was between 1823 and 1826, when the number of arrivals and departures was less than 300 in a year. Its commerce has since revived a little. The chief trade is in corn; beer, flax, hemp, tallow and wax, bristles, and quills are likewise exported. Königsberg, according to the census of 1837, contained 64,200 inhabitants.

KOOBA. [GEORGIA, p. 176.]

KOODOO. [ANTELOPE, vol. ii., p. 78.]

KOOM. [PERSIA.]

KORAN. [MOHAMMED.]

KORAY, ADEIMANTOS, born at Smyrna in 1748, of a family from Chios, studied first at Smyrna, and afterwards at Montpellier, where he took his degree as doctor of medicine, and settled in France. He wrote several works on medicine, and published French translations of the treatise of Hippocrates 'On Air, Water, and Situation,' with copious notes, and of the 'Characters' of Theophrastus. In 1801 he translated into modern Greek Beccaria's treatise 'On Crimes and Punishments,' which he dedicated to the then newly constituted republic of the Ionian Islands. He afterwards wrote in French a memoir, 'De l'Etat Actuel de la Civilization en Grèce,' 1803, which, being translated into modern Greek, answered the double purpose of making the people of Western Europe acquainted with the moral and intellectual condition of his countrymen, and of making the Greeks acquainted with it themselves. Koray also undertook to edit a series of antient Greek writers, under the title of the 'Hellenic Library.' He began with the 'Orations of Isocrates,' 2 vols. 8vo., Paris, 1807, which he accompanied with interesting prolegomena and explanatory notes. He afterwards edited in succession the 'Lives of Plutarch,' the 'Histories of Ælian,' the fragments of Heraclides and of Nicolaus Damascenus, the fables of Æsop, Strabo, the first four books of the Iliad, and the 'Politic of Aristotle.' The reputation of Koray attracted many young Greeks to him, who profited by his conversation and instruction. Although long absent from his native country he felt to the last the most lively interest in her fate. He foresaw that a struggle was approaching, and he wished the minds of the Greeks to be prepared for it. He encouraged particularly the diffusion of education, the formation of new schools in Greece, and he furnished directions for the method and course of studies. He also contributed to fix the rules and orthography of the modern Greek, in which he took a middle path between the system of Neophytus Doukas, which Koray stigmatized with the name of 'macaronic,' and that of Christopoulos, which affected to write the modern Greek exactly as it is spoken. Koray wished to purify the language by discarding the numerous Italianisms, Gallicisms, and Germanisms, which had been introduced into it, and by substituting old Greek words, at the same time avoiding the affectation of too great a purism or classic pedantry. (Rizo, *Cours de Littérature Grecque Moderne*, 1827.)

Koray died at Paris a few years ago, having had the satisfaction of seeing the struggle in which his countrymen had engaged rewarded by success.

KORDOFAN, or KORDUFAN, a country in the north-eastern parts of Africa, south of Nubia, extends from about 15° 20′ to 10° N. lat., and from 28° to 32° E. long. It is divided from Dar-fur, which lies to the west, and from Nubia, which lies farther north, by deserts, in which water occurs only at a few places, and not in all seasons. On the east it extends to the Bahr el Abiad, or western branch of the Nile, which divides it from Sennaar. Its southern boundary-line is unknown, and stated to be formed by extensive forests covering the northern declivity of the Deir or Tuggala Mountains, and inhabited by negroes.

The southern districts, as far north as 12° N. lat., have a broken surface, and the hills rise in some parts to a considerable height. This seems to be the best part of the country, as it contains many springs and wells, which always yield an abundance of drinkable water. Gold-dust also is collected in several places; and iron-ore is abundant and is worked. The country north of 12° N. lat. may be considered as an elevated and mostly level plain, on which several isolated groups of hills rise at considerable distances from one another. These hills are the only places which are inhabited, because it is only in their neighbourhood that wells are found which yield water all the year round. Certain wandering tribes visit some depressions in the plain, where, in the rainy season, temporary lakes are formed, which preserve the water during the greater part of the year. The plain itself is partly covered with grass and partly with low thorny bushes; in a few places forest trees occur, among which is the baobab, or Adansonia. In the rainy season, which lasts from April to September, the plain is partly covered with water, and affords pasture for numerous herds of cattle. In the dry season it is changed into a desert. No river traverses this country, with the exception of the Bahr el Abiad, which constitutes its eastern boundary.

Agriculture does not extend beyond the neighbourhood of the inhabited places. The principal objects of cultivation are two kinds of millet, called durrha and doghen, and of simsim or sessamum. In a few places wheat and barley are grown. The wandering tribes of the Beduin Arabs have herds of cattle, horses, and camels. The horses are of an excellent breed, and the cattle have a hunch of fat. The tribes of negroes inhabiting the southern hilly country keep a great number of cattle, sheep, and goats, but few camels and horses. Among the wild animals Rüppell mentions elephants, giraffes, and several kinds of antelopes.

Kordofan is inhabited by three races of men: the negroes, or Nuba; the Dongolawi, or settlers from Dongola; and the Beduin Arabs. The first, who may be considered as the native inhabitants, are exclusively in possession of the southern hilly country, but a great number of them are settled on the plain, where they are agriculturists. The Dongolawi are merchants, and settled in those places where the caravans pass. They have introduced horticulture and artificial irrigation into Kordofan; and their orchards contain date-trees. The different tribes of the Beduin Arabs wander about in the plain; they cultivate however a good deal of doghen for their own consumption. They are known under the name of Bakara Arabs.

Kordofan was subject to the sovereign of Sennaar up to the beginning of the present century. It was then taken from him by the king of Dar-fur, in whose possession it remained to the year 1820, when it was conquered by the arms of Mehemet Ali, Pasha of Egypt. At the time when the country was under the king of Dar-fur, Obeid, its capital, was a considerable town, and regular caravans resorted to it for slaves, ivory, gold-dust, gum arabic, ostrich feathers, tamarinds, and honey. But on the occupation of the Egyptian Turks the town was destroyed, and Rüppell estimates its population at about 5000 inhabitants. He mentions a place, Shabun, which is a kind of entrepôt for the caravans which traverse Eastern Sudan from east to west, and connect it with Sennaar and Habesh. Two roads lead from Sennaar to Obeid, two others from the last-mentioned place to Dabbe in Dongola, and three to Cobbe in Dar-fur.

(Rüppell's *Reisen in Nubien, Kordofan, und dem Petraischen Arabien.*)

KÖRNER, THEODOR, was born at Dresden in the year 1791, of respectable parents. The weakness of his health prevented any great application to study, and as a child he was rather remarked for the amiability of his disposition than for any intellectual acquirements. However, as he grew, both his mind and body gained strength, and he showed an early inclination to history, mathematics, and physical science. Above all he loved poetry, and was encouraged in his juvenile compositions by his father, who was an ardent admirer of the works of Göthe and Schiller. Being educated at a school in Dresden, and by private teachers, he did not leave his father's house till he was near seventeen, when, being designed to fill some office in the mines, he was sent to the Bergacademie* at Freiberg, where he made great progress. After completing the necessary course of study, he went to the university at Leipzig, and afterwards to Berlin. A fit of illness however, and the dislike which his father had to the wild spirit then reigning among German students, were the cause of his being sent to Vienna, where he laboured much at poetical composition. Two pieces, 'Die Braut' (The Bride), and 'Der grüne Domino' (The Green Domino), were acted at the theatre in 1812, and meeting with success were followed by others, of which 'Zriny' and 'Rosamunde' (the English Fair Rosamond), two tragedies, were works aiming at a high character.

The events of the year 1813 made a deep impression on Körner. Inspired by patriotic zeal, he resolved to engage in the cause of Prussia against the French, and joined the volunteer corps under Major Lützow. He was wounded by two sabre cuts at the battle of Kitzen, and lay concealed and disabled in a wood, whither his horse had carried him, until he was removed by two peasants, sent by his comrades, to a place of safety. In a subsequent battle, fought on the 26th August, on the road from Gadebusch to Schwerin, he was killed by a shot, and buried by his comrades at the foot of an oak on the road from Lübelow to Dreikrug, with all marks of honour, and his name was cut on the bark of the tree.

As Körner was scarcely twenty-two years of age at the time of his death, his works, which are rather numerous, must be judged with lenity. To comprehend the great impression which his patriotic poems made, it is necessary for the reader to throw himself back to the time, and enter into the deep-rooted hatred felt by the Prussians for the French. His fame chiefly rests on a collection of lyrical pieces called 'Leier und Schwert' (Lyre and Sword), many of which were written in the camp, and which can now only be properly felt and appreciated when studied in connection with the events that occasioned their composition, and with a full understanding of the sincerity of the poet's character. In fact, this very stamp of sincerity is the chief beauty of his works: they contain no new thoughts or striking creations of imagination, but are pervaded by only one sentiment, the glory of fighting and dying for 'fatherland,' expressed in a variety of shapes. When an attempt is made at more elaborate composition, the sentiment is rather encumbered than otherwise, as the impulse of feeling is less obvious. Körner evidently had a perception of the higher poetical beauties; but his best poems are those which seem the mere unpolished effusions of the moment, and exhibit the feeling quite unadorned. Such is his spirited song 'Männer und Buben' (Men and Cowards). The happiest effort of imagination is his 'Schwert-lied' (Sword-song), in which the sword becomes a person and addresses its owner; a piece which has been translated (not very closely) by Lord F. L. Gower.

Had his life been of longer duration, it is doubtful if he would have attained any great eminence as a dramatist. There are deeper thoughts in his dramas than in his 'Leier und Schwert;' some scenes are extremely powerful, and here and there a character, as for instance Solyman the Great in 'Zriny,' is boldly drawn. He also evinces a knowledge of that distribution of incidents which constitutes dramatic construction, but he has unfortunately two great faults of the most opposite character: on the one hand, he perpetually interrupts the action of his play by long speeches, which merely describe historical circumstances or psychological phenomena unconnected with the subject; and on the other, he has an inordinate taste for melodramatic situations and catastrophes. If the former fault had increased he would have been no dramatist at all; if the latter, he would have been a mere playwright. A complete edition of his works, in one volume, was published at Berlin in 1835.

KOSCIUSKO, THADDEUS, born in 1756, of a noble but not wealthy family of Lithuania, after studying first at Warsaw, and afterwards at Paris, for the military profession, was made a captain in the Polish army. He afterwards returned to Paris, and volunteered to accompany La Fayette and others, who were going to assist the revolted American colonies against England. In America he distinguished himself by his bravery, obtained the rank of general officer in the American army with a pension, and after the end of the war returned to his native country. In 1789 he was made major-general in the Polish army. He served with distinction in the campaign of 1792 against the Russians, but king Stanislaus having soon after submitted to the will of the empress Catherine, and Poland being occupied by Russian troops, Kosciusko with several other officers left the service and withdrew to Germany. When the revolution broke out in Poland at the beginning of 1794, Kosciusko was put at the head of the national forces, which were hastily assembled, and in great measure were destitute of arms and artillery. In April, 1794, he defeated a numerically superior Russian force at Raclawice. Again in the month of June he attacked the united Russians and Prussians near Warsaw, but was defeated and obliged to retire into his entrenched camp before the capital. He then defended that city for two months against the combined forces of Russia and Prussia, and obliged them to raise the siege. Fresh Russian armies however having advanced from the interior under Suwarrow and Fersen, Kosciusko marched against them with 21,000 men. The Russians were nearly three times the number, and on the 10th of October the battle of Macziewice took place, about 50 miles from Warsaw. After a desperate struggle the Poles were routed, and Kosciusko being wounded, was taken prisoner, exclaiming that there was an end of Poland. The storming of Praga by Suwarrow and the capitulation of Warsaw soon followed. Kosciusko was taken to St. Petersburg as a state prisoner, but being afterwards released by the emperor Paul, he repaired to America, and afterwards returned to France about 1798. Napoleon repeatedly endeavoured to engage Kosciusko to enter his service, as Dombrowski and other Polish officers had done, and to use the influence of his name among his countrymen to excite them against Russia; but Kosciusko saw through the selfish ambition of the conqueror, and declined appearing again on the political stage. A proclamation to his countrymen which the French 'Moniteur' ascribed to him in 1806 was a fabrication. He continued to live in retirement in France until 1814, when he wrote to the emperor Alexander recommending to him the fate of his country. In 1815, after the establishment of the new kingdom of Poland, Kosciusko wrote again to the emperor thanking him for what he had done for the Poles, but entreating him to extend the benefit of nationality to the Lithuanians also, and offering for this boon to devote the remainder of his life to his service. Soon after he wrote to Prince Czartorinski, testifying likewise his gratitude for the revival of the Polish name, and his disappointment at the crippled extent of the new kingdom, which however he attributed 'not to the intention of the emperor, but to the policy of his cabinet, and concluded by saying that as he could not be of any further use to his country, he was going to end his days in Switzerland.' (Oginski, *Mémoires sur la Pologne et les Polonais*, Paris, 1827.)

In 1816 Kosciusko settled at Soleure, in Switzerland, where he applied himself to agricultural pursuits. He died in October, 1817, in consequence of a fall from his horse. His remains were removed to Cracow by order of Alexander, and placed in the vaults of the kings of Poland, and a monument was raised to his memory.

KÖSTRITZ. This locality, south-west of Leipzig, in the valley of the Elster, is quoted by Baron Schlottheim,

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* A Bergacademie is an institution where the principles and practice of mining are taught.

Dr. Buckland, Von Meyer, &c., for the occurrence of bones of extinct quadrupeds (hyæna, felis, elephant, rhinoceros, bear, reindeer, &c.) in the fissures and cavities of the limestone and gypsum which occur in that district. Generally, the bones of *extinct* quadrupeds lie in large cavities of the gypsum, while the fissures therein often contain remains of *living* races. Bones of men also occur, but apparently they are of later date than those which accompany the perished races of hyæna, felis, elephant, and rhinoceros. (Meyer, *Palæologica*, p. 458.)

KOSTROMA. [COSTROMA.]

KOTZEBUE, AUGUST FRIEDRICH FERDINAND VON, was born at Weimar in the year 1761. In his sixth year he made attempts at poetical composition, and his interest for theatrical matters was excited by the performances of a company of players at Weimar. At the Gymnasium he was instructed by Musäus, the celebrated author of the 'Volksmährchen' (Popular Tales); and when he was sixteen years of age he went to the University of Jena, where an amateur theatre increased his love for the drama. He studied the law, but at the same time composed slight theatrical pieces. In 1781, at the instance of the Prussian ambassador at the Russian court, he went to Petersburg, and was kindly received by the emperor, who raised him to the rank of nobility, and made him president of the government of Esthonia. While at Reval he wrote several favourite works, and among them his well-known pieces 'Die Indianer in England' (The Indians in England), which has been translated into English, and 'Menschenhass und Reue' (Misanthropy and Repentance), well known in this country under the title of 'The Stranger.' He travelled in 1790 to Pyrmont, and after the death of his wife visited Paris, but returned to Esthonia in 1795, where he wrote above twenty dramas. In 1798 he went to Vienna as poet to the Court Theatre, but gave up that place in two years, and received a yearly pension of 1000 crowns. He had scarcely arrived in Russia, to which country he had returned, when, without knowing the cause, he was arrested and sent to Siberia. A translation made by a young Russian of a paltry little piece by Kotzebue, called 'Der Leibkutscher Peters des Grossen' (The Body-Coachman of Peter the Great), so delighted the emperor Paul that he was recalled from banishment. After the death of this emperor, he went to Weimar, and thence to Jena. Some disagreement with Goethe caused him to remove to Berlin, where he edited the periodical 'Der Freimüthige' (The Free-Humoured).* About the same time he commenced his 'Almanach dramatischer Spiele,' an annual much in the style of those in England, though the plates are of an humbler character, and the literary part is exclusively dramatic. His 'Recollections' of Paris, of Rome, and of Naples, and his 'Early History of Prussia,' appear to have added little to his reputation. The events of the year 1806 caused him to fly from Prussia to Russia, where in his writings he unceasingly attacked the emperor Napoleon and the French. His political expressions at this time raised him to importance, and the turn of affairs in 1813, and the unpopularity of the French, procured him the editorship of a Russian-Prussian paper. In 1814 he went as Russian consul-general to Königsberg, where he wrote several little plays, and an indifferent history of Germany. In 1817, after having again visited Petersburg, he was despatched to Germany by the emperor of Russia, with a large salary, to watch the state of literature and public opinion, and to communicate all that he could learn. He at the same time edited a weekly literary paper, but the German people had at last become disgusted with his scoffing at everything like liberal opinions. His writings were levelled against all liberal opinions, and against the freedom of the press. He sneered at every expression of the popular wish for a constitutional government. He held up the state of Europe before the French Revolution as the perfection of happiness; till at last he roused the indignation of Sand, a student and political enthusiast, who, considering him an enemy to liberty, assassinated him in 1819.

Kotzebue's fame rests almost entirely on his dramas, which are nearly 100 in number, and of the most various degrees of merit. The best of them (excepting 'The Two Klingsbergs') have been translated into English. Besides 'The Stranger' and 'The Indians in England,' it is only necessary to enumerate 'Lovers' Vows' (Der Strassenraüber aus Kindersliebe), 'Pizarro' (Die Spanier in Peru), 'The Virgin of the Sun,' and 'Benyowski.' Unfortunately for a permanent reputation, he created too great a sensation at the time of his writing; the public were at first delighted, and afterwards surfeited by his exaggerated expressions, his forced situations, and maudlin sentimentality. A reaction accordingly has taken place, and he is now as much despised as he was formerly overrated, and far more so than he merits. It is not fair to criticise him in a merely literary point of view: he was an actual working writer for the stage, and his knowledge of dramatic construction and of stage effect must call forth the approbation of every qualified judge. In his characters he is very unequal: some of them are absolute impossibilities, uttering nothing but the most forced and unmeaning sentiments, while occasionally an exquisite sketch may be found; and it would not be difficult to select from his works scenes of the deepest pathos. He wrote too much. There is a great difference between a writer who gives his thoughts in a dramatic form, and an author who goes on constructing plays whether he has new thoughts or not; and indeed this is the difference between the dramatist, in the high sense of the word, and the mere playwright, to which latter character Kotzebue too frequently approximated. Goethe reckoned as the best of his plays 'Die beiden Klingsberg' (The Two Klingsbergs), a genteel comedy of great merit, but little known in this country.

Kotzebue's dramas had rather an unfortunate effect on the estimation of German literature in England. The wits of the 'Anti-Jacobin' attacked him with great and often well-merited severity, but they mixed up with his works the productions of Goethe and Schiller, and thus writers of the most unequal rank were classed together under the name of the 'German School.' Now that a real knowledge of German literature is spreading, a critic would be ashamed to trust to a mere translation (as did the writers of the 'Anti-Jacobin'); and any attempt to classify so second-rate a writer as Kotzebue with the noble Schiller and the great Goethe would be treated with contempt, excepting where some of the minor and inferior works of the latter might warrant a comparison.

KOTZEBUE, OTTO VON, captain in the Russian marines, was son of the above. In the year 1814 he set out on a voyage round the world, which he completed in 1818, and of which he published an account three years afterwards. He had previously gone round the world as a midshipman under Krusenstern. In 1824 he undertook a third voyage as captain of an imperial man-of-war, when he discovered two islands in the South Sea, and returned in 1826. An account of this voyage was published in London, by Kotzebue's companion, Dr. Eschholz, and by himself in St. Petersburg.

KOULI-KHAN. [NADIR SHAH.]

KRAME'RIA TRIANDRA, or **RHATANY**, is a small low-lying undershrub, growing on the dry projecting parts of the mountains of Peru, near Huanaco, &c. The native name is Rhatanhia. The root, which is the officinal part, is from four to eight inches long, and from half an inch to two inches thick, with knotty but not strong ramifications, and is very variable in shape. The bark is thin, uneven, and easily separates from the woody part. The root is heavy, and devoid of odour; but the taste, especially of the bark, is strongly astringent and bitter, yet not disagreeable. Iodine turns it black. According to the analysis of Gmelin, it contains much tannin, with saccharine and mucilaginous matter, woody fibre, and salts. According to Peschier, it contains krameric acid. This root, from which, in Peru, an extract is formed, is a mild, easily assimilated, astringent medicine, possessed of great power in passive bloody or mucous discharges; and also in weakness of the digestive organs, muscular debility, and even in intermittent and putrid fevers. The powder forms, along with charcoal, an excellent tooth-powder; and an infusion is used as a gargle and wash.

KRAMERIA'CEÆ, a small natural order of Polypetalous Exogenous plants, by most botanists referred to Polygalaceæ, but apparently distinct in having stamens separate from the petals, which are disjoined, and all the parts of the flower highly irregular and unsymmetrical. There are from four to five irregular sepals; four or five very irregular petals; from one to four unequal hypogynous stamens, not bearing any obvious relation to the other parts; and a 1-celled or incompletely 2-celled leathery round fruit, covered with hooked prickles, and containing but one seed. The leaves are alternate, simple, and without stipules. The only remarkable product of the order is rhatany root. [KRAMERIA TRIANDRA.]

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* 'The Free-Humoured' is not a very good expression, but it is hard to find a better. 'Free-thinker' would convey a religious idea, whereas merely an open free person is intended. The book is a little weekly publication, every number of which is adorned with a rude cut of Ulrich von Hütten.

Krameriaceæ.
Fruit, Flowers, and Branch of Krameria Triandra.

KRANTZ, ALBERT, born at Hamburg about the middle of the fifteenth century, studied at Rostock, where he took degrees, and was made professor of philosophy and rector of that university in 1482. He afterwards became a canon of the cathedral of Hamburg, was elected syndic in 1489, and was sent by the Confederation of the Hanseatic Towns on several missions to France and England. He died at Hamburg in 1517. He is the author of several historical works:—1. 'Chronica Regnorum Aquilonarium, Daniæ, Sueciæ, et Norvegiæ,' printed in 1546; 2. 'Saxonia, sive de Saxoniæ gentis vetusta origine, libri xii.,' 1520, with a Preface by Cisnerus; 3. 'Wandalia, sive Historia de Wandalorum vera origine, variis gentibus, crebra e patria migratione, regnis item quorum vel autores fuerunt vel eversores, libri xiv.,' 1519; 4. 'Historia Ecclesiastica Saxoniæ,' 1548. All these works have gone through several editions.

KREOSOTE. [CREOSOTE.]

KRISHNA. [VISHNU.]

KSHATRIYAS. [HINDUSTAN, p. 231.]

KUBAN, or KOOBAN, is a river in Russia, which originates in Mount Caucasus, between the principal range and Mount Elbrooz. Having skirted the southern and western declivities of that snow-capped peak, it turns to the north, and afterwards to the west, and again to the north before it leaves the mountain-range near Grigoriopol. It then turns again to the west and flows along the northern offsets of the Caucasus, which it divides from the steppes of the Chernomore Cossacks, or the Cossacks of the Black Sea. Towards its mouth it enters a low flat country, and along its banks salt-marshes extend to a considerable distance. In this plain the river divides into two branches, and forms an island called the Island of Taman. One shallow branch, called by the Russians Chernaya Protoka, runs nearly due north, and falls into the Sea of Azoff. The other branch, which preserves the name of Kooban, continues its western course and falls into the Black Sea, or rather into an æstuary called Kubanskoi Liman, which is united to the Black Sea by a shallow passage scarcely 100 fathoms wide. The Kuban runs nearly 400 miles, and generally with a rapid current between elevated banks. It is navigable for river-barges up to the town of Yekaterinodar, and on its thinly inhabited banks a number of small fortresses have been erected to protect the level country from the incursions of the mountaineers of the Caucasus. (Pallas's *Travels through the Southern Provinces of the Russian Empire*.)

KÜHLOCH, an ossiferous cave on the bank of the Esbach River, near Rabenstein in Franconia, which is described by Dr. Buckland as one of the most remarkable that he had examined. In this cave, whose cavity is nearly equal to the interior of a large church, there are hundreds of cart-loads of black animal dust entirely covering the whole floor, to a depth which must average at least six feet, and which, if we multiply this depth by the length and breadth of the cavern, will be found to exceed 5000 cubic feet. Dr. Buckland observes, 'Many hundred, I may say thousand, individuals must have contributed their remains to make up this appalling mass of the dust of death.' (*Reliq. Diluvianæ*, p. 138.)

The whole of this mass has been again and again dug over in search of teeth and bones, which it still contains abundantly, although in broken fragments. The bones are of a black, or, more properly speaking, dark umber colour throughout, and many of them readily crumble under the finger into a soft dark powder resembling mummy powder, and are of the same nature as the black earth in which they are imbedded. (*Reliquiæ Diluvianæ*.)

KUMAON, a district forming part of the British territory in Northern Hindustan, comprehending an area of 7000 square miles, includes the country between the Ganges and the Kalee rivers, and thus comprises part of the province of Gurwal, from which it is naturally divided by a range of mountains. The whole of this district presents a succession of mountainous ridges, increasing in elevation as they approach the north, until they reach the snowy peaks of the Himalayas. Towards the south the country presents an almost uninterrupted succession of forests, containing many large trees; but in the higher region to the north, where the height amounts to 2500 feet above the plains, tropical productions disappear, there are no longer forests of any description, but in their place numerous groups of trees of various kinds commonly found in Europe; among these are the oak, fir, willow, mulberry, and birch. Ferns and lichens are everywhere seen, as well as wild raspberries and barberries, nettles and thistles. A description of tea-plant is also found wild, but it has an emetic quality which unfits it for use. During the cold season it is common for the farmers to quit their villages in the high grounds, and to proceed with their herds and flocks to the warmer districts below. Pheasants, black partridges, and sometimes woodcocks are seen towards the north. Kumaon is very thinly inhabited, and by a race who do not partake of the hardy character usually shown by the natives of so cold a region. In complexion they resemble the Chinese, but their features point them out as of Hindu origin. Before the country came under English dominion, the natives were much oppressed by the Gorkhas, whose periodical incursions continually deprived them of the fruits of their toil, and entirely prevented the accumulation of property. At length, in 1799, the Gorkhas made a conquest of the country, and retained possession of it until 1815, when, after a short campaign, it was acquired by the English, to whom it offers but little advantage in the way of revenue. The chief benefit which it affords is derived from its climate, which is found to be almost as efficient in restoring its tone to the constitution of Europeans as a visit to Europe. For this purpose the capital, Almorah, is much frequented. [ALMORAH.]

KUPFERSCHIEFER, in geology, the German name (meaning copper-slate) for certain laminated rocks at the base of the magnesian limestone formation of Thuringia, which are impregnated with copper, and richly stored with Palæonisci and other fossil fishes. The equivalent beds in England (*e.g.* at Ferryhill in the county of Durham and at Whitley in Northumberland) are called 'marl-slate,' and are equally rich in similar, if not identical fishes. The cause of their (perhaps contemporaneous) destruction at such distant points is an interesting subject of geological speculation. (Agassiz, *Recherches sur les Poissons Fossiles*; Sedgwick, *On Magnesian Limestone*, in *Geol. Trans.*)

KUR, or KOOR, the antient Cyrus, a river in Asia, rises near 41° N. lat. and between 42° and 43° E. long., on the eastern declivity of the mountain-range which divides the waters falling into the Caspian Sea from those which run to the Black Sea. Its sources are a little south-west of the town of Ardahan, belonging to the Pashalik of Kars; but after a course of about fifty miles in an eastern direction it leaves the Turkish empire and enters Russia, where it gradually turns to the north, and passes near the fortress of Akaltsic or Ahkiskhar. The river afterwards gradually declines more to the east, until it runs east-south-east, and receives from the southern declivity of Mount Caucasus the Arakui or Aragbor, a rapid river, which brings down a great mass of water. Below this junction the Koor is a very considerable river, and runs nearly south, passing the large town of Tiflis. So far its course is bordered by high, steep, and rocky banks, and traverses a hilly country. Below Tiflis it enters the Plain of Kara, where its banks are alternately low and high, the plain being considerably elevated above its bed, so that the water of the river cannot be used for irrigating any part of it. In this plain several springs of petroleum occur. The Koor runs through the plain mostly in an east-south-eastern direction, and at its termination its waters are increased by those of the Alazon, another powerful river, descending from the southern declivity of Mount Caucasus. After this junction the river traverses a hilly country of some extent, passing through the narrow part called Manga, and then enters that extensive plain which extends along the Caspian Sea from Baku to the Bay of Kizil Agatch for about 120 miles, and along the course of the river for about 150 miles. This extensive plain is broken by isolated hills and numerous salt-marshes. Some of the hills along its northern border are mud-volcanoes, and in many places springs of petroleum occur. Near the banks of the Koor the country is subject to inundations, and overgrown with rushes to a considerable distance. The districts nearest the sea-coast have a soil impregnated either with salt or petroleum, and are completely sterile, such as the Mogan desert; but towards the hills and mountains which surround the plain the soil is tolerably fertile. About 70 miles from its mouth the Koor receives the Aras. [ARAS.] After its junction with the Aras, the Koor becomes navigable for moderate-sized vessels, and is about 140 yards wide. About 20 miles from the sea the river divides into several branches, of which the outermost are the largest. On the left main branch is the town of Salian, a collection of villages rather than a town, but a wealthy place, on account of the productive fishery which is carried on by the inhabitants in the river, and especially at its mouth. The fish taken here are the same species which are caught at Astrakhan. The delta of the Koor projects several miles into the Caspian Sea. The whole course of the river is about 560 miles. (Dr. Reinegg's and Marshal Biberstein's *Description of Mount Caucasus.*)

KURDISTAN. [PERSIA.]

KURILE ISLANDS extend from Cape Lopatka, the southern extremity of the peninsula of Kamtchatka, in a somewhat curved line, to Cape Broughton, the north-eastern extremity of the island of Yeso. Some geographers even consider the last-mentioned island as one of the Kuriles. They are twenty-five in number, besides numerous rocks, and are all of volcanic origin, consisting of high masses of lava. Ten active volcanoes are known to exist on the nineteen northern islands. The vegetation is scanty, and on those near Kamtchatka trees do not grow; but the southern islands are more fertile, especially Kunashir and Iturup, on which the Japanese have settled. The remainder are claimed by the Russians as an appendage to Kamtchatka, and they even established a settlement on Urup, in 1828, for the purpose of hunting the numerous wild animals, especially beavers, which are found there. The natives are partly Kamtchadales and partly Aïnos, a tribe which seems to belong to the same race as the Japanese. Both tribes live on the produce of the chace, or rather of their fisheries. The Japanese have introduced agriculture into the islands which have been settled by them.

KURLAND. [COURLAND.]

KURSK, a large government of European Russia, lies between 50° 20′ and 52° 26′ N. lat. and 33° 40′ and 38° 20′ E. long. It is bounded on the north by Orel, on the east by Voronetz, on the south and south-west by Slobodsk-Ukraine, and on the north-west by Tschernigov. Its area is 14,720 square miles. The extreme breadth is 150, and its extreme length 200 miles. The surface of the province is undulating. It contains no mountains, but is traversed by many small eminences. There are no large rivers or large lakes, nor are the forests extensive. The soil is fertile and well cultivated, and the country populous, and covered with villages. The soil generally consists of a rich mould, of sufficient depth, over a thick clayey or loamy bottom; sand or stiff clay occurs but rarely, and heath and moor still more rarely. The hills consist of clay, marl, lime, freestone, and chalk. The principal river is the Donetz, which, after being joined by the Oskol, Ulooscha, and other rivers, flows into Slobodsk-Ukraine, where it joins the Don. Neither the Donetz nor any of the other rivers, of which there are 13 large and 495 smaller, is navigable. The Sem, or Seim, runs into the Desna, and consequently belongs to the basin of the Dnieper. Among the rivers that join it is the Swava, which comes from Orel and has many ruins and tumuli on its banks. The streams are not frozen over till the end of November or the beginning of December, and are free from ice at the beginning of March. In some parts the tapeworm is endemic among the people, and the liver-fluke in the cattle. The corn occasionally suffers from blight.

Kursk is one of the most fertile provinces of the empire, and in Great Russia at least is next to Orel in the abundance of its harvests. The soil is so rich that it needs no manure. When it is exhausted, it is suffered to lie fallow for three or four years. The system of agriculture is very rude: new ground is broken up with a large plough, drawn by three or four yoke of oxen; old lands are turned or scratched up with a light plough. The harvest begins in July: the corn is dried and threshed in the field; there are no barns, but the grain is deposited in pits in the ground, where it may be preserved for six or ten years, only covered with sods or boards. The commonest kinds of grain and their produce are:—winter rye, which yields from seven to nine fold; winter wheat, from three to six fold; barley, from seven to twelve fold; oats, from eight to nine fold; peas, from five to seven fold: buck-wheat, from two to five fold; millet, from eight to forty fold; and poppy, from twenty to forty fold. The other products are chiefly hemp and tobacco and some flax. Horticulture is very general and successful; all the vegetables usual in Germany are cultivated and thrive well: near the capital and on the estates of the nobility the more delicate vegetables are cultivated, and hops sufficient for consumption are found in most gardens. There are apples, cherries, and various sorts of plums; but scarcely any pears, except the wild sort, which is preserved. There is an abundance of hazel-nuts and wild berries: melons and water-melons are grown in the open fields. There is some wood in small coppices in most of the circles, but not enough for consumption in any, and all must at least import timber for building. In some they are obliged to use straw and cowdung for fuel. The crown forests cover an area of only 330 square miles. There are few beasts of the chase in these woods, but great numbers of wolves and foxes, the fur of which is of inferior quality. Hares, bustards, partridges, and quails abound. The breeding of cattle is indeed subsidiary to agriculture, but is carried on very extensively. The horses are of the Russian breed, but nearly equal to those of the Ukraine. Horned cattle are kept in great numbers, because oxen alone are employed in agriculture. Numbers of cattle are fattened, and cows are kept for the purposes of the dairy, but with less advantage than might be done. The sheep are of the Russian breed, and their wool is indifferent. Merinos do not thrive. The inhabitants keep numbers of swine and domestic poultry; and so many bees, that honey and wax are articles of exportation. There is scarcely any fish. The minerals are, some iron (of which no use is made), limestone, flints, and saltpetre.

Agriculture and the breeding of cattle are the most profitable and the chief employments: very few hands are engaged in manufactures. Such clothing as the countryman wants—shirts, stockings, gloves, and caps, are of his own manufacture. He often makes his own household furniture and farming implements, and builds his own house; so that he scarcely needs the help of the mechanics, of whom however many are settled in the villages, who make articles for sale and frequent the fairs. The manufactures are chiefly in the towns, the most industrious of which are Kursk and Belgorod. The exports consist of the natural productions of the country, which are mostly sent by land to the Volga and thence to Petersburg. Lately attempts have been made to send them by the Sem and the Desna to Odessa.

The population, which amounts to 1,720,000, consists partly of Great, partly of Little Russians; most of the latter came into the province in the 18th century. There are few strangers, but there is one entire village of gipsies, and many unsettled families of that people who lead a nomadic life. The head of the Greek church is the archbishop of Kursk and Belgorod, whose diocese is of the third class, and who has 870 churches under him.

KURSK, the capital of the government, in 51° 43′ 30″ N. lat. and 36° 27′ 45″ E. long., is the residence of the military governor of Kursk and Orel, of the civil governor and authorities, and of the archbishop. It lies on the Tuskar, or Tuskara, where it is joined by the Kara, at the foot of a hill on which there is an old decayed fortress. The town is surrounded with palisades, the old rampart having been converted into walks and gardens. The streets are narrow and crooked, but they are paved. There are twelve stone and four wooden churches, two convents, an ecclesiastical seminary, a gymnasium, hospital, and other public buildings, and several manufactories. The population is stated at 24,000. A very great annual fair is held on a heath at Koreaja Pustinja, a village in the circle of Kursk, about 12 miles from the town, which is attended even by merchants from Germany.

KUSTER, LUDOLF, born in 1670, at Blomberg in Westphalia, studied at Berlin, and afterwards visited various parts of Europe, where he became connected with the principal scholars of his age. In 1696 he published a critical dissertation on the history of Homer and his works: 'Historia Critica Homeri, qua de scriptis ejus tam deperditis quam extantibus, spuriis ac genuinis; de fatis, judiciis, studiisque hominum quæ idem poeta per omnia sæcula expertus est; necnon de rhapsodis, criticis, omnibusque iis qui aliquam in illustrando Homero, tam priscis quam nostris sæculis, operam posuere, agitur.' F. A. Wolff reprinted it in the first volume of his edition of Homer, 1785. Kuster went afterwards to Utrecht, where he remained some years, and contributed several papers to the 'Thesaurus Antiquitatum Romanarum' of Grævius, and to the 'Thesaurus Antiquitatum Græcarum' of James Gronovius. While at Utrecht, he also published a literary journal in Latin: 'Bibliotheca Librorum Novorum, collecta a L. Neocoro, ab Aprili, anno 1697, ad Decembrem, 1699.' Neocorus is the Latinized form of his name, which Kuster assumed in his works according to the fashion of the times. In the year 1700 he repaired to England, where he undertook to edit a new edition of Suidas, which was published at Cambridge, 3 vols. fol., 1705. In 1707 he published at Amsterdam the 'Life of Pythagoras,' by Iamblichus; and in 1710 he produced an edition of Aristophanes, with the Scholia. James Gronovius having criticised with his customary bitterness and ill temper Kuster's 'Suidas,' Kuster replied to him in his 'Diatribe Anti-Gronoviana, in qua editio Suidæ defenditur, itemque haud pauca loca Hesychii emendantur, et denique quid fuerit *Æs grave* apud veteres Romanos explicatur. Accedit Diatribe de verbo *cerno*,' Amsterdam, 1712. In this last dissertation on the verb 'cerno,' Kuster gave a specimen of a series of observations on the Latin language, about which he had been busy for years, but which he left incomplete at his death. This dissertation also led him into a controversy with Perizonius. About 1713 Kuster, being then at Paris, obtained from Louis XIV., through the friendship of L'Abbé Bignon, a pension of 2000 livres, and was made a member of the Academy of Inscriptions. He died at Paris in 1716. His notes on Hesychius, which he left in manuscript, were inserted by J. Alberti in his edition of Hesychius, 2 vols. fol., 1746. Kuster was one of the best scholars of his time.

KUTCH. [Cutch; Hindustan.]

KUTEERA, or **KATI'RA**, a kind of gum, considered in India by the native practitioners of medicine to be a good substitute for Tragacanth. Indeed, they consider it to be the true Tragacanth, which is described by Avicenna under the name *kuseera* in the original Arabic, while the plant which yields it is named *Ketad*, and its gum *Dragacanthum*. The Kuteera gum a good deal resembles Tragacanth in appearance, but does not in other respects correspond with that gum, according to the experiments which have been made on it in Europe. It has been described by Martius under the name *Kuteera* (*Pharmakognosie*, p. 338), which Guibourt says is the same as his *Gomme de Bassora*. Dr. Roxburgh states that *Sterculia urens* 'yields a gum not unlike Tragacanth, and has been sent to London as such; but the artists, who use that gum, did not find it answer.' He however mentions that the water in which he kept the green branches for examination became thick, like a clear glutinous jelly, while the bark was exceedingly astringent. (*Fl. Ind.*, p. 111.) Dr. Royle, on the contrary, states that the gum called *Kuteera*, and used as a substitute for Tragacanth in north-western India, is yielded by *Cochlospermum Gossypium*, and he possesses some of the same kind of gum collected by Mr. Malcolmson in Central India, accompanied with specimens of the tree which yielded it. This is identically the above-named species, which is so highly ornamental on the lower mountains of India, with its large and rich-coloured yellow flowers.

KUYP, or **CUYP, ALBERT**, was the son and disciple of Jacob Gerutze Kuyp, an eminent landscape painter of Dort, and a pupil of Abraham Bloemart. Jacob's works, chiefly views from nature in the environs of Dort, were highly and justly valued, and his memory was held in esteem at Dort for having founded in 1642 the Academy of Painting of St. Luke in that town, in conjunction with J. van Hasselt, Corn. Tegelberg, and J. Grief. His son Albert was born at Dort in 1606. Though his father's disciple, his manner is very different, and he embraced a greater variety of subjects. 'The pictures of this master,' says that profound critic Dr. Waagen, 'are the most splendid proofs that the charm of a work of art lies far more in a profound and pure feeling of nature, in the knowledge and masterly use of the means of representation which art supplies, than in the subject itself; for otherwise how would it be possible from such monotonous natural scenery as Holland affords, where the extensive green levels are broken only by single trees and ordinary houses, and intersected by canals, to produce such attractive variety as their pictures offer? How could it happen that so many pictures, even of eminent masters, such as J. Both and Pynaker, who represent the rich and varied scenery of Italy, have less power to touch our feelings than those of Kuyp, Ruysdaal, and Hobbima? In elevation of conception, knowledge of aerial perspective, with the greatest glow and warmth of the serene atmosphere, Kuyp stands unrivalled, and may justly be called the Dutch Claude. In the impasto, the breadth and freedom of execution, he greatly resembles Rembrandt.' Though Kuyp is reckoned among the cattle-painters, all kinds of which he represented with equal truth and felicity, he likewise painted landscapes, properly so called, and sea-pieces. He excelled in every thing that he attempted; and yet it is remarkable that he has been comparatively little known abroad. Scarcely anything is known of the circumstances of his life; even of the year of his death we can find no record. Kuyp's works were so low in value, that a beautiful picture of his, for which Sir Robert Peel paid 350 guineas, was bought at Hoorn, in Holland, some years ago, for one shilling English. He is a great favourite in England, and it is here that his finest works are found, chiefly in the National, Bridgewater, Grosvenor, and Dulwich Galleries, in the collections of Sir Robert Peel, Lord Yarborough, the duke of Bedford, the marquis of Bute, his late Majesty George IV., and the late Sir Abraham Hume.

KYANITE, CYANITE, DISTHENE, SAPPARE. This mineral occurs crystallized and massive. Primary form a doubly oblique prism. Cleavage parallel to the faces of the primary form. Fracture uneven. Hardness of the sharp portions sufficient to scratch glass. Colour white, yellow, and various shades of blue and green. Streak white. Lustre vitreous, pearly. Transparent; translucent. Specific gravity 3·6.

By the blow-pipe infusible, and merely becomes white even in a very strong fire; with borax readily dissolves into a colourless transparent glass.

	Analysis by Laugier.	Analysis by Arfwedson.
Silica	38·50	34·33
Alumina	55·50	64·89
Lime	0·50	
Oxide of iron	2·75	99·22
Water and loss	2·75	
	100·	

Found in Switzerland, in Scotland, and many other parts of Europe, and also in North and South America.

KY'DIA, a genus of trees of the natural family of Byttneriaceæ, which is sometimes called Sterculiaceæ. The species are only two in number, found in the hilly parts both of Peninsular and Central India, as well as all along the foot of the Himalayan mountains. The genus is distinguished by its monadelphous stamens, having the tube split about the middle into five segments, each bearing four anthers fascicled together at the apex. The trees are moderate sized, with alternate five-nerved, somewhat five-lobed leaves. The flowers are white and panicled. *K. calycina*, having the exterior calyx or involucel four-leaved, and larger than the petals, is called *chuo-puttca*, or four-leaved, by the natives of India. Like the greater portion of the family to which it belongs, this genus abounds in a bland mucilage, for which its bark is employed in clarifying sugar in the same way as that of Guazuma ulmifolia, belonging to the same family, is in the West Indies.

Dr. Roxburgh, in establishing this genus, says, 'I have ventured to give it the above name in memory of the late Colonel Robert Kyd, of Bengal, whose attachment to botany and horticulture induced him to retire from the high rank he held in the army, to have more leisure to attend to his favourite study, to the advancement of every object which had the good of his fellow-creatures in view, and to the establishment of the Honorable East India Company's botanic garden at Calcutta, where he was particularly attentive to the introduction of useful plants, and to their being dispersed over every part of the world for the good of mankind in general.'

INDEX TO THE LETTER K.

VOLUME XIII.

K, page 170
Kabyles [Algiers, vol. i., p. 327]
Kaempfer, 170
Kæmpféria, 170
Kaffa, 170
Kahira, or Cairo, 171
Kahau (Proboscis Monkey) [Nasalis]
Kakoxene, 171
Kalendar, 172
Kalendæ [Kalendar]
Kali, 173
Kalmucks [Calmucks]
Kalseepee [Antelope, vol. ii., p. 83]
Kalúga (government), 173
Kalúga (town), 173
Kamichi [Palamedea; Rallidæ; Megapodidæ]
Kámpen, or Campen, 173
Kamtchatka, 174
Kandahar, or Candahar [Afghanistan]
Kangaroo. Kangooroo, or Kanguroo [Marsupialia]
Kant, Immanuel, 175
Kantemir, 177
Kaolin, 177
Karabagh [Georgia]
Karamsin, 177
Karpholite, 178
Karphosiderite, 178
Kartli [Georgia]
Kasan [Casan]
Katmandu [Nepaul]
Katti [Hindustan, vol. xii., p. 221]
Keats, John, 178
Keeper, Lord [Lord Keeper]
Keighley [Yorkshire]
Kelp, 179
Kelso [Roxburghshire]
Kemble, 179
Kempis, Thomas à, 179
Kempten, 180
Kendal [Westmoreland]
Keneh [Egypt]
Kenilworth [Warwickshire]
Kennebeck [Maine]
Kennett, White, 180
Kennicott, Benjamin, 180
Kent, 181
Kent, William, 197
Kent, James, 197
Kent's Hole, 197
Kentucky, 197
Kenyon, Lord, 199
Kepler, John, 200
Kerman [Persia]
Kermanshaw [Persia]
Kermes Mineral, 202
Kérodon, 202
Kerry, 202
Kersey, Kerseymere [Woollen Manufactures]
Kertsch [Crimea]
Kesteven [Lincolnshire]
Kestrel, or Kestril, 206
Keswick [Cumberland]
Ketchup [Mushrooms]
Kettering [Northamptonshire]
Kétupa [Owls]
Keuper, 206
Kevel [Antelope, vol. ii., p. 83]
Kew [Surrey]
Key, in music, 206
Khalif [Caliph]
Khair Eddin [Barbarossa, Kair Eddin]
Khan, 207
Khaya, 207
Khemnitzer, 207
Kheraskov, 207
Kherson, 207
Khorassan [Persia]
Khosru I., II., 208
Kiachta, 209
Kidderminster, 209
Kidnapping, 209
Kidneys, 210
Kidneys, Diseases of, 210
Kiel, 210
Kien Loong, 210
Kiew (government), 211
Kiew (town), 211
Kilda, St., 212
Kildare (county), 212
Kildare (diocese), 215
Kilkenny (county), 216
Kilkenny (city), 219
Killala, 221
Killaloe, 221
Killarney, 222
Killarney Lakes [Kerry]
Killas, 222
Killenite, 222
Killfenora, 222
Killiney, 222
Kilmacduagh, 222
Kilmarnock, 223
Kilmore, 223
Kimbolton [Huntingdonshire]
Kimchi, David, 223
Kincardineshire, 223
King, 224
King, William, 225
King George's Sound, 225
Kingfishers, 225
King's County, 233
King's Evil [Scrofula]
King's Lynn [Lynn]
King's Yellow, 236
Kings, Books of, 236
Kingsclere, 236
Kingston [Jamaica]
Kingston-on-Hull [Hull]
Kingston-on-Thames [Surrey]
Kinic Acid, 237
Kinkajou [Potto]
Kino, 237
Kinosternon [Tortoises]
Kinross, 238
Kinross-shire, 238
Kinsale, 238
Kintyre, or Cantire [Argyleshire]
Kinyxis [Tortoises]
Kioosioo [Japan]
Kippis, Andrew, 239
Kircher, Athanasius, 240
Kirghis [Turkistan]
Kirkaldy [Fifeshire]
Kirkby Lonsdale [Westmoreland]
Kirkcudbright, Stewartry, 240
Kirkcudbright (town), 241
Kirkdale, 241
Kirkham [Lancashire]
Kirk Sessions [Sessions, Kirk]
Kirwan, Richard, 241
Kistna [Hindustan, p. 209]
Kitchen Garden, 242
Kite [Falconidæ, vol. x., p. 187]
Kittiwake [Laridæ]
Kiva [Turkistan]
Kizil Irmák, 244
Klaproth, Martin Henry, 244
Kleenebok [Antelope, vol. ii., p. 82]
Kleist [Germany (Literature)]
Klipspringer [Antelope, vol. ii., p. 77]
Klopstock, 244
Knaresborough [Yorkshire]
Kneller, 245
Knight, Knighthood, 245
Knight of the Shire, 246
Knight's Fee, 247
Knight's Service, 247
Knight, Richard Payne, 247
Knight, Thomas Andrew, 248
Knighton, Henry, 249
Knisteneaux [Algonquins]
Knot [Scolopacidæ]
Knox, John, 249
Knutsford [Cheshire]
Koala [Marsupialia]
Koba [Antelope, vol. ii., p. 79]
Kokan [Turkistan]
Kong Mountains, 251
Königsberg (government), 251
Königsberg (town), 251
Kooba [Georgia, p. 176]
Koodoo [Antelope, vol. ii., p. 78]
Koom [Persia]
Koran [Mohammed]
Koray, Adeimantos, 252
Kordofan, 252
Körner, Theodor, 253
Kosciusko, 253
Köstritz, 253
Kostroma [Costroma]
Kotzebue, August Friedrich Ferdinand von, 254
Kotzebue, Otto von, 254
Kouli Khan [Nadir Shah]
Kraméria, 254
Krameriáceæ, 254
Krantz, Albert, 255
Kreosote [Creosote]
Krishna [Vishnu]
Kshatriyas [Hindustan, p. 231]
Kuban, 255
Kühloch, 255
Kumaon, 255
Kupferschiefer, 255
Kur, or Koor, 255
Kurdistan [Persia]
Kurile Islands, 256
Kurland [Courland]
Kursk (government), 256
Kursk (town), 256
Kuster, 257
Kutch [Cutch; Hindustan]
Kuteera, 257
Kuyp, 257
Kyanite, 257
Kydia, 257

L.

L is a liquid formed at that part of the palate which is near the teeth. It is therefore allied at once to the adjoining liquids *r* and *n*, and to the palato-dental consonants. The various forms which the letter has assumed may be seen in ALPHABET. The interchanges to which it is liable are as follows:—

1. *L* is interchangeable with *r*. Hence from the Greek or rather Latin *apostolo*, *epistola*, the French have derived *apostre*, *apôtre*; *epistre*, *epître*. Again, in Latin, while from *rivo*, a stream, *rivali*, living near the same stream, and from *aevo*, age, *aequali*, of the same age, are derived; yet *populo* and *familia* lead to the adjectives *populari*, *familiari*, belonging to the same people, or the same family. These last words it will be observed already possessed an *l*. In the same way the well-known town on the African coast has been called at different times *Algiers* and *Argel*. The Spanish *coronel* corresponds to our *colonel*. Caralis, in Sardinia, is now Cagliari. Salamanca was called in antient times Salmantica and Hermandica.

2. *L* with *n*, as *Barcino* (onis), *Barcelona*; *Ruscino*, *Roussillon*; *Bononia*, *Bologna* or *Boulogne*, *Nebrissa*, *Lebrixa*; πνευμων from πνεω or πλευμων, Lat. *pulmo*; *benus* and *bellus* in Latin, βεντιστος and βελτιστος in Greek; λιτρον, *nitrum*; *anima* in Lat., Ital. *alma*.

3. *L* with *d*, as *St. Aegidius*; *St. Giles*; *gridiron*, meaning *grill-iron*; and the English title *admiral* is derived from the Spanish *almirante*. But see D, No. 4. L is also interchangeable with *t*. (See T.)

4. *Ll* in the middle of words with *li*. Examples of this are abundant in the French pronunciation of the *l mouillé*. Hence from the French *billards* is derived without much alteration of sound the English *billiards*. It is somewhat strange that the English name *Villiers* and the French *Villars*, which are no doubt of the same origin, should be pronounced so perversely that the first writes an *i* and omits to sound it, the second gives an *i* to to the ear and none to the sight. This change prevails between the Greek and Latin languages, as φυλλο and *folio*, a leaf; αλλο and *alio*, other; ʽαλλ and *sali*, leap. Even in the Greek itself μᾶλλον must be a corruption, as analogy would require μαλα, μαλιον, μαλιστα. It is probable indeed that the Greeks gave to the double *l* in this word the same sound as the French now do. On any other principle it would be impossible to defend the circumflex accent, which is only placed on syllables terminating in a vowel. It would perhaps not be wrong to write σκῦλλο rather than σκῦλο, corresponding to the Latin *spolio*, a skin or covering. With these forms may be compared *Mallorca*, pronounced *Mayorca*, the Spanish name for *Majorca*. Lastly, the Portuguese write *lh* with the same sound.

5. *L* disappearing. Not very dissimilar is the Italian interchange of *pl*, *cl*, *fl*, with *pi*, *chi*, *fi*; as from *pleno*, full, *pieno*; *plano*, flat or low, *piano*; *Placentia*, *Piacenza*; *clavi*, a key. *chiave*; *claro*, bright, *chiaro*; *clămare*, to call, *chiamare*; and *flor*, a flower, *fiore*; *fluctu*, a wave, *fiotto*; *Florentia*, once *Fiorenza*, now *Firenze*, the existing name of Florence.

This loss of an *l* after a consonant appears in other languages. The German *fliehen*, to fly, has for its chief element *flug*, corresponding to the Latin *fug*. In the same language *flispern* and *fispern* both mean to whisper; *flittich* and *fittich* both mean a wing; *blinzen* corresponds to the English words *blink* and *wink*. The word *dreifach*, threefold, is derived from *drei* and *flach*. Again the Greek ὑπνο and the Latin *somno*, *sopor*, have *sop* for the radical syllable. In the Gothic *in-suepp-an*, the same root has the form *suep*, but in German *schlaf*, and in English *sleep*. Lastly, the Latin *claud*, shut, and *clavi*, key (words of the same origin, as is proved by the various forms of *suavi*, sweet), appear in German in the form *schluss*, and in English as *shut* and *key*.

6. L with *u*, particularly after an *a*. *Alfidena*, a town, or *Aufidena*; ελεημοσυνη, pity (used by ecclesiastical writers to signify charitable gifts), Ital. *limosina*, Fr. *aumône*, Eng. *alms*; Lat. *altari*, an altar, Fr. *autel*; Lat. *aliqui-uno*, Ital. *alcuno*, Fr. *aucun*; Lat. *ulna*, Fr. *aune*. The French also contract the pronoun and article *à le*, *à les*, to *au* and *aux*.

7. Many words beginning with an *l* once had other consonants before the *l*: as in Latin, *loco*, a place, *liti*, a suit, *lato*, broad, were once preceded by *st*—thus, *stloco*, *stliti*, *stlato*. This explains how *lato* in Latin is the participle of *toll*. It must once have been *tlato*, corresponding to the Greek forms of the same root, viz. τλη-τος, τλη-μων, as well as τολ-μη. Again the English *liquorice* is a corruption from the word *glyco-rhiza*, sweet-root. To this head perhaps belongs the Welsh sound of words beginning with *ll*, as for example all the places beginning with *Llan*, which is pronounced by some as *thlan*, by others as *flan*. Perhaps *lana* and *flannel* are kindred words.

8. *L* is very apt to appear in a root, sometimes before a vowel, sometimes after one, as in the Greek words καλε or κλη, βαλ or βλη, &c. Where this slipping occurs after a sound like *k*, the *l* is apt to be converted into an *r*. Thus the Greek σκαλευ, poke, is in Latin *scru-tari* (compare the phrase *scrutari ignem*, to poke the fire). So καλυπτω and κρυπτω are of the same origin; σκελος and the Latin *crus*, σκολοψ and *crux*; *celeber* and *creber*.

LA, in music, the name given in England, Italy, and France, to the sixth of the syllables used in solmization [SOLMIZATION], and by the two latter countries to the note called A by the Germans and English.

LAALAND, LALAND, or **LOLLAND**, a bishopric of the kingdom of Denmark, comprises the islands of Laaland and Falster, the united area of which is 660 square miles, and the population 64,000. The island of Laaland is situated in the Baltic, between 54° 39′ and 54° 57′ N. lat., and 10° 56′ and 11° 50′ E. long.: its length from west to east is about 60 miles, its breadth 20 miles, and its area is 460 square miles. The population, which is about 45,000 inhabitants, is less than the island, which is extremely fertile, might support; but the climate is unhealthy and the water bad. The country is low, flat, and has much marsh ground. The soil, as already observed, is extremely fertile, producing all kinds of corn, pulse, flax, hops, potatoes, fruit, timber, &c. for exportation. The inhabitants have great numbers of horned cattle, and fish are very abundant. There are four towns in the island: Mariboe, situated on a lake, which, though it has not 1000 inhabitants, is considered as the capital; Naskow, with 2000 inhabitants, which has a good harbour and considerable trade; Nyestedt, with 800 inhabitants, who follow the seal fishery; and Rödbye, with 900 inhabitants, on a bay with many small islands, from which is the passage to Femern and to Heiligenhafen in Holstein.

LABARRAQUE'S DISINFECTING LIQUIDS. Solution of chloride of lime and of chloride of soda. [FUMIGATION.]

LA'BEO (Cuvier), a genus of fishes belonging to the Cyprinidæ. The species of this genus resemble the true carps in having the dorsal fin long, but they do not possess the strong spine of the anal and dorsal fins. The lips are very thick and fleshy, and more or less crenulated. There are no cirri. An illustration of this genus will be found in the *Cyprinus Niloticus* of Geoffroy St. Hilaire. (See *Poissons du Nil*, pl. xi., f. 2.) The *Cyprinus fimbriatus* of Bloch, Schn., p. 441, sp. 24, and the *Catostomus cyprinus* of Lesueur, also belong to the genus Labeo, which has no representative in the European seas.

LABEO, C. ANTISTIUS. [JUSTINIAN'S LEGISLATION.]

LA'BIA. [FORFICULIDÆ.]

LABIA'TÆ. [LAMIACEÆ.]

LABIDOURA. [FORFICULIDÆ.]

LA'BIDUS. [MUTILLIDÆ.]

LABIENUS. [CÆSAR.]

LABLAB, a name, it is said, of Egyptian origin, which has been adopted by botanists to designate a genus of Papilionaceous Leguminosæ of the tribe Phaseoleæ. This genus, like Dolichos, from which it has been separated, is a twisting climber with leaves composed of three large leaflets. The flowers are in racemes, and either white or purple-coloured. The legumes are large, scimitar-shaped, flat, and compressed, tubercularly muricated along the sutures, and having the seeds separated from one another by transverse partitions. It is on account of these seeds and legumes that the species are valued and cultivated in hot countries such as India, Egypt, and the West India Islands, as well as in China. In Indian *Lablab vulgaris* and *cultratus* are chiefly cultivated in the rainy season in gardens, and may be considered the analogues of the French and kidney beans of European gardens.

LABORATORY, the room in which chemical operations are performed. The requisites for the proper arrangement of and the necessary instruments for a laboratory may be seen at length in Professor Faraday's 'Chemical Manipulation.'

LABORDE, JEAN-BENJAMIN, a voluminous writer on the history of music, who evinces extensive knowledge and more industry than method, was born in Paris in 1734, of a rich family, and received a most liberal education, including music, which he studied under the celebrated Rameau. He was intended for the financial department of government, but his inclination prompted him to seek admission to the gay court of Louis XV., to whom he was appointed *premier valet de chambre*, and soon becoming the favourite and confidant of that prince, was, as a matter of course, led into great extravagance and dissipation. But a passion for music, which by some sour moralists of the last age was supposed to betray men of leisure into injurious habits, saved him from much of the evil that most likely would otherwise have ensued from his connection with a profligate monarch and a vicious court: he composed several operas, and these, though possessing little merit, proved successful, and occupied time which, in all probability, would have been devoted to less innocent pleasures. On the death of Louis, in 1774, M. Laborde resigned his office, married, and entered into a life of comparative tranquillity. He became one of the *fermiers-généraux*, devoted his spare hours to study, and, in 1780, published his 'Essai sur la Musique Ancienne et Moderne,' in four 4to. volumes, a splendid work, got up at vast expense, embellished by a great number of remarkably well-executed engravings, and illustrated by numerous examples of French national music in various forms. This contains an abundance of information, drawn with great labour from authentic sources, and though exhibiting occasional prejudices, and so desultory that it ought to have been entitled a Collection of Essays, rather than *an* Essay, yet it has supplied with facts and materials writers—some of them of no mean reputation—who have not had the candour to acknowledge the slightest obligation.

The French revolution brought in its train the ruin of M. Laborde. A *farmer-general* could expect no favor from those whom the new order of things had placed in power; he therefore withdrew into the country, and lived concealed, till an unlucky indiscretion of a person intimately connected with him made his retreat known. He was conveyed to Paris and committed to prison, where he might have remained, among others, till one of those changes in the government to which so many owed their lives had liberated him; but imprudently, and against the advice of his friends, he pressed for trial, was condemned, and perished on the scaffold on the 20th of July, 1794, just five days before the fall of Robespierre and his sanguinary colleagues.

The great pecuniary resources of M. Laborde, together with his activity and indefatigable industry, enabled him to publish, in a sumptuous manner, many original works; also some translations from the English. Among the former are: an 'Essai sur l'Histoire Chronologique de plus de 80 Peuples de l'Antiquité,' 2 vols., in 4to.; a 'Description générale et particulière de la France,' in folio; and 'Tableaux Topographiques, Geographiques, Historiques, &c., de la Suisse,' 4 vols., in folio.

LABOUR. [Wages; Wealth.]

LABOUR, PAYS DE. [Basques, Paysdes; Guyenne and Gascogne.]

LABRADOR. [Hudson's Bay.]

LABRADORITE, LABRADOR FELSPAR, occurs in rolled or imbedded crystalline masses. Cleavage parallel to the planes of a doubly-oblique prism; fracture uneven, conchoidal; hardness 5·5 to 6·5, scratches phosphate of lime, and is scratched by quartz; colour white, grey; richly iridescent; lustre vitreous; translucent; specific gravity 2·69 to 2·76.

When powdered and heated in muriatic acid it gelatinizes; on charcoal before the blowpipe, fuses into a compact glass, with a brilliant fracture.

Found on the coast of Labrador; and in Devonshire imbedded in a trap rock. It is probably a variety of Albite.

Analysis of the mineral from Labrador—

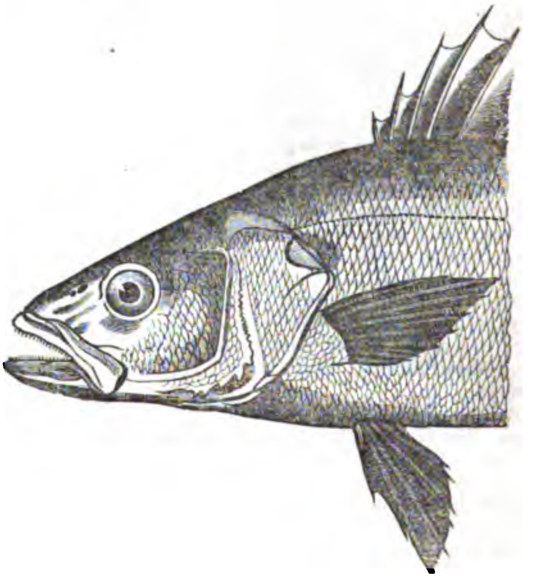
Silica . . .	55·75
Alumina .	26·50
Lime . .	11·00
Soda . . .	4·00
Oxide of Iron .	1·25
Water . .	0·50
	99·

LABRAX (Cuvier), a genus of fishes of the section Acanthopterygii and family Percidæ. The fishes of this genus are closely allied to the true Perches, but may be distinguished by the opercular bones being covered with scales, the absence of denticulations on the suborbital and interopercular bones, the operculum being terminated by two spines, and likewise by the tongue being almost entirely covered with minute and closely set teeth. There are two dorsal fins.

The *Labrax lupus* (Cuvier), a fish commonly known in this country by the name of the *Basse*, and sometimes called the *Sea-dace*, is abundant in the Mediterranean; its flesh being excellent food, it has been long known, and was called by the Romans *Lupus*, and by the Greeks *Labrax*.

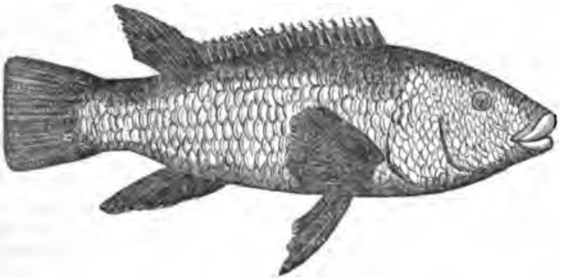
The *Basse* is not unfrequently met with on our own shores: it is generally from about twelve to eighteen inches in length, but sometimes attains a much larger size. The upper parts of the head and body are dusky-blue, passing into silvery-white on the sides and belly; the fins are pale-brown. In form it very much resembles the perch, and, like that fish, it has two distinct dorsal fins, the rays of the first being spinous, and those of the second being flexible: the scales are of moderate size.

The *Rock-fish* or *Striped Basse* of the United States (*Labrax lineatus* of Cuvier and Valenc.) also belongs to the present genus, and indeed very closely resembles the *L. lupus* in form, but attains a larger size, and is adorned with seven or eight longitudinal black lines on a silvery-ground colour. There is also a second American species of Basse, the *Labrax mucronatus* of Cuvier and Valenciennes, which differs from the former in having no black lines on the sides of the body, and in being of a smaller size and deeper and shorter form.



Head of Labrax Lupus.

LA'BRIDÆ (Labroïdes, Cuvier), according to Cuvier's 'Règne Animal,' a family of fishes of the order Acanthopterygii. The fishes belonging to this family are of an oblong form, covered with scales, usually of large size, formed of simple laminæ, and with the external or posterior margin smooth; they have a single dorsal fin supported in front by spinous rays, each of which is generally furnished with a membranous appendage; the jaws are covered by thick fleshy lips; two upper pharyngeals are attached to the cranium, and, together with a large lower pharangeal, are armed with teeth, which are large and rounded, sometimes pointed or laminated, and generally very strong. The intestinal canal is without cœca, or when these appendages are present they are of small size, and there is a simple and strong natatory bladder. The following genera are contained in this family:—*Labrus* proper, the characters of which are—opercula and preopercula without spines or dentations; cheek and operculum covered with scales; lateral line straight, or nearly so. Of this genus, the species of which are called Wrasses, we have several examples on the British coast. The Ballan Wrasse (*Labrus maculatus*, Bloch), is not unfrequently met with on various parts of our coast; it is about eighteen inches long, of a red colour above, pale orange beneath, and adorned with bluish green oval spots; the fins and tail are green, with a few red spots, the dorsal fin is spotted at the base. The length of the head compared to the whole length of the fish is as one to four, and the depth of the body is equal to the length of the head. The fin-rays are, dorsal, 20 + 11; pectoral, 15; ventral, 1 + 5; anal, 3 + 9; caudal, 13. Besides this species we have the Green-streaked Wrasse (*Labrus lineatus*), the Blue-striped Wrasse (*Labrus variegatus*, Gmel., Linn.), the Sea-wife (*Labrus vetula*, Bloch), the Red Wrasse (*Labrus carneus*, Bloch), the Comber Wrasse (*Labrus comber*, Gmel., Linn.), all of which are described in Mr. Yarrell's 'History of British Fishes.'



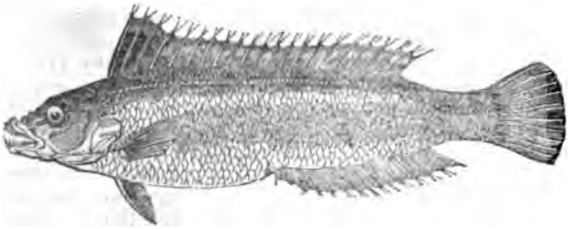
The Ballan Wrasse. (Labrus maculatus.)

Genus *Cheilinus*, Lacép.—The species of this genus differ only from the true Labri in having the lateral line interrupted opposite the end of the dorsal fin, and commencing again a little below the break. The scales on the tail are large, and extend on the fin. These fishes inhabit the Indian Ocean, and are very beautiful in colouring.

Genus *Lachnolaimus*, Cuv., may be thus characterized:—anterior spines of the dorsal fin with long flexible filaments; pharyngeals furnished with a villous membrane, with rounded flat teeth on the hinder part. The known species are from America.

Genus *Julis*, Cuvier, is distinguished from Labrus proper by the head being entirely smooth and without scales, and the lateral line being suddenly bent opposite the end of the dorsal fin.

Julis Mediterranea, Risso (Julis vulgaris, Cuvier), the Rainbow Wrasse, has been caught off the British coast; but it appears here to be scarce, though a well known fish in the Mediterranean. It is of a slender and elongated form, nd remarkable for the elegant distribution of its colours, which change according to the light and position: on each side of the body is a broad dentated stripe, extending from the head nearly to the tail, of a silvery and fulvous colour. The fin rays are:—dorsal, 9 + 13; anal, 2 + 13; caudal, 13; pectoral, 12; and ventral, 1 + 5. A specimen described by Donovan, which exceeded seven inches in length, was caught off the coast of Cornwall, and is the only recorded instance of the occurrence of the species on the British coast.

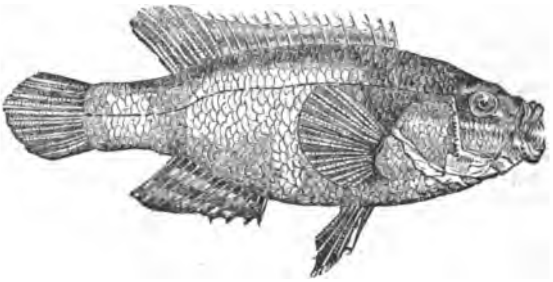


The Rainbow Wrasse. (Julis Mediterranea.)

The species of the genus *Anampses* of Cuvier differ from those of the genus *Julis* in having two flat teeth in each jaw, which project and curve outwards.

The genus *Crenilabrus* of Cuvier has the general characters of Labrus proper, but the margin of the preoperculum is dentated.

Crenilabrus Tinca, Flem., called the 'Gilt-head,' 'Connor, &c., is found on many parts of our coast, and indeed is one of the commonest species of the family Labridæ we possess it is from eight to ten inches in length; the upper parts are marked with alternate red and bluish longitudinal lines; below the lateral line the colour is bluish-green, spotted with dull red; head brownish-red, with undulating lines of an azure-blue colour; dorsal, caudal, and ventral fins, bluish-green, spotted, and lined with red; pectorals pale and immaculate; greatest depth of the body very nearly one-third of the entire length.



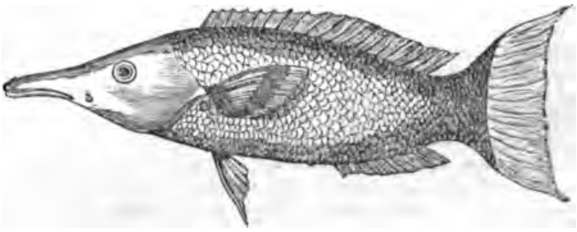
The Gilt-head. (Crenilabrus tinca.)

The works on British fishes contain three other species of the present genus. The Goldsinny (*Crenilabrus cornubicus*, Risso), the Gibbous Wrasse (*Crenilabrus gibbus*, Flem.), and the Scale-rayed Wrasse (*Crenilabrus luscus*, Yarrell).

In the genus *Coricus*, Cuvier, we find the same characters as in *Crenilabrus*; but the mouth is protractile, though not quite in so great a degree as in the next genus, *Epibulus* (Cuvier), where the species have the power of extending the mouth to a great degree: in the fishes of the last-mentioned genus the head and body are covered with large scales, which extend both on the caudal and anal fins; the lateral line is interrupted, and there are two long conical teeth in each jaw, behind which the teeth are comparatively small and blunt. The only species known (*Epibulus insidiator*) inhabits the Indian Ocean. *Clepticus* (Cuvier), which is the next genus in succession, has for its distinguishing characters—the snout small and cylindrical, which may be suddenly protruded like that of Epibulus, but which is not so long as the head: the teeth are minute, the body oblong, and the head obtuse; the lateral line is continuous, and the dorsal and anal fins are almost entirely enveloped by scales. But one species is known (the *C. genizara*, Cuv.), and this is from the Antilles.

In the genus *Gomphosus* (Lacépède), the muzzle is remarkably long and slender, owing to the prolongation of the maxillary bones; the head is smooth, as in *Julis*. The species inhabit the Indian Ocean.

Gomphosus viridis, Bennett,[*] is found off the coast of Ceylon, and is of a dark green colour; the pectoral fin is marked with a black streak.



Gomphosus viridis.

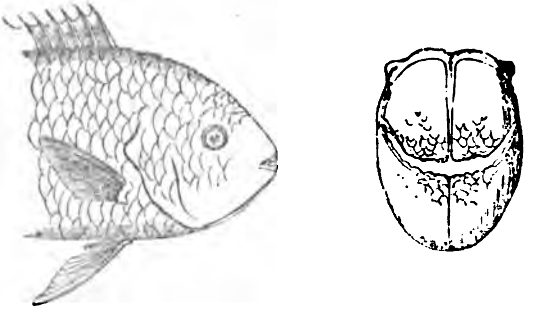
Xyrichthys (Cuvier).—The fishes of this genus are of a compressed form, and have the profile of the head high and nearly vertical: the body is covered with large scales; the lateral line is interrupted; the jaws are furnished with a range of conical teeth, of which those in the centre are the longest; the pharynx is beset with hemispherical teeth. The compressed form and almost vertical profile of the head caused the older authors to arrange these fishes with the Coryphænæ. The *Xyrichthys novacula* (*Coryphæna novacula*, L.), or Razor-fish of the Mediterranean, affords an example of this genus: it is of a red colour, irregularly striped with blue.

[*] See Bennett's 'Fishes of Ceylon.'

Genus *Chromis*, Cuvier.—With the thick lips, protractile intermaxillaries, pharangeal bones, filaments to the dorsal spines, and the general appearance of a Labrus, these fishes have the teeth in both jaws and on the pharangeals slender and thickly set, or, as Cuvier describes them, *en cardes*, but in front of these there is a range of conical teeth. The vertical fins are filamentous. The ventral fins are often prolonged into long filaments. The lateral line is interrupted. A small species of this genus, which is of a chesnut-brown colour, is common in the Mediterranean; it is the *Sparias chromis*, Lin.; another species is found in the Nile, the *Labrus niloticus*, Hassels, &c. The genus *Cychla* (Bloch, Schn.) differs from Chromis in having the body more elongated, and in having the whole of the teeth very slender and thickly set, like the pile on velvet, and forming a broad band: it contains numerous species. The genus *Pseliops* (Cuvier) differs from Chromis in having the head compressed, the eyes placed near to each other, and the ventral fins much elongated.

Malacanthus, Cuvier.—In this genus there are the general characters of Labrus; the maxillary teeth are nearly the same, but the pharyngeal teeth are *en carde*, as in *Chromis*. The body is elongated, the lateral line continuous, the operculum is produced posteriorly into a little spine, and the long dorsal fin has but a small number of slender and flexible spines in front. One species is found in the Antilles, which is of a yellowish colour with irregular transverse violet stripes and has a crescent-shaped tail: it is the *Coryphæna plumieri* of Lacépède.

Genus *Scarus*, Linn.—The species of this genus, commonly known by the name of Parrot-fishes, are remarkable for the convex and rounded form of the jaws, which are beset with several series of scale-like teeth, which are so soldered together, that they usually appear to form solid masses of enamel: these teeth succeed each other from behind forwards; those at the base, being the most recent in formation, in time replace those above, and themselves form the cutting edge. When alive, the fleshy lips nearly cover the teeth. In general form and in the large scales with which the body is covered the Parrot-fishes resemble the true Labri; their pharyngeals, like them, are furnished with teeth, but they consist of transverse laminæ.



Head of a Scarus; and the jaws—natural size.

These fishes are chiefly confined to the seas of hot climates, and are of very brilliant colours, which last circumstance, combined with a fancied resemblance between the mouth and the beak of a parrot, has given rise to the name of Parrot-fishes. Some of them have a crescent-shaped tail, and of these there are a few in which the forehead is very gibbous; in others, the tail is truncated. Cuvier has separated from the Parrot-fishes, under the generic name *Calliodon*, those species in which the lateral teeth of the upper jaw are square and pointed, and in which there is an interior range of much smaller teeth in the same jaw; and lastly, M. Cuvier has established the genus *Odax* for the reception of those Labroid fishes which approach the genus *Labrus* in having the lips thick and fleshy, and the lateral line continuous, and the jaws composed like those of *Scarus*, but which are however flat and not gibbous, and are covered by the lips; the pharyngeal teeth are as in Labrus. The *Scarus pullus* of Bloch (Schneider) belongs to this genus; the fish is found off the coast of New Zealand, is of a blackish brown colour, and furnished with small scales.

LABROIDES. [Labridæ.]

LABRUS. [Labridæ.]

LA BRUYERE. [Bruyere, La.]

LABURNUM, the common name of the European trees named by botanists Cytisus alpinus and C. laburnum. It is a native of the Alps of Europe, and is well known in gardens for the beauty of its pendulous racemes of beautifu yellow flowers. The seeds of Laburnum contain a poisonous substance called Cytisine; and the wood, which is olive-green, hard, and compact, is occasionally used by the turner for ornamental purposes.

LABYRINTH. [Crete; Faioum.]

LA CAILLE, NICHOLAS LOUIS DE. The following account is almost entirely from Delambre, either from the memoir by him inserted in the 'Biographie Universelle,' or the 'Hist. de l'Astron. au 18ième Siècle.' There are two éloges, one by Grandjean de Fouchy, the other by G. Brotier, prefixed to the 'Cœlum Australe.' As Delambre knew of these éloges, we have not thought it necessary to examine them.

La Caille was born at Rumigny, near Rosoy, in Thierache, March 15, 1713. His father, a retired military officer, was in the service of the duchess of Vendôme, and was himself attached to science, and endeavoured to cultivate the same taste in his son. He died however while the latter was at the college of Lisieux, and his son was enabled to continue his studies by the generosity of the duke of Bourbon. He chose theology as his profession; but in passing his first examination he showed so much frankness in his answer to some questions proposed by a doctor of the old school, that this examiner would have refused him his degree but for the remonstrances of the rest. This incident discouraged him, and he remained content with the title of Abbé, beyond which he never proceeded. He had previously turned his attention to astronomy under great disadvantages; and upon his renunciation of theology, Fouchy above mentioned, who relates that his knowledge of astronomy was above all comprehension in so young a person, introduced him to James Cassini, who gave him employment at the Observatory. In the following year, and in conjunction with Maraldi, he made a survey of part of the coast of France, where the talent which he showed occasioned his being employed in the verification of the arc of the meridian. This operation (in which Cassini de Thury was associated) commenced at the beginning of May, 1739, and before the end of the year he had completed the triangulation from Paris to Perpignan, had measured three bases, made the requisite astronomical observations at three stations, and had taken a prominent part in the measurement of a degree of longitude. In the winter of 1740, he extended his operations to the mountains of Auvergne, in order to test some suspicions which he had formed upon the accuracy of Picard's measurement. The result of these labours was the complete establishment of the gradual increase of the degree in going from the equator to the poles; which, though long known to be theoretically true, had not previously been confirmed by measurement. In the mean-while La Caille had been appointed to a chair of mathematics in the Mazarin College, the duties of which he fulfilled with care, and for which he published treatises on geometry, mechanics, astronomy, and optics. He was also employed in the calculation of ephemerides, and in that of eclipses for 1800 years, published in the 'Art de Vérifier les Dates.' In 1746 an observatory was constructed for him at his college, and he began observation on a large scale. The transit instrument being then but little used in France [Cassini], he had no means of judging of its value; so that with old methods and old instruments he continued his career for fourteen years. In 1751 he made his celebrated voyage to the Cape of Good Hope, where he remained four years or something less. His object was to form a catalogue of southern stars, and up to the present time his results have been in use. He determined the places of about ten thousand stars, and grouped them in constellations; measured a degree of the meridian at the Cape, and made a survey of the Mauritius and island of Bourbon. He received for his expenses and those of a clockmaker who accompanied him, all instruments included, ten thousand francs; and so accurately did he keep his accounts, that he was able to explain his expenditure to a sou; it was 9144 francs and five sous, and he insisted on returning the balance, in spite of the disinclination of the officers of the Treasury to receive it. He returned to Paris in 1754, and occupied himself in the preparation of his 'Fundamenta Astronomiæ,' for the publication of which he engaged to furnish a bookseller with almanacs for ten years. He now began to use the transit instrument, but with so much doubt of its accuracy, and consequent repetition of observations, that, according to Delambre, the secondary stars observed by him at this time were determined with a degree of accuracy superior to that of the fundamental stars of other observatories. He also published the posthumous works of Bouguer, a small table of logarithms, and various observations. At the end of 1761 he was seized with gout, but he remained during the winter employed in his observatory, passing most nights upon cold stones in the act of observing: a fever was the consequence, and he died March 21, 1762, aged 49 years. His last act was the return of the instruments which he had borrowed and the commission of his manuscripts to his friend Maraldi.

La Caille was an astronomer whose observations will have the highest value as long as astronomy is cultivated, which cannot be said of others, his superiors in originality of discovery. Lalande said of him that he alone had made more observations than all his contemporaries put together; which Delambre states would be no exaggeration, if spoken of the twenty-seven years during which he laboured. But though his utility was much increased by his extraordinary activity, industry, and honesty, yet his reputation was still more indebted to the genius which he displayed in producing exactness out of imperfect instruments. Delambre remarks that the repeating circles of Lénoir and Reichenbach have not been able to correct the latitude of the Observatory of Paris as determined by La Caille. He also says, 'Having been called upon by singular conjunction of circumstances to go over and verify a great part of the labours of La Caille, after having reviewed with the greatest care all his stars, made long researches on refraction, constructed new solar tables, measured the meridian of France, and had in my hands for several years all the manuscripts of La Caille, I never followed him one step of his track without feeling increased admiration and esteem for a savant who will always be *the* honour of French astronomy.' Delambre is, as we have seen, a severe critic in all quarters, and never shows much, if any, national bias in great questions: an éloge from him is history.

The writings published by La Caille are as follows:—1745-1754, Ephemerides; 1746, Leçons élémentaires d'Astronomie Géom. et Phys., reprinted in 1755, 1761, and in 1780, with notes by Lalande; translated into English by Robertson, 1750: his first observations, for 1743, are in the Memoirs of the Academy, which appeared in 1748: 1750, Leçons élémentaires d'Optique, a work which maintained its ground a long time, but only for want of a better: 1750, Avis aux Astronomes, &c., a pamphlet recommending the corresponding observations to be made in Europe while he was in the south: 1753, Observations made at the Cape, for parallax of Moon, Mars, and Venus: 1755-1764, Ephemerides, on the model of which, according to Lalande, our Nautical Almanac was constructed: 1757, Fundamenta Astronomiæ; among many other things this contains a catalogue of 397 stars (northern), of which Delambre says that it cost more trouble than any other catalogue ever gave its author: 1758, Tabulæ Solares, the best up to the time of Delambre and Zach.

But the first work of La Caille (according to Delambre, and omitted by Lalande) was an edition of, or commentary on, the tract of Cotes, entitled Estimatio Errorum, &c., the first attempt to apply the theory of probabilities to the determination of the most probable mean of observations. La Caille was an astronomer who made his own head supply the deficiencies of his workmen's hands.

The posthumous works of La Caille were as follows:—1765-1774, Ephemerides; containing also a catalogue of 515 zodiacal stars: 1763, Journal Historique du Voyage fait au Cap de Bonne Espérance: 1763, Cœlum Australe Stelliferum, the record of his observations in the southern hemisphere. It contains observations of more than ten thousand stars, with a catalogue of 1942 principal stars, which catalogue is also in the Memoirs of the Academy for 1752.

LA CHÂTRE. [CHATRE, LA.]

LA CONDAMINE, CHARLES MARIE, was born at Paris on the 28th of January, 1701. Upon leaving college he entered the army as a volunteer, and forthwith proceeded to take part in the siege of Rosas, where his intrepidity soon rendered him conspicuous; but on the restoration of peace, finding the expectations of promotion which he had previously entertained not likely to be realized, he quitted the military profession, and in 1730 entered the Academy of Sciences as assistant-chemist ('adjoint-chemiste'). Shortly after this he embarked in an expedition to the Mediterranean, having for its object the exploring the coasts of Asia and Africa, and while absent visited Troas, Cyprus, and Jerusalem, and passed five months at Constantinople. Upon his return to Paris the Academy were busily occupied in discussing the arrangements for a voyage to the equator for the purpose of measuring an arc of the meridian, with a view to the more accurate determination of the dimensions and figure of the earth. From the first mention of this project La Condamine directed his attention to every branch of science connected with it. 'The very desire,' says Condorcet, 'of being connected with so perilous an undertaking, made him an astronomer.' His proposals having been accepted by the Academy, who felt how much his natural zeal and courage might tend to the success of the expedition, he again (1735) took leave of his country in company with MM. Bouguer and Godin, and proceeded to Peru. The fatigue and hardships which they had to encounter till their return in 1743, and which were heightened by the discord and jealousy which rose up among them, have been already noticed. [BOUGUER.] Upon his return he published 'An Account of a Voyage up the Amazon,' 1745; and in the same year, an abridged account of his 'Travels in South America.' His work entitled 'The Figure of the Earth as determined by the Observations of MM. de la Condamine and Bouguer,' did not appear till 1749. In 1747 he proposed to his government the adoption of the length of the seconds' pendulum as an invariable unit of measure. In 1748 he was elected a Fellow of the Royal Society of London, and in 1760 a member of the Academy of Sciences of Paris. In 1763 La Condamine and Lalande formed part of the deputation appointed by the Academy to be present at the making of the Report of the Royal Society concerning the inventions of Harrison for facilitating the finding of the longitude. On the 4th of February, 1774, he died while voluntarily undergoing an experimental operation for the removal of a malady contracted in Peru. Always occupied, he appears to have needed time to feel his misfortunes, and notwithstanding his sufferings he appears never to have been unhappy. His wit, the amiability of his temper, and the celebrity of his travels, made him many friends, and his humour was generally successful in blunting the attacks of enmity. His curiosity and love of distinction urged him on in the pursuit of information, and ultimately led to his carrying on a correspondence with the learned of all nations upon almost every subject.

The principal works of La Condamine which have not already been mentioned are, 'Measure of the First Three Degrees of the Meridian in the Southern Hemisphere,' 1751; 'History of the Pyramids of Quito,' 1751; 'Journal of the Voyage to the Equator,' 1751; besides numerous scientific memoirs in the Transactions of the Academy of Sciences of Paris, and in those of the Academy of Berlin.

(Condorcet, *Eloge de La Condamine*, Paris, 1804, tome i.; Biot's *Notice of the Life of Condamine; Biog. Univ.; The Works of Condamine;* Thomson's *Hist. of the Royal Society*.)

LAC, a resinous substance, which in the East Indies flows from certain trees in the state of a milky fluid, on account of the puncture made by a small insect, the *Coccus ficus*, in their branches, in order to deposit its ova. The trees are principally the *Ficus Indica*, *Ficus religiosa*, and *Rhamnus jujuba*.

There are three kinds of lac known in commerce, and they are distinguished by the names of *stick-lac*, *seed-lac*, and *shell-lac*. Stick-lac is the substance in its natural state; it is of a reddish colour, and encrusts small twigs; when broken off and boiled in water, it loses its red colour, and is then termed *seed-lac;* and when melted and reduced to the state of thin plates, it is called *shell-lac*, which has a yellowish-brown colour. Mr. Hatchett appears to have been the first chemist who minutely examined these substances; and according to him seed-lac consists of—

Resin . . .	68·
Colouring matter	10·
Wax . . .	6·
Gluten . . .	5·5
Foreign bodies . .	6·5
Loss	4·
	100·

Dr. John, who has more recently examined stick-lac, gives as its composition—

Resin, insoluble in æther	66·66
Laccin	16·66
Cochinellin	3·75
Extractive	2·50
Cochinel coloured coverings of insects	2·08
Waxy tallow	1·66
Laccic acid	0·62
Yellow extract	0·41
Salts of potash, lime, iron, and earthy matter	1·66
Loss	4·
	100·

Notwithstanding the seeming accuracy of the details of the above-mentioned analyses, it would appear that further experiments are still required to determine the nature of lac; for Unverdorben has, since these analyses were published, stated the results of his examination: 1st, laccin; 2nd, red colouring matter (Cochinellin); 3rd, resin soluble in alcohol, but not in æther; 4th, resinous looking matter, slightly soluble in cold alcohol; 5th, crystallizable resin; 6th, uncrystallizable resin, soluble in alcohol and æther, but not in naphtha; 7th, wax; 8th, fat of coccus, not saponified, and some oleic and margaric acids.

Shell-lac is largely employed in the manufacture of sealing-wax; it answers this purpose better than any other resinous matter, because it melts without charring, and consequently without giving much smoke, and also because it is hard and less brittle than other resins. Shell-lac is also used in varnishes; and is so good an insulator of electricity, that a needle made of it is said to remain some days excited.

Laccin.—The properties of the substance to which this name has been given, and which remained after the lac had been repeatedly digested in alcohol and water, are, that it is hard and brittle, of a yellow colour, and slightly transparent. It is insoluble in water, but softens in it when hot; and it also swells and softens, but without dissolving, in alcohol either cold or hot; nor do æther or oils take it up. It is dissolved by concentrated sulphuric acid. Concentrated nitric acid, when heated, dissolves it slowly. Solution of potash dissolves it readily.

Laccic acid separates from solution in water, by spontaneous evaporation, in crystalline grains. It attracts moisture from the air, does not precipitate either the salts of lime or barytes, but throws down those of mercury and lead; the persalts of iron are precipitated white by it. With the alkalis and with lime it forms salts which are soluble in alcohol and in water, and are deliquescent.

Cochinellin, or the colouring matter of stick-lac, is similar to that of cochineal, is used for the same purposes, and yields a scarlet but little inferior to it.

Lac Dye and *Lac Lake,* two preparations of lac which are manufactured in the East Indies, and used to a very considerable extent in scarlet dyeing: they appear to be prepared by dissolving stick-lac in an alkali, as potash or soda, and then adding a solution of alum; by this there is precipitated a mixture of the alumina of the alum and the resinous and colouring matter of the stick-lac. The lac dye is much the more valuable of the two.

Trade.—The principal uses to which this article in its various forms is applied are for the making of sealing-wax, for varnishes, for japanning, and for scarlet dyeing. The trade in lac has of late years become of some importance. The quantities imported, re-exported, and taken for home use respectively in each of the ten years from 1828 to 1837 were as follows:—

	Imported.		Re-exported.		Consumption.	
	Lac-dye. lbs.	Shellac. lbs.	Lac-dye. lbs.	Shellac. lbs.	Lac-dye. lbs.	Shellac. lbs.
1828	694,148	497,475	48,178	352,162	430,665	343,409
1829	594,494	703,896	26,763	446,598	462,988	316,070
1830	488,050	692,458	73,773	111,820	578,061	337,185
1831	782,399	1,193,058	143,611	687,281	454,779	552,389
1832	472,976	1,332,590	71,197	772,712	603,629	404,766
1833	326,894	871,766	52,811	442,224	435,572	488,521
1834	708,959	1,032,918	88,234	533,930	393,474	486,416
1835	528,615	1,185,855	206,169	581,256	594,483	584,787
1386	663,675	1,454,355	200,975	685,300	620,248	576,332
1837	1,011,674	2,217,679	193,959	574,391	423,335	574,273

The import duty previous to 1832 was charged upon lac-dye at the rate of 5 per cent., and on shellac at the rate of 20 per cent. on the value, but in that year the rates were altered and reduced to the specific duty of 6*s.* per hundred-weight upon both descriptions. The present price of lac-dye of fine quality is from 3*s.* to 4*s.* per pound, and of shellac from 6*l.* to 6*l.* 15*s.* per hundred-weight.

LACCADIVE ISLANDS are situated in the Indian Ocean, opposite the coast of Malabar, between 10° and 13° N. lat. and 72° and 75° E. long. The inhabitants call them Lakeradeevh; deevh, in the corrupt Malabar dialect, which is spoken there, signifying island. They are seventeen in number, but only eight are inhabited, and two sand-banks are yet uncovered with vegetation. The other seven are uninhabited and overgrown with cocoa-nut trees. They are visited for the coir and nuts by boats from the other islands. The largest of these islands are Cabarettoe, Anderot or Underoo, and Akhatoe; but they are all small, Anderot, one of the largest, being only three miles in length, from east to west, and one mile broad.

These islands are based on coral reefs. The south-west monsoon is the only wind that prevails with any degree of regularity, the opposite or fine-weather monsoon being interrupted in a great measure by the proximity of the archipelago to the mainland of Hindustan. The coral-reef of Anderot projects to the north-east. The islands are low, and rise towards the centre with a slightly undulating surface. A small quantity of rice is grown in the rainy season, but it is far from being sufficient for the consumption. Besides a plant, not unlike our rhubarb, of a most acrid pungent taste, sweet potatoes are grown; but they are much inferior to those of India. The cocoa, plantain, and papau are the only cultivated fruits; others grow in a wild state, but they are not much attended to, except the betel-nut tree. Cows are the only quadrupeds on the islands; they are of small size and not numerous. There is poultry in small quantities, and the sea contains fish and turtle.

The inhabitants amount, according to an estimate, to about 6580. They resemble, in the conformation of their body and in language, the inhabitants of the coast of Malabar, and are Mohammedans. The four most considerable islands are subject to the Bebee, or petty sovereign of Cananore in Malabar, and the other four are ostensibly British. They export to Mangalore cocoa-nuts, coir, a few cowries, and a kind of coarse sugar or jaggery, made from the cocoa-nut tree: their coir is of good quality, but not well prepared. The imports consist of rice and coarse cotton-cloth. These islands have no safe anchorage. During the south-west monsoon all intercourse between them is interrupted, and their large boats are sent to the Malabar coast for shelter. (*Journal of the London Geographical Society,* vi.)

LACE. This fabric differs essentially in form and appearance from the products of an ordinary loom, and until the early part of the present century was made without the employment of machinery. The implements used by hand-lace-makers are few in number, and inartificial in their character. They consist of a pillow or cushion, a series of bobbins or small cylindrical pieces of wood round which the thread or silk employed is wound, and pins which are stuck into the cushion and around which the threads are twisted, the pattern of the lace being determined by the disposition of the pins, and this again being regulated by holes pierced in a piece of parchment which is laid upon the cushion. It is not possible to give in writing an intelligible description of the processes of lace-making by means of these implements; but it will be understood that the effect is produced by the twisting together of the threads upon the bobbins, and their being woven in among and around the pins, the pattern of the lace depending partly upon the order of arrangement preserved in these twistings and weavings, and partly upon the introduction of a thicker thread, called *gymp,* which is used for the formation of figures, flowers, and other ornaments. The principal seat of the lace manufacture in England is Buckinghamshire; but the most esteemed qualities are imported from foreign places, among which Mechlin in Belgium long maintained pre-eminence. Of late years lace-making as formerly conducted has very much declined in this country, owing to the greater cheapness of machine-made lace, better known as bobbin-net, the manufacture of which has increased beyond all expectation both in England and in France. In a memorial addressed to the Lords of the Treasury, in June, 1834, by the principal merchants and manufacturers engaged in the bobbin-net trade, it was stated that there were then employed in its various branches more than 150,000 persons, including a large proportion of young females, whose wages amounted to 2,500,000*l.* annually. The manufacture is principally carried on in and about Nottingham, Leicester, and Derby, and in the west of England, employing a fixed capital of more than 1,500,000*l.* The produce of various qualities of bobbin-net in the year 1834 is given, on the competent authority of Mr. William Felkin of Nottingham, as being equal to 27,919,063 square yards, the produce of 3545 machines. This manufacture is still only in its infancy. Improvements, both as regards the nature and quality of the fabric, and the cost at which it can be produced, are continually introduced, and there is little reason to doubt that in a comparatively short time machine-made lace will altogether take the place of that made by the hand.

LACEDÆMON, LACEDÆMONIANS. [SPARTA.]

LACE'PE'DE, BERNARD GERMAIN E'TIENNE, DE LA VILLE, COMTE DE, a celebrated French naturalist, born at Agen, chief town of the department of Lot-et-Garonne, in France, on the 26th of December, 1756. His father, Jean Joseph Médard de la Ville, held a high legal appointment (lieutenant-general of the Sénéchaussée) at Agen, and was descended from an antient and noble family. Young Lacépède lost his mother at an early age, and from a great resemblance which he bore to her he was doted on by his father, who brought him up at home, and freely allowed him to cultivate a taste which he showed for reading, by letting him have free access to a good library. He thus acquired romantic notions and a generous unsuspicious disposition, which all the changes of a long and eventful life never effaced, and which sometimes led him into error, inducing him to believe improbable circumstances rather than doubt the veracity of an author. Among other books he met with Buffon's 'Histoire Naturelle,' which he read over and over till he knew it by heart, and thus gained a taste for natural history from the works of this fascinating writer, whom he henceforth took for his master and his model. While at home he imbibed a fondness for music, in which science he became a proficient; he also applied himself with ardour to the study of physics and natural philosophy, and formed with some of his young companions a juvenile academy, many members of which became afterwards members or correspondents of the Institute. Having made some experiments on electricity, and collected, as he thought, some important facts and observations, he wrote a memoir on this subject, and sent it to Buffon, who returned him such a flattering answer, that on the reception of it he set off immediately for Paris, where Buffon then held the appointment of superintendant of the Jardin du Roi. He was at this time about twenty years old, and wished to devote himself entirely to the pursuit of science and music, but his friends insisted on his following some profession, and accordingly he obtained a commission in the army. He got attached however to a regiment where he had nothing to do, and which he hardly ever saw, though it served for a nominal employment. At this time he assiduously cultivated his musical talents, and published an opera for the stage, which though favourably received at first, was not ultimately successful, and from this time he only followed this study for his private amusement.

In 1781 he published an essay on natural and artificial electricity, and in 1782 a treatise on physics, entitled 'Physique Générale et Particulière.' These works were full of ingenious hypothesis and clever reasoning, but the theories which they contained were not based on facts, and they did not meet with success. Buffon however, on whose model they were written, was so much pleased with them that he became from this time the intimate friend and instructor of Lacépède, who was now the first and favourite pupil of Buffon and Daubenton. Buffon proposed to him to continue his 'Natural History,' and in 1785 offered him the appointment of curator and sub-demonstrator in the Cabinet du Roi. He gladly left the army and accepted it, though a laborious situation. He now applied himself with energy to natural history, and published his 'Histoire Naturelle des Quadrupèdes Ovipares et des Serpents,' in 1788-89; the last part came out after Buffon's death, which took place in 1788. Cuvier says, 'This publication, by its elegance of style, and the interesting facts it contains, was worthy of the immortal work of which it forms the continuation; it marks the change of ideas and progress of science which had taken place during the forty years which had elapsed since the "Histoire Naturelle" of Buffon first appeared.' M. Lacépède however had not the antipathy of his master to precise methods and nomenclature; he formed classes, orders, and genera, which he clearly characterized, as well as strictly defined many species; but his arrangement was, like that of Linnæus, artificial and unphilosophical, founded only on external characters, without reference to internal organization. After the death of Buffon, when France became disturbed by the national convulsions of the Revolution, Lacépède took an active part in political affairs; he was successively invited to fill the posts of president of Paris, commandant of the national guard, and deputy extraordinary for the town of Agen in the Legislative Assembly of 1791, of which he was elected president. With many others he got out of favour in the following year, and narrowly escaped destruction during the reign of terror, being obliged to secrete himself for some time. When the Jardin du Roi was converted by the Convention into a public school, and named the Museum of Natural History, he returned there, and in 1795 a new chair of zoology was created for him, in which he lectured on reptiles and fishes, with great success. In 1798 he brought out the first part of his 'Histoire Naturelle des Poissons,' which Cuvier pronounced to be a very good performance considering the disadvantages under which he laboured in getting specimens, and the imperfect knowledge of the organization of these animals at that time. In 1804 his 'Histoire Naturelle des Cétacés' was published, which he correctly estimated as the best of his writing. After this period he wrote no large work, though he contributed numerous memoirs to the 'Annales du Museum,' the 'Mémoires de l'Académie des Sciences,' and other publications. A great deal of his time was spent in public business. In 1799 he was elected a member of the senate, and was made president in 1801. From 1803 till the Restoration he filled the office of grand chancellor of the Legion of Honour. He was a member of the Institute at the time of its formation, and afterwards of the Academy of Sciences. He died on the 6th of October, 1825. Cuvier says that he was always distinguished by excessive politeness and courteousness of manner, with which however he combined great kindness of heart, and that his works show him to have been a profound observer and an elegant writer. We here subjoin the titles of his principal works, but for a complete enumeration of his literary contributions we refer to Cuvier's 'Eloges,' where a good biographical memoir of Lacépède will be found:—

'Histoire Naturelle, Générale, et Particulière, des Quadrupèdes Ovipares et des Serpents,' 2 vols. 4to., Paris, 1788-89, translated into German by Bechstein, Weimar, 1802, 8vo.; 'Histoire Naturelle, &c., des Poissons,' 5 vols. 4to., Paris, 1798, 1803, translated into German, 2 vols. 8vo., Berlin, 1804; 'Eloge Historique de Daubenton,' Paris, 1790, 8vo.; 'Histoire Naturelle, &c., des Cétacés,' Paris, 1804, 4to.

LACERTA (the Lizard), a constellation of Hevelius, surrounded by Andromeda, Cepheus, Cygnus, and Pegasus.

Character.	No. in Catalogue of		Magnitude.
	Flamsteed and (Piazzi.)	Astron. Society.	
a	1	2658	5
b	2	2667	5
c	3	2676	4½
d	4	2679	5
g	7	2692	4
m	(36)	2650	5

LACE'RTIADÆ, or LACERTIANS. Under the family name of *Lacertians* Cuvier arranged—

1st. The *Monitors* and their subdivisions, viz. the *Monitors properly so called*, including the *Ouarans* of the Arabs (*Varanus*), &c.; the *Dragons* (*Crocodilurus* of Spix, *Ada* of Gray); and the *Sauvegardes* (*Monitor* of Fitzinger and Ameiva).

2nd. The *Lizards* properly so called.

This second group comprises, according to Cuvier, the genera *Lacerta*, *Algyra*, and *Tachydromus*.

MM. Duméril and Bibron make the *Varanians*, or *Sauriens Platynotes* (Broad-backed Saurians), a family which comes immediately after the *Geckotians* in their *Erpétologie*. They allow that the *Varanians* are nearly allied (ont très grands rapports) to the *Lacertians*, as modified by them, and rest the distinctions of the former family from the latter—1st, on the presence in the latter of polygonal scales which cover the head; 2nd, on the form of the scales of the back and of the belly, and their noncompressed tail; and 3rd, on the form and disposition of the teeth, which are not distant, obtuse, and conical, but placed on the same line, and trenchant at their summit in the antero-posterior direction.

As the family of the *Varanians* is highly important and interesting, and the differences between that family and the *Lacertiadæ* are not, as we have seen, very wide, it will be most instructive to treat of both in the same article, and the reader will find a compendium of the organization and natural history of each under the title VARANIDÆ.

LA'CHESIS. (Herpetology.) [VIPERIDÆ.]

LACHRYMAL ORGANS, DISEASES OF THE. The lachrymal gland is very rarely the seat of disease. It sometimes suppurates from acute inflammation, but it is more commonly affected with a chronic enlargement and induration, forming a prominent tumour under the upper eyelid, which pushes the eye downwards and inwards. In this state it may be removed without difficulty and with perfect safety from beneath the eyelid.

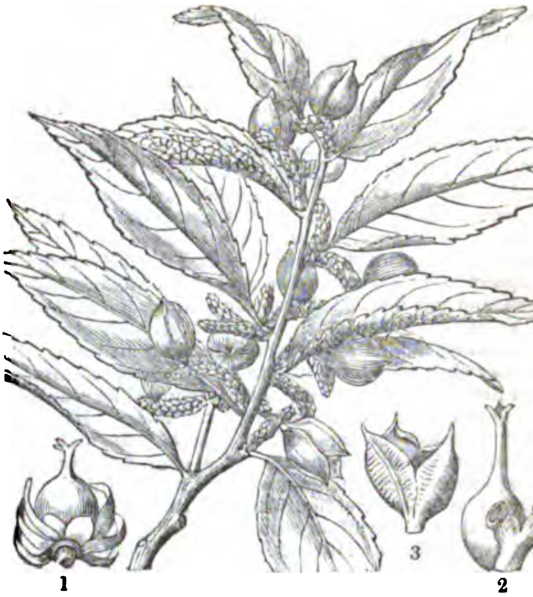
The most frequent disease of these organs is that commonly called fistula lachrymalis, which consists of inflammation of the lachrymal sac. [EYE.] When the inflammation is acute, it forms a tumour of about the size and shape of a horse-bean at the inner side of the eye, which is firm, red, hot, and extremely painful. The nasal duct being closed, the tears, which should pass through it into the nose, flow continually over the cheek, and produce redness and excoriation. The eyelids swell, and the pain and tension are sometimes so severe as to excite considerable fever and even delirium. If the inflammation be not early checked, suppuration takes place, and the matter may escape by an opening, which sometimes remains for a long time fistulous, at the corner of the eye. The treatment must be actively reducing, and when suppuration has taken place an early opening should be made into the sac at its most prominent part.

In the chronic inflammation of the lachrymal sac, which often succeeds to the acute, the nasal duct continuing obstructed, the sac becomes frequently distended with its secretion, and a mixture of mucous and purulent matter may be pressed out of it through the puncta lachrymalia. In some cases no other inconvenience is produced than that of the necessity of pressing out the contents of the sac once or twice a day; but in others, attacks of acute inflammation are apt to supervene, and excite very painful affections both of the lachrymal apparatus and the eye itself. In the first instance, leeches and other antiphlogistic remedies should be employed; but if they are unsuccessful, astringent lotions should be applied to the eye, that they may be imbibed by the puncta lachrymalia, and conveyed through them to the nasal duct. But if these means fail, the lachrymal sac must be punctured near the inner angle of the eye, and a probe passed through it into the nose. A portion of bougie must be introduced into the passage thus restored; the canal will enlarge around it so as to permit the tears to pass through, and after a few days the bougie may be exchanged for a nail-headed style, which must be worn in the canal and sac for a considerable time.

LACHRYMATORY, a small earthen or glass vessel, generally with a long neck, found in the sepulchres of the antients. Chifflet, in his 'Lachrymæ prisco ritu diffusæ,' first started the idea that they were intended to hold the tears of relatives or friends, who assisted at the funeral rites; and the notion was long supported by the antiquaries of different countries throughout Europe. It was afterwards combated by Schœpflin and Paciaudi, and as no such use of these phials or little bottles can be discovered in passages of the Roman writers, the conclusion has at last been come to that they were intended to contain perfumes or balms only for sprinkling upon the funeral pile. (Millin, *Dict. des Beaux-Arts*, 8vo. Par. 1806, tom. ii., p. 250; Fosbrooke, *Encycl. of Antiq.*, vol. i., p. 206.)

LACHSA, or LAHSA. [ARABIA.]

LACISTEMA'CEÆ, a small and obscure natural order of incomplete Exogenous plants, containing a few arborescent species, inhabiting the woods of tropical America, in low places. In appearance they resemble the genus Celtis; and in structure they approach very nearly to Urticaceæ, from which Von Martius first distinguished them. The principal characters on which the order is founded are the dehiscent three-valved fruit and amentaceous inflorescence. Nothing is known of their properties.



A branch of Lacistema serrulatum in flower and fruit. 1, a flower with its calyx; 2, an ovary with the double stamen below it; 3, a ripe fruit.

LACO'NICA, called by the Roman writers Laconia, a country of antient Greece, was bounded on the west by Messenia, on the north by Arcadia and Argolis, and was surrounded by the sea on the eastern and southern sides. Laconica is a long narrow valley, running from north to south, and lying between two mountain masses which stretch from Arcadia to the southern extremities of the Peloponnesus: the western range, which terminated in the promontory of Tænarum, now Matâpan (36° 23′ N. lat.), the most southerly point of Greece, was called Taygetus; and the eastern, terminating in Cape Malea, was known by the names of Parnon, Thornax, and Zarex. The whole drainage of this valley is collected in the river Eurotas, which flows from the high lands of Arcadia, and is joined by the river Œnus, a little above Sparta. From its source to its junction with the Œnus the Eurotas flows through a very deep and narrow valley, which near Sparta is so much contracted as to leave room for little more than the channel of the river. After it leaves Sparta the hills recede farther from the river; but near Œnoe they again approach it for a short distance, and afterwards retire to the west and east towards the Capes of Tænarum and Malea respectively, leaving between them a plain of considerable breadth and fertility, through which the Eurotas flows to the sea. Between the mountains which form the eastern boundary of the valley of the Eurotas and the sea there was a narrow strip of land, which contained the towns of Delium, Minoa, and Epidaurus Limera, belonging to Laconica: Prasiæ, which was farther north on the same coast, belonged to Argolis. The area of Laconica was probably about 1896 square miles.

The district of Thyreatis, on the borders of Argolis, was an object of early contention between Argos and Lacedæmon. (Herod., i. 82.) It originally belonged to Argolis, but was conquered by the Spartans about 547 B.C., in whose possession it remained till the decline of Sparta, when it was recovered by Argos. In the time of Pausanias it was included in Argolis. (Paus., ii. 38, § 5.)

The snow remains on the highest points of Taygetus, in the neighbourhood of Amyclæ, to the month of June: the streams on the eastern slope of this mountain-range are abundant. The orange-tree flourishes at Mistra, near the antient Sparta, and fills the air with its perfume at a time when the summits of Taygetus are still wrapped in snow.

Colonel Leake describes the soil of Laconica as 'in general a poor mixture of white clay and stones, difficult to plough, and better suited to olives than corn' (*Morea*, i. 148). This description is in conformity to that of Euripides, who says that 'it possesses much arable land, but difficult to work' (quoted by Strabo, viii. 366). Strabo informs us that there were some valuable stone-quarries near Tænarum and in the mountains of Taygetus (viii., p. 367); and Pausanias also speaks of the shell-fish on the coast, which produced a dye inferior only to the Tyrian. (Pausan., iii. 21, sec. 6.) Laconica was subject, in common with the southern countries of Greece, to earthquakes, the most remarkable of which occurred B.C. 462, and destroyed the whole of the city of Sparta with the exception of five houses.

Laconica is well described by Euripides as difficult of access to an enemy. (Strabo, viii. 366.) On the west the range of Taygetus formed an almost insuperable barrier to any invading force; and on the north there were only two natural passes by which the country could be entered; one by the valley of the Upper Eurotas, as the course of that river above Sparta may be termed, and the other by the valley of the Œnus. Both of these natural openings led to Sparta, which shows how admirably the capital was situated for purposes of defence. The want of good harbours on the coast also protected it from invasion by sea; and the possession of the island of Cythera, at the entrance of the Laconian Bay, which contained several good harbours, was therefore always considered by the Lacedæmonians as a point of great importance. Gythium, on the coast of the mainland, was the naval station of the Spartans.

There were no towns of any importance in Laconica, with the exception of Sparta. [SPARTA.] Strabo says that there were thirty towns in Laconica besides Sparta, but that it formerly contained a hundred (viii. 362). A brief account of all the towns of which anything is known is given in Clinton's 'Fasti Hellenici' (ii., p. 401-404). One of the most antient towns was Amyclæ, the residence of the Achæan kings, situated a little to the south of Sparta, in a fertile plain. In the time of Pausanias it had become a small place, but contained many temples and works of art (Pausan., iii. 18, sec. 5; 19, secs. 5 and 6); and its temple of Apollo is described by Polybius as superior to almost all the other temples of Laconica. (Polyb., v., p. 367; *Casaubon.*) The inhabitants of the rugged district of Sciritis, which lay to the south of Arcadia, between Tegea and the valley of the Upper Eurotas, enjoyed peculiar honors and privileges. They formed a separate body in the Spartan army, and were always stationed on the left wing. (Thucyd., v. 67; Xenoph., *Rep. Laced.*, xii. 3; *Cyrop.*, iv. 2, sec. 1.) After the invasion of Laconica, B.C. 369, they revolted from the Spartans. (Xenoph., *Hell.*, vii. 4, sec. 21.) They appear to have been of Arcadian race.

The Leleges, according to the most antient traditions of Laconica, were the earliest inhabitants. (Pausan., iii. 1, sec. 42.) Lelex, the first king, was succeeded by his son Mules, who left the kingdom to his son Eurotas. According to the same traditions Eurotas, dying without children, bequeathed the kingdom to Lacedæmon, the son of Jupiter and Taygeta, who married Sparta, the daughter of Eurotas. The sovereignty is said to have remained in his family till shortly before the Trojan war, when the descendants of Pelops, Menelaus and Agamemnon, obtained possession of the country by marrying Clytemnestra and Helen, the daughters of Tyndareus, the last monarch of the antient dynasty. At the time of the Trojan war we find the country in the possession of the Achæans, who undoubtedly settled in Laconica at a very early period, and probably conquered the Leleges. Menelaus was succeeded by Orestes, and Orestes by Tisamenus, during whose reign Peloponnesus was invaded by the Dorians.

After the conquest of the country Laconica was assigned to Aristodemus, or his sons Eurysthenes and Procles, for, according to the general tradition, Aristodemus did not live to enter Laconica. Strabo relates, on the authority of Ephorus (viii., p. 364), that Eurysthenes and Procles divided Laconica into six districts, over which they set governors with the title of kings. During the reign of Eurysthenes the conquered people were admitted to an equality of political rights with the Dorians; but his successor Agis deprived them of these privileges. The condition of the original inhabitants of the land, and their relation to their Dorian rulers, as well as the remaining history of the country, belong to the history of SPARTA.

(Strabo, lib. viii.; Pausanias, *Laconica;* Leake's *Morea;* Gell's *Itinerary of Greece;* Müller's *Dorians;* Thiersch, *De l'Etat Actuel de la Grèce;* Thirlwall's *History of Greece.*)

LACQUERING. [JAPANNING.]

LACTA'NTIUS (Lucius Coelius, or Cæcilius Firmianus Lactantius), one of the early Latin fathers, was a scholar of Arnobius, who taught rhetoric at Sicca in Africa. He lived at the end of the third and the beginning of the fourth century. His native country is uncertain, but he is generally supposed to have been an African. On the invitation of Diocletian, he went to Nicomedia, where he taught rhetoric. He became afterwards preceptor to Crispus, the son of Constantine, in Gaul. The time of his death is not satisfactorily ascertained.

His chief work is the 'Divine Institutions,' in seven books, written in reply to two heathens who wrote against Christianity at the beginning of Diocletian's persecution. The date of the composition of this work cannot be exactly fixed. Basnage, Du Pin, and others place it about A.D. 320; Cave and Lardner about A.D. 306: Lardner states the arguments on both sides in his 'Credibility;' and, on the whole, the latter opinion seems the more probable. Du Pin has given an analysis of the 'Institutions.' The other extant works of Lactantius are, an 'Epitome of the Divine Institutions;' the first five books of which were not extant in Jerome's time, but were discovered and published by Pfaff in the year 1712; a treatise on the 'Workmanship of God;' a treatise on the 'Wrath of God,' and a work entitled 'Symposion,' which he wrote when he was very young. He also wrote an 'Itinerary from Africa to Nicomedia,' a work entitled 'Grammaticus,' two books to Asclepiades, and eight books of Epistles, all of which are lost. A work on the 'Deaths of Persecutors' is ascribed to Lactantius, but its genuineness is much disputed.

The testimony to his learning, eloquence, and piety is most abundant. Le Clerc calls him the most eloquent of the Latin fathers, and Du Pin places his style almost on a level with Cicero's. Many writers however value his rhetoric more than his theology. He has been charged, among other errors, with Manichæism, from which Lardner takes great pains to defend him. Middleton has shown, in his 'Free Enquiry,' that Lactantius was not free from the credulity with which many of the early Christian writers are chargeable.

Complete editions of his works were published by Heumann at Göttingen in 1736 (the preface to this edition contains a catalogue of former editions); and by the Abbé Lenglet, 2 vols. 4to., Paris, 1748.

(Hieronymus, *De Viris Illust.*, c. 80; Eusebii *Chronicon*, p. 180; Du Pin's *Ecclesiastical History*, vol. i., cent. 3; Lardner's *Credibility*, vol. iii., p. 481, edit. of 1831.)

LACTEALS (from *lac*, milk) are so called from their containing an opaque white milky fluid. They are the system of vessels by which the chyle, or nutritive part of the food, is conveyed from the intestines to the left subclavian vein, in which it is mixed with the blood. They have their origin in the villi of the small intestines, which are short hair-like processes, each consisting of a fine network of lacteal vessels surrounded by capillary arteries and veins. From the villi the chyle is carried, between the layers of the mesentery, through numberless converging branches, to the thoracic duct, the main trunk of the absorbent system, which, at the part where the chief lacteal branches join it, is dilated into what is called the receptaculum chyli. The villi have no visible apertures for the entrance of the chyle, but the walls of the lacteal vessels themselves are extremely thin and permeable, and their canals are furnished with numerous and delicate valves, like those of the veins [CIRCULATION], to prevent the fluid which they contain from descending again to their absorbing extremities. In their passage through the mesentery the lacteals traverse numerous mesenteric absorbent glands [GLAND], where they communicate with veins, and the fluid contained in them is exposed to the influence of the blood, from which it acquires colouring matter and fibrine.

The villi being set so densely on the lining membrane of the small intestines that their summits form a smooth surface like that of the pile of velvet, the whole of this part of the intestinal canal presents a continuous surface for the absorption of nutriment. The power by which this absorption and the ascent of the chyle in the lacteal vessels is effected is unknown; but its nature is probably analogous to that by which the absorption and ascent of the nutritive fluids in the plant are governed. In this part of their physiology indeed the higher animals and vegetables present remarkable analogies; the extremities of the lacteals corresponding to the spongioles on the roots of plants, and their branches to the vessels of the wood through which the sap is conveyed to be exposed in the leaves to the influence of the air, as the chyle (after being mixed with the blood) is exposed to the same influence in the lungs. The absorption of the chyle however seems to be more purely a vital process; for while the spongioles absorb whatever is presented to them in a fluid form, the lacteals in the villi remove, from the heterogeneous mass which is presented to them in the intestinal canal, only that which is adapted to the nutrition of the body.

The lacteals are the system of vessels upon which the body depends primarily for its support. Their obstruction, which occurs to a greater or less extent in the diseases of the mesenteric glands, or from injury to the thoracic duct, causes a gradual emaciation, which, if its cause be not removed, is slowly but certainly fatal. For further information on the various processes to which they are accessory, see the articles ABSORBENTS, CHYLE, DIGESTION, DUODENUM, INTESTINES.

LACTIC ACID. This substance exists in milk, and in larger proportion when it has become sour; it was first recognised as a peculiar acid by Scheele, but he did not obtain it perfectly pure. It was afterwards observed by Berzelius in many animal fluids; and by Braconnet to exist with acetic acid in fermented rice-meal, wheat-paste, the juice of the beet-root, and other vegetable substances. It has by several chemists been suspected to be a compound of acetic acid and organic matter. Supposing it to be a peculiar acid, Braconnet called it *Nanceic acid*, from Nancy, the town in which he lives; and it has also been termed *zumic acid*, from *zyme* (ζυμή), *leaven*. The acid of *sauer-kraut* is also the lactic. MM. Pelouze and Jules Gay-Lussac obtained lactic acid by the following process:—Expose the juice of beet-root to a temperature between 77° and 86°; fermentation commences after some days, and continues for two months; the juice, after the fermentation has ceased, is evaporated to the consistence of a syrup, during which crystals of *mannite* separate, and common sugar is also present. The syrup is then digested with alcohol, which dissolves the lactic acid; to this water is added, and when the alcohol is distilled off, precipitation of impurities takes place. The solution of lactic acid is converted into lactate of zinc by adding the carbonate; and the solution of lactate of zinc is filtered and crystallized, which is purified by again dissolving in water and treatment with animal charcoal; the lactate of zinc is then decomposed by barytes, and the lactate of barytes by sulphuric acid, which precipitates sulphate of barytes, while the lactic acid remains in solution. Sour milk treated in the same way also gives lactic acid: the aqueous solution of the acid may be concentrated in vacuo, and rendered quite pure by solution in æther, which leaves a little flocculent matter undissolved. Lactic acid is colourless, inodorous, very sour, and may be so concentrated as to have a specific gravity of 1·215: it attracts moisture from the air, and dissolves in water and alcohol in all proportions. When heated with nitric acid it is converted into oxalic acid. When added to boiling milk it is capable of immediately coagulating about 700 times its weight; but when cold it produces comparatively little effect upon it: it also coagulates albumen.

When added to a strong solution of acetate of magnesia, granular lactate of magnesia is precipitated; but it gives no precipitate with lime, barytes, or strontia-water.

When the most concentrated lactic acid is heated gradually, it becomes more fluid, darker coloured, and yields acetic acid and inflammable gas, charcoal, and a white solid matter, which is both sour and bitter: when this is dried between folds of bibulous paper, and afterwards dissolved in alcohol, it yields perfectly white rhombic crystals, which are anhydrous lactic acid; they are fusible at 225°, and volatile at 472°, the vapour again crystallizing on condensation: when dissolved in water the solution has all the properties of that from which the crystals were obtained.

The crystals consist of—

Four equivalents of hydrogen	4	or	5·6
Six ,, ,, carbon	36		50·
Four ,, ,, oxygen	32		44·4
Equivalent . .	72		100·

In the driest lactates however it is always combined with one equivalent of water.

The lactates are not an important class of salts, and we shall therefore mention the general properties of only a few of them. The following are all soluble in water, but many of them are uncrystallizable:—lactate of ammonia, deliquescent and uncrystallizable; lactate of potash and of soda, deliquescent, soluble in alcohol, and, by evaporation in vacuo, they become crystalline masses. Lactate of lime and of barytes yield gum-like products: the lactates of alumina, peroxide of iron, and copper, do not crystallize; but that of magnesia and lactate of zinc crystallize in quadrilateral prisms, and that of silver in colourless needles.

LACTUCA'RICUM is obtained from the Lactuca Virosa, being the inspissated milky juice of the plant, and which is at first white, but afterwards by exposure to the air and sun concretes and becomes brownish. The juice of the leaves only should be collected before the flowering has begun: puncturing the leaves is the best mode of procuring it.

Other plants often mistaken for it: Lactuca sativa (Thridace, very inferior), L. angustana, L. quercina, L. scariola, Sonchus oleraceus, and Dipsacus sylvestris. According to Klink, it contains lactucic acid. It yields by distillation its odour and taste to water, which thus acquires some of the virtues of the plant. The inspissated concrete juice resembles opium in its action, but is much feebler; nevertheless it suits some constitutions better. In pulmonary diseases it is often a useful sedative. The common garden lactuca also possesses sedative properties, and eaten towards bedtime has often contributed to procure rest in cases of morbid vigilance, or to allay pains of the stomach.

LACTUCIC ACID, discovered by Pfaff in the juice of the *lactuca virosa*. When acetate of lead was added to the clear juice, lactucate of lead was precipitated, which was washed and decomposed by hydrosulphuric acid: the filtered liquor, when evaporated, yielded crystals of lactucic acid, which are very strongly acid, and greatly resemble oxalic acid; but they differ from it by giving a green precipitate when added to the neutral protosalts of iron, and a brown precipitate with sulphate of copper; with magnesia this acid forms a soluble salt. It has not been minutely examined, nor has it been analyzed.

LACU'NA. [TROCHIDÆ.]

LADAKH is a kingdom in Asia, situated to the east of Cashmere, from which it is separated by that branch of the Himalaya Mountains which is called the Tibet Panjahl range. According to Moorcroft its area is equal to half that of England. It has the figure of a triangle, whose longest side runs from Bissahir [HIMALAYA] along the mountain-range to Cashmere. North of it lie Baltistan, or Little Tibet, and Khotan in the Chinese province of Thians-han Nanlu. From the last-mentioned country it is divided by the nearly unknown mountain-chains of Kuen-luen and Kara-korum. East of it is Chang-tang, a province belonging to Tibet.

Ladakh is a part of the elevated table-land which is supported by the Himalaya system, and divided by it from the low plains of the Ganges and Indus. Its elevation above the sea is not known, but it can hardly be less than 9000 feet. Though it does not appear that any of the mountains within its boundaries rise to a great height above this elevated base, its surface is a continual succession of ascents and descents, many of which are very steep. Through the middle of the country runs the valley of the river Indus, here called Sing-ke-tse. This river, after passing Gertope, enters Ladakh at its southern extremity, where its valley is upwards of two miles wide. It continues to be wide as far as Roodok, a considerable distance above Leh, the capital of the country. At Roodok the high land comes up to the bed of the river, which rushes on with great impetuosity until it issues forth into the plain on which Leh is built. The plain is extensive and well peopled, but the country bordering it on the north is unknown.

The Indus, which traverses the country in a north-north-western direction, receives here several considerable tributaries, of which the Shayuk, the most important, joins the Indus below Leh. There are several lakes in this country, most of which are salt, and furnish great quantities of that article. The largest of these lakes is that of Chimorerel, which is from 20 to 25 miles long, with a width of 8 or 10 miles.

As the surface of the country is so elevated above the sea, its climate and productions do not correspond to its latitude (30° to 35°). The whole country is covered with snow in winter, and most of the mountains are so even in the month of June. The winters are long and severe, and all the rivers are covered with ice, which facilitates travelling in this season, just as in the northern countries of Europe. The people are mostly clad in sheep-skins and fur, as in Russia. The summers are hot and dry. Rain does not appear to be frequent.

The plain about Leh, though of moderate fertility, is well cultivated, which is the case with other districts of less extent. Moorcroft thinks that our agriculturists might learn something from the inhabitants of Ladakh. No rice is cultivated: wheat, barley, and lucerne are grown to a great amount. In some districts a kind of barley is raised which resembles wheat; in others cotton is cultivated in small quantities. Turnips are grown very extensively. Wood is scarce: poplars and some other trees are planted in the lower tracts.

The pastures occupy a large part of the country. The cattle are small and of three different kinds, common cattle, chowry-tailed cattle, and a third kind called *tho*, a bastard breed between the two former. Asses are rather numerous, as well as goats, which also live in a wild state. But the goat which yields the material of the shawls is not found in the country. Sheep are numerous, and among them there is a small race called the *purick-sheep*, which produces excellent wool. Horses are pretty common. On the uncultivated plains a species of wild horse is found, called by Moorcroft *Equus Kiang*. Among the domestic animals is the dog, which is large and strong. The animal from which musk is obtained is abundant in the mountains.

The sands of most of the rivers which fall into the Indus contain small particles of gold, that are collected in several places. Other metals are not mentioned. Saltpetre and sulphur also are found, and supply materials for gunpowder, which is made in considerable quantities.

Leh, or Lei, the capital of the country, contains 700, or, according to Moorcroft, 1000 houses, each several stories high and substantially built. There are several bazaars, each containing from twelve to fourteen shops. Leh is a place of great trade, being the principal entrepôt for the shawl-wool, and three great fairs are annually held here, of which that in February is the most frequented. These fairs are attended by merchants from Yerkand, in the Chinese province of Thian Shan Nalu, from L'Hassa and other parts of Tibet, from Amritsir and other towns of the Panjab, and particularly from Cashmere. Roodok, on the right bank of the Indus, but higher up the river, is another place of considerable traffic. It is said to contain 300 families, and is chiefly connected with Hindustan by the way of Kunawar in Bissahir. [HIMALAYA.]

The inhabitants of Ladakh belong to the same race as the inhabitants of Tibet. They are a very industrious and frugal people, and well acquainted with the arts of civilized life. Their country being surrounded by mountains, they have preserved their independence, though on all sides bordering on neighbours much more powerful than themselves. Their sovereign, who resides at Leh, is called *Gealbo*, *i.e.* Rajah of Leh. He sends however from time to time presents to his neighbours, because his subjects are connected with their countries by commerce. Ladakh, being situated between Hindustan, Cashmere, Khotan, and Tibet, is the thoroughfare of a very extensive commerce. The commercial routes are few. That to Tibet runs from Leh to Roodok, and thence to Gertope along the Indus; from Gertope it seems to cross mountain-ranges to L'Hassa. From Roodok the road to Kunawar traverses a table-land, and then descends to the Paruti river, a tributary of the Spiti, which falls into the Sutlej. Kunawar is that country which occupies the tract where these three rivers join. The road from Leh to Cashmere and the Panjab leads westward over the Tibet Panjahl Mountains by the elevated mountain-pass of Naubuck Nai Mallik. Ladakh is called Tibet by the Cashmerians. The road from Leh to Yerkand is by far the most difficult and dangerous: it crosses the high mountain-range of Karakorum and the whole mountain-system of the Kuenluen, and traverses wide mountain-tracts which are nearly uninhabited.

The principal object of this extensive commerce is the wool of the goats, which is used in the manufacture of shawls. It is brought from Gertope to Leh, and thence conveyed to Cashmere and the Panjab; eight hundred horse-loads are said to be carried annually by this route. We are not acquainted with the articles which are given in return, and have only some accounts of those which are sent to and received from Kunawar. The merchants of Kunawar bring to Roodok sugar, tobacco, cotton-cloth, cloth, indigo, swords, copper, tin, iron, paper, rice, and spices: they take in return salt, borax, gold-dust, tea, and shawl-wool. (Moorcroft, in the *Transactions of the Asiatic Society*, in the *Journal of the London Geographical Society*, and in the *Asiatic Journal*; Hügel, in the *Journal of the London Geogr. Society*; Ritter's *Erkunde*, ii.)

LA'DANUM, sometimes written *Labdanum*, but incorrectly, as it is the *lédanum* (λήδανον) of the Greeks, and the *ladun* of the Arabs. It is first mentioned by Herodotus (iii. 112) as procured in Arabia, and used by the Arabs for fumigation: the word is not Greek, but an Arabic word with a Greek termination; the Greeks also used the word *ledus* (λῆδος) to indicate the shrub which produced the ladanum. This gum resin is produced by several species of Cistus, the *kistos* (κίστος) of Dioscorides, though the name and description are often confounded with those of the *kissus* (κισσός), or Hedera. *C. ladaniferus*, *creticus*, *laurifolius*, and *C. Ledon*, Lam., are usually mentioned as the species which are indigenous in the Grecian Islands, in Spain, Italy and the south of France. That obtained from the Levant is the most celebrated. The juice exudes upon the leaves and branches of these shrubs, and is collected, according to Tournefort, by means of an instrument resembling a rake, with leather thongs instead of teeth, which is drawn over the plant; and as the juice adheres to the thongs, it is afterwards separated. Ladanum is also described by Dioscorides as being collected from the beards of goats which had been feeding on the leaves of Cistus. (Compare Herodot., iii. 112.) It is now seldom employed for any purpose, as it is with difficulty obtained of a sufficient degree of purity from the adulterations to which it is subjected, one analysis yielding 72 parts of ferruginous sand, and another 86 of resin, out of 100 parts. The purest kind, seen only in the places where it is produced, is described as blackish, homogeneous, and tenacious, easily softening under the fingers, and even sticking to them; having a greyish fracture, which however becomes black by exposure to the air; rather a bitter taste, and a very agreeable smell from the presence of a volatile oil. It was formerly employed as a stimulant, more recently as an expectorant, and is esteemed even in the present day by the Turks as a perfume, and used for fumigation.

LADOGA, LAKE. [RUSSIA.]

LADRONE ISLANDS, so called from the thievish disposition of the natives at the time of their discovery by Magalhaens (1521), are also called Mariane Islands, in honour of the queen of Philip IV. of Spain, who caused them to be settled. They extend in a northern and southern direction between 13° and 20° 30′ N. lat., and between 144° and 145° 30′ E. long., and are about twenty in number. They are mostly of a volcanic character, and even in modern times some of the volcanoes have been in activity. Like other islands of this description, their surface is broken, and rises to high hills and even to mountains. But the soil, wherever it can be cultivated, is of great fertility. Being exposed to the trade-winds, the climate is not so hot as might be expected from their geographical position. Nearly every kind of intertropical product thrives on these islands, which produce cotton, rice, indigo, Indian corn, sugar, cacao, cocoanuts, tobacco, plantains, &c. in abundance. The Spaniards have introduced most of these products, as well as the llama, from Peru, which is said to thrive on the mountains. Cattle, horses, mules, and asses are numerous. The sea abounds in fish, and also produces tripang (Holothuria) for the Chinese market. The principal island is Guajan, which is about 80 miles in circumference, and according to Kotzebue, who has given the latest account of these islands, it is the only one which is inhabited at present. Its capital and the seat of the Spanish governor is S. Ygnacio de Agaña, which in 1816 contained 3118 inhabitants. It has only an open roadstead, defended by two small fortresses; but about 10 miles farther south there is a good harbour, called Calderona de Apura, which is also fortified. Of the other islands, Tinian has obtained some notoriety from the stay there of our distinguished seaman Anson, and from the extensive ruins which indicate that these islands were once inhabited by a people well acquainted with the arts of civilization. The aboriginal inhabitants, who at the time of the foundation of the Spanish settlement, in the middle of the seventeenth century, are stated to have amounted to 150,000, have nearly disappeared on Guajan, only one family of them existing in 1816, but probably they are more numerous on some of the other islands, which are only nominally dependent on the Spanish governor. The present population of Guajan, which in 1816 amounted to 5389 souls, consists of settlers from Mexico and the Philippine Islands, who are called by the Spaniards Los Indios; they speak Spanish, and are Catholic Christians. The number of Spaniards is very small.

(Anson's *Voyage round the World*; Otto von Kotzebue's *Voyage round the World*.)

LAEKEN. [BRUSSELS.]

LÆMODI'PODA, Latreille's fourth order of *Crustaceans*, placed by him between the *Amphipoda* and the *Isopoda*. He describes them as being the only forms among the *Malacostracans* with sessile eyes (*Edriophthalmians**) whose posterior extremity does not present distinct branchiæ, and which have hardly any tail, the two last feet being inserted at that end, or the segment to which they are attached being followed by not more than one or two other joints, which are very small. They are also, he states, the only ones in which the two anterior feet (which agree with the second jaw-feet) make a part of the head.

The *Læmodipoda* of Latreille have all four setaceous antennæ carried upon a peduncle of three joints, mandibles without palps, a vesicular body at the base of four pair of the feet at least, beginning with the second or third pair, reckoning those of the head. The body, which is most frequently filiform or linear, is composed (reckoning the head) of from eight to nine joints, with some small appendages, in form of tubercles, at its posterior and inferior extremity. The feet are terminated by a strong hook. The four anterior feet, of which the second are the greatest, are always terminated by a monodactylous claw. In many the four succeeding feet are shortened, less articulated, without any hook at the end, or rudimentary, and not at all fit for ordinary use.

Reproduction.—The females carry their eggs under the second and third segments of the body, in a pouch formed by approximated scales.

Habits and supposed place in the System.—The *Læmodipoda* are marine, and Savigny considers them as approaching the *Pycnogonids*, and making, with that form, the passage from the *Crustaceans* to the *Arachnids*.

Latreille brought the forms under one genus, *Cyamus*, with the following subdivisions and subgeneric appellations.

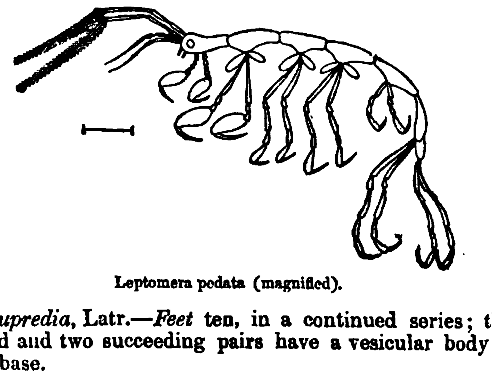
1. Filiformia. (Latr.)

Body long and very slender, or linear, with longitudinal segments; *feet* similarly elongated and slight; stem of the *antennæ* composed of many small joints.

Leptomera, Latr. (Proto, Leach).—*Feet* fourteen (reckoning the two annexed to the head), complete, and in a continuous series. (Latr.)

In the *Leptomeræ* (*Gammarus pedatus*, Mull., 'Zool. Dan.') all the feet, with the exception of the two anterior ones, have a vesicular body at their base. In the *Proto* of Leach (*Cancer pedatus*, Montag., *Trans. Linn. Soc.*, ii.) these appendages are peculiar to the second feet and the four succeeding ones.

Example, *Leptomera pedata*.



Leptomera pedata (magnified).

Naupredia, Latr.—*Feet* ten, in a continued series; the second and two succeeding pairs have a vesicular body at their base.

Locality, Coasts of Europe, France, &c.

Caprella, Lam.—*Feet* ten, but in an interrupted series, commencing with the second segment (inclusive), and not reckoning the head. This segment and the following one have each two vesicular bodies, and are totally deprived of feet.

Locality, Northern and Temperate European oceans.

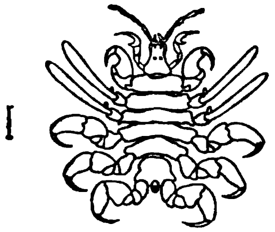
Habits.—The Læmodipods of this section keep among the marine plants and sponges, and walk like caterpillars, turn frequently with rapidity on themselves, or set up their bodies, vibrating their antennæ at the same time. In swimming they curve the extremity of the body.

2. Ovalia. (Latr.)

In this subdivision the *body* is oval, with transverse segments. The stem of the *antennæ* appears to be inarticulated. The *feet* are short, or have but little length; those of the second and third segments are imperfect, and terminated by a long cylindrical joint without hooks; at their base they have an elongated vesicular body. These Læmodipods form the subgenus

Cyamus, Latr. (Larunda, Leach.)

M. Latreille states that he has seen three species, all of which live on *Cetacea*, and the most known of which, *Cyamus Ceti* (*Oniscus Ceti*, Linn.; *Squilla*, Degeer; *Pycnogonum*, Fabr. and Sav.), is found also on the *Mackerel*. The fishermen term it the whale-louse, *Pou de la baleine*. Another species, very analogous to the first, was brought back by Delalande from his voyage to the Cape of Good Hope. The third and much the smallest is found on the Cetaceans of the East Indian seas. (Latr.)



Cyamus Ceti (magnified).

M. Desmarest gives the Læmodipods the same position as M. Latreille, and divides them also into two sections. The first, consisting of *Leptomera*, Latr. and Lam. (*Proto*, Leach; *Caprella*, Lam.); the second of *Cyamus* (*Cyamus*, Latr., Lam.; *Panope*, Leach; *Larunda*, Leach).

M. Desmarest remarks that M. Latreille never saw the *Leptomeræ* themselves, and that he has separated them from *Caprella* and *Proto* from published figures only.

M. Milne Edwards makes his *Legion* of *Edriophthalmians* comprise the *Amphipods*, *Isopods*, and *Læmipods*.

LAENNEC, RENE' THEOPHILE HYACINTHE, was born at Quimper, in Lower Brittany, in 1781. The first part of his medical education was conducted by his uncle, Dr. Laennec, a physician of repute at Nantes, and in 1800 he went to Paris, where he attended the several medical courses, and attached himself to the Hôpital de la Charité, of which Corvisart was the chief physician. In 1814 he took the degree of doctor of medicine, being already distinguished as well for his literary acquirements as for his professional industry and talent. In the same year he became chief editor of the 'Journal de Medicine,' to which he had communicated several excellent papers, both on healthy and morbid anatomy. Having obtained considerable reputation, both in private practice and by his lectures and writings, he was appointed, in 1816, chief physician to the Hôpital Necker, and it was there that he soon after made the remarkable and important discovery of mediate auscultation. [AUSCULTATION.] From this time he devoted himself unceasingly to the perfecting of his new system of diagnosis. In June, 1818, he read his first memoir on it to the Academy of Sciences, and in the following year he published his 'Traité de l'Auscultation Médiate.' But the labour necessary for its accomplishment so injured his health, which was naturally very delicate, that he was immediately afterwards obliged to resign all his studies as well as a large private practice, and to leave Paris for his native province. He returned in 1821, with his health restored, and having resumed his duties, he was soon after appointed professor of medicine in the College of France. In 1822 he was chosen professor of clinical medicine, and he regularly delivered the lectures at La Charité till 1826, when, after the publication of a second edition of his work, his health again failed him. Indications of consumption were discovered by means of the art he had himself invented; and although by retiring to Brittany he seemed again for a time recruited, he died of consumption in the same year.

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* Or, more properly, Hedriophthalmians.

Laennec's work on mediate auscultation is undoubtedly the most important which the present century has produced in medical science. But it must be remembered that only a small portion of his high reputation is due to the discovery of the stethoscope, although from the tone of his work it is evident that he rested chiefly upon that as the basis of his future fame. He, with many of Corvisart's pupils, had long been in the habit not only of using percussion as a means of diagnosis, but of applying the ear directly to the chest: the stethoscope was merely a convenient auxiliary for the accomplishment of the same purpose which they had in view, but so little essential that many of the best physicians now employ it only when the direct application of the ear is personally inconvenient. Had the stethoscope been invented by any one of less genius and fitness for the study of diseases than Laennec, it would probably have fallen into the same neglect as the more original discovery of the value of percussion by Avenbrugger had till his work was translated and his practice imitated by Corvisart. The invention however of a convenient auxiliary was the fortunate means of leading Laennec to apply himself to the special study of the diseases of the chest; and he so far elucidated their pathology that those diseases, which at the beginning of this century were involved in the greatest obscurity, are now the most completely and clearly known of all which fall within the province of the physician, who now studies them with the ear with almost as great accuracy and confidence as the surgeon can investigate the diseases of which he takes charge, with the eye or the hand.

Laennec's other publications, though thrown into the shade by his great work, fully maintain his reputation. The chief of them are published in the 'Dictionnaire des Sciences Médicales,' in the articles 'Anatomie Pathologique,' 'Ascarides,' 'Cartilages Accidentels,' 'Dégénération,' 'Désorganization,' 'Detrachyceros,' 'Encephaloide,' 'Filaire.'

A Life of Laennec by Dr. Forbes is prefixed to his Translation of the 'Traité de l'Auscultation Médiate.'

LAER, P. VAN. [Bamboccio.]

LA FAYETTE. [Fayette, La.]

LA FONTAINE. [Fontaine, La.]

LAGA'NA, the name used by De Blainville for a group of Echinodermata, included in Lamarck's genus Scutella. [Echinodermata.]

LAGERSTRŒ'MIA, a genus of plants of the natural family of Lythraceæ, which extends from the Malayan Archipelago into China and Japan, as well as along the foot of the Himalayan Mountains to the northern parts of India. The genus was named by Linnæus in honour of Lagerstrœm, who was director of the Swedish East India Company and imported many interesting plants from India and China. The species are few in number, but most of them highly ornamental in nature. *L. Reginæ* especially forms a small tree and is conspicuous from its large rose-coloured flowers, of which the petals, standing out on rather long claws, more fully display the varied outline of its undulated limb. *L. Indica* and *parviflora* are small and shrub-like, and suited to our hothouses, but all require moisture in the season of flowering.

LAGNY, THOMAS FAUTET DE, a French mathematician, was born at Lyon in 1660, and died at Paris, 12th April, 1734. At an early period his scientific attainments led to his being appointed hydrographer royal at Rochefort. Subsequently he became sub-director of the general bank of Paris, and lost the principal part of his fortune by the failure of that establishment. His mathematical labours appear to have been in a great measure directed to objects of mere curiosity; as an instance of which he occupied himself with the quadrature of the circle, and computed the ratio of the circumference to the diameter, as far as 120 decimal places, a degree of approximation which could never be of any practical utility. He however has called forth the eulogium of Fontenelle, who, speaking of his treatise on the 'Cubature of the Sphere,' says, 'it is a choice and singular production which only a great mathematician could have written.' His methods of facilitating the solution of indeterminate problems are ingenious, and the theorems which he added to the arithmetic of sines are important. He was elected member of the Royal Academy of Paris in 1696; associate-geometrician in 1699; veteran pensioner in 1723; and fellow of the Royal Society of London in 1718. The following is a list of his published works:—'New Method of Extracting and Approximating to the Roots of Quadratic and Cubic Equations,' Paris, 1691-2; 'Elements of Arithmetic and Algebra,' Paris, 1697; 'Cubature of the Sphere,' La Rochelle, 1702; 'Binary System of Arithmetic,' Rochefort, 1703; 'Analysis of the New Methods of Resolving Problems,' Paris, 1733; besides numerous memoirs in the Transactions of the Royal Academy from the year 1733 to the year 1729.

(Thomson's *History of the Royal Society*; *Dictionnaire Bibliographique de* Quérard; Hutton's *Mathematical Dictionary*, &c.)

LA'GO MAGGIO'RE (Lacus Verbânus, and, in German, Langensee), the largest lake in Italy, extends about 40 miles in length from north to south: its greatest breadth, which is eight miles, is about the middle of its length; but it is only between two and three miles broad in most other places, and still less at the north and south extremities. The elevation of its surface above the sea is 678 feet, and its greatest depth is 1100 feet. Its northern half extends between the lower offsets of the Pennine Alps on one side and the Rhætian Alps on the other, receiving all the streams that flow from the southern slope of those mountains, from Mount Rosa on the west to Mount Bernardin on the east. The southern extremity of the lake touches the level plain of Lombardy. The principal affluents of the Lago Maggiore are:—the Toccia, or Tosa, which comes from the Val d'Ossola; the Maggia, which flows through the valley of that name; the Ticino, or Tessin, coming from the St. Gothard; and the Tresa, which flows out of the neighbouring lake of the Lugano. It also receives an outlet from the small lakê of Orta, which lies west of the Lago Maggiore. The outlet of the Lago Maggiore is formed by the Ticino, which issues from its southern extremity at the town of Sesto. The northern extremity of the Lago Maggiore, which is called at that end the Lake of Locarno, extends into the Swiss canton of Ticino. Through the remainder of its length the Lago Maggiore divides Austrian Lombardy on its eastern bank from the Sardinian territory which lies along its western shore. The Ticino continues to mark the boundary between the two states to its junction with the Po. The principal towns along the banks of the lake are:—Intra, Palanza, and Arona, on the Sardinian coast; Locarno and Magadino, on the Swiss coast; and Laveno and Sesto, on the Austrian shore. For a description of the fine country around this lake see Arona, Como, Novara, Ticino.

About the middle of the length of the lake, and in its broadest part, where it forms a gulf indenting the western shore, are the Borromean Islands, 'Isole Borromée,' which belong to the noble Milanese family of the same name. They are four in number, Isola Madre, Isola Bella, Isola dei Pescatori, and the Isolino, the smallest of all. The Isola Madre, which is the largest, is covered with laurel, pine, and cypress trees, forming a grove rising in the midst of the water, and contrasting by its perpetual verdure with the snows of the neighbouring Alps. The Isola Bella is richer, but its beauty is more artificial. Numerous terraces rising in a pyramidical form are planted with orange and lemon trees, and adorned with marble statues and vases. The splendid palace of the owners is rich in marbles, gilding, and mirrors, and the lower apartments are shaped like grottoes and embellished with statues and fountains. The myrtle, the rose, the vine, and the fig-tree, thrive luxuriantly around. The whole has an air of enchantment, but art is too apparent, and the lovers of nature prefer the more simple beauty of the Isola Madre. The Isola dei Pescatori is inhabited chiefly by fishermen, and has nothing remarkable; neither has the Isolino.

The Lago Maggiore abounds with fish, and a considerable trade is carried on in boats between the various points of its coast. A steam-boat, Il Verbano, plies on this lake. The Simplon road follows its western bank from Feriolo, which is opposite the Borromean Islands, to Arona. (Amoretti, *Viaggio ai Tre Laghi*, and the numerous Italian tourists.)

LAGOON, or LAGUNE. Lagoons are sheets of water formed either by the encroachments of rivers or seas upon the land, or by the separation of a portion of the sea by the intervention of a bank. Thus there are fluvial and marine lagoons. When the land on either side of a river's course is lower than the immediate banks of the stream, and the river, in the season of the floods, either overflows its banks or in part breaks them down, the water inundates the low land; and if on the subsidence of the flood the water again flows back into the channel, the lagoon is merely temporary, and is simply an inundation. This, according to circumstances, may be a benefit to the country or a disaster. Inundations are a benefit when they bring with them and deposit a rich vegetable humus, which, on being cultivated, yields abundant crops; to such deposits Lower Egypt owes its great fertility. Inundations of this kind either diminish or increase annually, for, by repeated deposits, the soil becomes raised; and unless the bed of the river rise in proportion, the water is eventually kept within its channel; but if, on the contrary, the bed rise, the inundation gains every year in extent of surface what it loses in depth of water. Should the inundation however, instead of a prolific mud, bring nothing but sand and stones, then, as has been frequently experienced in Italy, the inundations are a cruel disaster, for they condemn rich lands to eternal barrenness and sterility. If the configuration of the land and other circumstances prevent the water of the inundated parts from flowing back on the subsidence of the flood, then a permanent lagoon is formed, and the land thus laid under water can only be recovered at a great expense, even if that be possible. These lagoons are generally fatal to the neighbourhood, for the water in them, being stagnant, gives rise to unwholesome miasmata, producing agues and other malignant disorders. Such lagoons are not absolutely confined to the lower parts of water-courses, though it is in such places that they are most frequently met with. Fluvial lagoons are sometimes formed by infiltration; a remarkable instance of which is the marshy lagoon of Ybera, on the Parana, in South America.

Marine lagoons are much more common than those on the borders of rivers. They are formed sometimes by the encroachments of the sea, and sometimes by the throwing up of a bar or bank, which eventually divides off a portion of the sea altogether, or leaves merely a small opening. In Europe there are many marine lagoons: the Adriatic, on its north and north-western parts particularly, is full of them. The Zuyder Zee with the Sea of Haarlem is a vast lagoon. There are also two very large ones known by the names of the Frische Haff and the Curische Haff, at the south-east angle of the Baltic Sea. In the Sea of Azoff there is the Sivasch or Putrid Sea. On the east coast of South America there are some very large lagoons, and they abound at the bottom of the Mexican Gulf. Marine lagoons can never be useful unless when sufficiently large and deep to admit of being navigated, in which case they form secure harbours. When shallow, they give out fœtid exhalations like fluvial lagoons, as is too well known in Venice, which is built on the 60 islands of the lagoon at the extremity of the gulf; though in this case much of the evil arises undoubtedly from the circumstance of the lagoon being the receptacle of all the filth of the city.

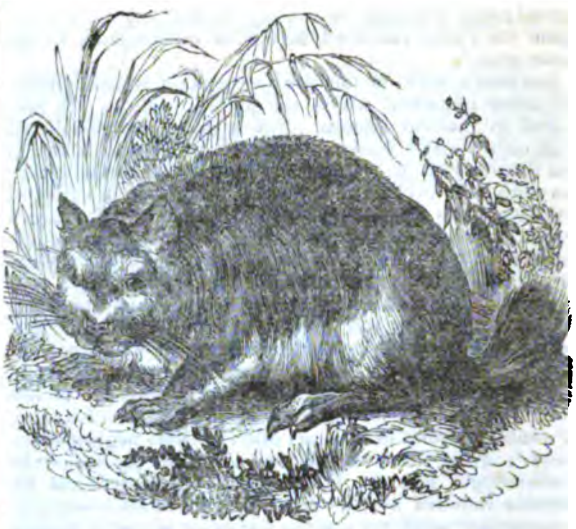
LA'GOMYS. [LEPORIDÆ.]

LA'GOPUS. [TETRAONIDÆ.]

LAGOS is a river in that part of Guinea which is called the Slave Coast. It rises on the southern declivities of the Kong Mountains, near 3° N. lat., and runs in a south-south-eastern direction until it approaches the sea, where in the low and level country it divides into two branches, of which the eastern, flowing parallel to the shore for about 12 miles, falls into the sea near 4° 12′ N. lat. The western also runs along the shore of the Gulf of Guinea at a few miles distance from the sea, and according to Bowdich it traverses the low country as far west as the Rio Volta (0° of Greenwich), with which it unites its waters near its mouth. But in this long course there are several channels, by some of which the river always communicates with the sea, and by others only during the rainy season. On one of these channels Badagry is situated. The length of the river, not including the western branch, probably does not exceed 150 miles. It is navigable to a considerable distance from the sea.

LAGO'STOMYS, or LAGOSTOMUS. [CHINCHILLIDÆ, vol. vii., p. 87.]

Having an opportunity of giving a figure from the living animal in the menagerie of the Zoological Society at the Regent's Park, we here subjoin it. The skeleton (from the late Mr. Brookes's figure) is given in the article referred to.



Viscacha, or Biscacho.

LA'GOTHRIX, M. Geoffroy's name for a genus of South American monkeys, thus characterised:—

Dental formula: — Incisors $\frac{4}{4}$; Canines $\frac{1-1}{1-1}$; Molars $\frac{6-6}{6-6} = 36$.

Facial angle about 50°; muzzle projecting; head round; extremities proportioned to the body; anterior hands provided with a thumb; tail strongly prehensile, and having a part of its extremity naked below; hair strong and curly. Two species are recorded, *Lagothrix Humboldtii* and *Lagothrix canus*.

The first of these, or the *Caparro*, was found by Humboldt and Bonpland in the hut of an Indian, who had captured it in an excursion to the westward. Size about two feet two inches without the tail. Head round and very large. Hair long, strong, and uniform grey, the tips black. Face naked and black; mouth beset with long stiff bristles. Tail rather longer than the body, prehensile, naked at the extremity.

Habits gregarious; frequently seen raised on the hinder extremities.

Locality, Rio Guaviare, one of the tributary rivers of the Orinoco.

The other species has shorter hair, and is of the size of the *Sapajou-sai* (*Cebus Capucinus*, Desm., *Simia Capucina*, Linn.).

Locality, Brazil.

Mr. Gray places the form in his family *Sariguidæ*, and in the second subfamily of it, viz. *Atelina*.

Mr. Swainson arranges it in the family *Cebidæ*, between *Mycetes* and *Ateles*.

LAGOTIS. [CHINCHILLIDÆ, vol. vii., p. 83.]

LAGRANGE, JOSEPH LOUIS DE, was born at Turin, 25th January, 1736. His parents were Joseph Luis Lagrange and Marie Thérèse Grass, the daughter of a physician at Cambiano. His father held the office of treasurer of war at Turin, and had once been in affluent circumstances, but had ruined himself by injudiciously entering into hazardous speculations. To this circumstance, which was then regarded as a misfortune, Lagrange himself has frequently attributed a considerable share of his subsequent fame and happiness. 'Had I been rich,' he has been heard to say, 'I should probably not have become a mathematician.'

In the early part of his studies he manifested no particular love either for the pure mathematics or the physical sciences. His chief delight consisted in the perusal of the various Latin authors, and more especially the works of Cicero and Virgil. These however in his second year were superseded by the synthetical writings of the antient geometricians, and these in their turn gave place to the more powerful analysis of modern times. The perusal of a memoir by Dr. Halley (*Phil. Trans.*, 1693) 'On the superiority of modern algebra in determining the foci of object-glasses' is said by his biographers to have convinced him of the utter inadequacy of geometrical methods as instruments of investigation, and it is not improbable that this might have been the occasion of his selecting the path which he thenceforth pursued with so much honour to himself and so great advantage to science.

Before he attained the age of nineteen he was appointed to the professorship of mathematics at the military college of Turin, where by far the greater part of his pupils were older than himself. The year following (1755) he addressed a letter to Euler, relative to the isoperimetrical problems, and that of the curve of quickest descent, which had engrossed so much of the attention of the principal mathematicians of the day, and of Euler in particular; but, owing to the want of general methods, their labours had proved but partially successful. Each problem had been resolved by methods peculiar to itself, and the solutions rested upon artifices unsatisfactorily indirect. In this letter Lagrange communicates the germs of his calculus of variations, to which his recent analytical researches had led, and shows with what advantage and facility it may be applied to the problems in question. Euler, in his reply, expresses his entire concurrence in the correctness of its principles, and hails the discovery as the harbinger of others of yet greater importance; he acknowledges how much the application of these principles had promoted the success of his own recent investigations, which however he refrained from publishing until the remainder of the researches of Lagrange were made known, lest he should thereby deprive him of any portion of the glory which was so justly his due, and concludes by announcing the nomination of Lagrange as a member of the Academy of Berlin.

In 1758 he took an active part in the foundation of the Royal Academy of Turin [ACADEMY, vol. i., p. 62], in which he was unanimously chosen the director of the physico-mathematical sciences. The following year appeared the first volume of the Transactions of that Society, consisting principally of the researches of Lagrange on the propagation of sound, and on the integration of differential equations, and those of finite differences. He here also proves, on the subject of vibrating chords, that the time of oscillation is independent of the figure of the chord, an empirical truth, the demonstration of which D'Alembert believed to be impossible (see the preface to D'Alembert's *Opuscules Mathématiques*, Paris, 4to., 1761, tome i.) [D'ALEMBERT.] Lagrange and D'Alembert were rivals, but not opponents. Their cause was a common one, which each laboured to promote with indefatigable zeal. The manner in which their controversies were conducted shows that they were prepared to sacrifice every personal feeling to their love of truth and the advantage of science. When either attempts the refutation of his rival's theory, it is frequently by means of the beautiful theorems to which the researches of the other has already led. On the other hand, a discovery of importance, by whichever party it may happen to be made, is immediately followed by the congratulations of him from whom congratulation is due. Thus D'Alembert, in one of his letters to Lagrange, says, 'Your problem appeared to me so beautiful, that I have investigated a solution upon different principles;' and upon another occasion, when the Academy had proposed the 'Theory of the Libration of the Moon' as the subject of one of its prizes, and the medal had been awarded (1764) to the memoir of Lagrange, we find D'Alembert writing to him solely to express the pleasure and advantage which he had derived from its perusal, and his acquiescence in the justice of the award.

The calculus of variations, upon the discovery of which the fame of Lagrange may be permitted to rest, is eminently important in many branches of the mathematics, as in the determination of the maxima and minima values of indefinite integral formulæ, &c.; but its utility is most conspicuous in the higher branches of physical astronomy. The space allotted to this article admits of our giving but one illustration of its importance in this respect. Euler, in his 'Treatise of Isoperimeters,' printed at Lausanne in 1744, had shown, that in the case of trajectories described about a central force, the product of the integral of the velocity and the element of the curve was either a maximum or minimum; but when he attempted to extend this principle to a system of bodies acting one upon another, he found that the highest analysis of which he could avail himself was insufficient to overcome the difficulties of the problem. This failure on the part of Euler excited the emulation of Lagrange, whose chief objects appear generally to have been the extension and generalization of existing theories. By a beautiful application of his method of variations to a principle of dynamics discovered by Huyghens, and known by the name of the *Conservation of vis viva*, he was led to the following general theorem: 'In every system of bodies acted upon by forces proportional to any function of the distance, the curves described by the bodies are necessarily such that the sum of the products of the mass, the integral of the velocity and the element of the curve, is always either a maximum or minimum.' This theorem, the proof of which offered so much difficulty to Euler, has been denominated the *principle of least action*, and is frequently regarded as one of the four great principles of dynamics, although Lagrange has shown that it is merely a corollary to a still more general formula given by him in the second section of the second part of his 'Mécanique Analytique.'

When the Academy of Berlin was threatened with the departure of Euler for St. Petersburg, Frederick renewed his importunities to D'Alembert to succeed him. [D'ALEMBERT.] D'Alembert however, from various motives, being unwilling to quit his native country, suggested that the proffered honour might be conferred upon Lagrange. Lagrange was accordingly appointed professor of the physical and mathematical sciences to the Academy, and continued for more than twenty years to enrich the memoirs of that Society with his researches connected with physical astronomy and other subjects of importance. The insignificant stipend (1500 crowns) which was allotted to him, when contrasted with the munificent offers made to D'Alembert, cannot fail to strike every reader with surprise. Lagrange quitted Berlin after the death of Frederic, not being satisfied with the treatment he then received. He had previously been invited by the ministers of Louis XVI. to settle in Paris.

In 1772 M. Lagrange was elected foreign associate of the Royal Academy of Paris, and in 1787, on his arrival at the French capital, he received the honorary title of veteran pensioner. Apartments were allotted to him in the Louvre, and here, surrounded by the principal mathematicians of the day, he continued to live happily up to the time of the Revolution. After this he began to be subject to fits of melancholy, which so far increased upon him that he has been heard to say that his enthusiasm for the sciences was extinguished, and that his love of physical research had disappeared. He was successively appointed professor of mathematics to the normal and polytechnic schools, member of the Institut, of the board of longitude, grand officer of the legion of honour, and count of the empire. He died at Paris, the 10th April, 1813, in his 78th year. His remains were deposited in the Pantheon, and his funeral oration was spoken by his illustrious friends Laplace and Lacépède.

'Among those who have most effectually extended the limits of our knowledge,' said Laplace, in his funeral oration, 'Newton and Lagrange appear to have possessed in the highest degree the happy art of detecting general principles, which constitutes the true genius of science. This art, joined to a rare elegance in the exposition of the most abstract theories, characterized Lagrange.' His work on Mechanics, resting upon the method of variations of which he was the inventor, flows wholly from a single formula, and from a principle known before his time, but of which no one but himself was able to appreciate the importance. 'Among the successors of Galileo and Newton,' says Professor Hamilton, speaking of the theoretical development of the laws of motion, 'Lagrange has perhaps done more than any other analyst to give extent and harmony to such deductive researches, by showing that the most varied consequences respecting the motions of systems of bodies may be derived from one radical formula; the beauty of the method so suiting the dignity of the results as to make of his great work a kind of scientific poem.'

We conclude this imperfect sketch of the life and writings of Lagrange with a list of his published works, which we believe to be complete:—

Letter dated 23rd June, 1754, addressed to Jules Charles Fagnano, containing a series for the differentials and integrals of any order whatever, and corresponding to the Binomial Theorem of Newton, Turin, 1754; 'Analytical Mechanics,' 1st edit. 1788, 2nd edit. 1811—1815 (the second volume of the last edition is edited by MM. De Prony, Garnier, and Binet). 'Theory of Analytical Functions,' 1st edit. 1797, 2nd edit. 1813; 'Resolution of Numerical Equations,' 1st edit. 1798, 2nd edit. 1808, 3rd edit. (edited by Poinsot) 1826; 'Lessons on the Calculus of Functions,' 1st edit. 1801, 2nd edit. 1804, 3rd edit. 1806 (printed in the 'Journal of the Polytechnic School,' tome 5).

Memoirs in the Transactions of the Academy of Turin.

1759. Tome 1. Method of Maxima and Minima; Integration of Differential Equations and Equations of Finite Differences; On the Propagation of Sound.

1762. Tome 2. Supplement to the Researches on the Propagation of Sound, contained in vol. 1; A new method of determining the Maxima and Minima of Indefinite Integral Formulæ; application of that method to Dynamics; New Researches on the Propagation of Sound.

1765. Tome 3. Application of the Integral Calculus to Dynamics, Hydrodynamics, and Physical Astronomy.

Tome 4. Integration of Differential Equations; Method of Variations; On the Motion of a Body acted upon by two Central Forces.

Tome 5. On the Percussion of Fluids; New Theory of the Integral Calculus.

Memoirs in the Transactions of the Academy of Berlin.

1765. Tome 21. On Tautochronous Curves.

1766. Tome 22. On the Transit of Venus, June 3, 1769.

1767. Tome 23. On the Solution of Indeterminate Problems of the second degree, and on Numerical Equations.

1768. Tome 24. Additions to the Memoir on the Resolution of Numerical Equations; New Method of resolving Indeterminate Equations; New Method of Resolving Algebraic Equations by means of Series.

1769. Tome 25. On the Force of Springs, on the Problem of Kepler, and on Elimination.

Memoirs in the Transactions of the Berlin Academy (new series).

1770. On Tautochronous Curves; Algebraic Equations, and Arithmetic.

1771. On Prime Numbers and Algebraic Equations.

1772. On Differentiation and Integration; on Imaginary Roots; Astronomical Refraction; Integration of Equations of Partial Differences.

1773. On the Rotatory Motion of a Body; on the Attraction of Elliptic Spheroids; on Triangular Pyramids and Arithmetic.

1774. On the Particular Integrals of Differential Equations; on the Motion of the Nodes of the Planets' Orbits.

1775. On Finite Differences; the Attraction of Elliptic Spheroids; and Arithmetic.

1776. On the Change in the Mean Motions of the Planets; Continued Fractions; and Spherical Astronomy.

1777. Diophantine Analysis; On Escapements; Determination of the Imaginary Roots of Algebraic Equations; on the Motion of a system of Bodies which mutually attract each other inversely as the square of the distance.

1778. Determination of the Orbits of Comets from three observations; Theory of Telescopes.

1779. On Particular Integrals; Construction of Geographical Maps.

1780. Libration of the Moon, and on other problems depending upon the Non-Sphericity of that Planet.

1781. Theory of the Motion of Fluids; Principles and general formulæ for determining the secular variations of the Planets' Orbits; Report of M. Lagrange on a method proposed for finding the Quadrature of the Circle.

1782. Continuation of the preceding Memoir on Secular Variations; Report of Lagrange on a method proposed for determining whether the Earth is flattened at the poles.

1783. On the periodical variations in the Planetary Motions; Secular Variations in the Mean Motions of the Planets; Corrections of the common methods of Approximation for integrating the Equations of the Planets' Motions; a particular method of Approximation and Interpolation; a new property of the Centre of Gravity; Third Memoir on the determination of the Orbits of Comets.

1784. Theory of the periodical variations in the Planets' Motions, independent of the Inclinations and Excentricities, for each of the six principal planets.

1785. Partial Differential Equations.

1786. Geometrical Theory of the Motion of the Aphelia, to serve as an addition to Newton's Principia; Correction of those parts of Newton's Principia relative to the Propagation of Sound and the Motion of Waves.

1792-3. Solution of a problem in Life Annuities; Determination of the general term of a recurring series whose generating equation contains equal roots; on Elliptic Spheroids; on Interpolation; on the Secular Equation of the Moon; Addition to a Memoir by M. Duval-le-Roi on the Secular and Periodical Variations of Herschel, printed in the Memoirs of the year 1787.

1803. On a General Law of Optics.

Memoirs in the Transactions of the Academy of Paris.

1764. On the Libration of the Moon (this is the memoir for which the medal was awarded to M. Lagrange by the Academy, and in which he first employs the principle of Virtual Velocities).

1766. On the Inequalities of Jupiter's Satellites.

1772. On the formation of Tables of the Planets; on the Problem of Three Bodies.

1774. On the Motion of the Nodes and the Inclinations of the Orbits of Planets.

Savans Etrangers.

Tome 7. On the Secular Equation of the Moon. (Prize Memoir for the year 1774.)

Tome 10. On the Perturbations of a Comet which passes near to a Planet.

French Institute. Memoirs of the First Class.

1808-9. On the Variation of the Elements of a Planet, and more particularly the Variation of the Major Axis of their Orbits; Theory of the Variation of Arbitrary Constants in all Mechanical Problems (2 Memoirs).

Journal of the Polytechnic School.

Tome 2. On the principle of Virtual Velocities; Essay on the Transformation of Fractions; Theory of Analytical Functions; Analysis of Spherical Triangles.

Tome 5. On the Calculus of Analytical Functions.

Tome 7. Supplement to the same.

Tome 8. On the Attraction of Spheroids.

Connaissances des Tems.

1814. On the Origin of Comets.

1817. On the Calculation of Eclipses.

1819. Remarks on the Method of Projection in the Calculation of Eclipses.

1821. Method of determining the Orbit of a Comet from Observation.

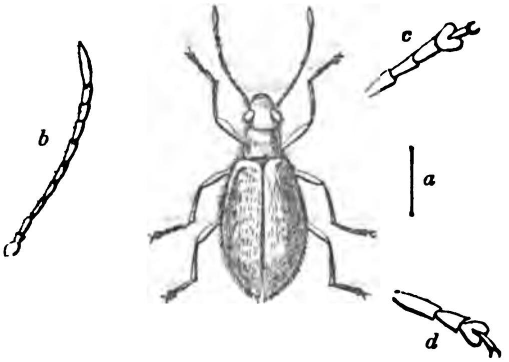
M. Carnot, while minister of the Interior, recommended to his government the purchasing of the manuscripts of Lagrange, and, at his suggestion, the mathematical and physical class of the Institute nominated a commission to select such as were in a state for publication; the rest are arranged and deposited in the library of the Institute.

(*Eloge de M. Delambre*; *Mémoires de l'Institut*, 1812; Lagrange, *Mécanique Analytique*, 1815; Lagrange, *Théorie des Fonctions Analytique*, 1813; *Miscellanea Taurinensia*, 1759-61; *Opuscules Mathématiques de M. d'Alembert*, 1761-9; *Notice of the Life of Lagrange*, by Maurice; *Biog. Universelle*; Professor Hamilton's *Memoir on a General Method in Dynamics*, in *Phil. Trans.*, 1834; *Dictionnaire Bibliographique de* Quérard, 1829, &c.)

LAGRIIDÆ (*Lagriariæ*, Latreille), a family of Coleopterous insects of the section Heteromera, the characters of which are—Elytra soft; head and thorax considerably narrower than the elytra, the latter almost cylindrical, ovate or quadrate and truncated; antennæ inserted near an emargination of the eyes, either filiform or insensibly larger towards the apex, the terminal joint being longer than the preceding, especially in the males: palpi thickened at the tip; terminal joint of the maxillary palpi of the form of a reversed triangle; femora oval and clavate; tibiæ long and slender; those of the anterior legs often curved; penultimate joint of the tarsi bilobed and the claws simple. The genus *Lagria*, Fab., contains those species in which the antennæ are gradually thickened towards the apex, and have the last joint ovate: the fore part of the head is but little produced, but behind is prolonged and slightly rounded; the thorax is almost cylindrical or square.

One species of this genus exists in England; the *Lagria hirta*, an insect not unfrequently found in hedges and woods, and apparently most abundant on the whitethorn. It is about 4-12ths of an inch in length, of an oval form, with a narrow head and thorax; these, as well as the body beneath, the antennæ, and the legs, are black; the elytra are dirty yellow, soft, and pubescent. The body of the males is rather narrower than that of the females, and the antennæ are longer.

The genus *Statyra* (Latreille) also belongs to the present family, and consists of species which have the body more elongated than those of Lagria proper; the antennæ are filiform, and consist of almost cylindrical joints, the last of which is very long and pointed: the head is considerably produced in front of the eyes, and is abruptly narrowed behind; the thorax is longer than broad, somewhat ovate, but truncated before and behind; the elytra are acutely terminated.



Lagria hirta.

The line *a* denotes the natural size; *b*, the antenna; *c*, the tarsus of the fore and middle pair of legs; *d*, the tarsus of the posterior pair of legs.

LA HARPE. [Harpe, La.]

LAHIRE, PHILIPPE DE, was born at Paris, March 18, 1640, in which city he also died, 21st of April, 1719. Up to the age of twenty-four years he followed the profession of his father, who had acquired considerable reputation as professor of painting and sculpture to the Royal Academy. In 1660 he visited Italy, partly for the improvement of his health, and partly with a view to the completion of his professional education. While at Venice he applied himself to the study of geometry, and more particularly to the conic sections of Apollonius; and a few years after his return to Paris, he published several treatises upon those subjects, which fully established his claim to the reputation of a profound geometrician. In 1679, Colbert having suggested the construction of a general map of France, Picard and De Lahire were nominated by the king to conduct certain surveys along the coast of Gascony, and in 1683 De Lahire, in conjunction with Dominic Cassini, was instructed to proceed with the measurement of the meridian, which had been commenced in 1669 by Picard. [Picard.] The death of M. Colbert having put a stop to this important undertaking, he was next employed in determining the difference of level of the river Eure and the reservoir of Versailles, preparatory to the construction of an aqueduct for the supply of the capital, which he effected to the satisfaction of the king and of Louvois, the then minister. The other public works in which M. de Lahire was successively engaged were numerous and important, but our limits will not permit us to notice them more particularly. He was twice married, and 'each of his marriages,' says M. Fontenelle, 'furnished an Academician.'

Although he does not appear to have been altogether unacquainted with the infinitesimal calculus, the whole of the subjects upon which he has written are treated synthetically. In his manners he was more reserved than the generality of his countrymen, but the uprightness and disinterestedness of his conduct were most exemplary. A pure piety, free from superstition and singularity, characterized the whole of his life.

For further information the reader may advantageously consult the 'Mémoires de Nicéron,' tom. v. and x.; 'l'Histoire du Collége Royal,' by Goguet; and the 'Éloge de Lahire,' by Fontenelle ('Œuvres Diverses,' fol. 1729), from which this notice is chiefly drawn. His published works are—'Treatise on Conical and Cylindrical Sections,' Paris, 1673, 4to.; 'De Cycloïde Opusculum,' 1676; 'Conic Sections and Geometrical Loci,' 1679; 'Gnomonics, or the Art of making Sun-dials,' 1682; 'Conic Sections,' 1685, fol.; 'Tabulæ Astonomicæ,' 1702, 4to.; 'Treatise on Surveying,' 1689; 'Mechanics,' 1675; 'Description of the Globes in the Pavilion of the Château de Marli,' 1704; besides numerous memoirs in the public journals of the day, and more particularly in the 'Transactions of the Academy of Sciences,' from 1666 to 1718.

LAHN, river. [Rhine.]

LAHORE, a province in the northern part of Hindustan, lying between 30° and 34° N. lat., and between 71° and 78° E. long. It is bounded on the north by Cashmere, on the east by the mountains of Northern Hindustan, on the south by Delhi, Moultan, and Ajmeer, and on the west by the Indus; it contains nearly 70,000 square miles of surface, its mean length and breadth being respectively about 340 and 200 miles. This territory is under the dominion of Runjeet Singh, the most powerful of all the native princes of India, and who is completely independent of the English government. His kingdom is divided geographically into two nearly equal parts, viz. 1. The Punjaub, a level country which derives its name from its lying among the five branches of the Indus, and, 2. the Kohistan, or Hill Country. The most productive part of the country is the Punjaub, especially in the neighbourhood of the rivers. The portion of this country that lies to the east is under the best cultivation; to the west much of the land is devoted to pasturing large herds of oxen and buffaloes, besides some droves of horses, which are of a pretty good description. The products of cultivation in the Punjaub are chiefly wheat, barley, rice, pulse of various kinds, sugar, and tobacco, but there is seldom much of these articles left for exportation after satisfying the wants of the inhabitants. Such exports as are made go for the most part to countries west of the Indus and to Cashmere. The temperature of the Kohistan country is hot in summer, but in winter it is at least as cool as the middle and southern parts of Europe. The pine and the willow are common. The sides of the hills, where the soil is strong, yield good crops of wheat, barley, and some smaller kinds of grain. Rice is grown in the valleys, but not to any great extent, as that grain does not enter much into consumption in Lahore. In the level country there are many large and populous villages; some towns, which have been of larger dimensions, are, with a few exceptions, fast falling into ruin. The number of souls under the dominion of the Rajah of Lahore is said to be 3,500,000. In some of the districts near the Indus manufactures of silk goods are extensively carried on. The manufactured plain and striped silks are considered to surpass in beauty those of every other country, and large quantities of them are every year exported to Caubul and Candahar. Of three caravans which leave the province annually for those countries, the first is said, by Captain Burnes, to be composed of 29,000 camels. White cotton goods, and occasionally indigo, sugar, and rice, are exported to the countries west of the Indus, and to Cashmere, in return for which, shawls, various kinds of cloths, and fruits are imported. Horses and camels, with some rice, sugar, and cotton-cloths, are exported to the south, and in return the merchants bring back metals, spices, and various European manufactured goods. The traffic would doubtless be much greater than it is but for the many duties exacted by the petty rulers of districts through which the goods are carried.

Until the early years of the present century, when the growing power of the present Rajah began to be extensively acknowledged among them, the province of Lahore was distracted by the incessant feuds of numerous petty chiefs, among whom the country was divided, and which armed against each other the inhabitants of neighbouring towns and villages. These feuds have happily ceased, and the whole of the chiefs now make common cause under one leader, who maintains an army of 80,000 men, of whom 50,000 are cavalry disciplined according to the European system. Runjeet Singh can also bring into the field 200 pieces of artillery, and the whole of his force is maintained upon such a footing of efficiency, that the friendship of this prince, whose territory forms a barrier against approaches from the north and west, cannot but have a powerful influence in securing the quiet of the Anglo-Indian Empire. On the 25th of April, 1809, in consequence of the hostile designs of France and Russia, a treaty was concluded with this prince containing little in addition to general declarations of amity on both sides, and upon this footing he has since continued with the English. In the course of the year 1831, a meeting took place between Runjeet Singh and the Governor-general, Lord William Bentinck, on which occasion considerable pomp and splendour were displayed on both sides.

LAHORE, the capital of the province of that name, under the dominion of the Rajah Runjeet Singh, is situated in 31° 36′ N. lat. and 74° 3′ E. long., on the south bank of Ravee river. Lahore is a place of high antiquity, and was the residence of the first Mohammedan conquerors of Hindustan, before they succeeded in establishing themselves in the central parts of the peninsula. Humaioon, the father of Akbar, made it his place of residence during a great part of his reign, and by him it was greatly enlarged and improved. The city and suburbs are said to have then extended three leagues in length. Thevenot, who was there in 1665, says, that the city, exclusive of the suburbs, was then a league in extent. Many of the buildings have since gone to ruin, but the city is even now of considerable size. The inhabitants not being in general wealthy, their dwellings are usually mean in their appearance; there are however some remarkable buildings. The mausoleum of Jehangire is magnificent, and in very good preservation. The tomb is a square building 66 paces on each side, and the whole is surrounded by a wall, each side of which is 1800 feet. On the south side of the city in the open plain is another tomb, that of Noor Jehan Begum, which is very handsome and 36 paces square. These, and the numerous domes and minarets of the mosques, give the city an imposing appearance at distance, but which is not confirmed by nearer inspection. Lahore is not a place of much strength. About thirty years ago it was surrounded by a wall and a broad ditch, having ramparts and bastions at intervals. The city is distant 380 miles from Delhi, 517 from Agra, 619 from Lucknow, 1070 from Bombay, and 1356 from Calcutta, all travelling distances.

LAIBACH, or **LAYBACH**. [ILLYRIA.]

L'AIGLE. [ORNE.]

LAINEZ. [JESUITS.]

LAIRESSE, GERARD, an eminent painter, was born at Liége in 1640. He acquired his knowledge of the art from his father; but there is reason to believe that he also studied under Bartolet, from whom he probably derived the taste for the antique which appears in his works. He first followed his profession at Utrecht, where he met with little encouragement, but having been advised to send one of his pictures to the famous picture-dealer Vylenburg, at Amsterdam, he was so pleased with it that he prevailed on Lairesse to remove to Amsterdam, which proved the means of raising him from poverty and obscurity to fortune and reputation.

Having a lively imagination, great rapidity of execution, and great industry, the number of paintings which he executed was very great. They are, it is true, of very unequal degrees of merit, but all bear the marks of genius: his expression is generally good, his colouring true and glowing, and his touch light and firm; his draperies too are well cast, broad, simple, and in natural folds. When he introduces architecture into his backgrounds, it seems to have been designed after Greek or Roman models. He had the misfortune to become blind several years before his death; but in this state he was surrounded by artists and lovers of painting, to whom he was fond of communicating instruction. The celebrated treatise on the art of painting which goes by his name, was not actually written by him, but compiled from his observations during his blindness, and published by a society of artists after his death, which happened in the year 1711, in the 71st year of his age.

'It would be unjust,' says Fuseli, 'not to mention Lairesse as an etcher, an art in which he had few rivals, whether we consider the decision, clearness, strength, or facility of his tool.'

LAITY, persons not clergy; that is, the whole population except those who are in holy orders. All the lexicographers, we believe, agree in deriving it from the Greek word *laos* (λαός), the people. A *Layman* is one of the Laity. The terms are not used except when the mind is directed to the distinction of the two classes.

LAKE, GERARD, first Viscount Lake, the second son of an antient family, was born July 27, 1744. Having entered the army at the early age of 14, and made his first campaigns in the Seven Years' War, he served afterwards in the American War, in Holland with the Duke of York in 1793, and having attained with credit to the rank of general, was appointed to the chief command in Ireland during the Rebellion of 1797-8.

In 1800 he was sent as commander-in-chief to India, during the Marquis Wellesley's government. On the breaking out of war with Scindiah, in 1803 [MAHRATTAS], General Wellesley being charged with the conduct of affairs in the Deccan, Lake himself took the field in the north of Hindustan. August 28, he crossed the northwestern frontier of Oude, into the Mogul territory, and after taking by storm the strong fort of Alighur, arrived within six miles of Delhi, September 11. The Mahrattas, in superior force, offered battle in defence of the city, and Lake led his troops at once to the attack. The enemy's position was strong; and a repulse seemed likely to ensue, when Lake, by a well conducted feint of retreat, lured the Mahrattas from their entrenchments, and then resuming the offensive, won the day by one brilliant and decisive charge. He entered Delhi the next day: and the Mogul emperor, Shah Allum, the nominal sovereign of India, old and blind, who had been but a puppet in the hands of the Mahrattas, gladly passed into the more decent and secure guardianship of the British government. Lake next marched upon Agra, which was taken after a stout resistance. A fresh descent of the Mahrattas recalled him towards Delhi: and on the 1st November he won another well-fought but decisive battle near the village of Laswaree. By this series of successes the whole of Scindiah's possessions north of the Chumbul River fell into his hands: and in reward General Lake was raised to the peerage, September 1, 1804, by the title of Baron Lake of Delhi and Laswaree, and Aston-Clinton, in Bucks.

In 1804-5, Lord Lake again took the field in the same part of India, against Holkar. In these campaigns he was less uniformly and brilliantly successful: still he had reduced Holkar's power to a low state when the arrival of the Marquis Cornwallis as governor-general substituted a peaceful policy for that system of conquest which Lord Wellesley had so energetically pursued. Lord Lake returned to England in September, 1807, and was immediately created a viscount, October 31. He died Feb. 20, 1808. (Collins's *Peerage*; *Hist. Brit. India.*)

LAKES are in the land what islands are in the sea; they are surrounded on all sides by land, as islands are by water. They are sheets of water of greater or less extent, and differ from lagoons in their origin, and from tanks and reservoirs by their being naturally formed, whereas the latter are the works of man. From ponds and pools it is not so easy to distinguish them, it being difficult to draw the line between a large pond and a small lake. The feature by which perhaps they would be best distinguished is this, that a lake is fed by streams either flowing at the surface of the soil or subterraneous, while a pond, though large, is only the accumulation of rain-water in some hollow. Thus ponds are usually dried up in hot weather, while true lakes are only temporarily diminished by heat.

Lakes have sometimes been divided into fresh-water lakes and salt-water lakes; though here again it is not easy to draw the line between the two, as from the freshest to the most salt the degrees of saltness are very various.

The principal difference in lakes is this: some have no apparent affluents nor outlet, others have affluents without any visible outlet, some have an outlet without any visible affluents, and others again have both affluents and an outlet.

Lakes without apparent affluents or outlets are comparatively small, and yet they are, relatively speaking, more permanent than larger lakes, because, being fed chiefly by subterraneous springs, they are not liable to be filled by those deposits of earth and sand which are the main cause of the rapid dessication of such lakes as receive the troubled waters of torrents and rivers. If we follow the usual custom and call all natural sheets of water lakes, then there are many lakes without affluents or outlet. Thus they are very numerous to the northward of the Caspian and in the plains which extend between the Ural Mountains and the Irtish, as also in the great Steppe of Baraba between the Irtish and the Ob. But in truth the greater part of these are more properly ponds, formed of the accumulated waters from rain and melted snow. The largest of them are not more than ten or twelve miles in circumference and six or seven feet deep; indeed many of them are quite dried up towards the end of summer. Some are salt and yield considerable profit. Their saltness is not easily accounted for; the more particularly as among and close to those that are salt there are many whose waters are quite fresh. The opinions of naturalists on the subject of salt lakes are very various, and no satisfactory theory has perhaps yet been offered. Small lakes of the kind of which we have been speaking, that is to say, such as have neither affluents nor outlet, sometimes occur in hollows resembling the craters of extinct volcanoes. We say resembling, because although Dolomieu, Spallanzani, and others, maintain the existence of lakes in such craters, M. Desmarest, upon apparently very good reasons, absolutely denies the possibility of lakes existing in the craters of extinct valcanoes. The celebrated Lake of Averno is, according to Ferber and Breislak, situated in an antient crater.

Of lakes which receive affluents without having any visible outlet, the largest is the Caspian. The Aral, and the Dead Sea, or Lake Asphaltites, are also examples of this kind of lake, which is very common in Asia. Some of them are of vast extent, such for instance is the lake Terkiri in Tibet, 27 leagues long and 9 leagues wide, and the lake Hoho-nor, or Koko-nor, in the same country, whose surface is 240 square leagues. It was at one time thought that the saltness of certain lakes was due to the circumstance of their receiving the saline impurities of their affluents, which impurities could not escape for want of an outlet; but on the one hand, the Durrah in Segistan, which receives the Helmund and has no outlet, is perfectly fresh; and on the other, there are many salt lakes which have no affluents hence the saltness of lakes must have some other cause. The question has sometimes been asked, what becomes of the excess of water brought into lakes having no outlet? Halley thought evaporation was all-sufficient to carry it off, and his opinion is highly plausible. If however it shall be found by actual experiment that a greater quantity of water is brought into a lake without apparent issue than can be carried off by evaporation, the natural conclusion will be that the surplus is lost by infiltration or subaqueous drainage. Several of these lakes have formerly had outlets, but water has ceased to flow from them, because the lakes have sunk in consequence of receiving now a much smaller quantity of water than formerly. There are many lakes in Europe at the present day whose outlets are diminishing; such among others are the lakes Balaton and Neusiedel in Hungary. The extent of surface of the former is very great compared with the quantity of water which it receives, so that the evaporation is rapidly diminishing the lake, and the river Schio, which used to carry off its superabundant waters and pour them into the Danube, is now nothing more than a slip of bog; and as for the Lake Neusiedel, it appears formerly to have communicated with the Danube by the Raab, into which it emptied its waters, and with which it has now no other communication than by a swamp. The Aral also, it is generally believed, once communicated with the Caspian.

Those lakes which have an outlet without any apparent affluent are fed by subaqueous springs, which, bursting out in a hollow, must fill it up before the waters can flow off in a stream. These lakes are generally situated at considerable elevations above the level of the sea. Thus there is one on Monte Rotondo in Corsica, at an elevation of 9069 feet. From lakes of this kind some of the largest rivers take their rise; the Volga, for instance, springs from such a lake in the government of Tver in Russia.

Lakes which receive one or more tributary streams and have a visible outlet for their superabundant waters are the most common and the largest; such are the lakes of Switzerland and of the north of Italy, the lakes Ladoga, Onega, Peipus, and Ilmen in Russia; the Saïma in Finland, the Wener in Sweden, the Enara in Lapland, &c. In Asia there are the Nor-Zaïssan and the Baikal, &c. In North America, Lake Superior, Lake Huron, Lake Erie, and Lake Ontario are examples of this kind of lake; each of them receives several affluents; and the grand outlet of the whole is the river St. Lawrence.

Lakes owe their origin to different circumstances: some from the sinking of the soil by the falling in of subterraneous caverns—such is the supposed origin of the Baïkal; others are caused by earthquakes—such a lake was formed in the province of Quito in 1797; some by the fall of mountains, as the Oschenen-see in the canton of Berne; or by lava currents damming up the stream, as the lakes Aidat and Cassiere in Auvergne, in France. Many are supposed to be the remains of the universal ocean which once covered the earth, and their waters, originally salt, have become fresh from their receiving constant supplies of fresh water while the salt was continually let off by their outlets.

Almost all lakes are in progress of diminution, although this is not everywhere apparent. The detrital matter brought in by their affluents is imperceptibly filling up their beds; and if regular observations were made, many provinces which owe much of their prosperity to their lakes would find the time fast approaching when these pieces of water will become mere pestilential marshes.

Certain lakes exhibit remarkable phenomena: thus some have floating islands in them, as is the case with a small lake near St. Omer. The lake Gerdau, in Prussia, has a floating island, on which a hundred head of cattle may be seen pasturing. In the lake Kolk, in Osnabrück, there is a floating island, on which fine elms are growing. Some of these floating islands sink and rise again; thus in the lake Râlang in Smoland, a province of Sweden, there is a floating island which appeared and disappeared ten successive times between the years 1696 and 1766. Other floating islands are found in East Gothland and many other places. Some subterranean lakes are supposed to have become so by the formation and subsequent fixing of floating islands, which successively uniting have finished by forming a solid crust over the water.

Some lakes have a double bottom, which rising and sinking alternately changes the apparent depth of the lake: there is a lake of this kind at Jemtia in Sweden.

Some lakes are said to have no bottom; but this is an impossibility: the fact is, that the sound does not reach the bottom, either for want of sufficient weight of lead or length of line, or else it is carried away by under-currents.

In Poland there exists a lake said to render brown the skin of those who bathe in it. Certain mineral waters impregnated with sulphuretted hydrogen are well known to change from white to brown the skins of those persons who have been under a course of metallic medicines, or who use metallic cosmetics, and some such circumstance may be the case with the lake in question.

Some lakes are intermittent: the most remarkable of this kind are those of Cirknitz in Illyria and Kauten in Prussia. They are supposed to be occasioned by a play of natural siphons, upon the same principle as intermittent fountains.

The Lake of Geneva is subject to a subaqueous wind, called the *Vaudaise*, which, rising to the surface, produces an agitation of the water which is sometimes dangerous to the navigation of the lake. Near Boleslaw in Bohemia there is a lake of unknown depth, from the bottom of which there rise, in winter, such violent puffs of wind, that they are said to send up into the air masses of ice of several hundred pounds weight. The sudden escape of gases formed in the bowels of the earth, and perhaps the air forcibly driven out from caverns by the water rushing into and filling them up, may be among the causes of this remarkable phenomenon.

The *Seiches* are a phenomenon which has hitherto been observed only in the Lake of Geneva and some other of the Swiss and Italian lakes, though it is probably common to many others. It consists in an occasional undulation of the water, something like a tide wave, which rises occasionally to the height of five feet. Its cause is not exactly known, though it is most probably due to a local and temporary change of atmospheric pressure. Water-spouts are a phenomenon sometimes seen on lakes as on the sea; they have been observed on the lakes of Zürich and Geneva.

Certain lakes seem to be placed in the immediate neighbourhood of centres or foci of electrical attraction; thus in the lake Huron there is a bay over which electrical clouds are perpetually hovering. It is affirmed that no person has ever traversed it without hearing thunder. The proximity of this lake to the American magnetic pole, that is, to the spot where the magnetic intensity is greatest, not where the dip is greatest, may perhaps have some influence in producing so remarkable a phenomenon.

Near Beja in Portugal there is a lake which is said to announce the approach of a storm by a tremendous rumbling. In Siberia also, near the little river Orcibat, which flows into the Abakan, there is, according to Pallas, a lake called the Roaring Lake, from the dreadful noise it makes, and which announces internal revolutions similar to that which occasioned the rupture of the dykes of the Lake Gousinoï in Douaria.

Some lakes have been observed to possess a petrifying or an incrusting property. The latter is merely a deposition of carbonate of lime. This, being dissolved by an excess of acid in the waters of certain springs, is precipitated whenever the waters of these sources coming into the lakes are exposed to the air and lose their excess of acid.

There is an interesting phenomenon presented by the Lake of Zürich, called the flowering of the lake. When this takes place the surface of the water is seen covered with a yellow scum or froth, which upon examination is found to be a very minute vegetation.

There are various other phenomena presented by lakes, but the most singular of them all perhaps is the attractive force of the mud at the bottom of some lakes, which is such that boats can hardly make their way through the water. The Lake Rose and one or two more in Canada are of this kind. Mackenzie describes the fact in these words:—'At the portage or carrying-place of Martres, on Rose Lake, the water is only three or four feet deep, and the bottom is muddy. I have often plunged into it a pole twelve feet long, with as much ease as if I merely plunged it into the water. Nevertheless this mud has a sort of magical effect upon the boats, which is such that the paddles can with difficulty urge them on. This effect is not perceptible on the south side of the lake, where the water is deep, but is more and more sensible as you approach the opposite shore. I have been assured that loaded boats have often been in danger of sinking, and could only be extricated by being towed by lighter boats. As for myself, I have never been in danger of foundering, but I have several times had great difficulty in passing this spot with six stout rowers, whose utmost efforts could scarcely overcome the attraction of the mud. A similar phenomenon is observed on the lake Saginaga, whose bottom attracts the boats with such force that it is only with the greatest difficulty that a loaded boat can be made to advance; fortunately the spot is only about 400 yards over.' Captain Back has confirmed the above by his late observations.

Lakes differ very much in temperature, transparency, and in the colour of their waters. Lakes fed by the water of melted snows in summer are generally much colder than would be thought conformable with the season; but the difference is principally in the lower waters, which, being cold, remain at the bottom by reason of their greater density. Some lakes never freeze, which is owing to their great depth. This is the case with Loch Ness in Scotland, which is 810 feet deep in the deepest part. Lakes are not subject to tides; at least the amount of tide, so far as observation goes, seems not to be ascertained.

The remarkable transparency of certain lakes is truly astonishing; thus the waters of Lake Superior are so pellucid, that, according to Mr. Heriot, the fish and rocks may be seen at a depth incredible to persons who have never visited these regions. The density of the medium on which the vessel moves appears scarcely to exceed that of the atmosphere, and the traveller becomes impressed with awe at the novelty of his situation. Elliot, in his 'Letters from the North of Europe,' says, 'Nothing appears more singular to a foreigner than the transparency of the waters of the Norwegian lakes. At the depth of 100 or 120 feet, the surface of the ground beneath is perfectly visible; sometimes it may be seen wholly covered with shells, sometimes only sprinkled with them; now a submarine forest presents itself to view, and now a subaqueous mountain;' and Sir A. de Capell Brooke observed of the same lakes, 'When a boat passes over a subaqueous mountain of a certain height, the visual illusion is so perfect, that one who has gradually, in tranquil progress over the surface, ascended wondering the rugged steep, shrinks back with horror as he crosses the vortex, under an impression that he is falling headlong down the precipice.' In the lake Wetter, in Sweden, it is said a farthing may be seen at the depth of twenty fathoms.

With regard to the colour of lakes, it may be observed that it is sometimes very difficult to account for the tints of large masses of water. The colour of the bottom, the depth, the shadows and reflected colours of surrounding bodies, subaqueous vegetation, springs, and many other circumstances, affect the colour of lakes.

Lakes perform a very important function in the economy of the earth. Rain does not always fall, and were it not for lakes, both visible and subterranean, those great natural reservoirs, the greater number of rivers would be dried up in summer, and canals could not have a constant supply of water. The freshness and humidity which these sheets of water occasion by their evaporation are also eminently favourable to the vegetation in their environs. Many lakes are of sufficient extent to be navigated, and thus facilitate commerce and industry. The fisheries of some are very valuable, and others, by the salt obtained from them, are a mine of wealth. Finally, they most agreeably diversify the surface of the earth by the various appearances which they present of the beautiful and the sublime.

LAKES are pigments prepared by combining vegetable or animal colouring matter with earths or metallic oxides; thus logwood [Logwood; Madder; Turmeric] and other woods and roots yield peculiar lakes; the general process is that of dissolving the colouring matter in a solution of potash or soda; and this, when added to a solution of alum, decomposes it, and the alumina and colouring matter are precipitated in combination. Indeed the affinity of some kinds of colouring matter for alumina is sufficiently strong to cause the formation of a lake without the intervention of an alkali, and merely by mixing aqueous solutions of the colouring matter and earthy salt.

LALAND. [Laaland.]

LALANDE, JOSEPH JEROME LE FRANÇAIS DE, was born at Bourg in the department of Ain, July 11, 1732. His parents were Pierre le Français and Marie Monchinet, of whom he was the only son. By their inordinate indulgence and extreme solicitude in anticipating all his wishes, he soon contracted habits of impatience and an irritability of temper, which, in after-years, he frequently found himself unable to control. Surrounded by Jesuits, and nurtured by his mother in the strict observance of devotional ceremonies, we are told that at the age of ten years it was not unusual for him, being disguised as a priest, to deliver a sermon of his own composition, to a select society, who requested as a favour to be present at the declamations of so precocious an orator. As his reason however began to be developed, he gradually detached himself from those occupations, notwithstanding the applause which his auditors were ever ready to bestow, and he as eager to receive, for while yet a child he evinced an unusual love of adulation. Many anecdotes are told in proof of the early acuteness of his perception and the strong desire which he manifested to comprehend the relation which one event bore to another.

When about thirteen or fourteen years old, he was sent to a college at Lyon, where for a time he appears to have derived equal pleasure from the study of poetry and eloquence, and from attending the lectures of the several professors on natural and metaphysical philosophy. Upon the occurrence of the great eclipse of 1748, of which, with the assistance of his tutor Le Père Béraud, he made a telescopic observation, he took great interest in the explanation given to him of that phenomenon, and thenceforward showed a more decided partiality for the mathematical sciences. But it was the perusal of Fontenelle's 'Entretiens sur la Pluralité des Mondes,' which, more than any other circumstance, influenced his choice of a profession by familiarising him with the sublime speculations of astronomers, and nourishing that love of distinction which characterized the whole of his career. 'It is with pleasure,' says Lalande himself, in his preface to an edition of that amusing book, which he afterwards edited, 'that I acknowledge my obligation to it for that devouring activity which its perusal first excited at the age of sixteen, and which I have since retained; from that time there appeared to me nothing comparable to the Academy of Sciences, and I desired ardently to see it long before I imagined there was a possibility of my ever becoming one of its members.' In order that he might devote himself more exclusively to the pursuit of the mathematics, he requested permission of his parents to become a Jesuit; but they now entertained views of a more ambitious and worldly nature, and instead of yielding to his request, held out the prospect of obtaining for him a lucrative appointment in the law, if he would consent to adopt that profession.

Under the pretext of acceding to their wishes he removed to Paris, where he commenced the study of jurisprudence; but his first visit to the observatory decided his vocation, for he immediately determined upon attending the course of astronomy at the College of France. Delille, who had recently returned from Russia, was then professor of astronomy to that institution, but he was old, and his long absence had occasioned him to be almost forgotten by the public, so that his lectures were very thinly attended. This latter circumstance enabled him to proportion his lessons to the progress of Lalande, whose rapid advances gave him the greatest satisfaction. They soon became mutually attached to each other, and Lalande was in the habit of frequenting the house of his tutor, where his mathematical difficulties could be more readily removed, and where he could gain experience in astronomical observation. About the same time he likewise attended the lectures of Lemonnier, whose reputation as an astronomer was perhaps greater than that of Delille, and as both were fully competent to appreciate the ability of Lalande, there arose between these professors a sort of emulation as to which should contribute most to his future eminence. But notwithstanding the ardour with which Lalande applied himself to his favourite science, the study of the law was not altogether neglected. At the age of eighteen he received from the judicial authorities of Paris the title of Advocate, soon after which he received instructions from his parents to return to Bourg, where they were anxious that he should practise his profession for some years. A fortuitous circumstance induced them to abandon the plans which they had formed for the promotion of his welfare and happiness.

Lacaille, who was at that time about to take his departure for the Cape of Good Hope, with a view to the more exact determination of the moon's parallax, had called upon the astronomers of Europe to forward the object of his voyage by making observations at their respective observatories, similar to those which he contemplated making himself at the Cape. The favourable position of Berlin, which has nearly the same longitude, while it differs in latitude by nearly the fourth part of the earth's entire circumference, suggested to Lemonnier the peculiar advantages which would accrue from observations made at the observatory of that city. But it so happened that there were no instruments of any value at that observatory, and no person of ability had been appointed to its superintendance. Lemonnier instantly offered the use of his own instruments, and at his recommendation the academy confided to Lalande the responsibility of making the necessary observations. When Maupertuis presented Lalande to Frederick, the latter, as might be expected, expressed his surprise at receiving so young an astronomer—for Lalande had not then completed his nineteenth year,—but after many flattering expressions he gave orders that every thing should be done which could tend to the attainment of the object in view. Here, during the latter part of the year 1751, and the early part of 1752, Lalande passed most of his nights in the observatory; his mornings, in studying the mathematics under Euler; and his evenings, in the society of Maupertuis, Voltaire, D'Argens, and La Matrie. After completing his observations, the substance of which he communicated in a memoir to the Academy of Berlin, he returned to Paris, where the Royal Academy expressed their unqualified approbation of his conduct, and immediately elected him a member of their society. From his election till within a few years of his death, he contributed regularly to the Transactions of the Academy, and from this time his popularity as an astronomer may be dated.

The expected return of Halley's comet had led Clairaut to investigate the amount of the perturbations to which it would be subject. Lalande, with the assistance of Madame Lepaute, supplied him with all the numerical computations of which he had need; and when the appearance of the comet had realized their predictions, he wrote its history, which appeared in 1759, appended to a translation of Halley's planetary tables. In 1760 he was appointed editor of the 'Connaissances des Temps,' in which he introduced many important alterations, and gave to it the form which it has since retained. In 1762 he succeeded Delille as professor of astronomy to the College of France, and continued to discharge the duties of his office with zeal and assiduity for more than forty years. From among his pupils he was in the habit of selecting those who manifested peculiar attachment to astronomical science, and these he would invite to his house, where he perfected them in the calculations necessary for applying their theoretical knowledge to objects of utility. His residence was in fact a school wherein many of his pupils not only received a scientific education, but likewise board, lodging, and other necessaries, and from whence they afterwards removed either to conduct some observatory, to fill an astronomical lectureship, or as professors of navigation and nautical astronomy on board the vessels of the government.

In 1764 he published his large treatise on astronomy, which he afterwards extended to four volumes 4to. Before the appearance of this work there existed several able treatises on the theory of astronomy by La Caille, Cassini, and Lemonnier; but these contained little or no information as to the practice of astronomy. To supply this omission was the main object of Lalande. The work contains many biographical and historical notes, which will always be interesting, and the results of numerous observations to which it will always be useful to recur.

In 1772 he published his 'Account of the Transit of Venus,' observed 3rd June, 1769, which was drawn up with considerable labour from the communications of those persons who, at his recommendation, had been sent by several of the European governments to different parts of the globe, in order to observe the phenomenon.

Lalande died at Paris, 4th April, 1807, in his 75th year. As an observer, an author, and a tutor, he undoubtedly did much for the promotion of astronomy; but looking to the state of the mathematics at the time in which he lived, his knowledge of them appears to have been very limited. The candour and the warmth of his disposition gave full relief both to his virtues and his defects. He regarded concealment of any kind and under any circumstances as disreputable to an honourable man; and acting up to this opinion, he invariably expressed his sentiments without the slightest reserve, even when by so doing he prejudiced his own interests and those of his dearest friends. His love of truth, and the boldness with which he attempted to subvert all systems and opinions which did not accord with his own, and which sometimes partook rather of a spirit of fanaticism than of pure philosophy, excited against him a crowd of detractors and enemies. The extreme irritability of his temper led him on several occasions to acts of ingratitude towards Lemonnier, his early tutor and friend, who, to use Lalande's own expression, 'refused to see him during an entire revolution of the moon's nodes.' His attachment to his native town was such that he made a point of visiting it every alternate year during the college vacation; and upon these occasions he gave public lectures, founded an Academical Society, and neglected nothing which might inspire a love of science and of letters. His filial affection induced him frequently to attend the devotions of his mother, although the creed which she had so zealously endeavoured to inculcate had been greatly modified, if not altogether eradicated, by his intercourse with Voltaire and others while at Berlin.

To conclude, although his moral character is not altogether irreproachable, he was always ready to patronize the needy votary of science, and he would advocate the cause of a friend at the risk of his own personal safety.

The following is a list of his principal publications:—

'Navigation, its History, Theory, and Practice,' Paris, 1793, 4to.; 'The Physician's Almanack,' Paris, 1800; 'The Geographical and Chronological Almanack,' 1799-80; 'Astronomy,' 1st edition, 1764, 2 vols. 4to.; 2nd ed., 1771-81, 4 vols. 4to.; 3rd ed., 1792, 3 vols. 4to.; the same work abridged, Amsterdam, 1774; Paris, 1775-1795, 8vo.; 'Astronomy for Ladies,' last edition, 1824; 'Astronomical Biography,' 1803, 4to.; 'Treatise on Canals in general, and in particular of the Canal of Languedoc,' Paris, 1778, fol.; 'Transit of Venus,' 1764, 4to.; 'Description of a Machine for dividing Mathematical Instruments, translated from the English of Ramsden,' 1790; 'A Discourse tending to prove "That the spirit of justice constitutes the glory and security of empires,"' to which the Academy of Marseille awarded their prize, 1757; 'Dissertation on Capillary Attraction,' 1770; 'Ephemeris of the Heavens,' 1775-1800; 'Exposition of Astronomical Calculations,' 1762; 'French Celestial History,' 1801; 'Letter to Cassini on the subject of Saturn's Ring,' 1773; 'Memoir on the Interior of Africa,' 1795; 'Reflections upon Comets which may approach the Earth,' 1773; 'Astronomical Tables for the Meridian of Paris,' 1770; 'Portable Logarithms,' 1802; 'Treatise on the Tides,' 1781; 'Journey to Mont Blanc,' 1796.

The whole of the papers of Lalande in the Memoirs of the Institut were contributed between the years 1751 and 1806. Of these the most important are: 'On the Parallax of the Moon, and its Distance from the Earth,' 1752-53-56-87; 'On Secular Equations, and on the Mean Motions of the Sun, Moon, Saturn, Jupiter, and Mars,' 1757; 'On the Theory of Mercury,' 1766-67-68-86; 'On the Solar Spots and Rotation,' 1776-78; 'On Herschel's Planet,' 1779-87; 'On the Length of the Solar Year,' 1782; 'Observations of 8000 Northern Stars,' 1789-90. He likewise superintended an edition of the 'Astronomy' of Lacaille, Bouguer's 'Navigation,' Flamsteed's 'Celestial Atlas,' Fontenelle's 'Plurality of Worlds,' and in conjunction with Laplace and others he edited the latter volumes of Montucla's 'History of the Mathematics.'

(Delambre, *Eloge de Lalande*, in the 'Memoirs of the Institut,' 1807, and notice of his life in the 'Biog. Univers.;'

Hutton's *Mathematical Dictionary;* Quérard's *Dictionnaire Bibliographique.*)

LAMA. [LLAMA.]

LAMA, LAMAISM, is the name given to the Buddhist religion in Mongolia and Tibet. Lama in these languages properly means priest, but is only applied to those persons who enjoy the higher dignities of the Buddhist hierarchy. It first became an illustrious appellation after the conquests of the Mongols under Genghis Khan and his successors had elevated the individual who pretended to be the successor of Buddha to the dignity of Dalai Lama. [DALAI LAMA.] The name was first confined to eight subordinate chiefs, who were appointed to act as his council, but was afterwards extended by the Dalai Lama to all other priests who possessed a certain degree of authority. The title of Lama is given to the head of every monastery, and every Lama is considered a vicar of the deity, and requires implicit obedience to all his commands, like the Dalai Lama himself. The opinions of this sect are fully developed in the article BUDDHA; and their religious rites and ceremonies resemble those of the BONZES in Japan.

LAMANTIN. [WHALES.]

LAMARCK, JEAN BAPTISTE PIERRE ANTOINE DE MONNET, CHEVALIER DE, member of the antient Academy of Sciences, and afterwards of the Institute. This celebrated botanist and zoologist was born 1st August, 1744, at Bazentin in Picardy, of a noble family. He was originally destined for the church, and received his education at the Jesuits' College at Amiens, where he was noted for that assiduous application to study which had so great an influence over his future career. Being desirous however at that time to follow the profession of his ancestors, at the age of seventeen he left college and entered the army, in which he served under Marshal Broglie in the long war against the English and Dutch. He greatly distinguished himself by his bravery, but accident turned his talents into another channel; for, being wounded and suffering from ill health, he was obliged to quit the military service. He then went to Paris to study medicine, but it does not appear that he ever did anything in that science, for we find him turning his attention to natural philosophy, and in 1778 he communicated to the Academy of Sciences some observations on the laws which regulate the formation and dispersion of clouds. The Academy engaged him to prosecute his researches on this subject, but he now commenced another branch of science which conducted him rapidly to celebrity, namely botany. At this time Bernard de Jussieu was engaged in arranging the plants of the Jardin du Roi, according to their natural affinities; and at the same period the ingenious but artificial system of Linnæus was at its height of popularity. M. Lamarck undertook to form a new arrangement, which should be intermediate between the others, selecting the most easily reconciled parts of both; he also borrowed from the older system of Tournefort, who formed the principal characters of his classes and orders on the modifications and form of the corolla. Lamarck thus constructed a new method of classification, according to which he arranged all the known species of plants indigenous to France. He named this work the 'Flore Française,' and presented it to the Academy of Sciences, who were highly pleased with it. The work particularly attracted the attention of Buffon, who had sufficient influence to get it published at the expense of government for the benefit of the author, whose circumstances at that time were narrow. The 'Flore Française' appeared in 1780, bearing the date of 1778, in 3 vols. 8vo. In 1779 Lamarck was elected a member of the antient Academy of Sciences. In his 'Flore' he announced that it was his intention to set about a general work on plants, and accordingly he commenced collecting materials for that purpose, and chance threw in his way several rich herbaria, among others that of Sonnerat. Having a great wish to travel over France and Europe, he obtained an appointment, through the influence of Buffon, to visit the different botanic gardens and celebrated collections of plants in Europe, for the purpose of procuring curious and rare specimens for the Jardin du Roi. Buffon's son accompanied him, and they travelled through most of Germany and the Low Countries. On his return to Paris he continued to cultivate botany with the same ardour as before, and was admitted to the botanical excursions of J. J. Rousseau, on condition that he should not appear to take any notice of either the person or actions of that extraordinary man, whose temper was so irritable that he was annoyed by the slightest circumstance. He now commenced arranging the results of his researches, but instead of forming a separate work they received another destination; for Pankouke having formed the plan of the 'Encyclopédie Méthodique,' engaged the most learned men in each department, and Lamarck, who undertook the botany, was one of the first contributors, and among the most active, for in 1783 his first volume was ready for publication, containing a history of botany, preceded by an introduction to the science: this composition, though good in some respects, shows marks of the precipitation with which it was written. He rapidly continued the work: a second volume appeared in 1788, and everything promised a speedy completion of the subject, when the publisher proposed to M. Lamarck to execute a series of plates to illustrate the different genera of plants. These appeared arranged according to the Linnæan system, though contrary to the wish of the author. It was the original intention that each fasciculus of plates should have been accompanied with explanatory letter-press, but this only appeared with the first; nine fasciculi of plates came out, but they were never completed. The publication of the 'Encyclopédie' was now arrested by the breaking out of the Revolution, and with this event Lamarck's botanical labours ceased.

In 1788 Lamarck had been appointed assistant to Daubenton in the 'Cabinet du Jardin du Roi,' where he was particularly intrusted with the charge of the vegetable department. Here nothing could disturb him from his peaceful occupations and studies, and he remained unmolested amidst all the troubles and horrors of the Revolution. During the reign of terror he proposed a plan for organizing the Museum, and though little attention was paid to it at the time, he had afterwards the satisfaction to see it realized in the establishment of the institution of the Museum in 1793. But notwithstanding his talents and labours, Lamarck was near being forgotten among the professors of the new institution. Botany was the only science which he was well qualified to teach, and in this department Desfontaines and Jussieu were appointed to the new chairs. The subject of zoology only remained, to which, with the exception of conchology, Lamarck had paid little attention. This branch was divided into several sections; the vertebrated animals were given to M. Etienne Geoffroy, since known as the illustrious Geoffroy Saint-Hilaire, who afterwards shared this department with M. Lacépède, who was then absent and persecuted: the latter undertook the reptiles and fishes. The remaining classes of the animal kingdom, comprising all the invertebrata, which were then considered of little interest, were left to Lamarck, who, putting forth all his zeal in their investigation, and all his talents in their classification and description, has shown that they are almost as complicated in structure and interesting in history, and incomparably more numerous, than the beings higher in the scale of creation. The 'Systéme des Animaux sans Vertébres,' published in 1801, was the fruit of his profound researches, and laid the foundation of his greater work, the 'Histoire Naturelle des Animaux sans Vertébres,' published at Paris from 1815 to 1822, in 7 vols. 8vo. This is the most valuable of all his labours, and ranks among the first modern works on natural history. Lamarck commenced his lectures in the Museum in 1794, being then fifty years old, and he continued to deliver them up to 1818, when, becoming almost blind and very infirm, he was obliged to resign, and was replaced by one of his colleagues in the Institute, M. Latreille. His eyes becoming affected during the compilation of his last work, the 'Mémoires sur les Coquilles,' published in the 'Annales des Museum,' he was assisted in the bivalves by M. Valenciennes, and in the remaining classes by his eldest daughter Mademoiselle Lamarck. This celebrated man died in Paris, in December, 1829, at the advanced age of eighty-six.

Lamarck is chiefly known in this country by his excellent arrangement of the Conchifera, or Testaceous Mollusca, in which department he made so great a change, that he has left comparatively little to be done by those who come after him. Mr. Swainson observes that 'the system of Lamarck, in regard to the soft or invertebrate animals, deserves particular attention, since he was unquestionably the first who, by his unrivalled perception of natural affinities, obtained an indistinct view of that circular arrangement which was more clearly and fully developed by his successors in this intricate field of inquiry,' particularly by Mr. MacLeay. But though we admire the talents, judgment, industry, and extensive knowledge which this able naturalist possessed, we must regret the absurd and fanciful theories which he introduced into his writings and lectures. He supposed that all organized beings, from the lowest to the highest forms, were progressively developed from similar living microscopic particles. This may be called the theory of metamorphosis, according to which a formative substance is held to exist, but is allowed to change its form in order to be converted into a new being. He was also an advocate of the doctrine of spontaneous generation; and, according to his theory, it was only necessary to suppose a soft gelatinous mass of amorphous but organic matter to become traversed by surrounding fluids in order to produce a permanent living movement or growth; if the mass was destitute of irritability it became the type of vegetable life, if it possessed that property, animal. Afterwards he pretended that use and circumstances determined the existence of new organs, which rendered the beings more or less perfect. These principles are only a continuation of those which Maillet and Buffon had before promulgated.

In his great work he adopts the same theories: he divides the animal kingdom into three classes, the 'Apathiques,' the 'Sensibles,' and the 'Intelligents;' and after having followed the order of progression by which nature conducts the different beings to perfection, he regards intelligence solely as the expression of the will of the supreme being. These theories are inconsistent even with his own words, and are almost too ridiculous to be repeated. Lamarck wrote many other works and papers. (*Biographie des Hommes Vivants; Biographie Médicale*, in the *Dictionnaire des Sciences Médicales*, &c.)

LAMB. [SHEEP.]

LAMB, CHARLES, was born February 18, 1775, in Crown Office Row, Inner Temple. His father was clerk to Mr. Salt, one of the benchers of the Inner Temple, and both master and servant (the latter under the name of Lovell) have received honourable commemoration in the 'Essays of Elia.' Born in the Temple, Lamb was educated at Christ's Hospital. Thus his early life was spent in the most old fashioned and busy parts of London: a circumstance which probably exercised a strong influence over his character and habits. For though many passages in his works indicate a lively power of relishing the beauties of inanimate nature (see for example his *Letters*, vol. i., p. 221) his relish was as of a luxury, to be enjoyed distantly, and at intervals: his cravings were for the excitement of society, the splendours, oddities, and squalidness of the metropolis. This feeling breaks out everywhere in his 'Letters.' 'I often shed tears,' he says, 'in the motley Strand, for fulness of joy at so much life.' (See vol. i., p. 182, 213, &c.) Coleridge was his school-fellow, and thus was laid the foundation of a friendship which endured through life. Labouring under an impediment of speech, which prevented his succeeding to an exhibition in one of our universities, Lamb was driven for subsistance to the uncongenial labours of the desk: he became in 1792 a clerk in the accountant's office in the India House, in which, rising in place and salary, he continued a regular labourer till March, 1825, when he was allowed to retire upon a handsome pension. His printed works, he says somewhere, were but recreations: his real ones being contained in some hundred volumes on the shelves of Leadenhall Street. But strongly as he felt, almost to repining, the irksome bondage of his daily duties, he was duly sensible of the value of a certain income and a fixed employment: and earnestly dissuaded one of his valued friends from exchanging the drudgery of a commercial life for the precariousness of a dependance upon literary labour. His own feelings on obtaining his liberty are beautifully recorded in 'The Superannuated Man,' one of the the 'Last Essays of Elia.' Being unmarried, he dwelt through life with an only sister, to whom he was linked by a community of tastes, and by the strongest ties of affection. He died in consequence of an accident, apparently trifling, December 27, 1834.

Lamb's first appearance as an author was in a small volume of poems published jointly with Coleridge and Lloyd. This association brought on him the wrath of the 'Anti-Jacobin;' as did his drama of 'John Woodvil,' published in 1801, the heavier fire of the 'Edinburgh Review.' An increasing relish for our older poets, and for those who in our own day have sought inspiration from them, or from nature herself, has caused the beauty and feeling of Lamb's poems to be better appreciated. Still his popularity depends more on his prose writings; and especially on his 'Essays of Elia,' which were begun in the 'London Magazine,' and collected afterwards in two small volumes. They abound in references to the author's character, history, and habits; and with the two volumes of Letters, lately published by Sergeant Talfourd, present a minute and most interesting picture of a mind quaint, humorous, full of high and lovely thoughts and feelings, and affection for all things animate, and more indulgent to the weaknesses of others than its own frailties. The preface to the 'Last Essays of Elia' is an exquisite sketch, by himself, of his own character.

His works are contained in two vols. 12mo., 1818, 'Essays of Elia, Album Verses,' &c., 1830; 'Specimens of English Dramatic Poets who lived about the time of Shakspeare,' 1808. They have recently been republished by Mr. Moxon, the poems in one, the prose in three volumes. The 'Farewell to Tobacco' and the 'Essay on Roast Pig' are admirable specimens, in verse and prose, and in widely different styles, of his peculiar and easy humour. 'Christ's Hospital Thirty-five Years ago;' 'The Old Benchers of the Inner Temple;' 'Blakesmoor,' &c., show his power of throwing a charm round things indifferent in themselves, but endeared to him by early association. As specimens of his criticism we may instance his essays 'On the Genius of Hogarth,' and 'On the Tragedies of Shakspeare.' His serious is no less admirable than his humorous vein, and is always pregnant with some healthy and benevolent moral. We doubt whether his works are yet, or will be, widely popular: for there was an original quaintness in his character, nourished by his habits and studies, which those only who have something similar in their temper and pursuits will fully relish. Few however have enjoyed so fully the affectionate admiration of a large and varied circle of friends: and having with them encountered and surmounted much ridicule, he will hold an honourable place in our literature along with Coleridge, and others yet living, whose friendship, in life, he regarded among his most precious privileges, and with whom he would be best pleased to be associated in fame.

LAMBALLE. [COTES DU NORD.]

LAMBARDE, WILLIAM, an eminent lawyer and antiquary, was the son of John Lambarde, an alderman of London, and was born October 18, 1536. Of his early years we know nothing, till in 1556 he entered at Lincoln's Inn as a student. Here he studied under Lawrence Nowel (the brother of Dean Nowel), a person eminent for his knowledge of antiquities and of the Saxon tongue, from whom Lambarde imbibed the notion that an acquaintance with the customs and jurisprudence of the Saxon times would be useful to him in his profession. The first fruits of his studies appeared in a collection and translation of the Saxon laws, under the title of 'ΑΡΧΑΙΟΝΟΜΙΑ, sive de Priscis Anglorum Legibus Libri,' 4to., 1568, afterwards republished in 1644 by Abraham Wheloc, with Bede's 'Ecclesiastical History.' In 1570 we find him residing at Westcombe, near Greenwich in Kent, of the manor of which he was possessed, and where, without giving up his profession of the law, he devoted much of his labours to the service of the county. His 'Perambulation of Kent,' finished in 1570, was published in a small quarto volume in 1576. In 1574 he founded an hospital for poor persons at East Greenwich in Kent, said to have been the first founded by a Protestant. In 1578 he was admitted a bencher of Lincoln's Inn, and in 1579 was appointed a justice of the peace for the county of Kent, an office which he not only performed with diligence and integrity, but endeavoured to explain and illustrate for the benefit of other magistrates in his 'Eirenarcha, or the Office of the Justices of the Peace,' in four books, 4to., 1581; between which year and 1619 it was reprinted eleven times. He also published a small treatise on 'The Duties of Constables,' &c., 8vo., 1582, which was reprinted six times. In 1592 he was appointed a master in chancery by Sir John Puckering, lord-keeper, and in 1597 keeper of the rolls and house of the rolls in Chancery-lane, by Sir Thomas Egerton, lord-keeper, and in 1600 keeper of the records in the Tower. He died at his house at Westcombe, August 19, 1601, and was buried in the parish church of East Greenwich. The monument placed over him, upon the rebuilding of that church, was removed to the parish church of Sevenoaks in Kent, where is still the seat and burying-place of his family. Lambarde's 'Archeion, or a Discourse upon the High Courts of Justice in England,' was not published till 1635 by his grandson Thomas Lambarde: another work, originally intended as a general account of Great Britain, he relinquished upon finding that Camden was engaged upon the same project. The materials which he had collected for it were published in 1730, in 4to., under the title of 'Dictionarium Angliæ Topographicum et Historicum.' Lambarde was one of the most accurate antiquaries of his day, and in all respects a man of learning and worth.

(Nichols's *Bibl. Topogr. Brit.*, No. xlii.; Chalmers, *Biogr. Dict.*, vol. xix., pp. 473-475.)

LAMBERT, JOHN, is said to have been born of a good family, probably about 1620, and to have been educated for the bar. On the breaking out of the contest between the king and the parliament, he abandoned the study of the law, and joined the parliamentary army, in which he is mentioned as holding the rank of colonel at the battle of Marston Moor (2nd July, 1644). After distinguishing himself at Naseby, with Cromwell in Scotland, at Worcester, and on other occasions, and rising to the rank of major-general, the appointment of Fleetwood on the death of Ireton (November, 1651) to the chief command of the forces in Ireland produced an alienation between Lambert and Cromwell which was never wholly healed, although he was one of the officers whom Cromwell summoned in June, 1653, to take upon them the settlement of the government, and he was in May, 1655, appointed by the Protector one of his eleven major-generals, as they were styled, or commanders of the military forces in the several districts of the kingdom. Lambert's district comprehended the five northern counties of Durham, Cumberland, Northumberland, Westmoreland, and Yorkshire. He took little part in public affairs, however, during the life of the Protector. The most important part of Lambert's career is comprised within the space of about twenty months that elapsed between the death of Oliver Cromwell and the return of the king. He became the soul of the confederacy of discontented officers, which after the meeting of his first parliament, in January, 1659, was formed against the new protector Richard, and which speedily effected the deposition of that feeble and unambitious personage. [Cromwell, Richard.] Lambert was now accounted the head of the Fifth-monarchy Men, or extreme republican and Independent party. On the breaking out of the Royalist insurrection in July, he was sent by the Rump Parliament to suppress it, a business which he performed with extraordinary vigour; but immediately after his success he turned round upon the parliament, and, on its resistance to his demands, dispersed it by military violence, 13th October. The part taken by Monk however, and the falling away of their partisans on all hands, soon reduced Lambert and the cabal of officers, or Committee of Safety, as they called themselves, to extremities; and by the beginning of January, 1660, having been deserted by almost the whole of the force with which he had set out for the north to encounter Monk, he was seized by orders of the restored parliament and committed to the Tower. On the 9th of April following he made his escape from confinement, to the infinite consternation of Monk and the Council of State; but the activity of Colonel Ingoldsby recaptured him at Daventry, on the 22nd of the same month, when he was already at the head of a considerable body of horse, the greater part of which however deserted him at the critical moment. He was excepted from the Act of Indemnity passed after the Restoration; but although he was in June, 1662, brought to trial before the Court of King's Bench along with Sir Harry Vane, he was, after being found guilty, reprieved at the bar, the distinction made between the two prisoners being expressly placed by the judges to the account of his comparatively dutiful and submissive behaviour in the course of the trial. He was eventually banished to the Island of Guernsey, where he lived for above thirty years.

LAMBETH, a large parish, a portion of which, together with portions of the parishes of St. Giles's, Camberwell, and St. Mary, Newington, constitute a parliamentary borough. It is in the eastern division of the hundred of Brixton and county of Surrey. It is situated on the right bank of the river Thames. The name is of Saxon origin, and signifies, according to Camden, 'a dirty station.' The Saxon kings had a mansion here, where they occasionally resided. The palace of the archbishop of Canterbury, which is situated near the river, exhibits specimens of the architecture of various ages. The chapel and crypt beneath were probably built by archbishop Boniface as early as the year 1262, but the other parts of the building are of more recent date. Within the last five or six years the palace has been repaired under the direction of Mr. Edward Blore. In the dining-room are the portraits of all the archbishops who have filled the see from Laud down to the present time. The library occupies the four galleries over the cloisters, which form a small quadrangle. During the civil wars the greater part of the books were removed to the university of Cambridge, and the others dispersed among private individuals. After the Restoration exertions were made to effect their complete restoration, which were in a great measure successful. At the present time there are about 25,000 volumes, some of which are of great rarity. Many of the manuscripts are valuable, and those which contain the registers of the see of Canterbury are in an excellent state of preservation. Before the Reformation the archbishops had prisons here for the punishment of ecclesiastical offenders, and it was here that Elizabeth confined the earl of Essex before sending him to the Tower.

In the year 1831 the parish contained a population of 87,856 persons, having been increased during the previous ten years by 30,218 persons. The manufactures are numerous and important, comprising those of soap, white and red lead, plate-glass, patent shot, besides extensive breweries, distilleries, &c. There is a parochial school erected in 1808, the Philanthropic Society's school, another belonging to the Benevolent Society of St. Patrick, and many other charitable institutions.

Lambeth was constituted a parliamentary borough by the Reform Act, and returns two members.

For an account of the antiquities of the parish the reader is referred to the *Bibliotheca Topographica Britannica*, vol. ii.; and Lysons' *Environs of London*, vol. i.

LAMBRUS, Leach's name for a genus of brachyurous crustaceous decapods. [Parthenopians.]

LAME'GO, a town of Portugal in the province of Beira, situated about two miles from the south bank of the Douro, and at the foot of the Serra de Penide, which is an offset of the ridge of Alcoba. It is a bishop's see, has an antient cathedral, built by Count Don Enrique, father of Alfonso I., several other churches and convents, an hospital, and 9000 inhabitants. The town is built in great part on the slope of a hill; the lower part contains one wide and nearly level street: the cathedral and the episcopal palace and gardens are in the upper town. Lamego is the chief town of the comarca of the same name, which extends from the Douro southwards to the Vouga, which divides it from the comarca of Viseu. This district is hilly, and contains several valleys, through which various streams flow northwards into the Douro. The Serra de Montemuro, which joins the Serra de Maraom on one side and the Serra de Alcoba or Caramula on the other, crosses the country from north-east to south-west. The county produces abundance of good wine, which is sent to Oporto, under the name of Alto-Douro wine. It was at Lamego that the first Cortes of Portugal were assembled in 1143 by Alfonso I., to establish the fundamental laws of the Portuguese kingdom. [Cortes.]

Alfonso is said to have claimed a divine right to the throne, asserting that, the night before the battle of Ourique, he had had a vision of the Saviour, encouraging him to the fight, and promising the kingly crown 'to him and his descendants after him.' (Duarte Galvão, *Chronica do Rei Dom Affonso.*) A document to this effect, signed by the king, two bishops, and eight of the nobility and deputies of the towns, was said to have been discovered in the monastery of Alcobaça in 1596 by Brito, who transcribed it in his 'Chronicles of the Cistercian Order.' Brandão, in his 'Monarquia Lusitana,' Lisbon, 1638, published the acts of the Cortes of Lamego, the genuineness of which has been doubted by some. (*History of the Revolutions of Portugal, with Sir Robert Southwell's Letters concerning the Revolution of* 1667, London, 1740.) By these acts a formal regulation is made as to the transmission of the crown to the lineal descendants of Alfonso, male and female, with a proviso that the eldest daughter of a king should marry none but a Portuguese, lest the kingdom should fall into the hands of a foreigner. It was also decreed by the Cortes, and assented to by Alfonso for himself and his successors, that Portugal was a free and independent kingdom, and that no king or prince of Portugal should ever acknowledge himself as tributary to a foreign power, for if he did, he should lose all right to the throne. (Lemos, *Historia General de Portugal*, b. ix.)

Lamego is 70 miles north-east of Coimbra, 25 north of Viseu, and 45 east of Oporto. A good road has been made between Lamego and Oporto at the expense of the Oporto Wine Company. (Miñano, *Diccionario Geografico;* Flores, *España Sagrada;* Kinsey, *Portugal Illustrated.*)

LAMELLA'RIA. [Pleurobranchus.]

LAMELLIBRANCHIA'TA, M. De Blainville's third order of *Acephalophora* (Acéphales Testacés of Cuvier).

M. De Blainville makes this order consist of the following families:—1st. *Ostracea* (Oysters, &c.); 2nd. *Subostracea* (Spondylus, &c.); 3rd. *Margaritacea* (Vulsella, Malleus, &c.); 4th. *Mytilacea* (Mussels and Pinnas); 5th. *Polyodonta*, or *Arcacea;* 6th. *Submytilacea* (Anodon, Unio, Cardita); 7th. *Chamacea;* 8th. *Conchacea;* 9th. *Pyloridea;* 10th. *Adesmacea* (Pholas, Teredo, Fistulana, &c.).

M Rang separates the order into two divisions.

1st. Monomyaria.

Families:—1st. Ostracés, Cuvier (*Ostreadæ*); 2nd. Pectinides, Lam. (*Pectinidæ*); 3rd. Malléacés, Lam. (*Malleïdæ*); 4th. Aviculés (*Aviculidæ*).

2nd. Dimyaria.

Families:—5th. Arcacés (*Arcadæ*); 6th. Mytilacés (*Mytilidæ*); 7th. Submytilacés (*Submytilidæ:* freshwater—Anodon, Unio, &c.; Naiades of Lamarck and Lea; marine—*Cardita, Cypricardia*, &c.); 8th. Chamacea (*Chamadæ*); 9th. Conchacea; 10th. Pyloridea; 11th. Tubicolés, Lam. (*Aspergillum, Clavagella*, &c.).

The families of this order which have not already been noticed will, for the most part, be treated of under their respective titles. The *Arcadæ* will be found under the title Polyodonta, and the *Adesmacea* under Pholas and other generic names. For the organization see Conchifera and Naiades.

LAMELLICORNES (Latreille), one of the sections of the order Coleoptera. The insects of this section have five joints to all the tarsi. The antennæ are inserted in a small hollow in front of the eyes, short, usually composed of nine or ten joints, the last of which are large and flat, and open like a fan. [Coleoptera, vol. vii., p. 341, fig. 9.] The number of these lamellated joints varies, but there are generally three. The clypeus is usually very large, and the labrum is small and hidden beneath the clypeus. The anterior tibiæ are dentated externally, and the posterior tibiæ are often more or less denticulated. The mandibles of some of the species are membranous.

The larva [Coleoptera, vol. vii., p. 340, fig. 1] is soft, of a cylindrical form, or nearly so, and has a large vertical head. There are six small legs attached to the thoracic segments. The body is always bent. When about to assume the pupa state, the larvæ enclose themselves in an oval case formed of particles of earth, rotten wood, or other surrounding substances, which are cemented by a glutinous matter. Some of them live in the ground and feed upon the roots of plants, and others live in decayed animal and vegetable substances, upon which they feed. The perfect insects also feed upon these substances (many of them are found in dung); others feed upon the leaves of plants, or on the flowers.

Latreille divides the Lamellicornes into two great tribes. [Scarabaides and Lucanides.]

LAMELLIROSTRES, Cuvier's name for the great family of the *Anatidæ* (Ducks, Geese, Swans).

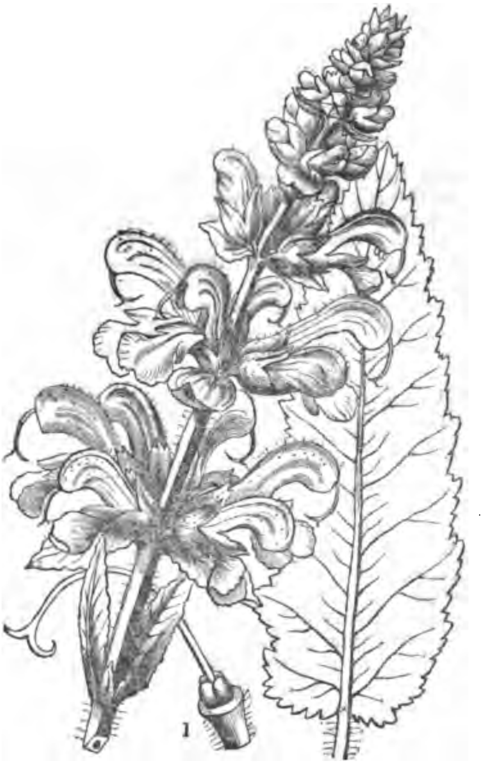
LAMENTATIONS of JEREMIAH. [Jeremiah.]

LAMIA'CEÆ, or LABIA'TÆ, a very extensive and important natural order of Exogenous plants, with irregular unsymmetrical monopetalous flowers, and a four-lobed ovary, changing to four seed-like monospermous fruits. It is technically allied so nearly to Boraginaceæ as to differ apparently in little except having regular flowers; but in nature it belongs to a different series of vegetation. The leaves of Lamiaceæ are uniformly opposite, and their stems square or nearly so, and in the greater part of the order the flowers are disposed in short opposite clusters axillary to leaves, and appearing in consequence as if in whorls.

The species are generally aromatic and tonic, a property that is in most cases owing to the secretion of a volatile oil in little cysts or glands occupying the leafy organs. The aromatic qualities are familiar to us in the Sage, Marjoram, Thyme, Basil, and similar plants, commonly cultivated for the service of the kitchen, as condiments; of Lavender, so much valued for its peculiar fragrance; of Mint and Peppermint, well known for their stimulating power, and of many others. Betony, Ground Ivy, Horehound, and others are examples of the bitter tonic qualities of such plants; Rosemary appears to have the specific property of stiffening the hair and encouraging its growth; its oil is that which gives the green colour to bear's grease and such pomatums; and Cat-thyme (*Teucrium marum*) and Cat-mint (*Nepeta Cataria*) seem to be genuine feline aphrodisiacs.

Plants of this order are distributed over all the warmer and temperate parts of the world, generally being herbaceous, and never exceeding the size of small bushes. Mr. Bentham has given an elaborate view of their geographical distribution, from which it appears that out of 1714 species 1030 belong to the Eastern hemisphere, and 649 to the Western; 8 only are arctic; 80 inhabit the temperate parts of Europe, 190 Spain, 149 the Himalayan Mountains, and only 157 the equinoctial regions of both the old and new world, and those are chiefly mountain plants.

Linnæus distributed the genera of Lamiaceæ through his Didynamia Gymnospermia and Diandria Monogynia. Writers on the natural system have devised much better modes of arrangement; the most perfect and recent is that of Mr. Bentham, (*Labiatarum Genera et Species*, London, 1832-36, 8vo. 783 pp.)



Leaf and flowers of Salvia pratensis.

1, the ovary, upon the four lobes of which a part of the character of this order depends.

LAMIAN WAR. Those cities of Greece which were impatient under the supremacy of the Macedonians regarded Alexander's death as a favourable opportunity to regain independence. In this struggle the Athenians took the lead. They were cordially supported by the Ætolians, both having a private reason for their alacrity in Alexander's avowed design to restore all Greek exiles to their countries. By such a measure the Athenians would have been obliged to cede Samos, part of which they had lately colonized to the expulsion of the former possessors, while the Ætolians had a similar motive in their treatment of Œniadæ. The richer part of the Athenians were very averse to contend again with the power of Macedon; but the poor, who looked to war for pay and plunder, of whom Philip said that war was their peace, and peace their war, carried the point and ambassadors were despatched through Greece to organize a confederacy, in which the Argians, Messenians, and other states of Peloponnesus, with many of the minor nations of northern Greece, joined. The events of this, which is called the Lamian War, have already been related at sufficient length. [Antipater; Athens; Leosthenes.]

LAMINARITES. Brongniart, classing fossil fuci according to the analogy they offer to recent tribes, uses this term for one species found in the secondary strata of Aix, near La Rochelle.

LAMMAS DAY, the name for the first of August, from the Anglo-Saxon *Hlaf-mæsse*, loaf-mass or feast, when the Saxons offered an oblation of loaves made from new corn. Brand in his 'Popular Antiquities' speaks of it as still a usage in some places for tenants to be bound to bring in wheat of the year to their lord on or before this day. In the Salisbury Manuals of the fifteenth century it is called 'Benedictio novorum Fructuum.' This day had also the name of the Gule of August, as Pettingal (*Archaeologia*, vol. ii., p. 67) says from the Celtic Wyl, or Gwyl, a festival. (Bosworth's *Anglo-Saxon Dict.*, v. Hlaf-mæsse; Brand, *Popul. Antiq.*, vol. i., p. 275.)

LAMOUROUX, J. V. F., professor of natural history at Caen, was born at Agen in Guienne, in 1779. He particularly applied himself to the study of marine productions, both vegetable and animal, and in 1805 published at Agen some observations on many new and rare species of Fuci. In 1809 he was appointed professor at Caen, where he wrote his 'Histoire des Polypiers Coralligènes flexibles,' which appeared in 1816 embellished with 15 plates, containing 150 figures drawn by the author. Before being printed, this work was presented to the Institute, of which Lamouroux was a correspondent. At first he only described those species of Polypi which were contained in his own collection, but afterwards he included all the species which had been described by other authors. Lamouroux, in his arrangement of these productions, divides them into 56 genera, only 14 of which were known before his time, and 560 species, 140 of which were new: thus, both as to genera and species, this work is the most complete that has been written on this family of animals. Lamouroux wrote several other works; he published, in 1817, a description of a new species or variety of wheat, which has been successfully cultivated in some of northern provinces of France, where it is called '*blé lamma*.' He also wrote a 'Dictionary of Zoophytes,' which forms part of the 'Encyclopédie Méthodique;' it came out at Paris in 1824, in 4to.

This promising naturalist died at Caen, 18th March, 1825, at the early age of 46.

LAMP-BLACK, a kind of fine charcoal prepared from the imperfect combination of certain kinds of fir, containing much resin, and the refuse and residuary resin left by the distillation of turpentine. The furnace chimney is long, and the greater part of it nearly horizontal, and its exit is covered with old sacking; or the smoke containing the charcoal is carried into chambers, where it is also deposited on coarse cloths. The purest lamp-black is procured by the combustion of oils, but that is much too expensive for common use.

Lamp-black is extensively employed as a black colour, and mixed with other pigments.

According to the analysis of Braconnot, lamp-black consists of—

Charcoal . . .	79·1
Pyretin soluble in alcohol .	5·3
Pyretin (black) insoluble in alcohol	1·7
Sulphate of ammonia . .	3·3
„ lime . .	0·8
„ potash . .	0·4
Phosphate of lime (ferruginous) .	0·3
Gein . . .	0·5
Sand (accidental) . .	0·6
Water . . .	8·
Chloride of potassium (trace) .	
	100·

According to Reichenbach, lamp-black contains naphthalin also. Pyretin is a peculiar resin, of which there are two kinds. It is owing to the presence of these substances that lamp-black burns with a flame when it is heated, and that it yields empyreumatic oil when subjected to dry distillation.

LAMP, SAFETY. It has been long known that coal-mines, and especially such as are deep, are occasionally infested with a gaseous product, which, on account of its combustible property, is called *fire-damp*, the word *dampf*, meaning, in German, a vapour or exhalation; the chemical name for this gas is carburetted hydrogen [HYDROGEN]; and its properties were first ascertained and its analysis correctly stated by the late Dr. Henry.

Several contrivances had been proposed for safely lighting coal-mines subject to the visitations of this gas, which it will not be necessary to notice: the safety-lamp of Sir H. Davy being the only one which has ever been judged safe, and been extensively employed. In his work on the 'Safety-lamp,' the author states that he first turned his attention particularly to this subject in 1815, when, as he observes, there appeared very little hope of finding an efficacious remedy. The resources of modern mechanical science had been fully applied in ventilation: the comparative lightness of fire-damp was well understood; every precaution was taken to preserve the communications open; and the currents of air were promoted or occasioned, not only by furnaces, but likewise by air-pumps and steam-apparatus.

After some allusions to what had been done by those who preceded him in the inquiry, Davy proceeds to describe the origin and progress of the investigations that led him to the discovery of the principles by which he conceived that flame and explosion may be regulated and arrested.

With these views he began a minute chemical examination of various specimens of fire-damp, by which he confirmed the previous statement of Dr. Henry, that the pure inflammable part of it is carburetted hydrogen gas. He found that it required an admixture of a large quantity of atmospheric air to render it explosive: when mixed with nearly four times its bulk of air it burnt quietly in the atmosphere; with between five and six times it exploded feebly; with seven or eight times the explosion was strong, and when mixed with even fourteen times its bulk of atmospheric air the compound was still explosive. Proceeding with his experiments Davy ascertained that explosions of inflammable gases were incapable of being passed through long narrow metallic tubes; and that this principle of security was still obtained by diminishing their length and diameter at the same time, and likewise diminishing their length and increasing their number, so that a great number of small apertures would not pass explosion when their depth was equal to their diameter. This fact led to trials upon sieves made of wire gauze; and he found that if a piece of wire gauze was held over the flame of a lamp, or of coal gas, it prevented the flame from passing; and he ascertained that a flame confined in a cylinder of very fine wire gauze did not explode even a mixture of oxygen and hydrogen, but that the gases burnt in it with great vivacity.

The experiments to which we have now alluded, served as the basis of the safety-lamp, which we shall now describe, and add some of the inventor's observations respecting it. 'The apertures in the gauze should not be more than $\frac{1}{22}$ of an inch square. As the fire-damp is not inflamed by ignited wire, the thickness of the wire is not of importance; but wire from $\frac{1}{40}$ to $\frac{1}{60}$ of an inch in diameter is the most convenient.

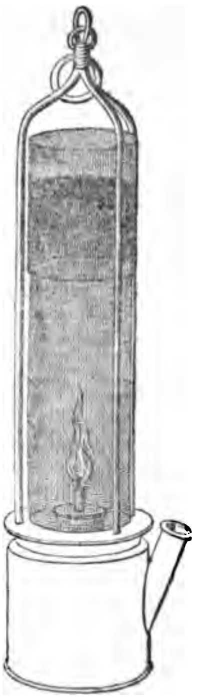
'Iron-wire and brass-wire gauze of the required degree of fineness are made for sieves by all wire-workers; and except when a lamp is to be used by a viewer for dialling, iron-wire gauze is to be preferred: when of the proper degree of thickness it can neither melt nor burn; and the coat of black rust which soon forms upon it superficially, defends the interior from the action of the air.

'The cage or cylinder should be made by double joinings, the gauze being folded over so as to leave no apertures. When it is cylindrical it should not be more than two inches in diameter; for in larger cylinders the combustion of the fire-damp renders the top inconveniently hot; and a double top is always a proper precaution, fixed at the distance of half or three-quarters of an inch above the first top.

'The gauze cylinder should be fastened to the lamp by a screw of four or five turns, and fitted to the screw by a tight ring. All joinings in the lamp should be made with hard solder; and the security depends upon the circumstance that no aperture exists in the apparatus larger than in the wire gauze.'

The annexed figure of the safety-lamp requires but little explanation: the cylinder of wire gauze is defended by three upright strong wires, which meet at the top, and to them a ring is fixed, from which the instrument is suspended. The lamp is screwed on to the bottom of the wire gauze, and is supplied with oil by the pipe projecting from it, when the top is unscrewed and removed. A wire, bent at the upper end, is passed through the bottom of the lamp for raising, lowering, or trimming the wick.

When the lamp is lighted and introduced into an atmosphere gradually mixed with fire-damp, the first effect of the fire-damp is to increase the size and length of the flame. When the inflammable gas forms as much as $\frac{1}{12}$ of the volume of the air, the cylinder becomes filled with a feeble blue flame, but the flame of the wick appears burning



brightly within the blue flame, and the light of the wick continues till the fire-damp increases to one-sixth, or one-fifth, when it is lost in the flame of the fire-damp, which in this case fills the cylinder with a pretty strong light, and when the foul air constitutes one-third of the atmosphere, it is no longer fit for respiration.

The operation of the wire gauze in preventing the communication of flame is thus explained:—Flame is gaseous matter so intensely heated as to be luminous, and the temperature requisite for producing it exceeds that of the white heat of solids. When the flame comes into contact with wire gauze it loses so much heat in consequence of the conducting power of the metal, which conveys it tot he surrounding air, that it is cooled below the point at which gaseous matter can remain luminous, and consequently the flame of the gaseous matter burning within the lamp is incapable of passing through it so as to set fire to and explode the mixture of fire-damp and air by which it is surrounded; and this cooling power is exerted even though the wire gauze, by effecting it, is rendered and remains red-hot.

Although the inventor of this lamp has expressed himself fully satisfied of its security, yet others have entertained strong doubts on the subject, which have latterly been much strengthened. During the session of parliament for 1835 a committee was appointed to inquire into the 'Accidents in Mines.' The evidence of Mr. Buddle was however strongly in favour of the safety of the lamp; he stated, that for many years he had not less than 1000, and sometimes 1500 lamps in daily use, and that he never knew in one solitary instance an explosion to happen from them; and he mentioned also that he had been with them in all possible varieties of explosive mixtures.

On the other hand abundant evidence, and especially that of Mr. Pereira, was adduced before the committee to show, that in strong currents of explosive mixtures the lamps could not be trusted, as the flame passed through them; indeed Sir H. Davy seems himself to have been aware that an objection might possibly be urged against them on this head, and he proposed the use of a tin shield where such currents occur. It is however probable that currents may happen so suddenly as to prevent the use of a safeguard, which at best must be considered as imperfect and precarious.

While then these lamps may be considered as safe in situations free from currents, the experiments which the writer of this article has witnessed have convinced him that in strong currents they are insecure, even though the wire gauze be not very hot. On this subject we cannot do better than adduce the opinion expressed by the late Dr. Turner, in the last edition of his 'Elements of Chemistry,' which coincides with that of the parliamentary committee:—'If a lamp with its gauze red-hot be exposed to a current of explosive mixture, the flame may possibly pass so rapidly as not to be cooled below the point of ignition, and in that case an accident might occur with a lamp which would be quite safe in a calm atmosphere. It has been lately shown by Messrs. Upton and Roberts, lamp manufacturers in this city, that flame may in this case be made to pass through the safety-lamp, as commonly constructed; and I am satisfied, from having witnessed some of their experiments, that the observation is correct. This then may account for accidents in coal-mines where the safety-lamp is constantly employed. An obvious mode of avoiding such an evil is to diminish the apertures of the gauze; but this remedy is nearly impracticable from the obstacles which very fine wire gauze causes to the diffusion of light. A better method is to surround the common safety-lamp with a glass cylinder, allowing air to enter solely at the bottom of the lamp through wire gauze of extreme fineness, placed horizontally, and to escape at top by a similar contrivance. Upton and Roberts have constructed a lamp of this kind, through which I have in vain tried to cause the communication of flame, and which appears to me perfectly secure; in case an accident should break the glass their lamp would be reduced to a safety-lamp of the common construction. Davy's lamp thus modified gives a much better light than without the glass, just as all lamps burn better with a shade than without one.'

In concluding we heartily adopt the language of the Report by the Parliamentary Committee, that we 'cannot admit that these experiments have any tendency to detract from the character of Sir H. Davy, or to disparage the fair value placed by himself upon his invention. The improvements are probably those which longer life and additional facts would have induced him to contemplate as desirable, and of which, had he not been the inventor, he might have become the patron.'

LAMPORNIS. [TROCHILIDÆ.]

LAMPREY. [PETROMYZON.]

LAMPRI'DIUS, ÆLIUS. [AUGUSTA HISTORIA.]

LA'MPROTES. [TANAGERS.]

LAMPRO'TILA. [KINGFISHERS, p. 232.]

LAMPROTORNIS. [STURNIDÆ.]

LAMPY'RIDÆ (*Lampyris*, Linn.), a family of Coleopterous insects of the section *Malacodermi*. The insects of this family have five joints to all the tarsi; flexible elytra; the body usually elongated and somewhat depressed. The thorax projects more or less over the head; the mandibles are usually small, and terminated in a sharp point; the penultimate joint of the tarsi is always bilobed; the claws are simple, and the antennæ are approximated at the base.

The family Lampyridæ contains the following genera, and some others of minor importance.

Genus *Lycus*, the distinguishing characters of which are—fore part of head prolonged into a snout; antennæ serrated; elytra most commonly dilated in the middle or towards their posterior part. One of the species of this genus is found in England, the *Lycus minutus*, Fab.; it is about a quarter of an inch in length, and of a black colour, with the exception of the elytra, which are brilliant red and have raised striæ.

Genus *Omalisus*, Geoff.: antennæ simple, the second and thirds joints much shorter than the following; head not sensibly prolonged in front; joints of the tarsi elongated and nearly cylindrical; the penultimate joint heart-shaped; elytra tolerably firm.

Omalisus suturalis resembles in colouring and size the insect last described; the suture however is black. It inhabits France.

Genus *Lampyris:* head not produced in front, hidden beneath the thorax; eyes in the male sex very large; antennæ short; females apterous. To this genus belongs the Glow-worm (*Lampyris noctiluca*, L.). This insect is rather more than half an inch in length, of a blackish colour, the thorax is margined with dusky-red, the legs and the edges of the segments of the body of the same colour. The female resembles the male, but is quite destitute of wings, and the terminal segments of the abdomen beneath are yellowish; the thorax is semicircular; the body is very soft, of an oblong form, pointed at the extremity, and composed of ten segments. The male glow-worm is said to emit the phosphorescent light in a slight degree, but it is chiefly the females from which the brilliant light proceeds which we so often see on banks, beneath hedges, and in various other situations. This light proceeds from the under part of the abdomen and near the tip, and it appears that the animal has the power of varying its intensity. Glow-worms will live, we are informed by Latreille, a long time in vacuo, and in different kinds of gases, the nitrous acid, muriatic and sulphurous gases excepted, for in these they soon expire. When placed in hydrogen gas they sometimes detonate. If the luminous portion of the abdomen be removed, it retains its luminous property for some time, and when apparently extinct it may be reproduced by softening the matter with water. The insects emit a brilliant light if immersed in warm water, but in cold water it is extinguished. The females being apterous, and consequently restricted in their powers of locomotion, and the insect being nocturnal, it is supposed that the light emitted by the female is for the purpose of attracting the other sex. The larvæ have been kept alive for a considerable time, by the writer of this article, during which they lived upon snails, killing those of the largest size; sometimes they would seize a snail whilst crawling, and when the animal retired within its shell, they would still keep their hold, and allow themselves to be carried into the shell with the snail, and although they became enveloped in the mucous secretion, it very seldom appeared to adhere to their bodies. Upon being touched or disturbed in any way they emitted the phosphoric light, but not to so great degree as the perfect insect.

LANARKSHIRE, or CLYDESDALE, is an inland county of Scotland, bounded on the north and north-west by the shires of Stirling and Dumbarton, on the west and south-west by those of Renfrew and Ayr, on the east and north-east by Linlithgow, Edinburgh and Peebles shires, and on the south by the county of Dumfries; being comprised between 55° 15′ and 55° 58′ N. lat., and between 3° 15′ and 4° 19′ W. long. The greatest length of the county, from Queensbury Hill, its southern extremity, to the borders of Dumbartonshire, is 54 miles; its greatest width, from Middlefield in the west to the Pentland Hills, is about 36 miles, and its superficial extent, according to Mr. MacCulloch, is 604,800 imperial acres, or 945 square miles, which nearly corresponds to 475,938 Scotch acres. It is divided into three principal districts or wards, to each of which is appointed a sheriff-substitute for the superintendence of its judicial concerns. The surface of this county is so various, being in some places mountainous, in others hilly, and in others comparatively flat, that it will be most convenient to notice the local peculiarities of each ward under separate heads.

The *upper or southern ward*, of which the antient burgh of Lanark is the chief town, comprises the parishes of Carluke, Lanark, Carstairs, Carnwath, Dunsyre, Dolphington, Walston, Biggar, Liberton, Lamington, Culter, Crawford, Crawfordjohn, Douglas, Wiston and Roberton, Symington, Covington, Pittenain, Carmichael, and Lesmahagow; and includes that extensive portion of the county which lies between the shires of Peebles, Dumfries, and Ayr. It constitutes more than one-half of the county, and consists principally of mountains, hills, and moorish lands, which do not appear susceptible of much improvement. Mr. Naismith, in 1794, estimated the surface as follows:—

	Scotch Acres.
Moor pasture	185,000
Woods	3,140
Channels of rivers, brooks, roads, &c.	2,060
Orchards	70
Arable and meadow	76,490
	266,760

The geology and mineralogy of this part of the county are important. Rich seams of excellent coal, from two to seven feet in thickness, are advantageously wrought at Wilsontown (parish of Carnwash), and in other parishes of the ward. The Wilsontown coal-field lies in an oval basin bearing north-east and south-west; the dip, about one in seven, is at right angles to the bearing; the veins are intersected by numerous *slips* or *hitches*, which throw the coal down from 30 to sometimes 50 feet perpendicular. In the immediate vicinity of this coal-field are the Wilsontown iron-works, which were conducted with apparent prosperity till the year 1808, when the company by whom they were carried on became embarrassed, and the machinery was permitted to remain idle for many years. This circumstance, which was the source of much distress to the resident population, does not appear attributable to any failure, either in the quantity or quality of the mineral, as it was reported in 1797, by persons employed for that purpose, that 40,000 tons of iron might be made annually for the space of 90 years, and that the supply of ironstone was inexhaustible. Operations have since been renewed under different proprietors, but we are not aware with what success. Freestone (of a beautiful white colour, well adapted for building), whinstone, and limestone, are all abundant and largely consumed. The lead-mines in the parish of Crawford are the most productive in Scotland, and have been continuously worked from a remote period. Gold and silver are disseminated in minute particles through the superincumbent clay, but the quantity is at present too small to repay the expense of its extraction, though formerly it appears to have been otherwise, as there are extant, in the Advocate's Library of Edinburgh, manuscript records, dated in the reign of Elizabeth, which state that specimens of native gold were here sometimes met with weighing from one to several ounces. The present annual produce of these mines is estimated at 700 tons of lead. In the vicinity of the lead-mines a vein of copper was found, and another of antimony, and some attempts made to work them, but, we believe, without success. Among the more elevated mountains of this part of the county are abundant quarries of slate, but their distance from the populous parts of the county precludes them from being extensively worked.

The arable portion of this ward is inconsiderable, and confined to the banks of the Clyde and those of the streams which are contributory to it. The quality is so various, that it is difficult to assign its average rent; where most productive, it lets for 4*l*. the imperial acre, at other parts it will scarcely fetch as many pence. The highest ground is in the parish of Crawford, where the Clyde has its source, and here 'the mountains are so huddled together,' says Mr. Naismith, 'that their grandeur is lost to the eye of a beholder. When he traverses a hollow, only the sides of the nearest mountains are presented to his view, and when he climbs an eminence he sees nothing but a confused group of rugged tops, with the naked rock frequently appearing among the herbage.' The principal elevations are: Tinto in the united parishes of Wiston and Roberton (2310 feet); the range of the Lowthers in the parish of Crawford and near the borders of Dumfriesshire (greatest height 2396 feet).

The *middle ward*, of which Hamilton is the chief town, comprises the parishes of Hamilton, Blantyre, Kilbride, Strathavon, or Avondale, Glassford, Stonehouse, Dalserf, Cambusnethans, or Camnethan, Shotts, and Old and New Monkland; and is about half the extent of the upper ward. In this ward the elevation of the land is considerably diminished, and it continues to decline towards the north-west.

In 1794, according to Mr. Naismith, the surface consisted of

	Scotch Acres.
Moors and coarse pasture	66,000
Woods	4,150
Towns, rivers, and roads	1,300
Orchards	130
Arable	70,750
	142,330

It is much diversified by gently undulating grounds, there being no plains of any extent except in the valley along the banks of the Clyde. The prevailing soil is of a clayey nature intermixed with sand, and varies considerably in colour, composition, and degree of fertility. In some parts, as in the parish of Hamilton, it consists of a deep fertile loam, resting upon a subsoil of loose gravel; in others, as in the parish of New Monkland, it partakes more of a mossy character, and yields, in early seasons, good crops of oats, flax, and rye-grass-hay, but in cold or late seasons the oats do not ripen well. The usual term of leases is nineteen years; some of them however are conditional, and permit the tenant to give up the lease in the event of his not being satisfied at the end of a specified time. Oats and barley form the principal crops, but there is also much wheat raised both in this and the adjoining ward to the north. The farm buildings are greatly improved, but the farms are for the most part small. Farming operations are much better understood than formerly, and draining, the long neglect of which had proved highly detrimental to the soil, is now more generally attended to. Bone-dust manure has been introduced, and is in great request for the cultivation of turnips. The rent of the arable land varies from 1*l*. 10*s*. to 7*l*. an acre.

This ward is also rich in a mineralogical point of view, containing an abundance of whinstone, sandstone, ironstone, and coal. The coal-seams vary from two to nine feet in thickness. The ironstone occurs both in masses and in seams. In the parish of Old Monkland are situated the Clyde iron-works, which are conducted upon a very extensive scale.

The *lower or northern* ward is of very limited extent, but as it contains the city of Glasgow, it is a very important one. It comprises the parishes of Carmunnock, Rutherglen, Cambuslang, Calder, and Govan, and the suburban parishes of Barony and Gorbals. The arable land in 1794 was estimated at 33,850 Scotch acres, the woods and waste ground at 1000 acres, and the remaining 1500 were allotted to towns, roads, &c.

In the parish of Calder are immense fields of fire-clay, varying from four to nineteen feet in thickness, and the quality is considered fully equal, if not superior, to the Stourbridge clay. In their vicinity are extensive works for the manufacture of crucibles, &c. The soil of this parish is for the most part moist and moorish, but there is a great deal of good soil, which is partly light and sandy, and partly alluvial. Many of the mosses have been already reclaimed, and they are all gradually, and some of them rapidly, lessening by peat cutting, 'so that oats, rye-grass, and even wheat, now grow luxuriantly where once the adder basked, the moor-fowl fed, and the long heath waved.' The *haughs* or valleys of Dalmarnoch are proverbially fertile. (*New Statis. Acct.*) The greater part of the tilled land is sown with oats, which also constitute the chief spring corn. Wheat is sown from the end of August to the beginning of November, and sometimes, though very rarely, in spring. The following is the ordinary rotation in the lower ward:—first year, the land is spring fallowed and well manured, mostly with Glasgow dung; potatoes are planted in drills, and kept clean by summer hoeing; second year wheat is sown as soon as the potatoes are removed, and grass-seeds sown among the wheat in the spring; third year, hay; fourth year, hay and the after-grass pastured; fifth year, lime manure and oats.

Nearly three-fourths of the land of this county belong to large proprietors. The resident owners usually have a certain portion cultivated under their own direction, and a considerable extent of enclosed land is kept constantly in grass, and let out from year to year for pasture. There are many farms, the rents of which amount to 200*l*., and from that to 600*l*. and upwards, but the greater part average from 30*l*. to 150*l*.

Throughout Lanarkshire the dairy system has been prosecuted with great success. The cows are mostly of the Ayrshire breed, and some farmers have from fifteen to thirty. The standing stock of sheep, which are mostly black-faced, is estimated to exceed 120,000, and that of the horses employed in agriculture is supposed to be nearly 9000. The draught horses of this county are held in great estimation in the north of England and throughout the south of Scotland.

The climate of the county is almost as various as its soil. The lower ward, being more open to the sea breezes which prevail from the west and south-west, is comparatively temperate; intense frost is seldom of long continuance, and deep snows are rare. At the same time the elevated lands in the counties of Renfrew and Dumbarton, intercepting the vapours with which the westerly winds are usually saturated, occasion the frequent fall of heavy showers. The barometric and thermometric variations in the middle ward are more uniform, but in the upper ward they are sudden, and there also the climate is unusually severe.

Before the commencement of the last century Lanarkshire was not remarkable either for its commerce or its manufactures, but at the time of the Union a considerable trade was carried on in all the towns and villages of this county in collecting linen yarn for the English markets, and many branches of the linen manufacture had been brought to considerable perfection. The rapid rise however of the city of Glasgow, both in commerce and wealth, has led to the discontinuance of most of the small establishments which were dispersed over the county, and more particularly those which were centrally situated. Those which now exist are rather to be considered as so many branches of the extensive establishments of Glasgow, which city comprehends nearly the whole of the population, manufactures, and commerce of the county. [GLASGOW.]

In 1831 the entire population, inclusive of the city of Glasgow, was 316,819, namely 150,229 males, and 166,590 females, distributed among 64,876 families, of whom 4504 were employed in agricultural pursuits, 39,692 in trade, manufactures, and handicraft, and the remaining 20,680 were not comprised in the two preceding classes.

The principal river of the county is the Clyde (the Glotta of Tacitus, *Agric.* c. 23), which in a commercial point of view is probably of more importance than any other river of Scotland. It rises near Queensbury Hill, on the borders of Dumfriesshire, whence its course is nearly due north, passing within two miles of Carstairs House, where it turns suddenly to the south-west, and soon after receives the Douglass Water, near Harperfield. Here it takes a north-west direction, passes within a short distance of the towns of Lanark and Hamilton, flows through the city of Glasgow, and finally falls into the Frith of Clyde a little below Greenock. The entire length of the river, from its source to the city of Glasgow, is between 70 and 80 miles, although the direct distance between those points is less than 50 miles. The contributary streams are the Douglas, Avon, and Calder, besides several others of minor importance. Before the junction of the Douglas with the Clyde, the course of the latter is comparatively tranquil, but afterwards it begins to be precipitated over a succession of falls or cataracts, and dashes along with the impetuosity of a mountain torrent. The first fall, near Bonnington, does not exceed 30 feet; the second is at Corehouse, where it falls through a perpendicular height of 70 feet. Dundaff Fall is 10 feet high, and there are three other falls below Lanark, making together a descent of about 76 feet. After this its descent becomes more uniform; it resumes its former tranquil character, the valley through which it flows widens, and it pursues its course through a well cultivated, rich, and populous country.

The Monkland Canal passes through the royalty of Glasgow, intersects the parish of New Monkland, and terminates at the southern extremity of the parish of Old Monkland. Its length from Glasgow city is about 12 miles, and its original width was 35 feet, but in the year 1834 the banks were raised, which occasioned a considerable increase both in the width and depth of the canal. This canal affords a very cheap communication between Glasgow and the collieries situated in the parishes of Old and New Monkland, and it has hitherto proved a very profitable investment to the shareholders.

The Ardrossan Canal proceeds from Port Eglinton, in the parish of Gorbals, through the parish of Govan, and thence to Johnstone and Ardrossan through the fertile counties of Renfrew and Ayr. The total length from Port Eglinton to Ardrossan is nearly 33 miles; the breadth at the top is 30 feet, and the average depth 4½ feet. The passengers by this canal in the year 1834 averaged 982 daily, and the average fare per mile was four-fifths of a penny.

The roads of this county are in general well constructed, and kept in good repair.

In addition to the roads there is the Kirkintilloch and Monkland railway, which, commencing at Kirkintilloch, passes through the parishes of Calder and Old Monkland, and terminates near Holytown in the parish of Bothwell. One branch of this railway proceeds to Glasgow, and another, called the Ballochney railway, passes the town of Airdrie.

The county returns one member to parliament, the city of Glasgow two, and the boroughs of Lanark, Hamilton, and Airdrie, which, after Glasgow, are the principal towns of the county, unite with Falkirk and Linlithgow in returning one member.

The town of Lanark, distant 32 miles south-west by south from Edinburgh, and 24 miles south-east by south from Glasgow, occupies nearly the centre of the county, of which it is considered the capital. It is generally allowed to be of great antiquity. Kennett II. assembled the states of the realm here in the year 978, and it had been constituted a royal burgh before the time of Malcolm IV. Numerous charters were granted to it by the subsequent Scottish monarchs, all of which were confirmed by the final one given by Charles I., and dated 20th February, 1632. The appearance of the town has been greatly improved within the last ten years, and at the present time there are many handsome houses built of freestone, which is extensively quarried for this purpose in the adjoining parish of Carluke. The chief public buildings are the commercial bank, county hall, prison, parish church, and grammar-school. The grammar-school once enjoyed considerable celebrity as a seminary of education. It is superintended by the rector and an assistant, whose salaries are respectively 40*l*. and 20*l*. The fees are 1*s*. a quarter for writing and arithmetic, 2*s*. 6*d*. for English, and 4*s*. for Latin. There are circulating and subscription libraries. There is a savings' bank, and several friendly societies for affording relief during sickness or want of employment. Fairs are held seven times in the the year for the sale of horses, sheep, and black cattle. The population in 1831 was 4266.

New Lanark is a well built village to the south of the town of Lanark. It stands low upon the right bank of the Clyde, and is completely surrounded by beautifully wooded hills. It contains a thriving cotton manufactory, originally established by Mr. Dale in 1784, who retired from the concern in 1827. It is now carried on by Messrs. Walker & Co., and the ordinary number of persons employed is 1110, of whom about 60 are mechanics and labourers. The population in 1831 was 1901.

Airdrie is a well-built town in the parish of New Monkland, distant 32 miles west by south from Edinburgh. It possesses the privileges of a royal burgh, and was constituted by the Reform Act a contributary parliamentary borough. The fairs for the sale of cattle are held the end of May and beginning of November. The foundation of a large cotton mill has recently been laid, which is expected to employ a considerable number of the inhabitants in carding, spinning, &c. In 1831 the population of the town was 6594. Besides the parochial school, there are four others in the parish, which have been built by subscription. The parish schoolmaster has a dwelling-house and a garden, and a salary of 30*l.* in addition to his other emoluments, consisting of school fees, &c., which amount to about 60*l.* per annum. Besides a circulating library and reading-room, there is a benevolent institution for the maintenance and education of poor orphans and other destitute children.

Hamilton (antiently Cadzow), a handsome though irregularly built town, is pleasantly situated near the confluence of the Avon Water with the river Clyde, and is 36 miles west from Edinburgh. In 1548 Queen Mary erected it into a free royal burgh, but the rights and privileges thus acquired from the crown were subsequently resigned into the hands of the duke and duchess of Hamilton, who, in 1670, made it a burgh of regality, dependent upon them and their successors, in which state it still remains. Hamilton Palace is a very superb building, and contains many valuable paintings; but for an account of these and the other antiquities of the place, which are numerous and interesting, the reader is referred to the 'New Statistical Account of Scotland.' The revenues of the town are considerable, and are derived chiefly from lands and other property within the burgh. Gas-works for the supply of the town were erected in 1831, at an expense of 2400*l.*; and subsequently attempts have been made to establish a company for supplying the town with water, as also to bring the Police Act into operation, which latter measure was however outvoted by the majority of the inhabitants.

The antient grammar-school of Hamilton is in great repute, and to its influence may be attributed the superior civilisation and love of literary pursuits which are said to distinguish the inhabitants of this place. The schoolmaster receives a salary of 34*l.* 4*s.* in addition to his fees, which, on an average, amount to 50*l.* The fees for Latin are 7*s.* 6*d.* per quarter, and an additional 3*s.* for Greek. The number of scholars in 1834 was thirty-five. The other schools in this parish are numerous, and afford education to more than 1000 children. Besides a public library, consisting of upwards of 3000 volumes, there is a Mechanics' Institution, established in 1825. The population of the parish in 1831 was 9513.

(*New Statistical Account of Scotland;* Naismith's *View of the Agriculture of Clydesdale*, 4to., 1794; M'Culloch's *British Empire; Beauties of Scotland;* Carlisle's *Dictionary; Parliamentary Papers*, &c.)

LANCASHIRE, a northern county of England, is bounded on the north by Cumberland and Westmoreland, on the north-east and east by Yorkshire, on the south by Cheshire, and on the west by the Irish Sea. Its form is irregular: the district of Furness, a portion of the county on the north-western side, is separated from the rest by the Bay of Morecambe, and by a narrow strip of the county of Westmoreland. Its greatest length, not including Furness, is from the 'Counties Stone,' at the junction of the three counties of York, Westmoreland, and Lancaster, to the bank of the Mersey, south of Prescott, about 64 miles; the greatest breadth is from Redmer's Head, east of Rochdale, to Formby Point on the Irish Channel, nearly 45 miles. The greatest length of Furness is from the neighbourhood of Ambleside at the head of Winandermere to Rampside, at the western extremity of Morecambe Bay, 23 or 24 miles; the greatest breadth from the Duddon to the Winster about 13 miles. The long narrow island of Walney and some smaller ones are at the southern extremity of this detached portion. The whole county is comprehended between 53° 20′ and 54° 25′ N. lat., and between 2° 0′ and 3° 15′ W. long. The area is estimated at 1766 square miles; the population in 1831 was 1,336,854, giving 757 inhabitants to a square mile. In size it is the sixth county in England, being somewhat smaller than Northumberland, and rather larger than Somersetshire: in population it is exceeded only by Yorkshire and Middlesex; and in density of population it is exceeded by the metropolitan county alone. Lancaster, the county town, is about 213 miles in a straight line north-west of London, or 238 miles by the road through Northampton, Leicester, Derby, Macclesfield, Manchester, and Preston.

Surface and Coast-line.—The inland part of Furness is an integral part of the Cumbrian mountains, and is marked by the features common to that county. Mountains rising to the elevation of between 2000 and 3000 feet are separated by narrow valleys watered by mountain-streams, or occupied by lakes. Towards the coast the mountains and hills subside; there are no cliffs, and in some parts the coast is occupied by bogs, or, as they are provincially termed, 'mosses.' Furness is distinguished into two parts, according to the character of the surface; the mountainous part is Upper Furness; the low flat towards the shore is Lower Furness. In the main portion of the county the northern and eastern parts are occupied by branches from the central high lands which run southward through Yorkshire into Derbyshire. These elevations are not equal to those of the Cumbrian group; but they expand into greater breadth, forming high waste moorlands. In the southern and western parts the high lands gradually subside, leaving between their base and the sea a broad flat belt of land, and on the south sinking into the valley of the Mersey and the wide expanse of the plain of Cheshire. These high lands reach the margin of the sea at Liverpool; but from the mouth of the Mersey northwards to that of the Ribble, a uniform level, containing extensive peat mosses, stretches inland from the flat and sandy coast for several miles. Between the mouth of the Ribble and the Wyre, the Fylde country, as it is termed, forms an extensive tract between the road from Preston to Lancaster and the sea, which is generally level, or has in parts a slightly undulating surface: this district also contains extensive peat-mosses. The level country still borders the sea from the mouth of the Wyre to that of the Lune, and continues along the coast of Morecambe Bay. With the exception of these low lands, and the tract of Lower Furness, Lancashire has a hilly and in some parts a mountainous character. The principal elevations are as follows:—Old Man in Coniston Fells, 2577 feet; another peak, near Old Man, 2577 feet; Pendle Hill, near Clithero, 1803; Bleasdale Forest, on the east border near Garstang, 1709; Boulworth Hill on the east border, near Burnley, 1689; Rivington Moor, near Bolton, 1545.

As the sea forms the western boundary the coast partakes of the flatness which marks that side of the county. Except near Blackpool, where there are clay cliffs extending for about three miles, and in some places more than one hundred feet high, the coast is low throughout, with a sweeping rounded outline, skirted by broad sands dry at low water. The roundness of its outline is particularly observable in the south-western part, where the æstuaries of the Ribble and the Mersey, with the ntervening coast, form almost the segment of a circle.

Towards the north, where the high land approaches nearer to the sea, the coast loses its convexity of outline and forms a deep bay, of which Rossall Point and the southern point of Furness form the extremities. A tongue of low land projecting near the mouth of the Lune divides this large bay into the two smaller ones of Lancaster and Morecambe, the Moricambe of the antients. Lancaster Bay receives the Lune and the Wyre: the æstuaries of the Leven and the Ken, or Kent, open into Morecambe Bay. The depth of water in both bays is little, except in the channels formed by the rivers; and a considerable part becomes at low water an expanse of sand, across which there is a road, passable, though not without danger, when the tide is out, from the neighbourhood of Lancaster into Furness.

The only islands along the coast are off the southern extremity of Furness. Walney Island, the largest, extends from north-west to south-east, about eight miles, in width nowhere more than one. It bends in at each extremity towards the mainland, from which it is separated by a narrow channel.

It lies upon a bed of moss or peat, in which large trees have been dug up, and is so low as to have been at times nearly inundated by the tide. It contains two hamlets, and has a chapel-of-ease to Dalton, in which parish it is. At the southern extremity of the island is a lighthouse. The other islands of the group, Foulney, Pile of Fouldrey (on which are the mouldring remains of an old castle, once extensive and strong), Sheep Island, Roe Island, Dova How, and Old Barrow Ramsey, are all small: they are in the channel between Walney and the main.

Geological Character; Mineral Productions.—The uppermost of the geological formations which overspread the county is the new red sandstone, or red marle, in which occurs the great deposit of rock salt. This formation occupies the valley of the Mersey, from the bank of which river it spreads inland several miles, especially in the neighbourhood of Manchester. It occupies also a considerable portion of the western side of the county, as far north as the valley of the Lune at Lancaster. It is covered near the coast by the moss or peat which extends to the westward of a line drawn from Liverpool by Ormskirk to Preston; and from Preston by Garstang to Lancaster it is covered by the clays, marls, and peat-mosses of the Fylde district. The peat-mosses contain great quantities of large timber-trees, the remains of antient forests. Some patches of this moss remain in a state of nature, and are unproductive; but the greater portion of the tract in which the peat occurs is in a state of cultivation, and continual progress is made in reclaiming those parts which yet remain in a state of nature. The portion of the county occupied by the red sandstone partakes of the flatness or the slight elevation which characterizes that formation generally. The coal-measures crop out from under the red marl. To the coal-field of South Lancashire the county owes its manufacturing pre-eminence. This field occupies a large irregular tract between the Ribble and the Mersey. The line which bounds it extents from Colne south-west by Burnley, Blackburne, and Chorley, to Upper Holland, near Wigan; from thence north-west to near Ormskirk; and from thence south and east by Prescot to between Newton and Warrington. From this point the boundary runs in an irregular line by Newton and Leigh to Worsley; and from thence makes a sweep round Manchester at an average distance of five miles from that town till it meets the river Thame on the border of the county. The eastern limit of the coal-field is, generally speaking, just within that of the county; for the high land which divides Lancashire from Yorkshire is formed of the millstone-grit, which here crops out from beneath the coal-measures. There is every reason to believe that the coal-measures extend west of the limits here mentioned, and descend under the sea. The coal re appears in the peninsula of the Wirral in Cheshire, and yet farther west in the coal-field of Flintshire and Denbighshire. A small coal-field, east of Lancaster, occupies a portion of this county, and extends into Yorkshire.

The coal-pits are most numerous about Prescot and Newton, and in the district between these towns; about Wigan and Bolton, about Oldham and Ashton-under-Lyne, and in the neighbourhood of Blackburn and Burnley. The pits in the northern coal-field are chiefly in the neighbourhood of Hornby in Lancashire.

The millstone-grit forms, as already noticed, the heights which skirt the eastern side of the county, as well as those which separate the basins of the Mersey and the Ribble, and the valleys of the Irwell and the Roch. The heights which separate the valleys of the Ribble and the Lune are also formed of millstone-grit. In the intervening space between the two coal-fields the red marl rests upon the millstone-grit. The dip of the strata of this formation is generally towards the west; but in some parts, as about Clithero, the strata are more disturbed than is common.

That part of the county which is north of the Lune is chiefly occupied by the carboniferous or mountain limestone. Between Hornby and Lancaster this formation extends over a small district south of the Lune. The old red sandstone, which underlies the mountain limestone, appears just on the border of the county near Kirkby Lonsdale.

Furness is occupied partly by the slate rocks which form the mass of the Cumbrian mountains. Lower Furness is occupied partly by the carboniferous limestone, which forms its southern extremity.

The principal mineral production of Lancashire is coal. The coal is of various kinds, including cannel coal. Lead is obtained, but not in great quantity, from the millstone grit and mountain limestone districts. The lead-mine of Anglezark, between Chorley and Bolton, yields also carbonate of barytes. Some copper is obtained in the high mountains of Furness; and ironstone is found in the lower part of the same district, between Ulverstone and Dalton. The mountains of Furness yield blue state, which is sent to other parts; coarse slate of lighter colour, and flag-stones, are obtained near Wigan. Excellent freestone is quarried near Lancaster, and scythe-stones and brick and pipe clay are also found in various parts.

Hydrography and Communications.—The rivers that water this county have their general course from north-east to south-west; those of Furness excepted, which flow from north to south. The principal rivers are the Lune in the north, the Wyre and the Ribble in the centre, and the Mersey in the south.

The Lune, or Loyne, rises in the county of Westmoreland. The principal sources are on the northern slope of the Langdale Fells, but the stream is soon increased by affluents from Shap Fells and the moors north of Orton. For a few miles the course of the stream is westward, but on receiving the stream from Shap Fells (by some considered to be its head) it turns southward, and flows through the county of Westmoreland, which in one part it divides from Yorkshire, to Kirkby Lonsdale, receiving several mountain streams. After passing Kirkby Lonsdale it enters Lancashire, through which it flows first south and then south-west past Lancaster, where it opens into a wide æstuary in Lancaster Bay. The Lune receives in the lower part of its course the Greta, which rises on the southern slope of Whernside, and the Wenning, which also rises in the mountains of Yorkshire and flows past the town of Hornby; both these tributaries join the Lune on the left bank. The length of the Lune may be estimated at 46 or 48 miles, of which 20 are in Lancashire. Lonsdale, or the Valley of the Lune, is equalled by few vales in England in picturesque beauty. The navigation of the river commences at Lancaster, up to which town it is navigable for ships of small burden.

The Wyre, or Wyer, rises in the moorlands on the Yorkshire border east of Lancaster, and flows first west and then south by Garstang, below which it turns west and then north-west until it enters the bay of Lancaster near Rossall Point, by a deep and wide æstuary. Its whole course may be estimated at 26 or 28 miles. A harbour is in process of formation at the mouth of the Wyre, which it is expected will be, in several respects, superior to any on the Lancashire coast, and a new town, called Fleetwood, is partly built.

The Ribble rises in the Yorkshire mountains, a little to the east of Whernside, and flows in a direct line south through a narrow valley, to below Settle in Yorkshire. It then flows first south-east and then south-west to the border of Lancashire, which it joins about two or three miles above Clithero. After dividing the counties of York and Lancaster for some miles, it enters the latter county, through which it flows in a somewhat sinuous course, but still preserving its general south-western direction to the town of Preston, below which it opens into a wide shallow æstuary, and enters the Irish sea. It does not receive any important affluent until it reaches the border of Lancashire, when it is joined on the right bank by the Hodder, which rises very near the source of the Wyre, and has the upper part of its course in Yorkshire, and the lower part on the border of Yorkshire and Lancashire. Just after its junction with the Hodder, the Ribble receives on its left bank the Calder, which rises just within the boundary of Yorkshire, but has the greater part of its course in Lancashire. Still lower down, in the neighbourhood of Preston, it receives on the left bank the Darwen, or Derwent, which rises in the moors near Over Darwen between Blackburn and Bolton. The Ribble's Dale, or Valley of the Ribble, is very beautiful. The æstuary is forded at low water at Hesketh Bank below Preston, where it is four miles wide; but with the tide small vessels can get up to near Preston.

The Mersey rises in Yorkshire, from different sources in Clough Moss and Holme Moss south-west of Huddersfield. The streams from these sources form the Thame, or Tame, which flows south-west first through Yorkshire and then along the border of Lancashire and Cheshire, by Stayley Bridge and Ashton-under-Line to Stockport, where it is joined by the Goyt [DERBYSHIRE] and assumes the name of Mersey. The lower part of its course is described elsewhere. [CHESHIRE.] The navigation of the Mersey begins at Stockport. Its principal Lancashire tributary is the Irwell, which has its source in Durpley Hill, in the moors between Rochdale and Burnley, and flows in a very winding course by Heywoodbridge near Haslingden, Bury, and Manchester. At Manchester it receives the Irk from between Oldham and Rochdale, and the Medlock from the Yorkshire border near Oldham. The Irwell is navigable as far as Manchester. The whole length of the Irwell may be estimated at 40 miles: that of the Tame or Mersey, including its æstuary, at nearly 70 miles.

There are several small streams in the county. The Winster and the Duddon form respectively the eastern and western boundaries of Furness: and the Leven from the lake of Winandermere, and a stream from Coniston Water, flow through the middle of Furness and unite their waters in the wide æstuary of the Leven. The Duddon is a beautiful stream; its valley is called Dounesdale. It rises north of Coniston Fells, and sweeps round and under them.

The Douglas rises near Wigan, and flows north-west into the æstuary of the Ribble. The Alt, or All, rises near Prescot and flows north west into the Irish Sea near Formby Point. The Douglas is 20 miles long; the Alt about 13 or 14: the former was made navigable nearly throughout as far back as the year 1727; but many years since, an artificial cut was substituted for the natural channel, except for a short distance near the mouth.

There are in Furness two considerable lakes, Winandermere or Windermere, and Coniston Water. Winandermere is on the border of Westmoreland and Lancashire, but by its position rather belongs to Lancashire, within which its southern part is included. It is about eleven miles long from north to south, and varies from half a mile to a mile in breadth; but in one part (where there is a ferry) it is not above five hundred yards over. It is the largest lake in England, and its greatest depth is rather more than 200 feet. At its northern extremity it receives two mountain streams from Langdale Pikes, which unite just before they enter the lake: several other mountain streams flow into it on the east and west: its waters are discharged by the Leven, which flows from its southern extremity into Morecambe Bay. A small lake, Esthwaite Water, in Lancashire, discharges its waters into Winandermere, to the west of which it lies. The waters of some of the smaller Westmoreland lakes also flow into this great receptacle. The waters of Winandermere are beautifully clear, on which account it has been suggested that its name is derived from the Celtic Gwyn hên dwr, 'the clear antient lake.' There are several small islands in it.

Coniston or Thurston Water is nearly six miles long from north to south, with a variable breadth, never perhaps exceeding three-quarters of a mile. Its greatest depth is about 240 feet. It is fed by a number of mountain streams, and discharges its waters into the æstuary of the Leven. Coniston Fells are near the northern extremity of the lake.

There are some shallow lakes or morasses along the western coast of Lancashire, as Marton Mere, between the Ribble and the Wyre, which is now considerably reduced by the channel called the Main Dyke; and White Otter, and Barton Mere, not far from Ormskirk. Martin Mere, near the mouth of the Douglas, has been drained, and brought, at least in a great degree, into cultivation.

Canals.—The Sankey Canal was the first executed in England. The act of parliament for it was obtained in 1755. It extends from St. Helen's near Prescot along the valley of the Sankey brook into the Mersey at Fidler's Ferry near Warrington. It has a very circuitous course of about twelve miles, with three branches.

The Duke of Bridgewater's Canal was commenced soon after the Sankey Canal. The act of parliament under which it was commenced was obtained in 1759. An act had been obtained several years before, but nothing had been done under it. The execution of this great work was effected by Francis, duke of Bridgewater, assisted by Brindley the engineer. The original design was, by a canal from Worsley (between Leigh and Manchester), where the duke had some valuable collieries, to Manchester, to supply the town of Manchester with coal at a cheaper rate than by the imperfect navigation of the Mersey and the Irwell. The canal from Worsley (where there are extensive tunnels and underground works connected with the duke's collieries) to Manchester was completed by the year 1762. The duke now enlarged his views, and by successive acts obtained power to make a canal from the neighbourhood of Manchester into the Mersey, which he effected; but this work chiefly belongs to Cheshire. [BRIDGEWATER, FRANCIS EGERTON, DUKE OF; BRINDLEY, JAMES; CHESHIRE.] The duke's canal was afterwards extended from the Worsley end of the original canal to the town of Leigh.

The Leeds and Liverpool Canal, the most extensive in the kingdom, was projected by Mr. Longbotham, a native of Halifax, and executed under successive acts, the first of which was obtained in 1770. It enters this county from Yorkshire at Foulridge near Colne, where it passes through a great tunnel nearly a mile in length. From this tunnel the canal passes by or near Burnley, Blackburn, Chorley, Wigan, and Ormskirk to Liverpool. The line between Blackburn and Wigan comprehends eleven miles of the Lancaster Canal. The Douglas Navigation forms part of the line between Wigan and Ormskirk; most of the shares in that navigation having been purchased by the proprietors of the canal, who have substituted artificial cuts for the natural bed of the river. The lower part of this navigation forms a branch from the main line communicating with the Ribble. Another cut has been made from the canal at Wigan to the Duke of Bridgewater's Canal at Leigh. The length of this canal, without reckoning the branches, is more than one hundred and twenty-seven miles, including the eleven miles of the Lancaster Canal incorporated with it. From Liverpool to near the neighbourhood of Wigan, a distance of thirty miles, there is not a single lock on this canal, a fact which indicates the level character of the country which it traverses before it enters the hilly district.

The Lancaster Canal begins near Kendal in Westmoreland and runs almost due south, and in a tolerably direct line to Lancaster, where it crosses the Lune by an aqueduct, the largest of the kind in England, of five arches, each of seventy feet span, and rising nearly forty above the surface of the river. Pursuing still a southward course, but on a less direct line, it passes by Garstang, at which place it crosses the Wyre by an aqueduct, to Preston. Here the canal is for a few miles replaced by a railroad which crosses the Ribble on a viaduct bridge. The canal recommences on the south side of the Ribble valley, and runs to Wigan. That portion of the canal which extends from Shaw Hall, a few miles from Preston, to Wigan, is incorporated in the line of the Leeds and Liverpool Canal; the junction of which rendered unnecessary the farther extension of the Lancaster Canal to West Houghton, as at first designed. The whole length of this canal is above 70 miles.

The Ashton-under-Lyne Canal, or, as it is sometimes called, the Manchester, Ashton-under-Lyne, and Oldham Canal, commences on the eastern side of the town of Manchester, and runs in a tolerably direct line to Fairfield, about four miles from Manchester on the road to Ashton. It has branches to Stockport; to the Huddersfield Canal, at Duckinfield, near Ashton; and to the collieries at Hollinwood, near Oldham. This canal, or its branches, are carried twice over the Medlock by aqueduct bridges: near one of these, in the Hollinwood branch, there is a tunnel of considerable extent. Several cuts have been made in Manchester from this canal to several wharfs and quays in that town. It communicates with the Rochdale Canal, and by means of that with the Duke of Bridgewater's. The length of the canal and its branches (exclusive of the branch to Stockport) is between 11 and 12 miles. The acts of parliament under which it was formed were passed in the interval from 1792 to 1805 inclusive.

Of the Huddersfield Canal and the Peak Forest Canal only a very small portion is in Lancashire. They both cross the Thame near Duckinfield to unite with the Ashton-under-Lyne Canal. The acts under which they were formed were passed in or between the years 1794 and 1806.

The Rochdale Canal commences in the Calder and Hebble Navigation in Yorkshire, and proceeds by Todmorden into Lancashire. It follows the valley of the Roch to Rochdale, and from thence proceeds to Manchester, where it locks into the Duke of Bridgewater's Canal, receiving a branch from the Ashton-under-Lyne Canal by the way. It was executed under acts passed in or between the years 1794 and 1807.

The Manchester, Bolton, and Bury Canal commences in the Mersey and Irwell navigation at Manchester, and runs to Bolton, with a branch to Bury. The length of the canal and branch is about fifteen miles. The acts for it were passed in 1791 and 1805.

The canals of Lancashire form part of that immense system of inland navigation which connects the Irish Sea with the German Ocean. The Leeds and Liverpool Canal, with the Aire and Calder Navigation, forms one line of communication; and the Duke of Bridgewater's Canal, with the Rochdale Canal, the Calder and Hebble Navigation, and the Aire and Calder Navigation, forms a second. The Ashton-under-Lyne, Huddersfield, and Sir John Ramsden's Canals may be substituted for the Rochdale Canal in this last line.

The first railway formed in Lancashire was probably that which is part of the line of the Lancaster Canal at Preston already noticed. In 1826 an act was passed for making a railroad from the Manchester, Bolton, and Bury Canal at Bolton, to the branch which connects the Leeds and Liverpool Canal with the Duke of Bridgewater's Canal at Leigh. This was effected; and on the opening of the Manchester and Liverpool Railway an act was obtained for extending the line from Leigh to that railway near Newton. The length of this railway, including the extension, is about nine miles.

The Liverpool and Manchester Railroad was commenced under acts obtained in 1826 and following years, and was opened in its whole length in 1830. Its length is above thirty-one miles: it has sixty-three bridges along the line, by which it passes over or under roads or over streams; the principal is that at the valley of the Sankey, which has nine arches, each of fifty feet span and sixty to seventy feet high. The railway passes by two tunnels, the longer extending 2200 yards, and the shorter about 300, under part of the town of Liverpool. Near Liverpool, at Olive Mount, it is cut in the sandstone-rock to the depth of about 70 feet.

The Grand Junction Railway connects Birmingham (and by means of the London and Birmingham Railway, London) with the manufacturing district of the south of Lancashire. It crosses the Mersey into Lancashire near Warrington, and unites with the Liverpool and Manchester Railway near Newton.

There are railroads connected with the Liverpool and Manchester; one from Preston to Wigan, and from Wigan to Newton, twenty-four miles together; and one from Bolton and Leigh, nine miles. There are also railroads from St. Helen's to Runcorn Gap, twelve miles long; and from Manchester to Bolton, ten miles long.

An act was passed in 1826 for a railway from Manchester to Oldham, but we believe the undertaking failed. The following railroads are in course of construction:—Bolton to Preston, twenty miles long; Preston to Lancaster, twenty miles and a quarter. Preston, by Kirkham and Poulton to the new harbour forming at the mouth of the Wyre, nineteen miles and a half long; Manchester to Leeds by Middleton, Rochdale, and Todmorden, sixty miles and a half long; Manchester to Sheffield by Ashton-under-Lyne, forty miles long; and Manchester to Birmingham, seventy-two miles and a quarter long. It has been contemplated to continue the railway communication northward from Lancaster to Carlisle and Glasgow.

Of coach-roads the following are the principal:—the Port Patrick, Carlisle, and Manchester mail road enters the county at Stockport, and runs by Manchester, Chorley, Preston, Garstang, and Lancaster into Westmoreland. The Liverpool road enters the county at Warrington, and runs by Prescot to Liverpool, from which place a road runs to Preston, where it joins the high-road to Carlisle. The coach-road from Manchester to Liverpool joins the London and Liverpool road at Warrington. A road from Manchester runs by Middleton and Rochdale to Halifax and Leeds in Yorkshire; another by Oldham to Huddersfield, and so to Leeds; and another northward by Bury, Haslingden, and Clithero, into the mountain district of Yorkshire. The other roads are too numerous to be detailed. The communication by the coach-roads from London to Manchester and Liverpool has very materially diminished since the opening of the railroads along that line.

Agriculture.—The climate of Lancashire is mild and moist. The high hills which run along its eastern boundary shelter it from the cold easterly winds, but at the same time arrest the clouds which come from the Atlantic, and produce more abundant rains than in other more eastern parts of England.

The surface of the county is very uneven in the northern and eastern parts. Near the coast the land is level, and the soil consists of a good sand over a rocky subsoil, or a clay marl, which, when mixed with the upper soil, renders it extremely productive, especially in garden vegetables. There are extensive tracts of peat-moss, but few very stiff cold clays, which abound in many other parts of England, and are very expensive in the cultivation.

From the moist nature of the climate Lancashire is more productive in grass than in corn. The arable land is well cultivated wherever sufficient encouragement is given to the tenant by granting a lease for a considerable term. Many of the farms are considerable, and were formerly occupied as domains by the larger proprietors. Several still retain the name of Hall or Manor Farm, but the subdivision of property has given rise to very small occupations, which are cultivated like large gardens, and are very productive, especially the sandy loams, where excellent crops of potatoes are raised. The course of tillage has improved of late years in the larger farms; but it was far from being good when the Agricultural Survey of the county was published in 1795. The more fertile the soil the worse was the cultivation of it, crop after crop being taken without much attention being paid to manuring or cleaning the land. Oats have always been a favourite crop, partly from their suiting a moist climate, and from their forming a considerable part of the food of the inhabitants in the central and northern parts of the county. Wheat is sown where the land is favourable to it, as along the shore north of Lancaster, in the Fylde, and in the south-west part of the county.

Potatoes were early cultivated in the fields in Lancashire, and they retain their celebrity when raised in the lighter soils, and when not over-manured. The land which is broken up from grass produces the best flavoured potatoes without any additional manure; but when they are raised to feed cattle the dung is not spared, and very great crops are obtained. Early potatoes are sometimes raised, with a crop of turnips after them the same year; then follows wheat or barley, and grass seeds. If the turnips are drawn off the land the next crop must be manured, or else the soil will be much impoverished. Sometimes two crops of early potatoes are raised in one year; the second is taken up in November, and immediately cut up into sets, which are preserved in chaff or sawdust, in which they shoot early in the ensuing year. They are then planted out, and secured from frost by throwing litter over the beds when they first come up. Another method is to cut the sets, and put them on a room floor, where a strong current of air can be introduced at pleasure; they are laid very thin, and covered with sawdust or chaff, about two inches deep. There they shoot, and the air being let in when there is no frost, the shoots get strong. When they are an inch and a half long the covering is lightly removed to give access to the light. They remain growing till the time arrives for planting, when they are planted out carefully, and soon begin to throw out stems and leaves. They then bear slight frosts without much injury. The earliest potato is called the Superfine White Kidney. Several crops of this potato may be raised one after another in the same year by great attention to forwarding the sets and planting them out carefully; and where there is a demand for young potatoes the profit is very great.

Meadows and pastures are much more common in Lancashire than arable fields. Even the extent of grass which is kept for the purpose of bleaching linen on is very considerable, especially in the neighbourhood of Manchester, Bolton, and other manufacturing towns. While in other parts of England meadows and pastures are broken up and converted into arable fields, in Lancashire the reverse is the case, and many fertile arable fields have been laid down to permanent grass. There is a great inducement to do this, for the best meadow grasses and the white clover seem to find a peculiarly favourable soil in the best loams of Lancashire; and by simply marling the land white clover springs up naturally. The demand for hay has caused great attention to be paid to the making and securing of it, and extensive hay-barns which admit the air freely have been erected in many places. [Barn.]

In feeding cattle or cows for the dairy a good pasture will keep one head per acre during the summer, but there are many of which two or three acres are required to maintain a milch cow.

Sheep are not abundant in proportion to cows; and there is not that attention paid to the breed of this useful animal which it deserves; the breeds commonly met with are the black-faced and the Cheviot. The improved Leicester has gained a footing, and will not soon lose it.

The original breed of oxen in Lancashire was one of the best in England until it was surpassed by the Leicestershire, which is only the same blood improved by careful selection. The animals of this breed have a great aptitude to fatten, and some of the cows are good milkers; but the farmers and dairymen are so careless, that if a cow or an ox has a good appearance in the market, the pedigree is never inquired into. Milk is a very important article of food in a populous district, where it can be sold as it comes from the cow; and the profit of a dairy is never so great as where new milk can be thus disposed of. Where the population is thinner, or the distance from towns is too great to carry new milk for sale, butter and cheese must be made. A great quantity of both is produced in Lancashire, and of a very good quality. The cheese is similar to the Cheshire, and, when carefully made, cannot be distinguished from it. The cheese from some particular spots, as near Leigh, Newborough, &c., is thought to be superior to the Cheshire. There is no colouring whatever put into this cheese; but inferior kinds are frequently coloured to make them pass for Cheshire. The quantity of cheese made from one cow between April and November is about 360 lbs. Mr. Boys, in the 'Agricultural Survey,' has given an account of a cow of the Lancashire breed which gave 16 lbs. of butter, each of 18 ounces, or 18 lbs. avoirdupoise in one week. She had had five calves, and was eight years old. The progeny of this cow, which was of the Lancashire long horned breed, kept up her reputation; but no trouble was taken to obtain a pure breed from her. In 1795, at the Roman Catholic College at Stonyhurst near Clithero, the cows were kept in stalls and fed with boiled food, as is the case in Flanders. Weeds, nettles, and docks were collected and boiled with more succulent vegetables. Thus, nearly half a century ago, an example was given of the Flemish mode of feeding cows, without its having been followed in a single instance; and yet it is noticed with approbation. This proves how difficult it is to alter old customs in husbandry.

Many useful horses are bred in Lancashire, for which there is a great demand in the manufacturing towns. They are chiefly cart-horses of a hardy active sort; and, with a little attention, the rearing of them is profitable to the farmer. They are worked gently when two years old, and soon earn their keep; at five years old they bring a high price, if they have a good shape, and work well. The rich pastures make them grow to a large size, and look sleek when brought to a fair. There is nothing peculiar in the breed of swine. A great deal of pork and bacon is imported from Ireland.

Divisions, Towns, &c.—The county of Lancaster is divided into six hundreds, as follows:—

	Situation.	Area in Acres.	Pop. 1831.
Amounderness .	W.	145,110	69,987
Blackburn . .	E.	175,590	168,057
Leyland . .	Central	79,990	48,338
Lonsdale (including the Borough of Lancaster)	N.	266,970	56,726
Salford (including the Town of Manchester)	S.E.	214,870	612,414
West Derby (including the Boroughs of Liverpool and Wigan) .	S.W.	234,730	380,078
Militia under training .			1,254
		1,117,260	1,336,854

The hundred of Lonsdale is distinguished as Lonsdale north of the Sands (including the district of Furness), 137,490 acres (population in 1831, 24,311), and Lonsdale south of the Sands, 129,480 acres (pop. in 1831, 32,415). The hundred of Blackburn is also divided: the higher division has an area of 91,710 acres (pop. in 1831, 84,072); the lower division has an area of 83,880 acres (pop. in 1831, 83,985).

The county contains the borough, market, and seaport towns of Lancaster (pop. of borough in 1831, 12,613) and Liverpool (pop. of borough in 1831, 189,242), the antient borough and market towns of Clithero (pop. of borough in 1831, 5213), Preston (pop. of borough in 1831, 33,112), and Wigan (pop. of borough in 1831, 20,774), the decayed and now disfranchised borough of Newton, the market-towns of Ashton-under-Lyne (pop. of parish in 1831, 33,597), Blackburn (pop. of the township and borough 27,091), Bolton-in-the-Moors (pop. of Great and Little Bolton and Haulgh townships, forming the parliamentary borough, 1831, 42,395), Burnley, Bury (pop. of townships of Bury and Elton in 1831, 19,140), Cartmel, Chorley (pop. in 1831, 9282), Colne, Dalton, Garstang, Hawkshead, Haslingden, Hornby, Kirkham, Leigh, Manchester (pop. of township in 1831, 142,026, or, including Salford township, 182,812), Middleton, Oldham (pop. of parliamentary borough in 1831, 50,513), Ormskirk, Poulton, Prescot, Rochdale (pop. of parliamentary borough in 1831, 20,156), Todmorden, Ulverstone, and Warrington (pop. of parliamentary borough in 1831, 18,184). Ashton-under-Lyne, Blackburn, Bolton, Bury, Manchester, Oldham, Rochdale, Salford (a suburb of Manchester) and Warrington, were made by the Reform Act parliamentary boroughs. Some of these, with one or two other places in the county, are described elsewhere [Ashton-under-Lyne; Ashton-in-Mackerfield; Atherton; Blackburn; Blackpool; Bolton; Burnley; Bury; Chorley; Clithero; Liverpool; Manchester; Oldham; Preston; Rochdale; Salford; Warrington; Wigan]. Of the others an account is subjoined.

Lancaster is in the hundred of Lonsdale, in the part south of the Sands, and on the south bank of the river Loyne, or Lune, not far from its mouth, 240 miles from London, through Leicester, Derby, Stockport, Manchester, and Preston. It is supposed, from the Roman antiquities discovered, and from the termination of the name, 'caster,' to have been a Roman station. Camden will have it to be the Longovicus of the Notitia, and others the Ad Alaunam of Richard of Cirencester. It is supposed to have been dismantled by the Picts after the departure of the Romans, but restored by the Anglo-Saxons of Northumbria, under whom it first gave name to the shire. The castle was enlarged, and the town, which had previously received a charter from King John, was favoured with additional privileges in the reign of Edward III., who conferred the duchy of Lancaster on his son John of Ghent or Gaunt, in whose favour the county was made a palatine county. The town suffered severely in the War of the Roses, and was again the scene of contest in the civil war of Charles I.

The parish of Lancaster reaches into Amounderness hundred, and comprehends an area of 66,100 acres, or above 103 square miles, with a population of 23,817. The municipal borough of Lancaster comprehends 1240 acres, and had in 1831 a population of 12,613. Considerable additions were made by the Boundary Act for the purposes of parliamentary representation. The town stands on the slope of an eminence rising from the river. The summit of the eminence is crowned by the towers of the castle, a spacious edifice, comprehending a large court-yard, some smaller yards, and several differently-shaped towers: it is now fitted up at a vast expense as a county gaol and court-house. The large square keep is very antient and prodigiously strong: the gateway, defended by two semi-octangular projecting towers, is referred to the time of Edward III. The shire-hall and county-courts are modern. The streets of the town are for the most part narrow; the houses are built of freestone, which is quarried in the neighbourhood, and covered with slate. The church is on the same eminence with the castle: it is very spacious, and contains some few specimens of screen-work; the tower is of modern erection. In the churchyard is the shaft of a Danish cross with Runic characters. There are two chapels-of-ease and several dissenting places of worship. There are assembly-rooms, a theatre, and public baths. A handsome stone bridge over the Lune, at the north-eastern extremity of the town, connects it with the suburb of Skerton. There are several almshouses, and in the neighbourhood of the town is the county lunatic asylum.

The port of Lancaster formerly had a considerable share of the West India trade, which is now in a great degree transferred to Liverpool; but it still possesses a portion of the American, Russian, and a large and increasing coasting trade. The number of vessels which entered the port, which includes Preston, in 1832 was 580 (33 of them from foreign parts), having an aggregate tonnage of 38,207. The cotton manufacture has been within the last few years introduced into the town and neighbourhood.

The assizes for the northern division of the county are held at Lancaster. The council of the borough consists, under the Municipal Reform Act, of a mayor, 6 aldermen, and 18 councillors: the town was divided by the same act into three wards. The living is a vicarage, in the archdeaconry of Richmond, diocese of Chester, of the clear annual value of 1709*l.*, with a glebe-house. The perpetual curacies of

St. Anne and St. John (the two chapels-of-ease) are respectively of the clear annual value of 115*l.* and 203*l.*

There were in the borough, in 1833, one infant school with 100 children; a grammar school, partly supported by the corporation, with 61 children; a Lancasterian school, with 198 children; a Quakers' school, partly endowed, with 30 children; and eight other day-schools, with 216 children; two national and one other day and Sunday schools, with 603 children on a week day and 30 more on Sunday; and four Sunday schools, with 1175 children. From two boarding-schools and one Roman Catholic day and Sunday school no returns were made.

The remainder of the parish is divided into eleven townships and five chapelries. The chapelries are all in the gift of the vicar of Lancaster. There are several schools, some of them endowed, in these townships.

Cartmel is locally in the limits we have assigned to the district of Furness, but is said not to be 'within the liberties of Furness.' It is 14 miles from Lancaster across the Sands. The parish contains 22,960 acres, and had, in 1831, a population of 4802. It is subdivided into seven townships or chapelries. The town is in the townships of Lower Allithwaite and Upper Holker, in a narrow well-wooded vale watered by a small stream, and overhung on the east by the high ridge of Hampsfield Fell. The streets are narrow and irregular; the houses are chiefly built of stone. The church, which formerly belonged to a priory of the regular canons of St. Augustine, founded A.D. 1188, by William Mareschal, earl of Pembroke, was purchased at the dissolution by the inhabitants, and afterwards made parochial. It is large cross church in the early English style, with a central tower, a choir with richly ornamented stalls, and a fine east window. The nave is more modern than the rest of the building. The population of the townships in which the town stands was, in 1831, 1933. There are cotton-mills at Upper Holker, but little trade is carried on: the market is on Tuesday. There is a medicinal spring of some repute about three miles from the town. The living is a perpetual curacy, in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 113*l.* There were in the whole parish, in 1833, four endowed day-schools, with 115 children; three national schools, with 147 children; ten other day-schools, with 215 children; two boarding-schools, with 21 children; and seven Sunday-schools, with 337 to 347 children; beside which two of the national schools were Sunday-schools also, and had 131 children.

Near Cartmel is Holker Hall, one of the seats of the Earl of Burlington.

Colne is in the higher division of the hundred of Blackburn, 32 miles north of Manchester, and 218 from London. It is in the parish of Whalley, and near the border of Yorkshire. The chapelry of Colne contains 8050 acres, and had, in 1831, a population of 8080. The town is situated on a dry and elevated ridge near the river Calder. The chapel is an antient building repaired or rebuilt about the time of Henry VII.: on three sides of the choir are portions of an old and elegantly carved wooden screen. An antient manor-house of the Lacies in this town was lately used as a workhouse. The chief manufacture of the place is that of cotton: the market is on Wednesday. The Leeds and Liverpool canal passes near the town. The neighbourhood yields slate, coal, lime, and freestone. The living is a perpetual curacy, in the archdeaconry and diocese of Chester, of the clear yearly value of 179*l.*, with a glebe-house. There are several dissenting places of worship. The chapelry contained, in 1833, two partially endowed schools, with 82 children; and ten other day schools, with 302 children; and eight Sunday-schools, with 1540 children.

Dalton in Furness is 25 miles from Lancaster across the Sands. The whole parish contains 16,210 acres, with a population, in 1831, of 2697; but Dalton township, one of the three into which the parish is divided, contains 770 acres and 759 inhabitants. This town flourished at an early period through the neighbourhood and favour of the abbey of Furness, but on the dissolution of the abbey its consequence diminished. The town consists of a principal street terminating on the west in a spacious market-place. The church is a small neat building of considerable antiquity. There is a square tower on a rocky eminence west of the town, the remains of a castle probably built by the monks of Furness to guard the northern approach to the abbey. This building is now appropriated to the courts leet and baron of the manor and liberty of Furness. The market is on Saturday: the chief trade carried on is malting; and there are some iron-works near the town. The living is a vicarage, in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 113*l.*, with a glebe-house. There were in the township, in 1833, two dame-schools, with 26 children; two endowed day-schools, with 189 children; ten other day-schools, with 189 children; and four Sunday-schools, with 196 children.

Garstang is in Amounderness hundred, on the north-west bank of the Wyre, and on the road from Preston to Lancaster, 229 miles from London and 11 from Lancaster. The parish contains 26,580 acres, with a population in 1831 of 6927; the township of Garstang contains 500 acres, with a pop. of 929. It is a poor town, though somewhat improved of late. The church is at what is termed Garstang Church town, about a mile from the town itself. The town-hall, a decayed building, was rebuilt about ninety years since. The market is on Thursday, and there are three yearly fairs. The Lancaster Canal crosses the Wyre by an aqueduct close to the town. There are some cotton factories and a calico printing establishment in the neighbourhood. Garstang was incorporated by charter of Charles II.; the corporation, consisting of a bailiff and seven capital burgesses, was left untouched by the Municipal Reform Act. The living is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 282*l.*, with a glebe-house. There were in the township in 1833, one dame-school, with 5 children; a grammar-school with a small endowment, with 55 children; an endowed school for Roman Catholics, with 30 children on the endowment, and 35 others; and two other day-schools, with about 40 children; and four Sunday-schools with 328 children.

Hawkshead is in Furness, near the head of the small lake Easthwaite Water, on a brook flowing into the lake: it is 267 miles from London and 27 from Lancaster by Cartmel. The parish contains 22,220 acres, with a pop. in 1831 of 2060: the township of Hawkshead (one of four into which the parish is divided) contains 6700 acres, with a population of 797. There is no manufacture in the town, but the weekly market (on Monday) is considerable, the town being the centre of business for Furness Fells. There are four yearly fairs. There is a neat town-house; and near the town are the remains of an old building in which one or more monks, representatives of the abbot of Furness, performed divine service, and in which the abbot's bailiff exercised temporal jurisdiction. The church is an antient building repaired and modernized by Sandys, Archbishop of York, a native of this town, in the time of Queen Elizabeth. The living is a perpetual curacy in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 110*l.* with a glebe-house. There were in the township in 1833, a grammar-school, founded by Archbishop Sandys, with 20 boys; three other day-schools with 87 children, and a Sunday-school with 110 children.

There are iron-works and slate quarries in the mountains in the neighbourhood.

Haslingden is in the lower division of Blackburn hundred, 18 miles from Manchester and 204 from London. It is in Whalley parish, and constitutes a chapelry containing 4420 acres, with a population in 1831 of 7776. The older part of the town is on the declivity of a hill, on which the church, a neat substantial edifice, rebuilt in the latter part of the last century, stands. The introduction of the cotton manufacture has led to the enlargement and improvement of the town: a new square and many new buildings have been erected in the present century, chiefly at the base of the hill. The woollen manufacture, formerly the staple of the town, is still carried on to some extent; but the chief manufacture is that of cotton. The market is on Saturday; and there are several yearly fairs, chiefly for cattle and horses. The living is a perpetual curacy in the diocese and archdeaconry of Chester, of the clear yearly value of 176*l.*, with a glebe-house. There are several dissenting places of worship. There were, in 1833, in the township, one school with a small endowment, with 48 children; nine other day-schools, with 310 children; and six Sunday-schools, with 1736 children.

Hornby is in Lonsdale hundred, south of the Sands, 9 miles north-east of Lancaster, and in the parish of Melling; the chapelry of Hornby contains 2290 acres, with a population in 1831 of 383: the population had decreased in the preceding ten years owing to families removing to the manufacturing districts. The town is on the banks of the river Wenning, near its junction with the Lune. Hornby Castle, near the town, the antient seat of the Stanleys, Barons Monteagle, is now fitted up as a modern mansion. In the neighbourhood are some remains of a fort ascribed to the Saxons, and of an antient religious house. The chapel is a neat building with an octagonal tower. The market, held every alternate Tuesday, is well attended: it is chiefly for cattle: there is a yearly fair. The living is a perpetual curacy in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 92*l.* There were in the chapelry in 1833, two day-schools, with 44 children, and one Sunday-school, with 40 children.

Kirkham is in the hundred of Amounderness, 40 miles from Manchester and 226 from London. It is about 8 miles west of Preston, and about 3 from the north bank of the æstuary of the Ribble. The parish contains 41,850 acres, with a population in 1831 of 11,630: it is divided into seventeen townships or chapelries; the township of Kirkham contains 850 acres, with a population of 2469: the population of the township had materially decreased between 1821 and 1831. The town is small, but the houses are tolerably good. The church was rebuilt in 1822, but the antient tower of Norman architecture remains. There are two or three Dissenting or Catholic places of worship. The chief manufacture of the town is cotton; but some sailcloth, sacking, and cordage, formerly the staple of the place, are made. The market is on Tuesday, and there are two yearly fairs. The living is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 921*l.*, with a glebe-house. There were in the township in 1833, six dame schools, with 104 children; five endowed schools (one of them a well endowed grammar-school, two of them Catholic), with 215 scholars; and five other day schools, with 155 children; and five Sunday-schools (one endowed), with 443 children.

Leigh is in the hundred of West Derby, 197½ miles from London, on the road from Newton to Bolton. The parish comprehends an area of 11,820 acres, with a population in 1831 of 20,083. It is subdivided into the six townships of Astley or Astleigh (East Leigh) (population 1832); Atherton (pop. 4181); Bedford (pop. 3087); Pannington (pop. 3165); Tyldesley with Shakerly (pop. 5038); and West Leigh (pop. 2780). The townspeople are engaged in the manufacture of cambrics and fustians. There are collieries and stone quarries in the parish. The district round the town is occupied by dairy farms, and is famous for cheese. Leigh communicates with Manchester by the Duke of Bridgewater's Canal, and with the Leeds and Liverpool Canal by a branch canal to Wigan. A railway from Bolton by this town communicates with the Liverpool and Manchester Railway. The living is a vicarage in the archdeaconry and diocese of Chester, of the clear yearly value of 263*l.*, with a glebe-house. Atherton and Astley townships constitute distinct chapelries. There were in the six townships in 1833, six infant or dame schools, with 162 children; two partially endowed day-schools, with 90 scholars; twenty-six other day-schools, with 923 scholars; and eighteen Sunday-schools, with 3940 scholars.

Middleton is in Salford hundred, 6½ miles north by east of Manchester, and 192½ from London, near the river Irk which flows into the Irwell. The parish contains 11,510 acres, with a population in 1831 of 14,379: it is divided into eight townships or chapelries; Middleton township contains 1860 acres, with a population of 6903. This town owes its prosperity to the cotton manufacture, which is carried on in its different branches. A charter for a market was granted in 1791: it is held on Friday. A market-house with shambles, also warehouses for general merchandise, were erected by Lord Suffield, lord of the manor. Coals are dug in the parish. The church is an antient building, with a carved screen dividing the chancel from the choir. There are several dissenting places of worship. The living is a rectory in the diocese and archdeaconry of Chester, of the clear yearly value of 1070*l.*, with a glebe-house. There were in 1833 in the township, a grammar-school, founded and endowed by Dr. Alexander Nowell, dean of St. Paul's, London, with about 100 children; a school with 33 children, partly supported by Lord Suffield; and thirteen other day-schools, with 391 children; and one boarding-school, with from 50 to 60 children; also ten Sunday-schools, with 2644 children.

Newton is in West Derby hundred, locally between Manchester and Liverpool, but not on the road between those towns, 193 miles from London, through Warrington. Newton is a chapelry in Winwick parish, and contains 3070 acres, with a population in 1831 of 2139. The place consists chiefly of one street; it has an antient court-house, now used for a school. There is a market-cross, though the market has been long discontinued. Newton was a borough by prescription, and returned two members to parliament from 1 Elizabeth, till it was disfranchised by the Reform Act. The chapel is a comparatively modern building. The living is a perpetual curacy, of the clear yearly value of 114*l.*, in the archdeaconry and diocese of Chester. There were in 1833 one endowed school, with 84 children; three other day-shools, with 219 children; and two Sunday-schools, with 277 children.

Ormskirk is in West Derby hundred, 13 miles north by east of Liverpool and 219 from London. The parish contains 31,150 acres, with a population in 1831 of 14,053, and is divided into seven townships or chapelries: the township of Ormskirk contains 600 acres, with a population of 4251. The town consists of four principal streets, which intersect each other at right angles. The church is mostly modern, with a few portions of late perpendicular character: it has a large western tower at the end of the nave, and another tower and spire at the west end of the south aisle. This church contains the burial-place of the earls of Derby Cotton and linen thread, silks, hats, and rope, are manufactured here, but not extensively. There are a weekly market and two yearly fairs. Coals are dug in the parish; and a quantity of carrots and early potatoes are grown for the supply of Liverpool. The living is a vicarage in the archdeaconry and diocese of Chester, of the clear yearly value of 367*l.*, with a glebe-house. There were in 1833, an infant school, with 136 children; an endowed grammar-school, with 22 children; and one endowed day and Sunday school, with 106 children daily, and 144 children in addition on Sundays.

In the parish, about three miles east of the town, is Lathom House, the seat of Lord Skelmersdale, which in the civil war of Charles I. was gallantly defended for the king by Charlotte de la Tremouille, countess of Derby. The house was well calculated for defence, standing in a boggy flat, and being defended by a wall six feet thick, strengthened by nine towers, on each of which were mounted six pieces of ordnance, and surrounded by a moat twenty-four feet broad. The siege was raised, but the place was ultimately surrendered by the king's order.

Lathom township contained a population of 3272 in 1831. There are in the township an endowed school, a chapel, an almshouse, and a chalybeate spring.

Poulton is in Amounderness hundred, 16½ miles north-west of Preston and 234 from London. The parish contains 15,400 acres, and had in 1831 a population of 4082; it is divided into five townships; that of Poulton contains 1150 acres, with a population of 1025. The town is about a mile from the æstuary of the Wyre. The church was rebuilt in the last century, except the tower, which is of the time of Charles I. There are three or four dissenting places of worship. The living is a vicarage in the archdeaconry of Richmond and diocese of Chester, of the clear yearly value of 257*l.*, with a glebe-house. The town has neither trade nor manufactures. There were in the township in 1833 six day-schools with 108 children, and two Sunday-schools with 300 children. The endowed grammar-school of Hardhorn township in this parish is free to the children of Poulton township; in 1833 it had 140 children.

Prescot is in West Derby hundred, 198 miles from London, and 8 from Liverpool. The parish, divided into fifteen townships or chapelries, contains 34,920 acres, with a population in 1831 of 28,084. The township of Prescot contains 240 acres; pop. 5055. There are extensive collieries in the parish. Among the principal manufactures of the town are those of small files, and the movements and other parts of watches, also coarse earthenware, especially sugar-moulds, sail-cloth, and cottons. The market is on Tuesday. The Liverpool and Manchester railway passes near the town, and the coach-road between those towns passes through it: the town consists principally of one long street along this road. The church is antient and large; the tower and spire are of modern erection. There are several dissenting meeting-houses. The living is a vicarage in the archdeaconry and diocese of Chester, of the clear yearly value of 893*l.*, with a glebe-house. There were in the township in 1833 one endowed school, with 55 scholars; ten other day-schools with 403 scholars; and three Sunday-schools with 960 children.

Saint Helen's is in the township of Windle, in the chapelry of St. Helen's, Prescot parish. The township contains 3540 acres, and had, in 1831, a population of 5825. The town has risen into importance of late years, chiefly by means of the large establishment of the British Plate-glass Company at Ravenhead, in the adjacent township of Sutton, and of the copper-works belonging to the proprietors of the Parys Mine in Anglesey, who brought their ore here to be smelted. The market, which is customary, is held on Saturday; and there are two yearly fairs. There is an episcopal chapel and some Dissenting and Catholic places of worship. The living is a perpetual curacy of the clear yearly value of 240*l*., with a glebe-house. There were in the township in 1833, four day-schools, supported wholly or in part by endowment or gift, with 212 children; fifteen other day-schools, with 444 children; and five Sunday-schools, with 1305 children.

The Liverpool and Manchester Railway and the Sankey Canal pass near the town, and there is a railway from St. Helen's to Runcorn Gap on the Mersey.

Todmorden is in Salford hundred, 21½ miles from Manchester and 207½ from London. The town is partly in the townships of Todmorden and Walsden, in Rochdale parish, containing together 1011 acres, with a population in 1831 of 6054, and partly in the townships of Langfield and Stansfield, in Halifax parish, in the West Riding of Yorkshire, which have an area of 8540 acres, with a population in 1831 of 10,776; together 9551 acres, population 16,830. The inhabitants are engaged in the cotton and woollen manufactures, both of which have greatly increased. There are two episcopal chapels, both of modern date, but one was rebuilt on the site of a more antient chapel; there are also several dissenting meeting-houses. The market is on Thursday. Every month there is a great cattle-market; there are two yearly fairs. The Rochdale Canal and the Manchester and Leeds Railway pass near the town. The living is a perpetual curacy in the archdeaconry and in the diocese of Chester, of the clear yearly value of 134*l*., with a glebe-house. There were in 1833, in the four townships, four infant or dame schools, with 105 children, sixteen day-schools with 534 children, one day and Sunday school with 30 children on week-days, and 130 on Sundays; and eighteen other Sunday-schools with 3616 scholars.

Ulverstone is in Furness, 261 miles from London, or 21 from Lancaster, across the Sands. The parish contains 29,100 acres, with a population in 1831 of 7741. There are slate-quarries in several parts of the parish, in which about 100 adult labourers are employed. The township of Ulverstone contains 2900 acres, with a population of 4876. The town is pleasantly situated on a declivity sloping to the south, about a mile from the sands, in the æstuary of the Leven. It rose to prosperity on the dissolution of Furness Abbey. The town consists of four principal streets, spacious and clean; the houses are chiefly built of stone. There are a theatre, assembly-room, and subscription library. The church, a plain neat structure, has been almost entirely rebuilt in the present century; the tower and a Norman doorway remain of the old church. There are several dissenting meeting-houses. The market is held on Thursday, for grain and provisions, and is well supplied: there are two large yearly cattle fairs. There are some manufactures of cottons and coarse linens. A canal from the æstuary of the Leven enables large vessels to come up and discharge their cargoes in a spacious basin, almost close to the town, from which there is a considerable export of iron-ore, iron, slates, and other articles. Some ship-building is carried on. The living is a perpetual curacy in the archdeaconry of Richmond, diocese of Chester, of the clear yearly value of 149*l*. There were in the township in 1833 two national schools, with 289 scholars, and eleven other day-schools (one with a small endowment), with 346 children; one Catholic day and Sunday school, with from 50 to 100 children, and four Sunday-schools with 461 children.

Besides the towns above described there are many places in this county which have acquired such importance from their population as to demand a brief notice. Newchurch, in Rossendale (pop. 9136), has considerable woollen and cotton manufactories, and quarries of freestone, coal, and slate. It constitutes a chapelry of the clear yearly value of 231*l*. It has a large chapel capable of containing 1300 persons, and two or three dissenting meeting-houses. There is an endowed school with 35 scholars, and several national and other day and Sunday schools. Padiham (pop. 3529) has also considerable cotton manufactories, an episcopal chapel, two dissenting meeting-houses, one endowed day and Sunday school, and several other schools. The clear value of the curacy is 131*l*. a year, with a glebe-house. At Old and New Accrington (joint pop. 6283), Higher and Lower Booths (joint pop. 6525), Habergham Eaves (pop. 5817), and Oswaldtwistle (pop. 5897), the cotton manufacture is carried on. Accrington is a separate chapelry, of the clear yearly value of 158*l*., with a glebe-house.

The above-mentioned places are all in the hundred of Blackburn, and in the parish of Whalley, one of the most extensive parishes in England. It is chiefly in Blackburn hundred, but extends into the West Riding of Yorkshire, and has a detached portion in the county of Chester. It comprehends an area of 108,140 acres, with a population of 97,868. There are in it fifteen or sixteen chapelries with parochial rights. Before the dissolution this parish was under the jurisdiction of the antient abbey of Whalley. This abbey was built in 1296 for the White or Cistertian Monks of Stanlaw in the Wirral in Cheshire, by Henry Lacy, or Laci, earl of Lincoln. The abbey flourished till the dissolution, when its yearly revenue was 551*l*. 4*s*. 6*d*. gross, or 321*l*. 9*s*. 1*d*. clear. Encouraged by Aske's rebellion, the monks resumed possession of the abbey, for which act the abbot and one of his monks were executed for treason. Of this abbey there are considerable remains, including two stately gateways, a building conjectured to have been the abbot's private oratory or chapel, and other parts less perfect. Some portions of the ruins are very good specimens of decorated and perpendicular English architecture. The parish church of Whalley is large, and mostly of early English character, of which style the chancel is a fine specimen. The east window and the windows of the nave are later insertions in the perpendicular style. There are in the chancel three plain stalls and some good wood screen-work, supposed to have been brought from the abbey. The living of Whalley is a vicarage, in the archdeaconry and diocese of Chester, of the clear yearly value of 137*l*., with a glebe-house: the vicar has the right of presentation to several of the chapelries in the parish.

Leyland township (pop. 3404), in the parish and hundred of Leyland (17,950 acres, 13,951 inhabitants), has also some cotton manufactories. It had in 1833 an endowed grammar-school, with 20 children, and another endowed school with nearly 60 children. The chapelries of Heap (pop. 10,429) and Tottington (pop. 9280), and the township of Walmersley (pop. 3456), are all in the parish of Bury, and in the neighbourhood of the town of Bury, but not included in the parliamentary borough. The inhabitants are engaged in the cotton manufacture. Horwick (pop. 3562) and West Houghton (pop. 4500) are in the parish of Dean, between Bolton and Wigan. The townships of Barton (pop. 8976), Pendleton (pop. 8435), and Worsley (pop. 7839), are in Eccles parish, west of Manchester: at Worsley are the extensive collieries formerly belonging to the duke of Bridgewater. The township of Pelkington (pop. 11,006) is in Oldham parish, but is not included in the parliamentary borough. Radcliffe (pop. 3904) is a parish near Bury; and the townships or chapelries of Blatchingworth and Calderbrook (pop. 4221), Butterworth (pop. 5648), and Wuerdale and Wardle (pop. 6754), are near the town and in the parish of Rochdale, though not included in the parliamentary borough. These places are all, with the exception of Leyland, in the hundred of Salford, which is the principal seat of the cotton manufacture.

In West Derby hundred are the following places:—North Meols (pop. 5132) is a parish on the coast at the entrance of the æstuary of the Ribble. Everton (pop. 4518) is a township in the parish of Walton on the Hill, near the æstuary of the Mersey: it forms a suburb of Liverpool, and is the residence of many genteel families. West Derby (pop. 9613), is in the same parish, more remote from Liverpool. Eccleston (pop. 3259), and Sutton (pop. 3173), are townships in Prescot parish, and participate in the manufactures of that town—flint and crown glass, earthenware, and watch-movements. The neighbourhood yields stone and coal. Hindley (pop. 4715), Pemberton (pop. 4276), and Upholland (pop. 3040), are all in Wigan parish.

Divisions for Ecclesiastical and Legal Purposes.—Upon the conversion of the Northumbrian Saxons to Christianity, this county was comprehended in the diocese and province of York. After the establishment of the West Saxon supremacy, the southern part of the county was added to the diocese of Lichfield and the province of Canterbury. In the year 1541 the disunited portions of the county were re-united in the new diocese of Chester, formed by Henry VIII., and have continued united up to the present time. The county is divided between the two archdeaconries of Chester in the south and Richmond in the north. The archdeaconry of Chester comprehends the four rural deaneries of Blackburn, Leyland, Manchester, and Warrington; that of Richmond contains the deaneries of Amounderness and of Furness and Cartmel. By an order in council just promulgated, pursuant to the act 6 and 7 William IV., c. 77, the whole of the county (except the deanery of Furness and Cartmel, which is to be added to the diocese of Carlisle) is to form the new diocese of Manchester, in the province of York. The collegiate church of Manchester is to become the cathedral, and the warden and fellows are to be the dean and canons. The revenue of the new see is to consist of an endowment averaging 4500*l.* per annum. The parishes are comparatively few: there are only sixty-eight, including Burton in Kendal, which is chiefly in Westmoreland, and Mitton and Oldham, which extend into Yorkshire. Twenty-six of these parishes are rectories, twenty-nine vicarages; the rest perpetual curacies. The rectory of Winwick, one of the richest in the kingdom (clear annual value 3616*l.*), is in this county.

The parishes are very extensive: Whalley parish (108,140 acres) and Lancaster (66,100 acres) have been already noticed. Oldham parish (58,620 acres), Blackburn (45,620 acres), Kirkham (41,850 acres), Prescot (34,920 acres), Manchester (34,260 acres), Bolton (31,390 acres), and Ormskirk (31,150 acres), are next in extent. Of the remaining fifty-nine parishes twelve consist of above 20,000 acres, and eighteen of above 10,000. There are however numerous dependent district chapelries; and many chapels-of-ease and new churches have been built.

The Dissenters form a considerable body in the large manufacturing towns, and the Wesleyan Methodists are particularly numerous. There is also a very considerable body of Roman Catholics.

Lancashire is in the northern circuit. The assizes were till of late years held at Lancaster alone, but they are now held at Lancaster for the northern division of the county, comprehending the hundreds of Lonsdale, Amounderness, Blackburn, and Leyland; and at Liverpool for the southern division, consisting of the two hundreds of Salford and West Derby. The quarter-sessions are held at Lancaster, and by successive adjournments at Preston, Salford, and Liverpool.

By the Reform Act the county was divided into two parts for parliamentary purposes. The division coincides with that for judicial purposes. The election for the northern division takes place at Lancaster: the polling-places are Lancaster, Hawkshead, Ulverstone, Poulton, Preston, and Bromley. The election for the southern division takes place at Newton: the polling-places are Newton, Wigan, Manchester, Liverpool, Ormskirk, and Rochdale.

Fourteen members were formerly returned to parliament for this county; viz., two for the county itself and two each for the boroughs of Lancaster, Clithero, Liverpool, Newton, Preston, and Wigan. By the Reform Act Newton was disfranchised and Clithero reduced to one member: but the division of the county, with the creation of four new boroughs, Manchester, Bolton, Blackburn, and Oldham, each returning two members; and of five, Ashton-under-Lyne, Bury, Rochdale, Salford, and Warrington, each returning one member, has raised the whole number to twenty-six.

Lancaster, as a county palatine, possesses a chancery court. At an early period the county was distinguished as *an honour*, or superior feudal lordship. In the time of Henry III. the honour was erected into an earldom, in favour of Edmund, surnamed Crouchback, second son of that king. In the time of Edward III. the earldom was erected into a duchy in favour of Henry Plantagenet, the then earl, and afterwards of John of Gaunt, who had married the heiress of Henry, and for whom the county was made a palatine county. Henry IV., son of John of Gaunt, procured an act of parliament that the title and revenues should remain to him and his heirs for ever, as a distinct and separate inheritance from the crown; but in the time of Edward IV. the duchy was declared forfeited to the crown, to which, by act of parliament, both it and the county palatine were inseparably united. The chancery court has a chancellor, attorney-general, and other functionaries, and has an equity jurisdiction within the limits of the duchy.

History and Antiquities.—In the earliest period of English history this county was inhabited chiefly by the Brigantes (Βρίγαντες, Ptolemy), the most numerous and powerful of the tribes which then possessed the island. As Ptolemy has given the name of Σεταντίων Λίμην, Haven of the Setantii, to an æstuary (the Ribble, according to some, the Lune, according to others) in this county, it is likely that a tribe called Σετάντιοι, Setantii, occupied the northern part. The Brigantes were subdued by Agricola, and in the subsequent division of Britain Lancashire was included in the province of Maxima Cæsariensis, which comprehended all the country from the Mersey, the Don, and the Humber, to the Roman wall.

Several places mentioned by antient geographers are commonly identified with positions in this county. The Μορικάμβη εἴσχυσις, 'the mouth (or æstuary) of Moricambe,' has retained its name with scarcely any change; the Σεταντίων Λίμην has been noticed; the Βελίσαμα εἴσχυσις, which Horsley supposed to be the mouth of the Mersey, is by later geographers transferred to the Ribble; and the Σετηΐα εἴσχυσις, which Horsley considered to be the mouth of the Dee, has been transferred to the bay which receives both that river and the Mersey. 'Ριγόδουνον, one of the towns of the Brigantes mentioned by Ptolemy, is supposed to be the Coccium of Antoninus, now Ribchester.

Of the stations of the Antonine Itinerary, Mancunium is identified with Manchester, and Coccium with Ribchester, on the north bank of the Ribble, midway between Preston and Clithero (though some, with less reason, fix it at Blackrode, between Manchester and Preston, others at Cockey or Cockley, near Bury, and others again at Bury itself); Bremetonacæ or Bremetonacis is fixed by some at Lancaster, and by Camden and others, with more reason, at Overborough near Tunstal, some miles higher up the Lune, in the neighbourhood of Kirkby Lonsdale.

In Richard of Cirencester's map Moricambe is marked as a river, and the Alauna, Belisama, and Seteia are evidently identified by him with the Lune, the Ribble, and the Mersey. His Portus Sistuntiorum (probably the Σετάντίων λίμην of Ptolemy) is so given in his map and his Itinerary, as best to accord with the mouth of the Lune: the Sistuntii however extend along the coast at least as far south as the Belisama, or Ribble; and another tribe, the Voluntii, whom he describes as confederated with them, occupy the more inland tract immediately to the west of the great Pennine chain, as far south as the Seteia, or Mersey. Mancunium is not given in his map, though it is mentioned in his Itinerary. Coccium, in his map, is evidently fixed at or near Ribchester, and Rerigonium agrees in position with Lancaster: possibly Ad Alaunam, which he mentions in his Itinerary, is another name for the same place. The termination 'caster' leads us to fix a station at this town, and the first syllable 'Lan,' or, as it is provincially pronounced, 'Lon,' accords well with the name 'Ad Alaunam,' as well as with the first syllable of Longovicus, a station mentioned in the Notitia, which Camden is decided in placing here. If the Rerigonium and Ad Alaunam of Richard be fixed here, there is an additional reason for fixing on Overborough as the site of Bremetonacæ, for we cannot suppose that Lancaster had three antient designations entirely distinct from each other.

Several Roman roads have been traced in this county, and the direction of these may enable us to determine between the positions assigned to the above stations. Six of them diverge from Manchester (Mancunium) as a common centre. One runs north-west to Blackrode, and another north to Ribchester, the position most reasonably assigned to Coccium; two others run into Cheshire, one south-east by Stockport, another south-west by Stretford, supposed to be the Fines Flaviæ et Maximæ mentioned by Richard. Two others run into Yorkshire: one north-east toward Halifax; one, which branches from the foregoing, more easterly toward Oldham, Saddleworth, and Almondbury. The road to Ribchester is continued northward in the direction of Overborough, the Bremetonacæ of Camden. One branch road led from Ribchester to Freckleton on the north side of the æstuary of the Ribble, and another from Overborough to Lancaster, the Ad Alaunam and Rerigonium of Richard. It has been supposed that a Roman road entered the county at Warrington, and ran northward by Blackrode and Preston to Lancaster. A vicinal way led from the neighbourhood of Manchester to Warrington.

All traces of the station Mancunium have disappeared; of Coccium and Bremetonacæ some traces are visible at Ribchester and Overborough. Various antiquities have been dug up or found at each of these places: at Manchester, some inscriptions on stones; at Ribchester, various inscribed and other stones, coins and other smaller antiquities; and (in 1796) a helmet and several plates or vessels of copper or earthenware; and at or near Overborough an altar, a tesselated pavement, and other antiquities. Coins and other antiquities have been found at Colne (perhaps the Colunio of Ravennas), and at Cliviger near Burnley.

Long after the invasion of the Saxons Lancashire, the northern part at least, retained its independence as a part of the British State of Cumbria, or Cumberland, though this was frequently obliged to own the supremacy of the Northumbrian Angles. Egfrid, the son of Oswio, who reigned over the Northumbrians A.D. 670—685, conquered a part of the county and bestowed Cartmel in Furness with the Britons therein (et omnes Britanni cum ea) on St. Cuthbert, bishop of Lindisfarne, or rather annexed it to the temporalities of that see. Whether Lancashire or any part of it was permanently brought into subjection by the Saxons before the submission of the Cumbrian Britons to Edward the Elder, A.D. 921, is not known. Sir Francis Palgrave, in his map of England as divided into the great earldoms of Edward the Confessor's reign, divides Lancashire between the earldom of Coventry, then held by Leofric, and the subordinate principality of Cumberland, held by a Scottish prince. The Ribble is assigned as the boundary between the two; and the line of division is nearly or quite coincident with that which separates the present archdeaconries of Chester and Richmond.

In A.D. 1323 the northern part of the county was ravaged by the Scots under Robert Bruce, who advanced as far as Preston, part of which he burned. In the civil war of the Roses no event of importance occurred in Lancashire, but in the reign of Henry VII., the Earl of Lincoln and Lord Lovel, with 2000 German soldiers under Martin Swart, and a number of Irish under Lord Gerardine, landed in Furness, to support the cause of the impostor Lambert Simnel. In the reign of Henry VIII., when the rebellion known as 'The Pilgrimage of Grace' took place, the populace of Lancashire rose, but were put down by the earls of Shrewsbury and Derby. In the civil war of Charles I. many contests took place. Lord Strange, afterwards earl of Derby, headed the royalists. He made an unsuccessful attempt in 1642 on Manchester, which was occupied for the parliament by the county militia. Preston and Lancaster were subsequently taken by the parliamentarians and retaken by the royalists. In 1644 the siege of Lathom House, already noticed, took place; it was raised on the approach of Prince Rupert, who had previously taken Bolton, and afterwards obliged Liverpool to surrender; but in the following year the house was besieged again, and was given up by order of the king. In the attempt of the royalists to renew the war in 1648 the Duke of Hamilton and General Langdale marched southward to Preston, in the neighbourhood of which, on Ribbleton Moor, they were routed by the less numerous but veteran forces of Cromwell and Lambert. The vanquished fled southward, were overtaken and again defeated at Winwick and Warrington. Lancaster Castle was meantime besieged by the royalists, but in vain. In the year 1651 the Earl of Derby again raised the royal standard, but being defeated by Lilburne at Wigan Lane, and subsequently taken, was executed at Bolton.

In the Rebellion of 1715 the supporters of the Pretender were compelled to surrender at Preston, to which place they had advanced in their march southward, to the royal army under Generals Wills and Carpenter. In the Rebellion of 1745 the army of the young Pretender crossed the county twice; once in its advance into England, and again in its retreat.

Of the early periods of our history there are but few castellated remains. The keep of Lancaster and Dalton castles, the ruins of the castle on the island of Pile of Fouldrey, and Hornby Castle, have been already noticed. Gleaston Castle is in Furness, about two miles east of Furness Abbey: the ruins consist of portions of three square towers, with some connecting walls, formed of mud and pebbles, and faced with limestone, enclosing an area or courtyard. Thurland Castle near Hornby is an old mansion which, having been fortified, stood a siege in the civil wars of Charles I. The ruins of Greenhaugh Castle, a mile from Garstang, consist of one shattered tower. The monastic ruins are of greater interest. Cockersand Abbey is about six miles south-west of Lancaster, on a point of land at the mouth of the Lune. The buildings are said formerly to have covered an acre of ground, but the only remain is the chapter-house, an octangular room the roof of which is supported by a single pillar rising in the centre. Furness Abbey is near Dalton in Furness, on the banks of a rivulet in a narrow and fertile vale. It was founded A.D. 1127 by Stephen, then earl of Morton (Mortain) and Bulloin (Boulogne), afterwards king of England, for Cistertian monks removed here from Tulket in Amounderness, but originally from Savigny in France. Its yearly revenue at the dissolution was 966*l.* 7*s.* 10*d.* gross, or 805*l.* 16*s.* 5*d.* clear. The ruins of this abbey are still magnificent, and from the seclusion and picturesque beauty of the surrounding scenery are among the most striking of our monastic remains. They are of Norman and early English character. The whole length of the church is said to be 287 feet; the nave is 70 feet broad, and the walls are in some places 54 feet high and 5 feet thick. The windows and arches are upon a scale of unusual loftiness. There are ruins of the chapter-house and cloisters, and of the school-house, a large building detached from all the rest. The immediate precincts of the abbey, said to comprehend 65 acres, are enclosed by a stone-wall, on which appear the remains of small buildings, the offices of the abbey, and entered by a gateway, a beautiful pointed arch. The ruins are built of a pale red stone, dug in the neighbourhood, and changed by time and weather to a dusky-brown tint. They are everywhere embossed by climbing or parasitic plants. Whalley Abbey and the Priory Church of Cartmel have been already noticed.

(*Beauties of England and Wales;* Arrowsmith's *Map of England;* Walker's *Map of Lancashire;* Rickman's *Gothic Architecture; Parliamentary Papers;* Conybeare and Phillips's *Geology of England and Wales;* Priestley's *Hist. Acct. of Navigable Rivers and Canals;* Horsley's *Britannia Romana;* Reynold's *Iter Britanniarum;* Palgrave's *Rise and Progress of the English Commonwealth,* &c.)

STATISTICS.

Population.—Lancashire is mostly a manufacturing county, ranking the 41st on the list of agricultural counties, and in this respect it retains the same position as it did in 1811 and 1821, when it was also the 41st on the list. Of 313,097 males, twenty years of age and upwards, inhabitants of this county when the census was taken in 1831, there were 97,517 employed in manufactures and in making manufacturing machinery; 60,546 employed as labourers in labour not agricultural; and only 37,321 engaged in agricultural pursuits, of whom 20,949 were labourers.

Of those employed in manufactures by far the greater proportion consists of boys and females, notwithstanding the large number of men so engaged. In the hundred of Amounderness, of males twenty years of age and upwards, 3000 are employed at Preston, 230 at Kirkham, and about 1000 collectively at Goosnargh, Wood-Plumpton, and forty other places, in the manufacture of cotton goods of almost endless variety. In the hundred of Blackburn 8700 men are employed in the very extensive parish of Whalley, 3350 in the township of Blackburn, and 3500 in the other townships of that large parish: the township of Ribchester (in the parish of Ribchester) contains 250: besides these nearly 2000 are similarly employed in several other places in Blackburn hundred. In the hundred of Leyland, Chorley contains 1200 males employed in the cotton manufacture, the township of Leyland 400, and the residue of that parish in various townships collectively 2300; in other places 450. In the hundred of Lonsdale, north of the sands, about 100 males at Coulton and 40 at other places; in Lonsdale, south of the sands, about 140, chiefly at Catton, Scotforth, and Halton. In the hundred of Salford the town of Manchester contains about 12,000 men employed in the cotton and silk manufactures; Salford 3500, including many makers of machinery; Oldham 4000; and Crampton, in that parish, 4200; Great Bolton and Little Bolton 6100; Bury 1600; and Tottington 1500; Spotland and Castleton (in Rochdale parish) 2000; Middleton township 1100; Chorlton Row, near Manchester, 1900; Heaton-Norris 1100; and other townships in the great parish of

Manchester about 4000 collectively: Pendleton 850; and besides all these there are 18,000 in the numerous manufacturing townships of this populous hundred. In the hundred of West Derby the town of Wigan contains 2600 men engaged in manufactures; the parish of Leigh 2800; and other places about 3000. The makers and repairers of spinning-jennies, looms, and other machinery employed in the cotton, silk, and woollen manufactures, are very numerous, but are mostly connected with the cotton factories in such manner as to preclude any distinct mention.

The manufacture of woollen articles in this county is comparatively unimportant: the number of men employed in worsted-mills and as fullers, makers of baize, blankets, and flannels, being about 2700, chiefly at Newchurch in Whalley parish, in Rochdale and at Bury.

At Chorlton-Row, near Manchester, 1900 men are employed as workers in iron and brass; at Ashton 240, at Prescot 24, in the parish of Ulverstone 14. The manufacture of hats employs 550 men in several of the townships in the parish of Manchester, and 300 at Oldham. In the parish of Prescot 200 men are employed in making glass bottles and in glass-grinding, and 20 at West Derby. There are manufactures of pins and of sailcloth at Warrington; 70 men are employed in making sailcloth at Freckleton; and at Liverpool 340 men are engaged in various manufactures usual in a large seaport town.

The following Table is a Summary of the Population, &c., of every Hundred, &c., as taken in 1831.

HUNDREDS, TOWNS, AND BOROUGHS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Amounderness . .	12,847	13,508	99	733	3,309	8,191	2,008	34,091	35,896	69,987	16,183
Blackburn . .	29,509	31,249	97	1,874	3,132	23,469	4,648	82,966	85,091	168,057	37,266
Leyland . . .	8,138	8,551	13	518	1,875	5,251	1,425	24,127	24,211	48,338	11,013
Lonsdale (North of the Sands) . .	4,603	4,753	20	295	1,856	1,510	1,387	12,126	12,185	24,311	5,806
Lonsdale (South of the Sands) . .	3,544	3,692	20	196	1,802	1,001	889	9,975	9,827	19,802	4,091
Salford . . .	75,565	83,901	608	3,468	5,685	64,082	14,134	211,337	218,265	429,602	100,023
West Derby . .	28,882	31,200	505	1,385	6,657	16,280	8,263	83,855	86,207	170,062	39,850
Lancaster (Borough).	1,975	2,173	7	63	62	1,055	1,056	5,471	7,142	12,613	2,707
Liverpool (Borough) .	29,546	38,122	1,409	1,207	227	18,881	19,014	87,919	101,323	189,242	44,726
Manchester (Town) .	29,651	38,888	80	1,239	75	30,809	8,004	87,320	95,492	182,812	45,847
Wigan (Borough) .	3,870	3,988	4	288	16	3,164	808	9,948	10,826	20,774	4,775
Militia under training	..	..	..	..	..	..	..	1,254	..	1,254	..
Totals .	228,130	260,025	2,842	11,266	24,696	173,693	61,636	650,389	686,465	1,336,854	313,097

The population of Lancashire at each of the following periods was as under—

	Males.	Females.	Total.	Increase per cent.
1801	322,356	350,375	672,731	..
1811	394,104	434,205	828,309	23·13
1821	512,476	540,383	1,052,859	27·10
1831	650,389	686,465	1,336,854	26·97

showing an increase between the first and last periods of 664,123, or rather more than 98½ per cent., which is 41½ per cent. above the whole rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

		£.		s.	d.	
1801	were	148,282,	being	4	4	for each inhabitant.
1811	..	306,797	„	7	4	„
1821	..	249,585	„	4	8	„
1831	..	293,226	„	4	4	„

The expenditure for the same purpose in the year ending March, 1837, was 183,790*l.*: assuming the population to have increased since 1831 in the same proportion as in the ten preceding years, the above sum gives an average of about 2*s.* 4½*d.* for each inhabitant. All these averages are below those for the whole of England and Wales.

The sums raised in Lancashire for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1833, was 430,429*l.* 11*s.*, and was levied upon the various descriptions of property as follows:—

On land . .	£167,681	19*s.*
Dwelling-houses .	162,691	17
Mills, factories, &c. .	75,547	11
Manorial profits, navigation, &c.	24,508	4
	430,429	11

The amount expended was—

For the relief of the poor . .	£274,981	11
In suits of law, removal of paupers, &c.	17,215	13
For other purposes . .	149,578	5
	441,775	9

In the returns made up for the subsequent years the descriptions of property assessed are not specified. In the years ending March, 1834, 1835, 1836, and 1837, there were raised 428,770*l.*, 378,946*l.* 14*s.*, 331,740*l.* 7*s.*, and 251,542*l.* respectively; and the expenditure for each year was as follows:—

	1834.		1835.		1836.		1837.
	£.	s.	£.	s.	£.	s.	£.
For the relief of the poor .	253,405	0	222,059	10	193,854	8	183,790
In suits of law, removals, &c.	15,775	0	11,625	2	9,504	14	7,829
Payments towards the county-rate . .	133,192	0	68,927	9	71,854	13	..
For all other purposes			64,886	3	60,520	13	59,923
Total money expended	£402,372	0	367,400	4	335,734	8	251,542

The saving effected in the sum expended in 1837, as compared with that expended in 1834, was therefore about 37½ per cent.; and the saving effected, comparing the same periods, in the expenditure for the relief of the poor, was 23½ per cent.

The number of turnpike trusts in Lancashire, as ascertained in 1835, under the Act 3 and 4 Wm. IV., chap. 80, was 62; the number of miles of road under their charge was 631. The annual income arising from tolls and parish compositions in lieu of statute duty was, in 1835, 139,833*l.*, and the annual expenditure in the same year was as follows:—

Manual labour . .	£30,407	9	5
Team labour and carriage of materials	10,141	0	10
Materials for surface repairs .	18,389	13	9
Land purchased . .	1,037	6	10
Damages done in obtaining materials	234	12	8
Tradesmen's bills . .	2,637	6	10
Salaries of treasurer, clerk, and surveyor	5,515	10	5
Law charges . . .	1,345	9	2
Interest of debt . .	38,171	2	0
Improvements . . .	16,532	4	2
Debt paid off . . .	15,956	0	0
Incidental expenses . .	3,272	12	10
Estimated value of statute duty performed	229	2	6
Total expenditure	143,869	11	5

The county expenditure in 1834, exclusive of that for the relief of the poor, was 39,169*l.* 3*s.* 4*d.*, disbursed as follows:—

	£.	*s.*	*d.*
Bridges, building and repairs, &c.	116	3	4
Gaols, houses of correction, and maintaining prisoners, &c. .	5,479	0	2
Lunatic asylums . .	1,934	9	2
Prosecutions . . .	19,903	11	11
Clerk of the peace . .	778	12	11
Conveyance of prisoners before trial	3,075	18	9
Conveyance of transports .	1,949	5	7
Vagrants, apprehending and conveying	512	2	7
Constables, high and special .	1,563	3	3
Coroner . . .	2,199	0	6
Miscellaneous . . .	2,467	15	2
Total expenditure	39,169	3	4

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 10,563, 13,873, and 16,064, respectively; making an average of 1509 annually in the first period, of 1982 in the second period, and of 2295 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect of whom any costs were paid out of the county-rate, was 1705, 1968, and 2018 respectively.

Among the persons so charged with offences there were committed for

	1831.	1832.	1833.
Felonies . .	1628	1857	1876
Misdemeanors .	77	110	142

There is no return of the committals in each of the same years; nor of the number convicted or acquitted.

At the assizes and sessions in 1837 there were 2809 persons charged with criminal offences in this county. Of these 167 were charged with offences against the person, 81 of which were for common assaults, 111 persons were charged with offences against property committed with violence, 2292 with offences against property committed without violence; 5 were committed for arson, 3 for forgery, 52 for uttering counterfeit money, &c., and 179 for riot or various other misdemeanors. Of the whole number committed, 2190 were convicted, 374 were acquitted, and as respects the remaining 245 no bill was found, or there was no prosecution. Of the whole number of persons convicted, 29 were sentenced to death, but none were executed, their sentences being commuted, 8 to transportation for life, 12 for 15 years, 2 for 7 years, and 7 to different periods of imprisonment not exceeding 2 years; 30 were sentenced to be transported for life, and 111 for different periods; 1 was sentenced to 3 years' imprisonment, 72 for not more than 2, 278 for one year or under, and 1359 for 6 months or under; 25 were whipped or fined, and one was pardoned. Of the whole number of offenders, 2171 were males and 638 were females; 1259 could neither read nor write; 1349 could read and write imperfectly; 160 could read and write well; 11 had received superior instruction; and the degree of instruction of the remaining 30 could not be ascertained.

The number of persons registered in 1837 to vote for county members was—in the northern division 9691; in the southern division 17,754: together 27,445. Of these 16,669 were freeholders, 2827 leaseholders, 1265 copyholders, 6396 occupying tenants, 253 trustees, 35 mortgagers: total 27,445; being one in 48 of the whole population, and one in 11 of the male population twenty years and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county 457*l.* 8*s.* 3*d.*, and were paid out of the general county rate.

This county contains 26 savings' banks; the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.	1836.	1837.
Number of Depositors	26,687	29,160	32,613	36,744	40,861	40 519
Amount of Deposits	£911,141	£970,994	£1,075,313	£1,198,667	£1,334,058	£1,317,534

The various sums placed in the savings' banks in 1835, 1836, and 1837, were distributed as under:—

		1835.		1836.		1837.	
		Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding	£20	17,978	£137,220	19,637	£154,856	19,807	£151,584
"	50	11,431	347,557	13,048	393,592	12,588	383,494
"	100	4,730	325,302	5,235	360.756	5,208	357,150
"	150	1,526	184,671	1,733	208,908	1,727	207,228
"	200	865	146,528	940	160,450	995	168,160
Above .	200	214	57,289	218	55,496	194	49,918

Education.—The following summary is taken from the parliamentary returns on education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools . . .	123		
Number of infants at such schools; ages from 2 to 7 years:—			
Males . .		2,863	
Females . .		2,996	
Sex not specified .		501	
		——	6,360
Daily schools , . . .	2087		
Total of children at such schools:			
Males . .		49,439	
Females . .		34,801	
Sex not specified .		6,934	
	——	——	91,174
Daily schools .	2220		——
Total of children . . .		.	97,534
Sunday schools . . .	964		
Number of children at such schools; ages from 4 to 15 years:—			
Males . .		91,043	
Females . .		95,559	
Sex not specified .		12,175	
		——	198,777

Assuming that the population between the ages of 2 and 15 had increased in the same proportion as the whole of the population had increased during the ten years preceding 1831, and supposing that this part of the population bears the same relative proportion to the whole as it did in 1821, we find by approximation that the number of children residing in Lancashire between the ages of two and fifteen in 1834 was 481,266.

Of the Sunday-schools fifteen are returned from places where no other school exists, and the children, 1522 in number, who are instructed therein cannot be supposed to attend any other school. At all other places Sunday-school children have an opportunity of resorting to other schools also; but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Eighty schools, containing 11,183 scholars, which are both daily and Sunday-schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. At some of the Sunday-schools in this county, especially at Blackburn, Great and Little Bolton, Chorley, Manchester, Salford, and Oldham, a few persons receive instruction who are upwards of twenty years of age. Making allowances for these causes it may be a tolerably correct statement to say that about one-half of the children between the ages of two and fifteen were receiving instruction in this county at the time this return was made.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	11	1411	102	2,624	20	2,325
Daily Schools	241	12,454	82	10462	1691	58,033	73	10,225
Sunday Schools	19	2,369	900	188036	10	819	35	7,553
Total.....	260	14,823	993	199909	1803	61,476	128	20,103

The schools established by Dissenters, included in the above statement, are—

	Schools.	Scholars.
Infant schools . .	10 .	1,467
Daily schools . .	90 .	7,917
Sunday-schools . .	490 .	110,024

The schools established since 1818 are—

		Scholars.
Infant and other daily schools	1553 containing	63,609
Sunday-schools . .	756 .	154,038

Eighty-four boarding-schools are included in the number of daily schools given above. No school in this county appears to be confined to the children of parents of the Established church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists and Roman Catholics; the latter, to the amount of 15,916 children, are distinctly specified in the returns from this county.

There are lending-libraries of books attached to 321 schools in the county of Lancashire.

LANCASTER. [LANCASHIRE.]

LANCASTER, SIR JAMES, a skilful seaman, who received for his services the honour of knighthood from Elizabeth, conducted the first voyage undertaken by the newly constituted East India Company, A.D. 1600-3, and established commercial relations with the princes of Achim in Sumatra and Bantem in Java. He was a firm believer in a north-west passage; and his authority had much weight in promoting the numerous attempts made in that enterprising age to discover one. Lancaster's Sound, a deep inlet in Baffin's Bay, 74° lat., was named after him by Baffin, one of our most successful explorers. It is nearly certain, from the last discoveries, that this inlet does actually lead into the Arctic Ocean, north of America. Relations of Sir J. Lancaster's first voyage to the East Indies in 1591, and of a successful predatory voyage against the Portuguese in Brazil, in 1594, are given in Hakluyt's 'Voyages,' vol. iii.: his voyage to the East Indies in 1600-3 is contained in Purchas's 'Pilgrims,' vol. i. He died in 1620.

LANCELOT, CLAUDE. [PORT ROYAL.]

LANCE'OLA, a genus of Crustaceans established by Mr. Say on a single species, *Lanceola pelagica*, two females of which only he appears to have seen taken on the coast of America, in the Gulf Stream. M. Desmarest is of opinion that the genus belongs to the *Amphipoda* by reason of its vesicular oblong *branchiæ*, to the number of ten, placed at the internal base of the feet, except those of the first and seventh pairs, and that it especially approaches *Phronima* in its caudal appendages, which consist of three pairs of lanceolate styles, which are double and supported by depressed linear peduncles annexed to the sides by three rings which compose the tail. Its *mouth*, provided with two triarticulate filiform palps and bifid jaw-feet, bears analogy to that of the *Cloportes*. Its general *form* is that of the genus *Praniza* (which M. Desmarest considers to be an Isopod); its *antennæ*, composed of four joints, have the last joint not divided, and the inferior antennæ are the longest. The superior antennæ have their base hidden. The *eyes* are elongated; the *front* is concave; the *feet* are fourteen in number, and simple: the two first pairs are compressed, and the sixth is the longest. The *head* is short and transverse. The *body* is soft, and covered with membranous integuments; the *tail* is depressed, narrower than the body, and its terminal segment is attenuated between the posterior caudal styles.

LANCEROTA, or LANZAROTE. [CANARIES.]

LANCIA'NO. [ABRUZZO.]

LAND in its most restricted legal signification is confined to arable ground. In this sense the term is construed in original writs, and in this sense it is used in all correct and formal pleadings.

By the late statute of Wills, 1 Victoria, c. 26, s. 26, a devise of the land of the testator generally, or of the land of the testator in any place or in the occupation of any person mentioned in the will, is to be construed to include customary, copyhold, and leasehold estates to which the description will extend, as well as freehold estates, unless a contrary intention appear by the will. In its more wide legal signification land extends also to meadow, pasture, woods, moors, waters, &c.; but in this wider sense the word generally used is lands: the term land or lands is taken in this larger sense in conveyances and contracts.

In conveying the land, houses and other buildings erected thereon, as well as mines, &c. under it, will pass with it, unless specially excepted. A grant of the vesture of certain land is more restricted, and transfers merely a particular or limited right in such land, and the houses, timber, trees, mines, and other real things, which are considered as part or parcel of the inheritance, are not conveyed, but only corn, grass, underwood, &c., the produce of the land. Other limited or particular rights, as fishing, cutting turf, &c. may be granted, which confer no interest in the land itself, or, as it is called, the realty, but only the benefit of such particular privileges. But a grant of the fruits and profits of the land conveys also the land itself. Absolute ownership of land carries with it the right to the possession downwards of the minerals, waters, &c., and also upwards, agreeably to the maxim, 'cujus est solum, ejus est usque ad cœlum.'

Ownership of land is expressed in the English law by the term *real* property, in contradistinction to *personal* property, which consists in money, goods, and other movables.

In some parts of England the word 'land' is frequently used to denote the fee simple as distinguished from a less estate, without reference to the nature of the property. Thus it is usual to say, A has a lease of such an estate or such a house, but B has the land, *i.e.* the reversion or remainder in fee.

Land is legally considered as enclosed from neighbouring land, though it lie in the middle of an open field, and may therefore be called a *close;* and the owner may subdivide this ideal close into as many ideal parcels as he pleases, and may, in legal proceedings, describe each of these parcels, however minute, as his close. An illegal entry into the land of another is therefore called, in law, breaking and entering his close, and the remedy is by the action of trespass 'Quare clausum fregit;' it having been necessary, when writs were framed in Latin and all common law proceedings were entered on the rolls of the court in that language, to insert the words 'Quare clausum fregit' in the king's writ, or the party's plaint, by which the action was commenced, and also in the declaration wherein the nature of the injury was more circumstantially detailed.

Land derelict, or left dry by the sudden receding of the sea, or of the water of a navigable river, belongs to the king by his prerogative; but land formed by alluvion, that is, by gradual imperceptible receding of any water, or by a gradual deposit on the shore, accrues to the owner of the adjoining land.

(*Doctor and Student; Co. Litt.;* Comyn's *Dig.*)

LAND-TAX is a branch of the public revenue of England, which was first raised in its present form in 1692. It was contrary to the spirit of the feudal system that pecuniary assessments should be made upon land held by knight's service, the personal military services of the tenants being in this and in other countries considered as entitling them to exemption from tallage, or direct taxation. The first inroad upon this principle in England was the payment of escuage as a commutation for personal service. This was followed by pecuniary grants made by parliament in the form of subsidies upon the abolition of the military tenures by the Long Parliament, which was afterwards confirmed by the first parliament of Charles II.; the ground of exemption ceased, and land as well as personal estate, was made the subject of assessment.

Until 1799 the land-tax was granted by parliament for only one year, and the acts under which it was levied were renewed annually; but in that year an act was passed rendering the tax perpetual, the object of this alteration being to facilitate the raising of money by means of its redemption. Under the conditions of this act the tax was offered for sale first to the owner of the land upon which it was chargeable, and if the purchase were declined by him then to any other person, in which latter case the purchaser was to receive the amount half-yearly from the receiver-general. The payments were in either case to be made not in money, but by the transfer of an equivalent amount of the national debt. The advantage stipulated on the part of the public was, that if redeemed by the owner of the land, the interest or annuity transferred in payment should exceed the annual amount of the tax redeemed by 10 per cent.; and if purchased by an indifferent party, that the interest or annuity should exceed that annual amount by 20 per cent.: for example, if the land-tax to be redeemed by the owner amounted to 5*l.* per annum, the sum of 3 per cent. stock to be paid for the same would be 183*l.* 6*s.* 8*d.*, the annuity in respect of which would be 5*l.* 10*s.*, or 10 per cent. advance upon the tax. If the purchaser were a stranger, the amount of 3 per cent. stock would be 200*l.*, or an annuity of 6*l.* per annum, being 20 per cent advance. This measure met with only a partial success, which occasioned several modifications to be made in its terms with the view of rendering them more acceptable to the landowners. The most important of these modifications were passed in 1811 and 1812, when the management was transferred from special commissioners to the Commissioners for the Affairs of Taxes; the preference given in previous acts to the owners was revoked, except as regarded priority where competition appeared, and the purchase-money was made payable by thirty-two half-yearly instalments. It is not possible to give any detailed account of the amount redeemed from time to time under these acts. It appears from a report made by the commissioners in May, 1828, that up to that time 'the number of sales effected had been 3593, the total value thereof 1,438,513*l.* 4*s.* 3*d.*, and the total amount of land-tax redeemed thereby could not be fairly estimated at less than 63,100*l.* per annum.' Since that time it does not appear that any further account in reference to this plan has been called for by parliament.

The rate at which this tax is charged is 4*s.* in the pound on the annual value. The amount which it has yielded to the exchequer in each year from 1828 to 1837 has been as follows:—1828, 1,168,254*l.*; 1829, 1,172,068*l.*; 1830, 1,182,409*l.*; 1831, 1,161,312*l.*; 1832, 1,184,340*l.*; 1833, 1,155,019*l.*; 1834, 1,203,578*l.*; 1835, 1,199,783*l.*; 1836, 1,199,600*l.*; 1837, 1,192,635*l.*

LANDAU is a strong fortress in Bavaria, situated in 49° 11′ N. lat. and 8° 9′ E. long., in a beautiful valley on the river Queich, and on a canal, by which provisions, materials for building, &c., are conveyed to it by water. Though small, it is celebrated in military history, having sustained several memorable sieges. It is a regular octagon, with 8 curtains, covered by 7 bulwarks, 3 redoubts, 7 lunettes, 1 fort, 3 whole and 2 half bastions, and surrounded by broad moats. The barracks and casemates are bomb-proof. It is very regularly built within, has two gates, a large parade, a church, which the Protestants and Roman Catholics have in common, a gymnasium, various public offices, and manufactures of calico, woollens, linen, hats, fire-arms, copper and iron foundries, &c. The population amounts to rather more than 6000, besides the garrison. Landau, which was formerly an imperial city, was ceded to France in 1680, and fortified by Louis XIV. In 1702 it was taken by the Austrians, but recovered by the French in 1703. After the battle of Blenheim in 1704 it again fell into the hands of the Austrians, who retained it till 1713, when it was again ceded to France. In 1793 it was closely but unsuccessfully besieged by the Austrians and Prussians. The first treaty of Paris, in 1814, left it to the French; but at the second treaty, in 1815, it was declared a fortress of the German Confederation, under the protection of Bavaria, a part of whose contingent to the army of the Confederation forms the garrison.

LANDEN, JAMES, a mathematician of the last century, was born at Peakirk, near Peterborough, in January, 1719, and died at Melton, near the same place, January, 1790. He was for many years agent to Earl Fitzwilliam; but no details have been published of his life, neither have we heard of any which it would be worth while to give.

The writings of Landen stretch over a long period, from his first essays in the Ladies' Diary, in 1744, to his paper on rotatory motion in the Phil. Trans. for 1785. The thing by which he is now most known is his attempt to derive the differential calculus from algebraical principles, often called his residual analysis. [Differential Calculus.] His writings, though they contain many curious and original theorems, yet are mostly upon isolated subjects, and, except as being all the work of one man, need no more detailed description than a volume of miscellaneous memoirs. They relate for the most part to points of the integral calculus, and of dynamics; we may take, for instance, his determination of the arc of an hyperbola by means of two elliptic arcs, in the Phil. Trans. for 1775.

The writings of Landen which are not contained in the Philosophical Transactions are, his 'Mathematical Lucubrations,' 1755; the 'Residual Analysis,' 1764; two volumes of Memoirs, the first published in 1780, the second written near the end of his life, and published posthumously; Tracts on Converging Series, 1781-82-83.

LANDER. [Quorra.]

LANDERNAU. [Finistere.]

LANDES, LES, a name formerly given to the wild sterile districts stretching along the coast of Guyenne and Gascogne, between the Gironde and the Adour. The name, which denotes heath or waste open country, is sufficiently descriptive of its natural character, though it varies considerably, the part near the coast being the wildest. The district was subdivided into Les Landes, properly so called, including the territories of Dax, Albret, Tartas, and Urt; Le Pays de Marenne between the Adour and the sea; Le Pays de Marausin, on the coast, north of Le Pays de Marenno; the districts of Chalosse and Marsan inland, toward the east; Les Landes de Bordeaux, in the neighbourhood of that city; Les Petites Landes, between Bazas and Mont de Marsan; and Les Grandes Landes, comprehending the central parts of this extensive waste. The former high-road from Bordeaux to Bayonne, and into Spain, ran direct through Les Grandes Landes; but has been abandoned for a more circuitous inland route through Les Petites Landes, by Bazas, Mont de Marsan, and Dax. The physical characteristics of the country are noticed in the following article.

LANDES, a department in the south-west of France, bounded on the north by that of Gironde, on the east by those of Lot et Garonne and Gers, and on the south by that of Basses Pyrénées: on the west it is bounded by the sea-coast running in an almost undeviating line north and south to the mouth of the Adour. The form of the department approximates to that of a quadrangle, having its northern side 73 miles long, its eastern side 42 miles, its southern side 60 miles, and its western side, or coast line, 69 miles. Its area is estimated at 463 square French leagues (25 to a degree), or 3541 square English miles, just about the area of the two English counties of Norfolk and Suffolk. The population in 1836 was 284,918, or above 80 to a square mile, showing the density of the population to be very little more than half the average of France; and far below that of any county in England except Westmoreland. Mont de Marsan, the capital, is in 43° 53′ N. lat. and 0° 30′ W. long.; 365 miles in a direct line south by west of Paris, or 467 miles by the road through Orléans, Blois, Tours, Poitiers, Angoulême, Bordeaux, and Bazas.

The surface is generally flat. The range of hills which separates the basin of the Adour from that of the Garonne skirts the department on the north-east side, and some of the lower slopes of the Pyrenees extend into it on the south, but it has no considerable elevations. The rocks which pervade it generally belong to the supercretaceous group, but just on the southern border the strata between the chalk and the newer red or saliferous sandstone crop out chalk is not found. This southern part of the department yields building-stone, marl, porcelain clay, and some iron. Along the coast is a range of sandy downs, skirted on the land side by a line of étangs, or pools, of which those of Orx, Tosse, Soustons, Vieux Boucau, Léon, St. Julien, Aureillan, Parentes or Biscarosse, and Sanguinet or Cazau, are the chief. The last three communicate by a narrow stream with each other, as do those of Tosse, Soustons, and Vieux Boucau: several of them also communicate with the sea.

The chief rivers of the department are: the Adour, which waters the southern part; with its tributaries, the Midouze, formed by the junction of the Midou and the Douze, the Gabas, the Luy de France, and the Gave de Pau, beside a great number of streams which flow into these. The only river in the northern part, of any size, is the Leyre, which is formed by the junction of two streams both rising within the department. The Adour enters the department on the east side, and passes by Aire and Grenade to St. Sever, where the navigation commences; it shortly after receives the Gabas on the left bank, and flows west to the junction on its right bank of the Midouze, which is navigable from Mont de Marsan. It afterwards receives the Luy and the Gave from the Pyrenees on its left bank; both these streams are navigable for a short distance. The river navigation of the department has an extent of about 115 or 116 miles; of which the navigation of the Adour is 78 miles; that of the Midouze about 27 miles; and that of the other two about 10 or 11 miles together. The rapidity of the stream renders the navigation of the Adour of very little use.

There are no navigable canals in the department. Several have been contemplated: one was projected as far back as 1781 by Dupré de St. Maur, then intendant of Guyenne; it was to run from the Gironde below Bordeaux, by the line of the étangs to the mouth of the Adour, or by the étangs to the Bassin d'Arcachon, and thence by the course of the Leyre and the Estrigon to the Midouze near Mont de Marsan. Another canal was projected to run from the Garonne at Bordeaux to the Adour at Dax. A company was formed and a royal ordonnance obtained in 1821, for executing one of these works. A third canal has been projected, and we believe something has been done towards its execution, from the Gelize, a stream belonging to the system of the Garonne, to the Midouze near Mont de Marsan. Though little has been done in these great works, we believe the projects have not been given up.

The high road from Paris by Bordeaux into Spain enters the department at Le Poteau, and runs south-west by Roquefort, Mont de Marsan, Tartas, and Pontons, to St. Esprit, a suburb of Bayonne, where it crosses the Adour into the adjacent department of Basses Pyrénées. A road branches off from this at Roquefort, and runs south by Villeneuve de Marsan and Aire to Pau, capital of the dep. of Basses Pyrénées; and a road from St. Esprit runs east by Peyrehorade to the same city. There are other roads from Tartas, by Grenade and Cazéres, to Aire; and from Mont de Marsan, by St. Sever, to Orthes, in the department of Basses Pyrénées. The older and more direct road from Bordeaux to Bayonne, by the Grandes Landes, passes by detached posting-houses and miserable villages. It is indeed in many parts scarcely a road, but rather a track across a wild sandy desert; and is now almost deserted. The aggregate length of the government roads is 287 miles, viz. 175 in repair, 27 out of repair, and 85 unfinished. The aggregate length of the departmental roads is 207 miles, of which more than half is unfinished. The bye-roads and paths are in number 1439, in aggregate length above 3000 miles.

The agricultural produce of the department is small: in the part south of the Adour, some maize and millet and rye are grown, and a little wheat: there are considerable vineyards, which produce tolerable wine; much fruit is grown, especially peaches, and also madder. North of the Adour the country consists of wide plains, on which numerous sheep of a hardy breed find scanty pasturage. In some parts the soil, composed of an ash-coloured sand, is too unproductive even for sheep-walks. Forests of pine occupy a vast extent of country. The pine (*pinus maritima* of Linnæus) acquires, in the sandy and else unproductive wastes, a height beyond that which it attains in other parts of France; it yields wood for the carpenter and masts for the shipwright: pitch is extracted from it, and charcoal is manufactured. The population of the wilds is scanty. The peasantry live in solitary cabins: the head of the family engages in the cultivation of the soil, where its sterility is diminished by nature, or counteracted by abundance of manure: the younger branches go, perhaps twenty miles from home, to make charcoal in the forests, or to attend their flocks. They traverse the deserts on long stilts, that they may pass dry-footed through the morasses which from time to time intervene. The shepherds watch their flocks, mounted on these stilts, and resting on their staves, the tops of which are broad and rounded to afford them a seat. They employ the leisure which their occupation allows in knitting large woollen stockings. Some good horses are reared on the wastes; mules are bred; and some swine are kept. Poultry, bees, and silk-worms are objects of attention in the department.

The department is divided into three arrondissemens; as follows:—

Arrondissement.	Situation.	No. of Com. in 1837.	Area in sq. miles.	Population. 1831.	Population. 1836.
Mont de Marsan	N.	117	1985	91,595	93,292
St. Sever . .	S. E.	114	661	90,446	90,500
Dax	S. W.	108	895	99,463	101,126
		339	3541	281,504	284,918

The number of cantons, or districts under a justice of the peace, is twenty-eight.

In the arrondissement of Mont de Marsan are the capital, on the Midouze; Roquefort and St. Justin on the Douze, Villeneuve de Marsan on the Midou, Grenade and Cazéres on the Adour, and Houtans on a stream flowing into the Midou. Mont de Marsan was built by Pierre, Viscount of Marsan, A.D. 1140. It is a handsome town at the confluence of the Douze and the Midou, approached by fine avenues of trees, and having broad straight streets, neat well-built houses, and a handsome bridge over the Midou. There is an office for the prefect of the department, and a justiciary court and prison of appropriate architecture. There are also a theatre, an hospital, and some barracks. The population was 3774 in 1831, and 4082 in 1836. There are no manufactures, except a trifling one of sailcloth; but the town is the general mart for the supply of the neighbouring country, and is the residence of many genteel families. During the war, it was one of the stations for the inland communication carried on by means of the Garonne and the Midouze and the Adour, between Bordeaux and Bayonne. Mont de Marsan has a high school, a library of 10,000 or 12,000 volumes, an agricultural society a departmental nursery-ground and several baths. Roquefort has some lime-kilns and potteries; some trade is carried on in cattle, wool, honey, and wax. The population is about 1500. Villeneuve de Marsan has about as many inhabitants as Roquefort, who carry on considerable trade at their markets and their fairs. Some miles north of Mont de Marsan is Labrit or Albret, now a village, but formerly the capital of a county, the lords of which played an important part not only in the province, but in the kingdom at large.

In the arrondissement of St. Sever are St. Sever, Aire, Mugron, and Pontons, on the Adour; Tartas on the Midouze; Souprosse between Tartas and St. Sever; Pimbo, Arboucave, Samadet, and Montaul, on or near the Gabas; Hagetmau, or Hagetmeau (pop. in 1831, 3053), on the Louts, a feeder of the Adour, and on the road from St. Sever to Orthes; Geaune, Loubouer, and Coudures, on the Bas, a feeder of the Gabas; and Maut, Amou, and Pomares, on or near the Luy and its branches. St. Sever is pleasantly situated on an elevation near the Adour, over which there is a handsome bridge. The town is neat and well built: it has a terrace commanding an extensive prospect. The population of the commune was 5949 in 1831, and 5863 in 1836; about half the population is in the town itself. Aire is described elsewhere. [AIRE.] Hagetmeau has many tan-yards. There are the ruins of an antient castle. Tartas is in a pleasant situation; and the upper town, separated by the Midouze from the lower town, commands an extensive prospect. The inhabitants, about 2000 in number, carry on considerable trade with Bayonne, by means of the Adour.

In the arrondissement of Dax are Dax (pop. of the commune in 1831, 4716, in 1836, 4776), and Saint Esprit (pop. of commune in 1831, 5895; of town, 4108), a suburb of Bayonne, on the Adour; Cap Breton and Vieux Boucau, on or near the coast; and Peyrehorade, Nastingues, Sorde, and Habas, on or near the Gave. Dax and St. Esprit are noticed elsewhere. [DAX; BAYONNE.] Cap Breton was once of greater importance than now, as its extent and the number of ruined and deserted habitations testify. It is on the bank of a rivulet, the mouth of which once formed a haven. Vieux Boucau (*i.e.* Old Mouth) was formerly a place of consequence. The mouth of the Adour at Bayonne having been blocked up by sand-hills, the river forsook its channel, and flowing northward on the inner or land side of the downs, which line the coast, found no outlet until it reached Vieux Boucau, where it entered the sea, forming a haven which gave some consequence to the place. The river pursued this course for nearly 140 years, or, according to some writers, above 200 years, until, in A.D. 1579, the Bayonne mouth was cleared and reopened. This restoration of the channel to its former course caused the downfal of Vieux Boucau, which now contains scarcely thirty inhabited houses. Peyrehorade (pop. in 1831, 1740 town; 2453 whole commune) is on a hill on the right bank of the Gave de Pau: it has a considerable weekly market. There is a poor-house or hospital.

The manufactures of the department are not considerable. There are many tan-yards; some woollen cloths and coarse woollen stuffs, sail-cloth, and table-linen are manufactured. The exports of the department consist of hams, sheep, fruit, cork, deals, pitch, resin, &c. There is no port along the coast; but that of Bayonne, at the mouth of the Adour, is close upon the border of the department.

The department is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Pau. It forms the diocese of Aire, the bishop of which is a suffragan of the archbishop of Auch. The diocese was in existence as early as the beginning of the sixth century. The department is in the eleventh military division, the head-quarters of which are at Bordeaux. It sends three members to the Chamber of Deputies. In respect of education it is considerably below the average of France. Of the young men enrolled in the military census of 1828-9, only twenty-eight in every hundred could read and write, while the average of France was more than thirty-nine in every hundred.

LANDING-WAITER, an officer of the customs, whose duties consist in taking an accurate account of the number, weight, measure, or quality of the various descriptions of merchandise landed from foreign countries or colonial possessions. Landing-waiters likewise attend to the shipment of all goods in respect of which bounties or drawbacks are claimed. These officers are likewise called searchers.

LANDGRAVE. In the early history of Germany the *Grave* was an inferior judge, who was chosen by the people for his experience in business. He was hence called *Grau* or *Grave* (*i. e.* gray, or aged), or more probably from the old German *Gerefa*, receiver, afterwards judge, which subsequently was changed to the present German title *Graf*, which we translate Count. Under the Franks the Graves were no longer chosen by the people, but appointed, like the dukes, by the kings, and were judges of a district (called a *Gau*, a division of which there are still some traces in Germany, as the Rheingau), in which they exercised the rights of government in the king's name, having especially the administration of justice, the police, and the royal revenues. After the time of the Carlovingian kings the following classes were distinguished: *Palgraves* (Pfalzgraf, from *pfalz*, court), who sat in judgment at the king's court, and examined whether a suit must be decided by the king himself; *Margraves* (properly *Markgraves*, Markgraf), from *mark*, a frontier or boundary, who were keepers of the frontiers (lords of the marches); *Landgraves*, after the eleventh century, so called in contradistinction to the Markgraves, they being governors, or graves, of the interior, who were under the dukes, and to whom the graves were subordinate. They very soon however made themselves independent of the sovereign. The Markgraves of Thüringen assumed the title of Landgraves towards the end of the eleventh century, and it was obtained in the next century by the Graves of Hesse, in whose dominions the title is still borne (with the exception of the sovereigns of Hesse-Cassel and Hesse-Darmstadt and their presumptive heirs) by all the members and collateral branches of the reigning families.

LANDGUARD, FORT. [Harwich.]

LANDRE'CY, or LANDRECIE. [Nord.]

LANDSCAPE GARDENING. [Garden.]

LANDSCRONA is a town in Sweden, on the shores of the Sound, at nearly an equal distance between Cape Kuller and the town of Malmö, and opposite the small island of Hven, 55° 51′ N. lat. and 12° 8′ E. long. It is situated in the province of Skonen, and in the lan of Malmö, in a level and fertile country, in which much tobacco is grown. Its harbour is rather spacious and very safe. Being situated nearly opposite the capital of Denmark, the harbour as well as the town are well fortified. Its population amounted in 1825 to 3722, and is supposed to exceed at present 4000 souls. It carries on a considerable trade in corn, and has some manufactures of tobacco and starch, and also some sugar-houses, tanneries, and soap-houses, the produce of which is sent to some of the neighbouring harbours of Sweden. There is a good grammar-school in the town.

LANDSHUT, one of the prettiest and most agreeable towns in the kingdom of Bavaria, lies in 48° 30′ N. lat. and 12° 7′ E. long. It is situated in a delightful country on the banks of the Isar, over which there is a new bridge. The principal portion of the town consists of two long broad and straight streets, connected by a number of narrower ones. The houses are well built of brick, and many of them have gardens. The open parts are two market-places and the parade-square. The most remarkable buildings are the palace, called the Neue Bau (New Building), the house of the provincial assembly, an hospital, and two parish churches, of which St. Martin's is celebrated for its beautiful steeple, one of the loftiest in Germany: this steeple, which is said to be 456 feet in height, commands a magnificent and most extensive view over almost the whole plain of Bavaria. On a mountain near the town is the antient castle of Trausnitz, which was formerly a strong fortress, and the residence of the dukes of Bavaria. On the declivity of this mountain is the botanic garden. A suburb is built on an island formed by the Isar. In the year 1800 the university of Ingolstadt was transferred to Landshut, but in 1826 it was removed to Munich. There are however still a seminary of Catholic divinity, a gymnasium, a lyceum, and a chirurgical clinical school. There are some manufactories of cloth, leather, starch, playing-cards, snuff, and tobacco, but all on a small scale; the breweries and distilleries are however extensive. Landshut was formerly an important fortress, as its name, 'Guard of the Country,' seems to imply. It has accordingly suffered severely in times of war, as in 1742, 1743, and from the French invasions in 1796, 1800, 1805, 1809. The population is now nearly 8000.

LANFRANC, Archbishop of Canterbury, was born at Pavia, A.D. 1005, where he was instructed in grammar and logic. After the death of his father, who was a counsellor to the senate of that town, he spent some years in the study of rhetoric and civil law at Bologna, whence he returned to his native city, and commenced as advocate in the courts of law. Thinking this too narrow a sphere, he removed into France, and opened a school at Avranches, which was soon crowded with students of high rank. In a journey to Rouen he had the misfortune to be robbed and left bound in a wood, where he was found the next morning by some peasants, who carried him, almost dead, to the abbey of Bec. Here he was treated with so much tenderness, that when he recovered he became a monk in that abbey, A.D. 1041. At the end of three years he was chosen prior of Bec. Here he entered into a long and violent controversy with Berenger, archdeacon of Angers and master of the academy of Tours, on the subject of the Eucharist, which at that day made no little noise in the church. His fame ultimately procured him the favour of his sovereign, William duke of Normandy, who made him one of his counsellors, employed him in an important embassy to the pope, and appointed him, A.D. 1062, abbot of his newly-erected monastery of St. Stephen at Caen. Here he established a new academy, which became no less famous than those which he had before set up at Avranches and Bec. When the see of Canterbury became vacant by the deposition of Stigand, William, who had effected the conquest of England, procured his election to that see, August 15, A.D. 1070, and with some difficulty prevailed upon him to accept the station. To the church of Canterbury he proved a great benefactor, by asserting its right to the primacy of England, by recovering many of its possessions, and by rebuilding the cathedral. During a large portion of the reign of William the Conqueror, Lanfranc enjoyed a high degree of favour; and had the chief direction of affairs, both in church and state, under William Rufus, till the time of his death, which happened May 28, A.D. 1089, in the 84th year of his age.

Several of our historians who were almost his contemporaries speak in very advantageous terms of the genius and erudition of Lanfranc; and some of them, who were personally acquainted with him, represent him as the most learned man of his age. His writings consist of commentaries on St. Paul's Epistles, sermons, letters, and his Treatise on the Eucharist against Berenger. This last production rendered him a prodigious favourite with the literary historians of the Church of Rome. His works were collected and edited by Lucas d'Achery, at Paris, fol., 1648.

(*Histoire Litéraire de la France*, tom. viii.; Tanner, *Bibl. Brit. Hib.*; Henry's *Hist. of Great Britain*, 8vo. ed., Lond., 1805, vol. vi., pp. 126-128.)

LA'NGAHA. [Viperidæ.]

LANGHORNE, JOHN, was born at Kirkby Stephen, in Westmoreland, in 1735, and educated at the school of Appleby. Being too indigent to proceed to the university, he had recourse to private tuition, took orders, and in 1760 entered himself as a ten-year-man at Clare Hall, Cambridge. Having fallen in love with a daughter of the gentleman in whose family he lived, he offered her his hand, and on being refused quitted his employment, and repaired to London, where he obtained a curacy, helped to support himself by his pen, and soon became a well-known and popular author. Dr. Hurd appointed him assistant preacher of Lincoln's Inn Fields, and a short poem, called 'Genius and Valour,' written in defence of the Scotch against the coarse abuse of Churchill and others, procured for him, from the university of Edinburgh in 1766, the degree of D.D. In the following year he renewed his suit, and was accepted. The living of Blagden in Somersetshire was purchased for him; but in the first year of his marriage his happiness was interrupted by the death of his wife in childbed. To solace his grief he undertook, with his brother, the new translation of Plutarch's Lives, published in 1771, by which he is best known. In accuracy this has doubtless the advantage over Sir Thomas North's old version from the French of Amyot, but it is much inferior in spirit and effect. Having married again, he lost his second wife in 1776, also in childbed. This double disappointment is said to have led him into intemperate habits. He died in April, 1779.

Langhorne wrote tales, poems, chiefly short, and sermons, which did not establish for him much reputation as a divine. His prose is flowery and sentimental, his verses pleasing and harmonious but over ornamented, seldom rising above prettiness, and often spoiled by affectation. They have a place in Chalmers's 'British Poets.' For the list of Langhorne's works see Watt, *Bibl. Brit.* The poems, published by his son in 1802, contain a Life of the author.

LANGELAND. [Denmark; Funen.]

LANGRES, a town in France, capital of an arrondissement in the department of Haute Marne, 167 miles east-south-east of Paris. This town takes its name from the Lingones, one of the Celtic nations. Strabo gives to this nation the names Λίγγονες and Λιγκάσιοι: Ptolemy calls them Λύγγωνες. They were among the tribes who, in the time of Cæsar, embraced the Roman alliance, and they retained a considerable degree of liberty even under the emperors. Their chief town was called Andomatunum; in the later period of the Roman empire it was called, after the name of the people, Lingones; and thence by corruption Langres. It was a place of great importance under the Romans: many antiquities have been found; and there yet remain the ruins of two triumphal arches, one erected to Probus and one to Constantius Chlorus. Langres was much injured in the invasion of Gaul by the barbarous tribes which overwhelmed the Roman empire. It stands on an elevated site on the northern slope of the range of hills which unite the Cévennes with the Vosges, and near the sources of the Marne. It is surrounded by old fortifications raised during the middle ages. It is not well built, but is adorned with fountains and promenades. The cathedral is remarkable for the beauty of its architecture, and for its antiquity; some part of it is thought to have been a heathen temple. There are a town-hall and a theatre. The population of Langres in 1831 was 5960 for the town, or 7460 for the whole commune; in 1836 it was 7677 for the commune. The chief manufactures are cutlery, especially scissars, leather, and earthenware; there are many breweries. The inhabitants trade in millstones, skins, grain, flax, hemp, wool, &c. There are eight yearly fairs. There are two seminaries for the priesthood, a high-school, a drawing-school, and lectures on mechanics and geometry applied to the arts. The public library consists of 30,000 volumes. There are a foundling and two other hospitals.

This city is commonly reputed to be the birth-place of Julius Sabinus, who assumed the purple against Vespasian, and was concealed for nine years after his defeat by the faithful affection of his wife Epponina. (Tacit., *Hist.*, iv. 67.) It was also the birth-place of Diderot.

LANGTOFT, PETER, an English chronicler who lived at the end of the thirteenth and beginning of the fourteenth century, was a canon-regular of the order of St. Austin at Bridlington in Yorkshire. He translated from the Latin into French verse Herbert Bosenham's (or Boscam's) 'Life of Thomas à Becket,' and compiled, likewise in French verse, a 'Chronicle of England,' manuscripts of which are preserved in the Cottonian Collection, Julius A.V., in the old Royal Library at the British Museum, and among the Arundel manuscripts in the library of Heralds' College. The 'Chronicle' begins with the fable of the Trojans, and comes down to the end of the reign of Edward I. Langtoft is believed to have died early in the reign of Edward II. Robert de Brunne gave an English metrical version of Langtoft, which was edited at Oxford, in 2 vols. 8vo., by Hearne, in 1725. (Hearne's *Pref.* to *Peter Langtoft;* Tanner, *Bibl. Brit. Hib.;* Chalmers, *Biog. Dict.*, xix., p. 526.)

LANGTON, STEPHEN, was a native of England, having been born in the earlier half of the twelfth century, according to one account in Lincolnshire, according to another in Devonshire. After finishing his studies at the university of Paris, he taught with applause in that seminary, and gradually rose to the office of its chancellor. He held this rank, and had also obtained some preferment in the church of his native country, when he visited Rome, about the year 1206, on the invitation of Pope Innocent III., who immediately honoured him with the purple by the title of Cardinal of St. Chrysogonus, and soon after recommended him to be elected to the Archbishopric of Canterbury, then considered as vacant by the rejection of the claims both of Reginald the sub-prior of Christ-church, whom his brother monks had in the first instance appointed to succeed the last archbishop Hubert, and of John de Gray, bishop of Norwich, whom they had afterwards substituted in deference to the commands of King John. Langton was elected by a few of the monks who were then at Rome, and was consecrated by Innocent at Viterbo, 17th June, 1207. John's determined resistance to this nomination gave rise to the contest between him and the pontiff which had such important results. [Innocent III.; John, King of England.] The consequence, in so far as Langton was concerned, was, that he was kept out of his see for about six years; till at last, after the negociation concluded by the legate Pandulf, John and the cardinal met at Winchester, in July, 1213, and the latter was fully acknowledged as archbishop. In the close union however that now followed between John and Innocent, Langton, finding his own interests and those of the clergy in general, in so far as they were opposed to those of the king, disregarded by the pope, was naturally driven into confederacy with the insurgent barons, among whom the eminence of his station and the ascendency of his talents soon acquired him a high influence, and in whose counsels he took a prominent part. It was he who, at the meeting of the heads of the revolt at London, 25th August, 1213, suggested the demand for a renewal of the Charter of Henry I. To the cause of the national liberties, which he had thus joined, he adhered without swerving throughout the rest of the contest; a course by which he so greatly offended the pope, that on his refusal to excommunicate the opponents of the royal authority, after John's perfidious attempt to release himself from his engagements at Runnymede, he was in the latter part of the year 1215 suspended by Innocent from the exercise of his archiepiscopal functions. After this the name of Cardinal Langton is little mentioned by the historians; but he continued to preside over the church till his death, 9th July, 1228. He was a person of considerable learning, and is the author of various theological tracts, some of which have been printed, and lists of all of which that are known are given by Cave and Tanner. It has been shown in a note to the last edition of Warton's 'History of English Poetry' (ii. 80), that there is no reason to suppose Langton to have been the author of a drama in the French language, which had been assigned to him by M. de la Rue (in the *Archæologia*, vol. xiv.), on no better grounds than the manuscript having been found bound up with one of the cardinal's sermons.

LANGUAGE. The purpose of the following remarks is to show generally what language is, and to point out the principles according to which particular languages should be studied and compared. All languages may be viewed simply as existing phænomena, without any reference to the changes which they have undergone. The history of such changes is a part of the history of man, and is necessary for a full and complete understanding of any given language; but a language, considered in any stage of its development and progress, is in its essentials as language one and the same phænomenon. The origin of language, like that of man himself, is unknown, beyond the brief statement given in the book of *Genesis*. That man has the faculty of speech, is only another mode of saying that by his organization he is qualified to produce all the sounds which compose spoken language. Whether man, being originally endowed with this power, gradually formed language, stimulated by his instincts for social life, and guided by his intellectual powers; or whether language, and not the bare faculty of speech, was conferred on him by the same power which called him into being, are questions that cannot be answered, and for our present inquiry they are unimportant. If any conclusion can be drawn from the narrative of the creation in the sacred Scriptures, it is in favour of the hypothesis that language was given to man; a conclusion which even those who deny the truth of the Mosaic account must admit to contain the only satisfactory solution of the difficulty that has yet been proposed. The supposition that language was gradually formed by the efforts of man may be put side by side with the notion that man was originally a solitary savage animal, that society was formed by his perception of the advantages of union, and that thus barbarism was gradually exchanged for civilization. If this latter hypothesis is justly rejected as not only unsupported by any evidence, but as contrary to the recorded experience of mankind, the former hypothesis, that of man constructing language*, if it does not necessarily fall with it, must at least be greatly shaken.

It is no objection to the opinion, not here expressed, but only intimated, that the history of many languages shows a gradual progress from rude beginnings to a more perfect state, and that so far back as we can trace most cultivated tongues, they bear the impress of a ruder state than that exhibited at any subsequent stage in their development, and that the social state of which they are the index and the exposition has had a progress of improvement corresponding to that of the language. Without fully admitting all that is contained in such objection, we may reply, that we know little of any language before the time when it was committed to writing, and that we know nothing of the remoter origin of any language, there being no one of which we can affirm that it is either unconnected with every other existing language, or unconnected with some language no longer known.

A definition, or rather a description, of what language is, may be required at the outset of these remarks: that which we shall give does not aim at such a degree of accuracy as to be above criticism; it is merely such a description as will show what it is that we are speaking about; and perhaps there would be no great impropriety in leaving it undefined, and allowing each person to collect his definition from what is here said.

Language consists of vocal sounds [LARYNX], which convey to the hearer the same conceptions as those which prompt the speaker to utter the sounds. Any sounds then are a component part of language which produce in the hearer the counterpart of that mental state of which these sounds are the material and sensible signs. But language, as it exists, presents great varieties, and though all languages have many sounds in common, which are universally significant and intelligible, the greatest part of the sounds composing any given language are only intelligible to those who from their early youth and long experience have become familiar with them. But this fact does not affect the definition of language. If any two human beings can by vocal sounds mutually convey to each other their desires, thoughts, and conceptions, this possession of a common power and capacity constitutes the possession of a common language. When this power and capacity are common to a considerable number of persons living in a community, the exercise of them constitutes and makes a language. Whether the vocal sounds employed are many or few, or whether the language is rude or cultivated, makes no difference for the purposes of this general description.

A language then must be viewed as the totality of the vocal sounds by which the members of any given society communicate to one another their inward conceptions. As action or motion of the body and all its parts, and the application of the bodily powers to various purposes and ends, are the signs and expression of the sensations and of the will, the result, as it were, of the moving power within, so language, which is itself in its material character nothing more than a corporeal act, is another mode of signifying and expressing the same things. But language is the expression (whether perfectly or imperfectly, is nothing to the general truth of the proposition) of our intellectual and judging faculties also; and its *form* is therefore necessarily subordinate to the laws of the human mind.

Thus language can do more than other corporeal acts: *they* can only express desire, will, purpose, design, but they cannot express many of those things which only exist as conceptions of the mind, or are only modes and forms in which the mind, according to its laws, views things and the relations of things. Language therefore, in addition to its power of expressing what can be expressed by other corporeal signs, has a peculiar power of conveying from one person to another notions, as conceived by the mind, which have no actual existence, or which at least can only be mentally conceived to exist. The degree in which language is capable of doing this depends on the mental cultivation which the people using it have had: for without such cultivation language is not wanted for the expression of many notions, and unless preceded by, or accompanied by, such cultivation, such part of language cannot exist. The language of many nations may be so poor in sounds and the combinations of sounds, as to convey very little more from one person to another than can be conveyed by other corporeal signs; or a very few sounds and combinations of sounds, aided by the other natural signs, may be sufficient for all the purposes of social existence. But even in the poorest languages many names of things, that is, general or universal terms, are required to express the meaning of a speaker when the objects referred to are not present, and probably there is no language which does not contain a considerable number of abstract terms, indicating not only things and qualities which are the objects of a sensuous intuition, but also those which are the objects of a non-sensuous intuition. Every language also, however poor, must, as far as its powers extend, express the mode in which the mind views or contemplates things and the relations of things; and the form therefore of every language is necessarily subordinate to the laws of the human mind, by which we mean that the choice of the vocal sounds intended to express any distinct meaning must have respect to the notions which the speaker intends to convey, and their arrangement must have a settled conformity to the order and sequence, as among themselves, of such notions, or in other words, their mutual relations.

The matter then of which language consists is vocal sounds: the form which it assumes is the relation of those sounds to one another, which is expressed (within certain limits) chiefly by their arrangement with respect to one another. In order that the several sounds may convey the same meaning, the same sounds must be used for the same purposes, that is, the meaning of any single sound must, generally speaking, at least for any given epoch, be fixed. It is no less necessary that the arrangement of the vocal sounds should be tolerably well fixed, in order that the same set of sounds may convey the same meaning; for as the number of permutations of a small number of sounds is very great, there could be no certainty in the meaning of any considerable number of sounds, when used in connection for the purpose of conveying a speaker's meaning, unless the speaker used not only sounds familiar to the hearer, but also arranged them in an order such as the hearer himself would arrange them in, if he were to attempt to express the meaning which the speaker intends to convey.

Even in many of the simplest sentences, consisting only of two or three words, every or nearly every language has a definite order for expressing one meaning by such words, and another order for them when they are to express a different meaning. Frequently, instead of a change in the order of the sounds, the difference of meaning may be conveyed by the greater or less stress laid on a particular sound, or by some change in the intonation of voice, which is in effect a change in the sounds, and therefore all that is necessary to mark a difference. This power, which spoken language possesses, gives it one advantage over written language, in the use of which we are sometimes obliged to use supplementary signs or marks to express what the voice can more surely effect.

If we come to analyze the vocal sounds of a language, we can separate them with no great difficulty into two chief classes, just as we resolve the whole meaning conveyed by them into a variety of objects or notions suggested by the sounds, and into a number of relations among these objects or notions, which are also suggested by the sounds; for no set of words can convey a meaning without suggesting to the mind two objects or notions at least, and a relation between them.

Thus the sounds of a language, viewed as an existing phænomenon, may be divided into two great classes: sounds which of themselves convey a notion, and may therefore be called *notional*, such as 'man,' 'horse,' 'virtue,' 'vice,' 'come,' 'walk;' and sounds which of themselves express no notion, but only serve to connect notional words and to indicate the relation between and among them, and may therefore be called *relational*, such as 'from,' 'to,' 'who,' 'which.' It is true that many of these relational words, perhaps all of them, may once have been notional, and also that their precise meaning and value, in the case of languages no longer spoken, can only be determined by tracing them to their origin, or to such source as we are compelled by want of other evidence to consider as their origin; but this, though it may be true, is no objection to our statement of what a language consists as an actual phænomenon. The actual meaning of all the words which compose a language must be determined by their actual use. Their former meaning and their history must be determined by a reference to the language as formerly used, the evidence of which use is the written form of language.

The examination of the various modes of recording language, or of the representations or marks by the aid of which sounds can be at any time reproduced equivalent in meaning to those by which the writer would have orally expressed what he has expressed by signs or marks on paper or any other durable substance, belongs to the subject of writing. [WRITING.] It will be sufficient at present to observe that the mode in which the sounds of any given language are represented must not be considered as necessarily indicating anything peculiar in the language itself.

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* 'The meaning of Language is derived from Compact.'—Harris's *Hermes*, 314.

It would seem probable that the character of any language now existing must have been permanently and to a considerable degree affected by the circumstance of the state or condition in which it was when it was first reduced to writing. Whether we suppose all words to have been originally notional or not, it is difficult to conceive any words as first used otherwise than as monosyllabic sounds; at least, so far back as we can trace any known language, such seems to be the result to which we approximate. By this it is not meant to say that a syllable is one simple sound, but that the monosyllabic sounds here meant are such as in their integrity expressed one notion distinctly and one only, that every part of the sound was a necessary part of the meaning, and that no part of the sound was derived from the union of another sound with it. Thus the whole of a language would consist of vocal sounds, every one of which had its distinct meaning in itself.* But spoken language is in its nature favourable to the agglutination of sounds, and particularly of those which come into juxtaposition in such a way as to readily unite without thereby obscuring the meaning of what is said. Thus, to adopt for the purpose of convenience the names now used, the verb and its pronoun, the word signifying a place and the word expressing some relation to that place, and other similarly situated words, would respectively form combinations, and thus would arise the phænomenon, which we observe in most languages, of words reducible to various elements, some of which in their simplest form are notional terms, and some which, taken by themselves, convey no meaning at all, but by virtue of their union with the notional term modify and qualify it.

As this agglutination owes its existence mainly, as we think, to the use of spoken language, we should expect to find that unwritten languages present these phænomena of agglutination and aggregation of elemental sounds, as well as written languages. And such is the fact. Some of the Indian languages of North America, for instance, are exceedingly rich in all such words as are formed by this process of agglutination. When a language has by writing obtained a considerable degree of fixedness, this process is stopped, and all that then takes place in the way of producing new forms of words is by compounding actually existing words, which are in fact and appear as unions of distinct words, yet so that each part of the word retains its distinctive character.

If the language of a nation were committed to writing in a very early state of its progress, it seems probable that the simple elementary forms would be kept much more distinct than in languages which have not been committed to writing except in a more mature form. Thus the mass of the words would be of the monosyllabic class, and the adoption of distinct symbols for the representation of each sound would seem natural and almost necessary. It must have been in the attempt to represent in writing some of the languages which had been cultivated by longer use and improved by social and intellectual development that the discovery of the mode of representing all the sounds of a language by an alphabet originated.

It only remains to observe that some languages, as the Greek and the Latin, and, to a considerable extent, the German, express many relations between the various notions contained in any set of words, by means of certain variations in the forms of the words themselves, which variations mainly occur in the terminations of such words. Thus the whole meaning intended to be expressed by the words 'Homo bovem ferit,' may be indicated by any arrangement of these three words. It is true that in the Latin and Greek, and indeed in all languages in which the terminations of words are capable of expressing relations, it is by no means unimportant in what order we place the words, notwithstanding the general meaning can be conveyed by almost any order. The particular and special meaning can only be conveyed by adopting that arrangement which shall express the order in which the several ideas, as suited to the particular occasion, rise up in the mind of the speaker. Some languages, of which the English in its present form is a striking example, have little or no power of expressing the relation of ideas by any change in the terminations of words; and accordingly they express notions by one set of terms, and relations by another set of words. Such languages are necessarily more limited as to the power of varying the order of their words than languages of the class above referred to. The English language, for example, is now brought pretty nearly into that form in which we may conceive language to have originally existed; with this exception, that language as originally existing, so far as we are capable of conceiving it in that form, consisted altogether of notional words, some of which were also used in a subordinate sense as relational words. The English language, after losing much of its original stock of inflections and terminations, is now fixed by writing in this primitive form; but if by any accident it should in any country exist only as a spoken language for some time, and should in such country be reduced to writing in the form in which it is spoken, it is easy to conceive that the process of agglutination and aggregation above referred to might produce a language of a character very different from that now in use.

That part of language which treats of single words and their varieties of form in the way of inflection is called Etymology, and is one of the divisions of grammar. Etymology also comprehends the notion of historically tracing the successive forms which the words of a language have had, of separating them into their elementary parts, and then comparing the words, thus reduced to their simplest forms, with the corresponding words and forms in languages known to be related, or in order to establish the relationship, that is, the ultimate identity or unity of words in the languages compared.

That part of language which treats of the arrangement of the words composing a sentence, and of the modifications in form or termination to which such words are subjected in consequence of entering into that combination which constitutes a sentence, is generally called Syntax. The syntax of every language is a subject requiring a special investigation and exposition, as well as its etymology; but as etymology has its general principles, so has syntax. These general principles are contained in logic and rhetoric, but their proper application to the syntax of any particular language has not, so far as we know, been yet satisfactorily exhibited.

That division of grammar which is called Etymology has been disgraced by such puerile trifling, and has been pursued with such an utter disregard to anything like scientific principles, as to create in the minds of many persons a suspicion against every thing presented to their notice under the name of etymology. Such persons have viewed etymology as nothing else than a dextrous play upon words, and have looked upon etymologists as little better than indifferent punsters. That the generality of writers upon this subject scarcely deserve any better appellation, will hardly be denied by any one who has studied etymology upon true philological principles; and if any doubt were entertained upon the point, it would only be necessary to refer to such works as Damm's 'Homeric Lexicon,' and Lennep's 'Etymology of the Greek Language,' which are full of such wild conjectures and such extravagant etymologies, that we cannot be surprised that a study which produced such results should have been considered as ridiculous and absurd. But within the last twenty or thirty years the study of etymology has been pursued on sound principles and with corresponding success; and the various and apparently capricious sounds of language have been shown to be governed by laws, within limits as strict and invariable as those to which matter in general is subjected. This improvement has been owing in a great measure to the comparison of many languages with each other, instead of confining the field of observation to one or at the most two or three tongues. Nothing has perhaps contributed to this improvement more than the discovery of Sanskrit (for, as it has been justly observed, it may properly be called a discovery), which was found to bear such a striking resemblance both in its more important words and in its grammatical forms to the Latin and Greek, the Teutonic and Slavonic languages, as to lead to the conclusion that all must have been derived from a common source. The great similarity of all these languages, and their contrast to the Hebrew, Arabic, and other Semitic tongues, has led to the use of the term 'affinity of languages,' by which is meant that all those languages which employ the same sounds to express the most simple ideas and adopt the same mode of grammatical inflexion, must originally have been one and the same language, or derived from some common language. We cannot well suppose that languages which resemble one another in these respects have been derived from any one of those now existing in which these resemblances are obvious: for if we could imagine the Latin to be descended from the Greek, how should we account for the similarity of the Latin and Greek to the Sanskrit and Teutonic tongues? The little intercourse that subsisted between the inhabitants of India and the Western nations precludes the supposition that one nation could have derived its language from the other; and indeed the resemblance is so striking, and descends to such minute particulars, that nothing but a common origin is sufficient to account for their similarity. The error we have been attempting to combat is very general, and nothing is more common than to hear a certain class of etymologists speak of a number of English words as derived from the Latin and Greek, which are in fact the common property of many tongues. Many English words, such as *inspect*, *corporate*, *communicate*, *detriment*, are doubtless derived from the Latin, while others, such as *astronomy*, *geography*, *geology*, have been borrowed directly from the Greek, or manufactured according to settled analogies; but such words as *know*, *lick*, *break*, *yoke*, *sit*, and numerous others, are common to the English, Sanskrit, Latin, Greek, and Slavonic tongues; and it might be said, with as much truth, that the Sanskrit *jnā*, or the Greek *γι-γνώ-σκω*, are derived from the English, as that the English word comes from the Latin.

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* This is nearly the same as Aristotle's definition of a Word.

In examining cognate languages, and particularly that class of which we have been speaking, it is necessary to attend in the outset to two points: first, care should be exercised, in the comparison of words, not to allow any letter or letters which are no essential part of the root to be adduced as proof of similarity, but in every case to discard these letters, whether they are prefixed or suffixed to the root, before any opinion is formed with respect to the identity or dissimilarity of the words. Secondly, a knowledge should be acquired of the letters which are interchangeable in each language; for, without such a knowledge, the greater number of resemblances would necessarily escape our notice. The identity of many words which seem at first sight to have but a very slight resemblance in sound is fully established by an acquaintance with the regular transformation of letters that occurs between the different languages.

In the Sanskrit, Greek, Latin, and cognate tongues, the different cases of nouns and adjectives, and the different tenses and persons of verbs, are formed by means of affixes: thus the nominative singular of masculine and feminine nouns is usually formed by adding *s*, and the accusative by adding *m*, with or without a short vowel prefixed. Thus in the Latin nominatives *cani-s*, *lupu-s*, *legatu-s*, *equu-s*, and in the accusatives *cani-m*, *lupu-m*, *legatu-m*, *equu-m*, the *s* and the *m* are no essential parts of the words, but are only added to mark the cases. It would therefore be necessary, if we wished to compare these words with any other words in one or more of the cognate languages, to look at the form of the word unaffected by case-endings, namely, *cani*, *lupu*, *legatu*, or *equu*, or more properly *lupo*, *legato*, *equo*, since the nominative and accusative singular of Latin nouns of the second declension originally ended in *o,s* and *o,m*. If we look at the verb, we see that the past imperfect of an active verb always ends in the first person in *eba-m* or *ba-m*, the *m* being the sign of the person or pronoun 'I,' and the *eba* or *ba* marking the tense. Thus *reg-eba-m*, *ama-ba-m*, *mone-ba-m*, *audi-eba-m*, would become *reg*, *ama*, *mone*, and *audi*, after the sign of the person and tense had been removed; and if the characteristic of each tense be removed, the essential part of the verb will always remain the same. This essential part of the verb and noun separated from the characteristic letters which mark the cases, numbers, tenses, and persons, has been sometimes called, for want of a better name, the crude form of a noun or verb; and every word should always be reduced to this state before it is compared with another word in one of the cognate tongues for the purpose of proving the identity or dissimilarity of the two. But after we have reduced the word to its crude form, we must frequently proceed a step further before we venture to compare it with another word in a different language. The majority of words in the Latin and cognate languages are derived from monosyllabic roots by affixing various terminations to qualify the meanings of the roots to which they are attached, and to fit them for a new and different use. [Affix.] It is therefore necessary to discover what is the root of a word, in order to compare it with a corresponding root in a different language; since it will frequently happen that two languages which have the same root in common always make use of it with different affixes to mark nouns, verbs, adjectives, &c.; and it is therefore impossible to compare the two roots before the terminations are removed. Several words, especially verbs which express the most simple notions, frequently contain the root without any termination affixed, except the letters to mark inflection, as *ut-i*, *fer-re*, *ed-ere*, *bib-ere*, *cad-ere*, &c.; and even when terminations are added to the root to form adjectives, verbs, nouns, &c., there is seldom any difficulty in discovering the root, in consequence of the regularity of structure of the Latin, Greek, and cognate tongues. Thus, if it were necessary to discover the root of *utili-s*, it would only be necessary, after separating the *s* of the nominative case, to compare it with such words as *fac-ili-s*, *fut-ili-s*, *sut-ili-s*, *sim-ili-s*, *ag-ili-s*, *doc-ili-s*, &c.; and it would be evident from analogy that the root must be *ut*, even if we did not know the existence of *ut-i* and *us-u-s*. On the same principles we should have no hesitation in asserting that *sig* is the root of *sig-nu-m*, by comparing it with *tig-nu-m*, *reg-nu-m*, *lig-nu-m*; that *mad* is the root of *mad-idu-s*, by comparing it with *viv-idu-s*, *rap-idu-s*, *tim-idu-s*, *tab-idu-s*, &c.; that *frag* is the root of *frag-men*, by comparing it with *nu-men*, *flu-men*, *gra-men*, *sta-men*, *teg-men*, &c.; that *mar* is the root of *mar-inu-s*, by comparing it with *vic-inu-s*, *taur-inu-s*, *sup-inu-s*[*]; even if we had no other proof of such being the case. But since the same root frequently occurs in several words in the same language, it is only necessary in such cases to compare these words with one another, in order to see what letters are common to all these words, and to separate those which are not found in each instance, in order to ascertain the root. Thus in the words *cap*-ere, *cap*-tus, *cap*-tivus, de-*cip*-ere, re-*cip*-ere, con-*cep*-tus, re-*cup*-era-re, the letters *cap*, *cip*, *cep*, or *cup*, always occur, and may therefore be regarded as the root.

It not unfrequently happens that a word is derived from another word, which is itself a derivative from the root. Thus the adverb *audacter* is derived from the adjective *audac* by affixing *ter*, in the same manner as *sapient-er* is formed from *sapient*, while *aud-ac* itself is derived from the root *aud* (which we have in *aud-ē-re*), as *fer-ac* from *fer*. Sometimes a word must be traced through three or four different terminations, in order to arrive at the root. Thus *equitatu-s* comes from the verb *equita-re* (crude form, *equita*); *equita* is derived from *equit* or *equet*, a 'horseman,' and *equit* from the root *equ*, which we have in *equo*.

The meaning of the root is not only affected by the terminations which are affixed to it, but also by words prefixed to it. We are familiar with this in our own language, as in the words *un-able*, *un-fore-seen*, *be-calm*, *be-come*, &c. So in Latin, in *re-prim-ere*, *prim* is the root with *re* prefixed; in *con-duc-ere*, *duc* is the root with *con* prefixed. The root of the following Latin words will, after the preceding remarks, be easily recognised:—inter-*nec*-ion-em; com-*min*-us; *vir*-tut-e; *mag*-ni-tudin-is; in-*op*-ia; *vic*-tu-s; trans-*mar*-inu-m; *cæl*-itus; pro-*ced*-ere; *leg*-a-to-s; con-*tig*-it; *fru*(*g*)-mentu-m; con-*spec*-tu-s; pro-*hib*-e-at; co-*gno*-sc-o; con-*fec*-to; oc-*cul*-ta-v-it; con-*tin*-ent-es; im-*ped*-i-mentu-m; ex-*ped*-i-to-s; *leg*-ion-um; re-*liqu*-it; *vic*-ini-tat-ibus.

The advantage of analyzing words in this manner is not confined to the comparison of roots in different languages; it will be found of great use in explaining the forms of a language, without reference to any other, and will prove that the real roots of a language are comparatively few. It will also greatly abridge the labour of learning a language; since, after the original signification of the root has been acquired, the meaning of almost all the words which contain the same root can generally be ascertained, even though the learner may never have seen these individual words. A few examples from the Latin language will show with what regularity words are formed from the same root: thus from the root *ar*, 'plough,' we have *ar*-o (*ar*-a-o) *ar*-a-tu-s, *ar*-a-tio.

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[*] Some of these examples and many of the above remarks have been taken from an appendix to an introductory lecture delivered at the University of London, 'On the Study of the Latin and Greek Languages,' by Professor Long, in which the reader will find many excellent observations on the importance and advantage of this method of studying language.

ar-a-tor, *ar*-a-tru-m; from the root *ag* we have *ac*-tu-s, *ac*-tio, *ac*-tor, *ag*-men, *ag*-ili-s, *ac*-turu-s; from the root *fac* we have *fac*-io, *fac*-tu-s, *fac*-tio, *fac*-tor, *fac*-ili-s, *fac*-turu-s, sedi-*fic*-iu-m; from *ac*, signifying a point, we have *ac*-u-s, *ac*-ie-s, *ac*-u-o, *ac*-u-tu-s, *ac*-idu-s, *ac*-etu-m, *ac*-ri-s; from *pac* (to fasten, to arrange, to fit) we have *pac*-s, *pa*(n)*g*-o, *pac*-tu-m, *pac*-tio, *pac*-isc-or, *pac*-o, *pac*-a-tor, *pac*-a-bili-s, com-*pag*-e-s. In the same manner from the root *spec* or *spic*, signifying 'to see,' we have *spec*-i-o (used by Varro), *spec*-i-e-s, *spec*-i-ali-s, *spec*-i-osu-s, *spec*-i-men, *spec*-to, *spec*-ta-tu-s, *spec*-ta-tio, *spec*-ta-tor, *spec*-ta-tric-s, *spec*-ta-bili-s, *spec*-ta-culu-m, *spec*-ta-men, *spec*-tio, *spec*-tru-m, *spec*-ula, *spec*-ul-or (*spec*-ula-or), *spec*-ula-tor, *spec*-ula-tric-s, *spec*-ula-tor-iu-s, *spec*-ula-tus, *spec*-ula-bili-s, *spec*-ulu-m, *spec*-ula-ri-s; con-*spic*-i-o, con-*spec*-tu-s; con-*spic*-or (con-*spic*-a-or), con-*spic*-uu-s; in-*spic*-i-o, in-*spec*-tor, in-*spec*-tio, in-*spec*-t-o (in-*spec*-ta-o), in-*spec*-ta-tio; re-*spic*-i-o; re-*spec*-tu-s, re-*spec*-t-o (re-*spec*-ta-o), and many more.

In the above examination we have confined our attention to one language; but the same remarks would apply with equal force to the formation of the kindred languages. It could easily be shown by numerous examples from the Greek and Sanskrit that the different tenses of verbs and cases of nouns in these languages can be stripped of their inflection letters, and thus reduced to their crude forms; and that these crude forms, if they contain any terminations, can easily be reduced to their roots, as in the Latin language. It might also be shown that the vast majority of words in the cognate tongues are built up from roots by means of affixes or suffixes, with the same regularity of structure as we find in the Latin language.

The necessity of an acquaintance with the regular transformations of letters that occur between cognate languages has been already remarked. In fact, it is impossible to compare one language with another without a knowledge of the principal changes of the letters. Thus the German *herz* might be supposed to have little in common with the Latin *cor*, *cord-is* (crude form, *cord*), except the meaning; but the identity of the two words is established at once when it is known that *c* in Latin is almost invariably *h* in the Teutonic languages, as *coll-um*, *hal-s*; *cel-a-re*, *hehl-en*; *cut-i-s*, *haut*; *corn-u*, *horn*; *cannabi-s*, *hanf* (*hemp*); *caput*, *haupt* (*head*), &c.; and that the Latin *d* frequently corresponds to the Teutonic *z*, as *den-s* (*dent*) *zahn*; *duc-ere*, *zieh-en*; *dec-em*, *zeh-en*, or *zeh-n*, &c.

The Sanskrit word for 'ten,' *dasa*, and the German *zeh-en*, or *zeh-n*, have not one letter in common; but no doubt can be entertained respecting their identity when it is shown that the *d* in Sanskrit constantly corresponds to *z* in German, and that the palatal *s* of the Sanskrit corresponds to the German *h*. The following table, taken from Pott's 'Etymologische Forschungen' (pp. 82, 83), contains a list of the principal transformations of letters in some of the Indo-Germanic languages. The reader who desires further information on this subject can consult the articles under the letters of the alphabet in this work, in which will be found examples of many of the changes in the following table, and also a list of the transformations that occur between the English, German, and other Indo-Germanic languages, which are not included in the list below. This table is chiefly formed for the purpose of comparing the transformation of the Sanskrit letters with those of the cognate tongues; the arrangement of the Sanskrit alphabet has accordingly been adopted in drawing up the list.

	Sanskrit.	Greek.	Latin.	Lithuanian.	Gothic.	Old High German.
Gutturals.	k	κ, π	c (qu)	k, *Lettic* k and z	h, g	h, g
	(ksh)	ξ, σσ, κτ κ, (π)	x (c-s), c, s	kss, k, ss (pronounced sh) *Lettic* z	hs, h, g	
	kh	χ, κ				
	g	γ, β	g, b	*Lettic* g	k	ch
	gh	χ				
	n (guttural)	γ (nasal)	n (guttural)			
Palatals.	ch	π, τ	c (qu)	cz (pronounced ch) k; *Lettic* chh, z, k	f	v
	chh	σχ	sc, c	. . . .	sk	sk
	j	γ (β, ζ ?)	g	g; *Lettic* ds	k	ch
	jh	. .	. .	. .		
	n (palatal)	Different nasal letters	n (guttural)	. .		
Dentals.	t	τ, σ	t, s	t	th	d (t)
	th	τ	t	t	th (t)	. .
	d	δ, θ	d, l	d	t (d)	z (pronounced ss)
	dh	θ, σ	f, d	d	d	t
	n	ν, λ	n, l	n (m)	n	n
Labials.	p	π, φ	p, c (qu)	p	f	v
	ph					
	b	β, π	b			
	bh	φ (β)	f, b	b	b	p
	m	μ, (β before liquids)	m	m	m	m
Semi-vowels.	y (palatal)	ι, ε, ζ, aspirate	j, i	y	y	y
	r (lingual)	ρ, λ	r, l	r, l	r, l	r, l
	l (dental)	λ	l	l	l	l
	w, v, (labial)	F, υ, ε, β, φ, aspirate	v	w	v	w
Sibilants.	s (palatal)	κ, σ, aspirate	c (qu), s	s, ss, sz, k	h, s	h, s
	sh (lingual)	σ, aspirate	s, r	sz (pronounced sh)	s	s, r
	s dental)	σ, aspirate, ρ	s, r	s	s, z	s, r
	h (guttural)	χ, γ, κ	h, g, c	z (pronounced as French j), sz, g	h, g	k

That languages spoken by different nations, and at present mutually unintelligible to the people of each nation, may nevertheless be so closely allied to each other in their grammatical forms, and in the words used to express the most common objects, actions, and relations, as to prove that they are kindred languages, and proceed from one common origin, will scarcely be denied by any one who has studied some of the principal languages which belong either to the Indo-Germanic or Semitic branches. It is proposed in the following remarks to show the affinity of languages by examples drawn from Indo-Germanic tongues; partly because some of these languages are familiar to most of us, and partly because they are more in number and have been studied with greater accuracy than the Semitic tongues.

The family of Indo-Germanic languages may be divided into six branches, two of which belong to Asia, and four to Europe, and through European colonies to other parts of the world.*

1. The Indian branch, comprising the Sanskrit and its derivative dialects.
2. The Medo-Persic, or Arian branch; at the head of which stands the Zend. The other antient languages of the country, the Pehlvi and the Deri, and also the modern Persian, belong to this division.
3. The Teutonic branch, with the Gothic at its head, and comprising the different German dialects, the Anglo-Saxon, the Icelandic, the Swedish, Danish, &c.
4. The Græco-Latin branch, comprising the two antient classical languages.
5. The Slavonic branch may be divided into three divisions; the first comprises the Lithuanian, with the antient Prussian and Lettic; at the head of the second stands the Russian; the third comprehends the Polish and Bohemian, and the languages of the Slowaks in Hungary, and of the Wends and Sorbs in Lusatia and Saxony.
6. The Celtic branch may be divided into two divisions: the first comprising the Welsh, Cornish, and Armorican; the second, the Irish or Erse, the Gaelic or Highland Scotch, and the Manks. The connection of these languages with the other Indo-Germanic languages has been questioned by many etymologists; but the grammatical structure of the Welsh and Erse resembles that of the acknowledged Indo-Germanic languages in so many particulars, that we may safely pronounce them to belong to the same great family.

It is now universally admitted by those who have written best on the comparative study of languages, that the affinity of languages should above all things be established by a comparison of their mode of forming and deriving words, and the system of their inflections. 'Comparisons of detached words,' remarks Mr. Pott, 'frequently yield but a single point of coincidence, which is always liable to the suspicion of having been transferred from one language into the other; while the actual coincidences in the expression of some grammatical relation, which is not so easily transplanted, and in the roots as found by careful grammatical analysis, often present a hundred or thousand points of approximation. Even languages of the same family sometimes diverge widely, owing to the diversity of pronunciation which gradually estranges them as dialects no longer intelligible to each other. But this diversity of pronunciation, although from a higher point of view it must be considered as accidental, stands under the control of certain natural laws, especially that of the physiological affinity of sounds; and these laws we ought to discover and establish. *Kindred Languages* are those which, either in consequence of the internal development and the geographical spreading of a language, or the effect of external influences, have lost their original identity, and have become varied and manifold; while languages not akin are those which from the outset have originated under principles of formation altogether different, and have grown up conformably to those principles. If languages not akin occur in any particulars, such occurrences must be accounted for either through the intercourse of the nations to whom they belong (even if that intercourse cannot be traced in history), or by the general sameness of the human mind and senses, or of the object designated; or finally, by assuming an accidental coincidence, which is not altogether to be excluded. No small proportion of the words collected by Klaproth, in his "Asia Polyglotta," in support of his theory of an antediluvian conformity of languages, show an external similarity of sound; but this similarity vanishes, as soon as we come critically to investigate these words, and to dissect them into their component elements, conformably to the rules of their respective languages.'

In conformity with these remarks, it is proposed first to establish the affinity of the Indo-Germanic languages by a comparison of their numerals and grammatical forms, and afterwards by a copious list of words common to all or most of these languages.

The following examples have been chiefly taken from Bopp's 'Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Litthauischen, Altslawischen, Gothischen, and Deutschen;' Pott's 'Etymologische Forschungen auf dem Gebiete der Indo-Germanischen Sprachen;' Prichard's 'Eastern Origin of the Celtic Nations, proved by a comparison of their dialects with the Sanskrit, Greek, Latin, and Teutonic languages;' and from Grimm's great work on Teutonic Grammar.

Numerals.

	Sanskrit.	Zend.	Persian.	Greek.	Latin.	Lithuanian.	Russian.	Gothic.	Old High German.	Modern German.	English.	Erse.	Welsh.
1	êka	aêva	yik	ἕν	oino œno uno	wena	odin	ain	ein	ein	one an a	aen	un
2	dwi	dwa	du	δύο	duo	du	dva dvie	twa	tue	zwei	two	da do	dau dwy
3	tri	thri	seh	τρί	tri	tri	tri	thri	thri	drei	three	tri	tri tain
4	chatur	chatwar	chehaur	τέτταρ τέσσαρ πέσσυρ πέσυρ πίσυρ	quatuor quadra	keturi	chetyre	fidwor	fiuuar	vier	four	keathair	pedwar pedair
5	panchan	panchan	penj	πέντε πέμπε	quinque	penki	pyat	fimf	finfe	fünf	five	kuig	pump
6	shash	cswas	shesh	ἕξ	sex	szeszi	shest	saihs	sehs	sechs	six	se	chwech
7	saptan	haptan	heft	ἑπτὰ	septem septua	septyni	sem	sibun	sibun	sieben	seven	secht	saith
8	ashtan	astan	hesht	ὀκτὼ	octo	asztuni	osm vosem	ahtan	ohto	acht	eight	ocht	wyth
9	navan	navan	nuh	ἐννέϜα	novem	devyni	devyat	niun	niguni	neun	nine	noi	naw
10	dasan	dasan	deh	δέκα	decem	deszimt	desyat	taihun	tehan	zehen zehn	ten	deich	dêg
20	vinsati	visaiti	bist	εἴκοσι εἴκοντι Ϝίκατι	viginti vinginti?	dwideszimpti	dvatzat	twaimtigum	tuentig	zwanzig	twenty	fichid	ugain
30	trinsat	thrisata	si	τριάκοντα	triginta tringinta?	trisdeszimpti	tritzat	thrinstigum	thrittig	dreiszig	thirty	deich ar fichid	dêg ar ugain
100	satam	satem	sad	ἑκάτοντα ἑκατὸν	centum	szimta	sto	hunta	hunt	hundert	hundred	kett	cant

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* This classification is taken from an excellent review of Pott's 'Etymologische Forschungen,' by the late Dr. Rosen, in No. 18 of the 'Journal of Education.'

Declension of the Demonstrative Pronoun.

		Sanskrit.			Zend.			Greek.			Latin.		
		M.	F.	N.	M.	F.	N.	M.	F.	N.	M.	F.	N.
Singular.	Nom.	sas	sâ	tat	hô	hâ	tat	ὁς, ὁ	ἁ, ἡ	τὸ	hi-c	hæ-c	ho-c
	Acc.	tam	tâm	tat	tem	tanm	tat	τὸν	τὰν, τὴν	τὸ	hun-c	han-c	ho-c
	Gen.	tasya	tasyâs	tasya	tahê	tanhâo	tahê	τοῖο	τᾶς, τῆς	τοῖο	hujus	hujus	hujus
	Dat.	tasmai	tasyai	tasmai	tahmai	tanhai	tahmai	τῷ	τᾷ, τῇ	τῷ	hui-c	hui-c	hui-c
Plural.	Nom.	tê	tâs	tâni, tâ	tê	tâo	tâ	τοὶ, οἱ	ταὶ, αἱ	τὰ	hi	hæ	hæ-c
	Acc.	tân	tâs	tâni, tâ	tan	tâo	tâ	τοὺς	τὰς	τὰ	hōs	hās	hæ-c
	Gen.	têsham	tâshâm	têsham	taêshanm	tâonhanm	taêshanm	τῶν	τάων, τῶν	τῶν	hōrum	hārum	hōrum
	Dat.	têbhyas	tâbhyas	têbhyas	taêibyô	tâbyô	taêibyô.	τοῖσι	ταῖσι	τοῖσι	hīs	hīs	hīs

		Gothic.			Lithuanian.			Old Slavonic.			Old High German.		
		M.	F.	N.	M.	F.	N.	M.	F.	N.	M.	F.	N.
Singular.	Nom.	sa	so	thata	tas	ta	tai	t'	ta	to	der	diu	daz
	Acc.	thana	tho	thata	tan	tan	tai	t'	tû	to	den	dia	daz
	Gen.	this	thizôs	this	to	tôs	to	togo	toja	togo	des	dera	des
	Dat.	thamma	thizai	thamma	tam	tai	tam	tomû	toi	tomû	demu	deru	demu
Plural.	Nom.	thai	thos	tho	tie	tos	..	ti	ty	ta	diê	dio	diu
	Acc.	thans	thos	tho	tus	tas	..	ty	ty	ta	diê	dio	diu
	Gen.	thizê	thizô	thizê	tû	tû	tû	tjech	tjech	tjech	dero	dero	dero
	Dat.	thaim	thaim	thaim	tiem(u)s	tom(u)s	tiem(u)s	tjem	tjem	tjem	dêm	dêm	dêm

Declension of the First Personal Pronoun.

		Sanskrit.	Zend.	Greek.	Latin.	Gothic.	Lithuanian.	Old Slavonic.	Old High German.	Russian.
Singular.	Nom.	aham	azĕm	ἐγών ἐγὼ	egomet ego	ik	asz	az	ih	ya
	Acc.	mâm, mâ	manm, mâ	μὲ	mē, met	mik	manen	mja	mih.	menya
	Gen.	mama, mê	mana mê, môi	μοῦ	mei, mis	meina	manens	mene	mîn	menya
	Dat.	mahyam, mê	mê, môi	ἐμίν, μόι	mihi	mis	man	mnje, mi	mir	mne
Plural.	Nom.	vayam asmê	vaêm	ἄμμες, ἡμεῖς	nos	veis	mes	my	wîr	mi
	Acc.	asmân nas	nô	ἄμμε, ἡμᾶς	nos	unsis	mus	ny	unsih	nas
	Gen.	asmâkam nas	ahmâkĕm nô	ἀμμέων, ἡμῶν	nostri nostrum	unsara	musû	nas	unsar	nas
	Dat.	asmabhyam nas	nô	ἄμμι(ν) ἡμῖν	nobis	unsis	mumus	nam	uns	nam

Declension of the Second Personal Pronoun.

		Sanskrit.	Zend.	Greek.	Latin.	Gothic.	Lithuanian.	Old Slavonic.	Old High German.	Russian.
Singular.	Nom.	twam	tûm	τούν, τὺ	tu	thu	tu	ty	dû	tŭ
	Acc.	twâm, twâ	thwanm thwâ	τὲ	te	thuk	tawen	tja	dih	tebya
	Gen.	tava, twê, tê	tava thwôi, té, tôi	τεῦ	tui, tis	theina	tawens	tebe	dîn	tebya
	Dat.	tubhyam, thwê, tê	thwôi, tê, tôi	τεΐν, τοί	tibi	thus	taw	tebje, ti	dir	tebe
Plural.	Nom.	yûyam, yushmê	yûshĕm, yûs	ὕμμες ὑμεῖς	vos	yus	jûs	vy	îr	vŭ
	Acc.	yushmân, vas	vô	ὔμμε ὑμᾶς	vos	izvis	jus	vy	iwih	vas
	Gen.	yushmâkam vas	yûsmâkĕm vô	ὑμμέων ὑμῶν	vestri vestrum	izvara	jusû	vas	iwar	vas
	Dat.	yushmabhyam vas	yûsmaêibya	ὔμμι(ν) ὑμῖν	vobis	izvis	jumus	vam	iu	vam

Nominative Singular of Nouns.

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Gothic.
m.	(vrĭka) vrĭka-s (wolf)	vĕhrkô (wolf)	λύκο-ς	lupu-s	wilka-s (wolf)	vulf'-s * (wolf)
n.	(dâna) dâna-m (gift)	dâte-m (given)	δῶρο-ν	donu-m	géra (good)	daur' (door)
f.	(jihvâ) jihvâ (tongue)	hizva (tongue)	χώρα	terra	rankà (hand)	giba (gift)
m.	(pati) pati-s (master)	paiti-s (master)	πόσι-ς	hosti-s	pati-s (master)	gast'-s (guest)
f.	(prîti) prîti-s (love)	âfrîti-s (blessing)	πόρτι-ς	siti-s	awi-s (sheep)	anst'-s (mercy)
n.	(vâri) vâri (water)	vairi (water)	ἴδρι	mare	. . .	
m.	(sûnu) sûnu-s (son)	pasu-s (beast)	ἰχθύ-ς	portu-s	sunù-s (son)	sunu-s (son)
f.	(tanu) tanu s (body)	tanu-s (body)	πίτυ-ς	socru-s	. . .	handu-s (hand)
n.	(madhu) madhu (wine)	madhu (wine)	μέθυ	pecu	darkù (ugly)	faihu (beast)
m. f.	(gô) gau-s (cow, ox)	gâu-s (cow, ox)	βοῦ-ς	bō-s		
f.	(nau) nau-s (ship)	. . .	ναῦ-ς	nav(i)-s		
f.	(vâch) vâk (speech)	vâk-s (speech)	Fὄπ-ς	voc-s		
m.	(bharat) bharan (bearing)	baran-s (bearing)	φέρων	feren-s	sukan-s (turning)	fijand-s (enemy)
m.	(âtman) âtmâ' (soul)	asma (heaven)	δαίμων	sermo'	akmu' (stone)	ahma (soul)
n.	(nâman) nâma' (name)	nâma' (name)	τάλαν	nomen	. . .	namó (name)
m.	(bhrâtrĭ) bhrâtâ' (brother)	brâta' (brother)	πατήρ	frater	. . .	brôthar (brother)
f.	(duhitrĭ) duhitâ' (daughter)	dughdha (daughter)	θυγάτηρ	mater	dukté' (daughter)	dauhtar (daughter)
m.	(dâtrĭ) dâtâ' (giver)	dâta' (giver)	δοτήρ	dator		
n.	(vachas) vachas (word)	vachô (word)	Fἔπος	opus		

Accusative Singular of Nouns.

m.	vrĭka-m	vĕhrkĕ-m	λύκο-ν	lupu-m	wilka-n	vulf'
n.	dâna-m	dâte-m	δῶρο-ν	donu-m	géra	daur'
f.	jihvâ-m	hizva-nm	χώρα-ν	terra-m	ranka-n	giba
m.	pati-m	paitî-m	πόσι-ν	hosti-m	páti-n	gast'
f.	prîti-m	âfrîtî-m	πόρτι-ν	siti-m	áwi-n	anst'
n.	vâri	vairi	ἴδρι	mare		
m.	sûnu-m	pasû-m	ἰχθύ-ν	portu-m	sunu-n	sunu
f.	tanu-m	tanû-m	πίτυ-ν	socru-m		handu
n.	madhu	madhu	μέθυ	pecu	darkù	faihu
m. f.	gâ-m	ga-nm	βοῦ-ν	bov-em		
f.	nâv-am	. . .	ναῦ-ν	nav-em		
f.	vâch-am	vâch-em	Fὄπ-α	voc-em		
m.	bharant-am	barĕnt-em	φέροντ-α	ferent-em	. . .	fijand
m.	âtmân-am	asman-em	δαίμον-α	sermon-em	. . .	ahman
n.	nâma'	nâma'	τάλαν	nomen	. . .	namô'
m.	bhrâtar-am	brâtar-ĕm	πατέρ-α	fratr-em	. . .	brôthar
f.	duhitar-am	dughdhar-ĕm	θυγατέρ-α	matr-em	. . .	dauhtar
m.	dâtár-am	dâtâr-ĕm	δοτῆρ-α	datōr-em		
n.	vachas	vachô	Fἔπος	opus		

Nominative Plural of Nouns.

m.	vrĭkâ-s	. . .	λύκοι	lup'ī	wilkai	vulfô-s
n.	dânâ-n-i	dâta	δῶρα	dona	. . .	daura
f.	jihvâ-s	hizvâ-o	χῶραι	terrae	ranko-s	gibô-s
m.	patay-as	paity-ô	πόσι-ες	host'-es	. . .	gastei-s
f.	prîtay-as	âfrity-ô	πόρτι-ες	mess'-es	áwy-s	anstei-s
n.	vârî-n-i	var'-a	ἴδρ-α	mari-a		
m.	sûnav-as	pasv-ô	ἰχθύ-ες	portū-s	sûnu-s	sunju-s
f.	tanav-as	tanv-ô	πίτυ-ες	socrū-s	. . .	handju-s
n.	madhû-n-i	madhv-a	μέθυ-α	pecu-a		
m. f.	gâv-as	geu-s	βό(F)-ες	bov-es		
f.	nâv-as	. . .	νᾶ(F)-ες	nav'-es		
f.	vâch-as	vâch-ô	Fὄπ-ες	voc-ēs		
m.	bharant-as	barĕnt-ô	φέροντ-ες	ferent-ēs	. . .	fijand-s
m.	âtmân-as	asman-ô	δαίμον-ες	sermon-ēs	. . .	ahman s
n.	nâmân-i	nâman-a	τάλαν-α	nomin-a	. . .	namôn-a
m.	bhrâtar-as	brâtar-ô	πατέρ-ες	fratr-ēs		
f.	dubitar-as	dughdhar-ô	θυγατέρ-ες	matr-ēs	dughter-es	
m.	dâtâr-as	dâtàr-ô	δοτῆρ-ες	datōr-ēs		
n.	vacha(n)s-i	vachanh-a	Fέπε(σ)α	oper-a		

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* The apostrophe indicates that a letter has been dropped.

Accusative Plural of Nouns.

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Gothic.
m.	vrĭkâ-n	věhrka-n	λύκο-υς	lupō-s.	wilkù-s	vulfan-s
n.	dânâ-n-i	dâta	δῶρα	dona	rankà-s	daura
f.	jihvâ-s	hizvâ-o	χώρᾶ-ς	terrā-s	. . .	gibô-s
m.	patî-n	paity-ô	πόσι-ας	hostī-s	. . .	gasti-ns
f.	prîtî-s	âfrîtî-s	πόρτῑ-ς	messī-s	ŝwy-s	ansti-ns
n.	vârî-n-i	var'-a	ἴδρι-α	mari-a		
m.	sûnû-n	pasv-ô	ἰχθύ-ας	portū-s	sùnu-s	sunu-ns
f.	tanû-s.	tanû-s	πίτῡ-ς.	socrū-s	. . .	handu-ns
n.	madhû-n-i	madhv-a	μέθυ-α.	pecu-a		
m. f.	gâ-s	gâu-s	βό(ϝ)-ας	bov-ēs		
f.	nâv-as	. . .	νᾶ(ϝ)-ας	nav-ēs		
f.	vâch-as	vâch-ô	ϝόπ-ας	voc-ēs.		
m.	bharat-as.	barĕnt-ô.	φέροντ-ας	ferent-ēs		
m.	âtman-as.	asman-ô.	δαίμον-ας	sermoń-ēs	. . .	ahma-ns
n.	nâmân-i	nâman-a	τάλαν-α	nomin-a	. . .	namôn-a
m.	bhrâtrî-n.	brâthr-eus?	πατέρ-ας	fratr-ēs		
f.	duhitrî-s.	dughdhĕr-eus?	θυγατέρ-ας	matr-ēs	dughter-es	
m.	dâtrî-n	dâthr-eus?	δοτῆρ-ας	datōr-es		
n.	vachâ(ṅ)s-i	vachanh-a	ϝέπε(σ)α	oper-a		

Present Tense of the Verb 'To Place' (Stand).—CRUDE FORM, *Stha or Sta.*

	Sanskrit.	Zend.	Greek.	Latin.	Old High German.	Lithuanian.	Old Slavonic.
Singular.	ti-sthâ-mi	hi-stâ-mi	ἵ-στᾱ-μι ἵ-στη-μι	si-st-o	stâ-m	stow-mi	stó-jû
	ti-stha-si	hi-sta-hi	ἵ-στᾱ-ς ἵ-στη-ς	si-st-is	stâ-s	stow-i	stu-ïsi
	ti-stha-ti	hi-sta-ti	ἵ-στᾱ-τι ἵ-στη-σι	si-st-it	stâ-t	stow	sto-ïtj
Dual.	ti-sthâ-vas	. . .	. . .	. . .	. . .	stow-iwà	sto-ïva
	ti-stha-thas	hi-sta-thô?	ἵ-στα-τον	. . .	. . .	stow-ita	sto-ïta
	ti-stha-tas	hi-sta-tô	ἵ-στα-τον	. . .	. . .	(Same as Sing.)	ste-ïta
Plural.	ti-sthâ-mas	hi-stâ-mahi	ἵ-στα-μες ἵ-στα-μεν	si-st-imus	stâ-mês	stow-imè	ste-ïm
	ti-stha-tha	hi-sta-tha	ἵ-στα-τε	si-st-itis	stâ-t		
	ti-stha-nti	hi-stĕ-nti	ἵ-στα-ντι	si-st-unt	stâ-nt	(Same as Sing.)	ste-jatj

Present Tense of the Verb 'To Give.'—CRUDE FORM, *Da.*

	Sanskrit.	Zend.	Greek.	Latin.	Lithuanian.	Old Slavonic.
Singular.	da-dâ-mi	da-dhâ-mi	δί-δω-μι	da-o, do	du-(d)-mi	da-(d)-mj
	da-dà-si	da-dhâ-hi	δί-δω-ς	da-s	du-d-i	da-(d)-si
	da-dâ-to	da-dhâi-ti	δί-δω-τι δί-δω-σι	da-t	du-s-ti	da-s-tj
Dual.	da-d-vas	. . .	. . .	. . .	du-(d)-wa	da-d-eva
	da-t-thas	da-s-tô?	δί-δο-τον	. . .	du-s-ta	da-s-ta
	da-t-tas	da-s-tô?	δί-δο-τον	. . .	(Same as Sing.)	da-s-ta
Plural.	da-d-mas	da-de-mahi	δί-δο-μες	da-mus	du-(d)-me	da-(d)-my
	da-t-tha	da-s-ta?	δί-δο-τε	da-tis	du-s-te	da-s-te
	da-dă-ti	da-dĕ-nti	δι-δό-ντι δι-δό-ασι δι-δοῦσι	da-nt	(Same as Sing.)	da-d-jatj

Present Tense of the Verb 'To Be.'—CRUDE FORM, *As or Es.*

	Sanskrit.	Greek.	Latin.	Lithuanian.	Old Slavonic.	Gothic.
Singular.	as-mi	ἐμ-μί ἐ-μί	s-um	es-mi	jes-mj	ĭ-m
	a-si	ἐσ-σί	es	es-si	je-si	ïs
	as-ti	ἐσ-τί	es-t	es-ti	jes-tj	ïs-t
Dual.	s-vas	. . .	. . .	es-wa	jes-va	si-yu
	s-thas	ἐσ-τόν	. . .	es-ta	jes-ta	si-yuts?
	s-tas	ἐσ-τόν	. . .	(Same as Sing.)	jes-ta	. . .
Plural.	s-mas	ἐσ-μές	s-umus	es-me	jes-my	si-yum
	s-tha	ἐσ-τε	es-tis	es-te	jes-te	si-yuth
	s-anti	(σ)-εντι	s-unt	(Same as Sing.)	s-ûtj	s-ind

Remarks on the preceding Tables.

Numerals.—The numerals which are subject to inflection are given in their crude forms; and in the Latin and Greek lists several antient forms are inserted, which show more clearly the connexion of the numerals of these languages with those of the cognate tongues. The only numeral which appears to have more than one root to express the same number is "one." All the languages, with the exception of the Sanskrit, Zend, and Persian, express the notion of unity by the same word, *en*, *un*, *ain*, *ein*, &c., with a *w* sound before it in some of the languages, as the Lithuanian and English, and probably also in the Latin; in the

Greek this sound appears under the form of an aspirate. The Sanskrit *êka*, which is probably the same as the Persian *yik*, is also found in the cognate languages; as in the Greek ἑκά-τερος and ἕκα-στος, and in the English *each*. Bopp has suggested that this irregularity has arisen from the numeral 'one' being derived from the different pronouns of the third person. The form of *en*, *un*, &c., he connects with the Sanskrit pronoun *êna*, and the Zend *aêva* with the Sanskrit pronominal-adverb *êva* and *êvam*.

Pronouns.—The cases in the singular number of the first personal pronoun appear in all these languages to have two roots; one from which the nominative is formed, and the other from which the oblique cases are derived. The Sanskrit nominative *ah-am* consists of two parts; namely, *ah* and *am*, of which *am* is merely a termination, occurring in the Zend *az-ĕm*, and the Greek ἐγ-ών. The root *ah* appears in ἐγ-ών, *eg-o*, *ik*, *ich*, *ih*, &c. The oblique cases are formed from a root *m*, followed by a vowel. All the cases of the plural are formed from a root *v*, followed by a long vowel. In the nominative plural of the Sanskrit *vay-am* the same termination is added as occurs in the singular.

In the second personal pronoun, the cases of the singular number are formed from the root *tu*. In the nominative singular of the Sanskrit, Zend, and Greek the same termination is added as in the nominative singular of the first personal pronoun. The vowel of *tu* is changed in the formation of the oblique cases into the semi-vowel *v* or *w*. The plural cases are formed from *yu* and *vas*.

The two first personal pronouns are the same in the Celtic dialects as in the other Indo-Germanic languages; but they are not given in the preceding list, because they are not subject to inflection.

FIRST PERSONAL PRONOUN.

	Erse.	Welsh.
Singular.	me	mi, Reduplicated form, my-mi
Plural.	sinn, inn	ni, Reduplicated form, ny-ni

SECOND PERSONAL PRONOUN.

	Erse.	Welsh.
Singular.	tu, thu	ti, Reduplicated form, ty-di
Plural.	sibh, ibh	chwi, Reduplicated form, chwy-chi

The personal pronoun of the third person, answering to the Greek ἵ and the Latin *se*, is not found in the Sanskrit; but it exists in many of the cognate languages, as the following table will show:—

	Zend.	Greek.	Latin.	Gothic.	Lith.	O. Slav.
Singular Acc.	——	σφέ, ἕ	se	sik	sawen	sja
Gen.	hê, hôi	οὗ	sui	seina	sawens	sebe
Dat.	hê, hôi	οἷ	sibi	sis	saw	sebje, si

The demonstrative pronoun, one declension of which is given in the preceding tables, appears to have been originally a personal pronoun. The termination of the third person of the verb was probably borrowed from this pronoun, of which the root is *ta* or *sa*. The demonstrative pronoun, the relative, and the article, as it is called, have all one origin. The English *he*, *she*, *it*, and *the*, *this*, *them*, &c., contain the same root *ta*, or *sa*. In the Greek, the aspirate has taken the place of the τ or σ in the nominative singular; but the words σήμερον, or τήμερον, 'this day,' and σῆτες, 'this year,' point to a primitive σός, σή, τὸ(τ), as in Sanskrit and Gothic. The Latin *iste* probably contains the same root *ta* or *sa*.

In the Celtic languages this pronoun occurs under the following forms:—

Erse.

	M.	F.
Singular.	se, he, e.	si, she, i
Plural.	siad, iad	

Welsh.

	M.	F.
Singular.	ev, evo, eve, ve, vo, e, o.	hi; reduplicated hihi
Plural.	hwy, hwynt; reduplicated hwynthwy	

The original form of the pronoun is preserved in the Erse *se*. Dr. Prichard supposes that the Welsh had originally the same form, and that the initial *s* was softened into *h*, and at length dropped entirely, giving us the words *e* and *o*. *Eve* and *evo* he regards as reduplicated forms of *e* and *o*.

The preceding examples are sufficient to prove the affinity of the pronouns in the different branches of the Indo-Germanic languages; and, if our limits permitted, many more examples might be adduced. The interrogative pronoun is the same in all these languages; in the Sanskrit, Zend, and Lithuanian its crude form is *ka*, which in Latin becomes *qui* or *quo*, and in Gothic *hwa*. The words κότε, πότε; κῶς, πῶς; κότερον, πότερον; κόσος, πόσος, &c., in Greek, point to a primitive κός, κή, κό. The same root occurs in the old High German and Slavonic languages, in the English *who*, *which*, *what*, and in the modern German *wer* and *was*.

The pronominal adverbs of the Indo-Germanic languages present many striking points of affinity. The termination *dâ*, for instance, in Sanskrit, indicating time, occurs also in the Greek, Latin, Lithuanian, and old Slavonic tongues:—

Sanskrit.	Greek.	Latin.	Lithuanian.	Old Slavonic.
ka-dâ	πό-τε	qua-(n)do	ka-dà	ko-(g)-da
ta-dâ	τό-τε	——	ta-dà	to-(g)-da
ya-dâ	ὅ-τε	——	——	je-(g)-da

Nouns.—The examples are classed according to the final letter of the Sanskrit crude forms, which are prefixed to the Sanskrit column. Our limits have only permitted us to select examples from the nominative and accusative cases; but they are amply sufficient to prove that the inflection of nouns is essentially the same in all those languages from which the examples are taken.

Verbs.—The most striking marks of relationship may be traced in the mode of conjugating the verb in the various branches of the Indo-Germanic languages. The verbs, given in the preceding lists, have been selected for the purpose of pointing out the great similarity of the personal terminations of the verbs in all these languages. Even in some instances, in which there is a considerable difference, as in the case of the Latin, which usually has the termination *o* in the first person singular of the verb, it may be proved that there was a more ancient form in the same language, which bore a greater resemblance to the usual termination of the kindred languages. Thus it may be shown from the first person singular of the past-imperfect (*regeba-m*), future (*rega-m*), and past perfect tenses (*rexera-m*) of the indicative, as well as from the tenses of the subjunctive, and such words as *sum* and *inquam*, that *m* was the usual sign of the first person singular in the Latin language. The personal endings of the verbs in the Celtic languages, though they differ in some respects very widely from the cognate tongues, nevertheless preserve the same terminations in several cases. The following list contains the personal endings of the verbs in the Welsh language:—

		First form.	Second form.	Third form.
Sing.	1	—av	—ais	—wn
	2	—i	—aist	—it
	3	root simply	—odh	—ai
Plur.	1	—wn	—om	—em *or* ym
	2	—wch	—och	—ech *or* ych
	3	—ant	—ont	—ent *or* ynt

It is a characteristic of the conjugation of many Latin and Greek verbs to add certain letter or letters to the crude form of the verb in the present tense, and those tenses formed immediately from the present. Thus in Latin, *n* and *sc* are frequently added, as in *tem-n-o*, *sper-n-o*, &c., and in *cre-sc-o*, *no-sc-o*, &c. In the same manner the terminations ν, νυ, αν, σκ, and many others, are added to Greek verbs; as in δάκ-ν-ω, τέμ-ν-ω, κάμ-ν-ω; δείκ-νυ-μι, ζεύγ-νυ-μι; λανθ-άν-ω; μανθ-άν-ω; γι-γνώ-σκ-ω, &c. Frequently, in both of these languages, a letter is inserted, or the first letter of the word is reduplicated with a short vowel in the present tense; as in *ta(n)g-o*, *li(n)qu-o*, *fu(n)d-o*, *tu(n)d-o*, *cu(m)b-o*, *ru(m)p-o*, *si-st-o*, *gi-gn-o*; and in λα(ν)θ-άν-ω, μα(ν)θ-άν-ω, λα(γ)χ-άν-ω, λα(μ)β-άν-ω, δί-δω-μι, ἵ-στη-μι, τί-θη-μι, γι-γνώ-σκ-ω.

The Teutonic languages have lost these variations; but in the Sanskrit and Slavonie verbs the present tense is frequently modified by the addition of the same letters as in Latin and Greek. In the Sanskrit the verb is divided into ten conjugations, according to the letters which are added to the present tense of the verb. The third conjugation, for example, is characterized by the reduplication of the first letter of the verb with a short vowel, of which an instance has been given above in the present tense of the verb 'to give.' The characteristic of the ninth conjugation is *nâ*, or *nî*, inserted between the crude form and the personal terminations of the verb. The Latin, Greek, and Slavonic languages form the present tenses of many verbs in a similar manner.

		Sanskrit.	Greek.	Latin.	Lithuanian.	Old Slav.
Sing.	1	str-nâ-mi	δάκ-ν-ω	ster-n-o	gáu-nu	gyb-nû
	2	str-nâ-si	δάκ-ν-ε,ις	ster-n-i,s	gáu-n'-i	gyb-ne-si
	3	str-nâ-ti	δάκ-ν-ε(τ)ι	ster-n-i,t	gáu-na'-	gyb-ne-tj
Dual.	1	str-nî-vas	—	—	gáu-na-wa	gyb-ne-va
	2	str-nî-thas	δάκ-ν-ε,τον	—	gáu-na-ta	gyb-ne-ta
	3	str-nî-tas	δάκ-ν-ε,τον	—	same as Sing.	gyb-ne-ta
Plur.	1	str-nî-mas	δάκ-ν-ο,μεν	ster-n-i,mus	gáu-na-me	gyb-ne-m
	2	str-nî-tha	δάκ-ν-ε,τε	ster-n-i,tis	gáu-na-te	gyb-ne-te
	3	str-na-nti	δάκ-ν-ο,ντι δακ-ν-οῦσι	ster-n-u,nt	same as Sing.	gyb-nû-tj

The past-imperfect and aorist tenses of the Greek verb are formed in a manner very similar to the preterite tenses of the Sanskrit. The Sanskrit preterite, which corresponds to the past-imperfect of the Greek verb, is formed by prefixing the augment *a*, and shortening the personal terminations.

EXAMPLE OF PAST-IMPERFECT.

	Sanskrit.	Greek.
Sing.	a-tud-am	ἔ-τυπτ-ον
	a-tud-as	ἔ-τυπτ-ες
	a-tud-at	ἔ-τυπτ-ε
Dual.	a-tud-âva	
	a-tud-atam	ἐ-τύπτ-ετον
	a-tud-atâm	ἐ-τυπτ-έτην
Plur.	a-tud-âma	ἐ-τύπτ-ομεν
	a-tud-ata	ἐ-τύπτ-ετε
	a-tud-an	ἔ-τυπτ-ον

The other Sanskrit preterite, which corresponds to the two aorists of the Greek verb, has, according to Bopp's division, seven forms; of which the four first agree more or less with the Greek first aorist, the fifth and sixth with the Greek second aorist, and the seventh, which, besides the augment, has also a reduplication of the first syllable, with the Greek past perfect. The four first forms always add the letter *s* in order to form the preterite; thus from the crude form *kship* is derived a preterite *a-kshaip-sam*, corresponding to the Greek ἔ-τυπ-σα(μ). The fifth and sixth forms have the same terminations as the past-imperfect tense, and differ from that tense nearly in the same manner as the second aorist in Greek differs from the Greek imperfect; thus from the crude form *lip* is derived a preterite *a-lip-am*, corresponding to the Greek ἔ-τυπ-ον. In the same manner, from the crude form *dâ*, the Sanskrit forms a past-imperfect *a-da-dâ-m*, and a preterite *a-dâ-m*, analogous to the Greek ἐ-δί-δω-ν, and ἔ-δω-ν.

The perfect tense seems originally to have been formed on the same principles in the Sanskrit, Latin, Greek, and Teutonic languages; namely, by a complete or partial reduplication of the crude form of the verb. Thus in Sanskrit, from *bhrĭ* is formed the perfect *ba-bhār-a;* from *tri*, the perf. *ta-tār-a;* from *tup*, the perf. *tu-tōp-a;* from *kship*, the perf. *chi-kshēp-a*. In the same manner in Greek, from λιπ is formed the perfect λέ-λοιπ-α; from μεν, the perf. μέ-μον-α; from θαλ, the perf. τέ-θηλ-α; from φαν, the perf. πέ-φην-α. In Latin also we have the perfects *cu-curr-i*, *spo-spond-i*, *ce-cĭd-i*, *ce-cīd i*, *mo-mord-i*, and *po-posc-i*, from the crude forms *curr*, *spond* or *sponde*, *căd*, *cæd*, *mord* or *morde*, and *posc;* and in Gothic we have the perfects *skái-skáid*, *mái-mdit*, *hldi-hlaup*, *sái-salt*, *sdi-slēp*, from the verbs *skáida*, *mdita*, *hláupa*, *salta*, and *slēpa*.

It is, perhaps, scarcely necessary to remark that the preceding observations relate to only a small part of the resemblances which are found in the grammatical structure of the Indo-Germanic languages. An examination of the manner in which the comparative and superlative degrees of adjectives are formed, and especially a comparison of the suffixes added to form verbs and nouns, as well as a list of the more simple prepositions, would afford many additional points of resemblance; but the examples which have been already given are sufficient to prove the close affinity of these languages in the laws which regulate their grammatical forms.

The affinity of these languages may be still further shown by a comparison of such words as express the most common objects and the most simple ideas, and which, from their very nature, are the least likely to have been derived from any other language. In compiling the following lists considerable assistance has been derived from a useful book lately published by Mr. Winning, entitled 'A Manual of Comparative Philology.' The words in the Celtic column are taken from the work of Dr. Prichard on the 'Eastern Origin of the Celtic Nations.' The Zend and Persian forms are so closely allied to the Sanskrit, that it has been thought advisable to place them under the same column. In the column devoted to the Slavonic languages, *Lith.* stands for Lithuanian; *Lett.* for Lettic; *O. Pr.* for Old Prussian; and those words which have no letters before them belong to the Old Slavonic language. In the Teutonic column, *Goth.* stands for Gothic; *G.* for German; *O. H. G.* for Old High German; *L. G.* for Low German; *A. Sax.* for Anglo-Saxon; *Engl.* for English; and *O. Engl.* for Old English. In the Celtic list, *Er.* stands for Erse, and *W.* for Welsh. The English words in the first column give the meaning of the words in the cognate languages. All the Sanskrit, Greek, and Latin words are given in their crude forms.

Words denoting Relationship, &c.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Father	pitri Z. paitar P. pader	πατερ	pater	bat	O. H. G. vatar L. G. fader	Er. athair
Mother	mâtri L. matar P. mader	μητερ, ματερ	mater	mater Lith. moter	G. mutter	Er. mathair
Son	sunu	. . .	. . .	syn Lith. sunu-s	Goth. sunu-s. G. sohn	
Daughter	duhitri Z. dughdhar P. dokhter	θυγατερ	. . .	dotcher Lith. dukter	Goth. dauhtar G. tochter	Er. dear
Brother	bhrâtri Z. bratar P. brader	φρατορ φρατρια (fraternity)	frater	brat	Goth. brothar G. bruder	Er. brathair W. brawd
Sister	swasri	. . .	soror	sestra Lith. sesser	Goth. swistar G. schwester.	Er. siur
Father-in-law	swasurah	ἑκυρο	socer	swekar Lith. szessur.	Goth. svaihra	W. chwegrwn
Mother-in-law	swasruh	ἑκυρα	socru	swekru	Goth. svaihro	W. chwegyr
Daughter-in-law	snushâ	νυο	nuru	snocha	A. Sax. snoru G. schnur	
Brother-in-law	dêvri	δαερ	levir	dever Lett. deeveris	O. H. G. zeihhur A. Sax. tacor	
Master and *Husband*	pati Z. paiti-s	ποσι	. . .	Lith. pati-s	Goth. fath-s	

[*Words denoting Relationship, &c.*—continued.]

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Mistress and *Wife*	patnî	ποτνια as in *Il.* xxi. 470, πότνια θηρῶν.	. . .	Lith. patti		
Man	nara Z. nairya P. nar	α-νερ	. . .	. . .	. . .	nêr (lord)
Man	vîra Z. vairya (strong)	. . .	viro, vir	Lith. vyra,s Lett. vyr,s	Goth. vair-s	Er. fear W. gwyr, wyr
Man	manu-shya	. . .	ho-mon?	mush, monsh. Lith. zmones	G. mann mensch	
Woman	jani Z. gena P. zenne	γυναικ γυνη.	. . .	gena O. Pr. genna	Goth. quino O. Engl. quean	Er. gean
Woman	vâmanî	. . .	fēmina	. . .	Engl. woman	Er. femen

Parts of the Body, &c.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Eye	akshi Z. ashi	οκκο οσσε	oc-ulo	oko Lith. aki,s	Goth. augo G. auge	
Brow	bhrû Z. bru, bruat P. a-bru	ο-φρυ	. . .	browi	O. H. G. prawa	Er. brai
Nose	nâsâ Z. nao	. . .	naso	nos Lith. nosi,s Lett. nassi,s	G. nase	
Tooth	danta	ο-δοντ	dent	danti,s	Goth. thuntu,s G. zahn	Er. dend W. dant
Nail	nakha P. nakhan	ο-νυχ	ungui	nogot Lith. naga,s	G. nagel	
Knee	ganu Z. genu P. zanu	γονυ γονατ	genu	. . .	Goth. kniu G. knie	
Right Hand	dakshina Z. dashina	δεξιο	dextero. dexter	dessna Lith. deszine.	Goth. taihsvo	Er. deas
Foot	pada Z. padha	πεδ	ped	Lith. pada,s	G. fuss	
Tear	asru P. zareh	δακρυ	lachruma	Lith. aszara Lett. assara	Goth. tagr	Er. deor W. deigryn
Hair	kêsa P. kisu	. . .	cæsa-rie	Lith. kassa		

Objects of Nature and Art.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Sun	hêli	ἡλιο	sōl	Lith. saule	Goth. sauil	W. haul
Moon or *Month*	mâsa Z. mao P. mah	μην, μηνη	mensi	Lith. mienu	Goth. mena	Er. mios
Star	târâ Z. staro	α-στηρ	stella (diminutive of *stera*; as *tenella*, of *tenera*.)	. . .	Goth. stairno. G. stern	W. seren
Sky, Cloud	nabha nabhâ	νεφεσ (N. νεφος) νεφελη	nube, nubi. nebula	Lith. debbesi,s Lett. debbe,s.	O. H. G. nepal G. nebel	Er. neal W. niwl
Water	uda	ὑδατ ὑδος	udo, unda	voda Lith. vandu Lett. uden,s O. Pr. und,s	Goth. vato A. Sax. wæter O. H. G. wazar G. wasser Engl. wet	Er. dour W. dwr
Day	dyu	διο?	diu diu-rno die	den Lith. diena Lett. deena	Goth. dag,s A. Sax. dæg G. tag	Er. di, dia W. dydh
Night	nisâ nakta-m (Adverb 'by night' *nakta* is not found by itself as a substantive.)	νυκτ	noct.	noc' Lith. nakti,s Lett. nakt,s Russ. notch'	Goth. naht,s G. nacht	Er. nochd W. nôs
Sea	mîra	. . .	mari	more Lith. mare,s Russ. more	Goth. marei G. meer	Er. muir W. môr
Earth	dharâ	ἐρα ἐρα-ζε	terra tellur	. . .	Goth. airtha G. erde	W. daiar, dhaiar Er. talamh, tellur
Earth	go. Z. zao	γη	. . .	zemia, zemla. Lett. semme	Goth. gavi G. gau (district)	Er. ce
Fire	agni	. . .	igni	ogni Lith. ugni,s	. . .	Er. aghna
Light	âlôka from *lôch*, 'to see'	λευκο (adj.) λυκο-φωτ	luc	luc'	Goth. liuath G. licht	Er. leos W. lhwg
Cloud	mêgha P. migh	ο-μιχλη	. . .	mgla Lith. migla	Goth. milhma	

Oojects of Nature and Art—continued.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
Winter . . .	hima . . . . (snow) Z. zima	χειμ-ων . .	hiem . . .	zima . . . . Lett. seema . .		
Wine	. . .	οινο or ϝινο . .	vino . . .	vino . . . . O. Pr. vyna	G. wein	Er. fin W. gwin, win
Clothing . . .	vâsa . . . . Z. vashtra	ϝεσθητ . . .	vesti . . .	. . .	Goth. vasti	
Door	dwar . . . . P dar	θυρα . . .	fori. . .	dwer . . . . Lett. durri,s	Goth. daura . . G. thür	Er. doras W. dor
Carriage or *Axle-tree*	aksha	αξων . . .	axi	Lith. assi. . .	O. H. G. ahsa G. achse Engl. axle	
Carriage or *Wheel*	ratha . . . . Z. ratha	. . .	rota. . . .	Lith. rata,s . . Lett. rat,s	G. rad . . .	Er. roth *Gallic*, rheda, see Quinctil. I. 5
			Adjectives.			
Great . . .	mah-at . . . Z. mazo	μεγα . . .	mag-no . .	mogu . . . (*to be able*) Lith. mac-ni,s (*power*)	Goth. mikils . O. H. G. mihil O. Engl. muchel	Er. meall
Broad . . .	prithu . . .	πλατυ . . .	lato . . .	Lith. platus . . Lett. plat,s	G. breit and platt Engl. broad & flat	
Thin	tanu . . . . From the verbal root tan. (See below.)	τανυ, in composition; as τανυ-δρομο	tenui . . .	tanan . . .	G. dünn . . .	W. denau
Young	yuv-an . . .	. . .	juv-eni. . .	januii . . . Lith. jauna,s	G. jung . . .	W. jau jeuant
New	nava . . . . P. nu	νεϝο . . .	novo . . .	novii . . . . Lith. naiya s	Goth. nivi,s . . G. neu	Er. nuadh W. newydh
Middle . . .	madhya . . . Z. maidhya P. mijan	μεσο . . . μετα	medio . . .	mezdu . . . (between)	Goth. midi,s . . O. H. G. midja,s G. mittel	Er. meadhon
Red	rôh-ita . . .	ε-ρυθ.ρο . . .	rub.ero. . . rut,ilo ruf,o	Lith. rudda,s. . Lett. rud,s	O. H. G. rot. . G. roth Engl. ruddy	Er. ruadh
Both	ubha . . . . Z. uba	αμφω . . .	ambo . . .	oba . . . . Lith. abbu Lett. abbi	Goth. ba G. beide	
			Verbal Roots.			
To Generate . .	jan . . . . Z. zan	γεν . . . . γεν-ες (N. γενος) γι-γν-ομαι	gen. . . . gen-es (N. gen-us) gen-itor gi-gn-o	Lith. gemu . . Lett. dsimt	Goth. kin . . Engl. kin	W. geni E. gein (*offspring*)
To Die . . .	mri . . . . mara (death) Z. mar P. murd-en	μορ-το . . . (μρο-το) βρο-το See 'Journal of Education,' No. 5. p. 100	mor . . . mor-tuo mor-t	mri- . . . . Lith. mir Lett. mir-t	Goth. maurthr . G. mor,d	Er. marbh (dead) W. marw (die)
To Live . . .	jîv . . . . Z. ji, or jva	ζα	viv	jivu, jiva . . . (*life*) O. P. giva (*life*)	Goth. quivs . . (*living*) O. Engl. quick	Er. beo W. byw, or vyw
To Know . . .	jnâ	γνω . . . γι-γνω-σκ γνω-μη	gno . . . co-gno-sc (g)no-sc gna-ro (g)no-to	zna	Goth. kann . . G. kenn-en Engl. ken	W. gwn
To Know . . .	vid* . . . . Z. vid	ϝιδ. . . . . ϝιδ-μεν	vid . . . . vid-e	vid . . . . Lith. veizd-mi	Goth. vid. . . G. wiss-en Engl. wit, wot, wise	W. gwydh and wydh (*knowledge*) Er. fis, fios (*knowledge*)
To Hear . . .	sru	κλυ . . . κλυ-το	clu . . . . clu-e in-clu-to	slu . . . . Lith. klau Russ. sluch (*hearing*)	Goth. hliuma . (ear)	W. clyw (*hearing*) Er. cluas (ear)
To See . . .	dris	δερκ. . . . δε-δορκ-α	. . .	Lith. dairaus . (*look about*)	. . .	Er. dearc
To Lick. . . .	lih (h guttural) .	λειχ . . .	li(n)g . . .	. . .	Goth. laigw,an . A. Sax. licc,an	Er. lighim

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* This verb in Sanskrit, Greek, and Gothic, has no Present Tense, but uses the Perfect in the sense of the Present; and in the inflection of the tense the short vowel of the root is in each language changed into a long vowel in the Singular Number. In the Greek οἶδ-α, the ι represents the ϝ which appears in ϝιδ-μεν, &c.

	Sanskrit.	Greek.	Gothic.
Sing.	véda	οἶδ-α	vait
	vét-tha	οἶσ-θα	vais-t
	vèd-a	οἶδ-ε	vait
Plur.	vid-imá	ϝίδ-μεν	vit-um
	vid-a(tha)	ϝίσ-τε	vit-uth
	vid-as	ϝίσ-ασι	vit-un

Verbal Roots—continued.

English.	Sanskrit.	Greek.	Latin.	Slavonic.	Teutonic.	Celtic.
To Put, or *Place*	sthâ Z. sta	στα	sta	sta	Goth. stand-an	Er. stadam
To Think	man man-as (*mind*) Z. man	μεν μι-μνη-σκ μεν-ις (N. μεν-ος)? μι-μον-α ?	min, or men me-min-i men-t mon-e	mjen Lith. men	G. mein-en Engl. mean	W. menw (*mind*)
To Go	i *Present Tense* ê-mi ê-shi ê-ti i-mas i-tha y-anti	ι Present Tense εἶ-μι εἶ-ς εἶ-τι, εἶ-σι ἴ-μες ἴ-τε ἴ-ασι (from ἴ-αντι)	i i-re	i	Goth. iddja (*I went*)	
To Sit	sad	ἰδ ἰδ-ις (N. ἰδ-ος) (*seat*)	sid, or sed sed-e	Lith. sed	Goth. sit-an G. sitz-en	Er. suidham
To Join	yug	ζυγ ζευγ-νυ-μι ζυγ-ο (N. ζυγ-ον)	jug ju(n)g jug-o	jgo	Goth. juk Engl. yoke	W. jau
To Carry	vah	Ϝοχ Ϝοχ-ις (Ϝοχ-ος)	veh	Lett. wes	Germ. wag-en O. Engl. wain	
To Bear	bhri	φερ	fer	. . .	Goth. bair-an A. Sax. bear-an	Er. bheirim
To Make	kri	κρα κραιν or κραν	cre cre-a	O. Pr. kura (*he created*)	O. H. G. karaw-an	Er. ceard (*workman*)
To Give	dâ Z. dha	δο, δω	da	da	. . .	Er. daighim (*I give*)
To Place	dhâ Z. da	θε θη	. . .	Lith. de	O. H. G. tu-on O. L. G. do-an G. thu-n Engl. do	
To Be	bhû Z. bu P. bu-den	φυ	fu	bu Lith. and Lett. bu	O. L. G. be-on G. bi-n (*I am*) Eng. be	Er. bu mi (*I was*) W. bu
To Be	as Z. as P. es	ες	es	jes Lith. es O. Pr. as	Germ. is-t (*he is*) Engl. is	Er. is W. ys
To Eat	ad	εδ	ed	ed O. Pr. is	Goth. it-an O. H. G. iz-an G ess-en	Er. ith W. ysu
To Drink	pî	πι or πο πι-ν-(ω) πο-το	po po-to po-ta (*verb*) bi-b-o, like si-st-o gi-gn-o	pju Lith. po		
To Call	vach Z. vac	βαγ or βακ βαγ-ματ βακ-σι	voc	O. Pr. vack		
To Heat	tap Z. tap	τυφ (*burn*) τεφ-ρα (*ashes*)	tep tep-ido	tep-leiu		
To Fear	bhî Z. bi-as (*fear*)	φοβ φοβ-ο	. . .	boi Lith. and Lett. bi	O. H. G. pi-pin-an	
To Strew	strî	στορ στορ-νυ-μι στρω-το	ster, or stra ster(n)-o stra-to	stre	Goth. strauj-an G. streu-en	
To Mix	misr	μιγ or μισγ μιγ-νυ-(μι) μισγ-(ω)	misc misc-e	Lith. miss	G. misch-en	W. mysgy
To Breathe	an	. . . αν-ιμο	. . . an-ima an-imo	. . .	Goth. us-ana (*breathe out, die*)	Er. anaim (*soul, spirit*)
To Stretch	tan	τεν τειν-ω ταν-υω	ten ten(d)-o	. . .	Goth. than(j)an G. dehn-en	taen

A brief examination of the family of languages, usually known by the name of Semitic, will tend to confirm the observations that have already been made respecting the affinity of languages. It will be seen that the various dialects of this family are related as closely to each other as the different branches of the Indo-Germanic race; and that they differ widely from the latter, both in their grammatical structure and in the majority of their roots.

The Semitic languages have derived their name from the real or supposed descent of the people who speak these languages from Shem, the son of Noah. They may be divided into three branches:—

I. The *Aramæan*, spoken in Syria, Mesopotamia, and Babylonia, may be subdivided into two branches; the Babylonian, or East Aramæan (sometimes, but erroneously, called Chaldee), and the Syriac, or West Aramæan.

II. The *Hebrew*, spoken in Palestine, and probably with little variation in Phœnicia and the Phœnician colonies, as Carthage, &c.

III. The *Arabic*, to which the Ethiopic is very closely allied, is at present spoken in many countries, but was originally confined to the peninsula of Arabia and Ethiopia.

In order to save room, the examples in the following lists have been taken from the Hebrew and Arabic languages alone, since they are the two most important branches of the Semitic family of languages.

In general the remarks already made on the changes of letters in the Indo-Germanic languages will hold good in the Semitic family. One example of this deserves a distinct mention. In Hebrew *p* פּ and *f* פ are only distinguished by the dot in the former; in Arabic there is no *p*, and the Hebrew *p* is always expressed by *f*; as, *to do*, Heb. *pa'al*, Ar. *fa'ala*.

The nouns and verbs given below have been taken at random: they might easily be multiplied to almost any extent, so numerous are the roots which are common to the two languages. Those words only have been taken which are likely to be primitive words in any language:—

Numerals.

	Hebrew.	Arabic.
One	eḥad	ahad wahid
Two	shĕnē shĕnēm	ithnāni
Three	shĕlosh	thalāth
Four	arba'	arba'
Five	ḥamish	ḥams
Six	shish	sitt
Seven	shib'	sib'
Eight	shĕmōn	thamān
Nine	tish'	tis'
Ten	'asār	'ashar
Hundred	mēāh	meait
Thousand	elef	alf

Personal Pronouns.

	Separate.		Affixed.	
	Hebrew.	Arabic.	Hebrew.	Arabic.
1st Pers. Sing.	anī, *or* ānōci	anā	i *or* nī	ī *or* nī
Pl.	ānū anaḥnū naḥnū	naḥnu	nu	nā
2d Pers. Sing. m.	attāh	anta	ca	ca
f.	at	anti	ĕc	ci
Pl. m.	attem	antom	cem	com
f.	atten	antonna	cen	conna
3d Pers. Sing. m.	hū (a)	howa	o	hu
f.	hī (a)	hiya	āh	ha
Pl. m.	hēm	hom	ām	hom
f.	hēn	honna	ān	honna

Demonstrative Pronouns.

	Hebrew.	Arabic.
This masc.	zeh	dzā
fem.	zoth	tā
These	ēlleh	ūlā
That. masc.	hallāzeh	dzāca, *or* dzalica
fem.	hallēzū	tāca, *or* tālica

The relative pronouns are often expressed in both languages by the article. They also have these forms.

Hebrew.	Arabic.
asher (indec.)	aladzdzi (dec.) man (indee.)

Interrogative Pronouns.

	Hebrew.	Arabic.
Who?	mī	man
What?	mah	mā

Conjugation of the Present and Future Tenses of a Verb.

Lamad, *to learn.* | Kabala, *to kill.*

Preterite Tense.

		Hebrew.	Arabic.
Sing.	1st pers.	lāmad-ti	kabal-tū
	2d p. m.	lāmad-tā	kabal-tā
	2d p. f.	lāmad-t	kabal-tī
	3d p. m.	lāmad	kabal-a
	3d p. f.	lāmĕd-āh	kabal-at
Plur.	1st pers.	lāmad-nū	kabal-nā
	2d p. m.	lāmad-tem	kabal-tom
	2d p. f.	lāmad-ten	kabal-tonna
	3d p. m.	lāmĕd-ū	kabal-ū (a)
	3d p. f.	lāmĕd-ū	kabal-na

Future Tense.

		Hebrew.	Arabic.
Sing.	1st pers.	e-lmōd	a-kbol-u
	2d p. m.	ti-lmōd	ta-kbol-u
	2d p. f.	ti-lmĕd-ī	ta-kbol-īna
	3d p. m.	yi-lmōd	ya-kbol-u
	3d p. f.	ti-lmōd	ta-kbol-u
Plur.	1st pers.	ni-lmōd	na-kbol-u
	2d p. m.	ti-lmĕd-ū	ta-kbol-ūna
	2d p. f.	ti-lmōd-nāh	ta-kbol-na
	3d p. m.	yi-lmĕd-ū	ya-kbol-ūna
	3d p. f.	ti-lmōd-nāh	ta-kbol-nah

Words expressing relationship.

	Hebrew.	Arabic.
Father	Ab	Ab
Mother	ēm	ōm
Son	ben	ebn
Daughter	bath	bint
Brother	aḥ	aḥ
Sister	aḥoth, *fem. of* aḥ	aḥt, *fem. of* aḥ

Parts of the body.

	Hebrew.	Arabic.
Head	rōsh	rās
Eye	'ayin	'ain
Mouth	peh	fūh, fīh, fāh
Tooth	shēn	sinn
Ear	ozen	odzon
Hand	yād	yad
Heart	lēb, *or* lēbāb	lobb

Familiar objects, animate and inanimate.

	Hebrew.	Arabic.
God	el	allah
Man	anash, īsh	nās
Men	ănāshim	ins
Lion	layish	laith*
One of a flock, *i.e.* a sheep, or goat.	seh	shāt, *or* shāhat
Ox	shūr	thaur†
Sun	shemesh	shams
Star	cocab	caucab
Heaven	shāma-yim (dual)	samā (sing.)
Earth	erets	arḍ‡
Day	yōm	yawam
Night	lāyĕlāh	lail, *or* lailat
Water	ma-yim (dual)	maā (sing.)
Fire	(a)ūr	(a)owār‖
River	nāhār	nahar
House	bayith	bait
Wall	sūr	sūr
Name	shēm	ism

* Compare Gr. λῖς, (Homer.) † Compare ταυρος, taurus.
‡ Compare *earth, erde*, (Ger.) ‖ Compare aurora.

Verbal Roots.

	Hebrew.	Arabic.
Do	pā'al	fa'ala
Die	mūth	māta, *for* mawata
Eat	ācal	acala
Laugh	tsāḥak	ḍaḥica
Place	nātsab	nasaba
Cry out; and hence read *or* recite.	kārā*	
Read		kara
Shine	hā'al	halla
Sit	gālash	jalasa†
Speak, *or* command	āmar	
Command		amara
Stand	'āmad	'amada
Weep	bācā	bacā
Write	cāthab	cataba

* Compare κραζω, and *cry*.
† By many of the Arabs, as for example, the Egyptians, j is pronounced g.

It would be an interesting object of inquiry, if we possessed sufficient data from which a satisfactory conclusion might be drawn as to the affinities which exist between other languages not related to the Indo-Germanic and Semitic families. Such an inquiry might be of no small advantage in an historical point of view; since the use of languages, closely related to each other in their grammatical structure and their principal roots, must be allowed to furnish a strong presumption, if not a direct proof, that all the nations who speak such languages must originally have been one and the same people, however much their moral and social circumstances may differ, and however distant they may be from each other in geographical position. Such an investigation might perhaps lead to the conclusion, that the number of languages in the world, radically distinct from each other, is not so great as some philologists have represented; but at present our acquaintance with the greater number of languages is of too imperfect and unsatisfactory a nature to allow us to form an opinion on the subject. Our knowledge of many languages is limited to short lists of words, which have been copied down by voyagers or travellers, who have often only remained for a few days or weeks in the countries where the languages were spoken; and yet philologists have frequently ventured, on these lists alone, to maintain or deny the affinity of different tongues. Languages, such as the English and the Sanskrit, which differ in many important points, and which to a common observer may appear to be entirely distinct from each other, are proved by investigation to be closely allied; while others, such as the Chinese and Polynesian, which have been thought by many persons to be nearly related to each other, are shown by the researches of modern scholars to have no connexion. A comparison of two different languages cannot therefore be safely conducted without a complete or at least a tolerable acquaintance with the vocabulary and grammar of each.

But though a more complete knowledge of the various languages at present spoken may enable us to trace affinities that have never been suspected; yet it is not to be supposed that any examination will enable us to discover so many points of resemblance as to *prove* that *all* languages may be referred to a common origin. Many languages, with which we are already acquainted, differ so entirely in their vocabulary and grammatical structure, as to lead some philologists to the conviction that they were from the beginning formed upon different principles, and could never have had any connexion with each other. It may be asked, whence has this diversity of language arisen? The common opinion, derived from the testimony of the book of *Genesis*, refers all mankind to one common parentage; and it is believed by most persons that all mankind spoke one common language, till that event occurred known in Scripture by the name of the 'Confusion of Tongues,' when God miraculously caused many different languages to arise in place of the one that had hitherto been spoken. But a careful examination of the tenth and eleventh chapters of *Genesis* will not allow us to admit the correctness of this popular interpretation; for without supposing, with many orthodox commentators, that the miracle 'consisted rather in a temporary confusion of mind, producing as its effect a corresponding confusion of expression, than in any miraculous change in the permanent dialects,' it is evident from the tenth chapter of *Genesis* that the dispersion of Noah's family and their emigration to different parts of the earth happened *previous* to the confusion of tongues at Babel. Whatever this confusion of tongues may have been, it could only have had any effect upon that branch of Noah's descendants who remained in the land of Shinar, and could not therefore have affected the majority of the human race, who had already gone to other parts of the world.

Those persons who reject the popular interpretation of the eleventh chapter of *Genesis*, but at the same time believe that originally only one language was spoken in the world, maintain that the diversities of language may be accounted for 'by the operation of gradual causes arising from long separation, distant emigrations, and new associations, constantly modifying the simplicity of earlier language.' But allowing that these causes may have had great influence in modifying, and, to a certain extent, changing languages, yet they do not appear to be sufficient to account for the great dissimilarity that exists between languages which appear radically distinct, such for example as the Chinese and Sanskrit, on the supposition that these languages were originally one and the same. The nations of Germany and India are widely removed from each other in geographical position; we know from history that they have lived under a different form of government, in a different state of civilization, and in a different climate for upwards of 2000 years at least, and yet the languages spoken by these people still continue to bear the most striking proofs of identity in their vocabulary and grammatical structure.

Another mode of accounting for the diversity of languages is by supposing that the earth must have been originally peopled by several separate races, with languages peculiar to each. This opinion extensively prevailed among the Greeks and Romans, and has been advocated in modern times by many celebrated writers, such as Niebuhr and Von Humboldt. The greatest objection to this opinion arises from the Mosaic account of the creation, which certainly inculcates a different doctrine. Many biblical critics indeed maintain that the early chapters of *Genesis* are not to be interpreted literally, and that the word 'Adam' in particular merely means mankind in general, without determining the number of the species that were created. But such a mode of interpretation is open to many solid objections.

Many philologists have included all known languages under three great divisions, which they distinguish from one another by the following characters.

1. Languages composed of monosyllabic roots without any forms of grammar. To this class belong the Chinese idioms, in which we find nothing but naked roots, and in which the meaning of sentences is determined, not by grammatical relations, but by the position of words in a sentence.

2. Languages composed of monosyllabic roots, but with a great abundance of grammatical forms. To this class the Indo-Germanic, Armenian, and other languages belong.

3. Languages whose verbal roots consist in their present form of two syllables, and require three consonants for the expression of their fundamental meaning. This class is limited to the Semitic languages, which contain only few examples of compound words, and possess very few grammatical forms. It is however the opinion of Gesenius, Ewald, and the most eminent Semitic scholars of the present day, that these languages also were originally monosyllabic; which could easily be proved to be the fact by an examination and dissection of the most simple roots of the Hebrew and Arabic languages.

Our limits do not allow us to give even a list of the known languages, far less to attempt any systematic account of them. We must refer our readers who desire information on this subject to Adelung's 'Mithridates,' continued by Vater, 4 vols., 1805-1817; Marsden's 'Catalogue of Dictionaries, Vocabularies, Grammars, and Alphabets,' 1796; Vater's 'Linguarum totius Orbis Index Alphabeticus,' 1815, and 'Vergleichungstafeln der Europäischen Stamm-Sprachen und Süd-West-Asiatischer,' 1822. The principal varieties of the Asiatic languages have been briefly pointed out in the article Asia (ii., 473-475); and the late Mr. Marsden has, in his 'Miscellaneous Works,' 1834, given us much valuable information respecting the languages spoken in the Polynesian Islands; by which he understands all those islands 'which extend through the intertropical region from Madagascar, or more obviously from Sumatra, as its western, to Easter Island in the Pacific Ocean, as its eastern limit.' In the languages spoken throughout these islands, he remarks 'that there is a manifest connection between many of the words by which the inhabitants of these islands express their most simple perceptions; and in some instances, of places remote from each other, a striking affinity, insomuch that we may pronounce the various dialects, in a collective sense, to form substantially one great language.'

With respect to the American and African languages, Dr. Prichard, who has devoted great attention to this branch of linguistic study, remarks 'that the native races of North America may be referred by a classification of their dialects to a few great divisions, several of which extend as radii issuing from a common centre in the north-western part of the Continent, where it is divided from Asia by Behring's Strait. The traditions prevalent among the antient Mexicans seem to have derived credit from the discovery of a chain of nations extending almost from New Mexico to Mount St. Elias, in the neighbourhood of the Esquimaux Tschugazzi, their languages, particularly those of the

Ugalyachmutzi and Koluschians, bearing a curious analogy to that of the Aztecs and Tlaxcallans. Another series of nations, the Karalit or Esquimaux, connected by affinities of dialect, has been traced from the settlements of the Tschuktschi, in Asia, along the polar zone to Acadia and Greenland. Light has also been thrown in a similar manner on the history of the Lenni Lenape, and the great kindred family of Algonquin nations, on that of the Iroquois, and likewise of the Floridian and other races of North America, by a comparison of their national tradition with the indications discovered in their dialects. One circumstance, which is perhaps of more importance than all the preceding, is the singular congruity in structure between all the American languages, from the northern to the southern extremity of the continent.'

'In Africa a remarkable and interesting fact was the discovery of a nation occupying nearly the whole northern region of that continent, to which the Kabyles of Mauritania and the Tuarik of the Great Desert belong, and whose branches extend from the oasis of Siwah on the eastern, to the mountains of Atlas, and even to the Canary Islands on the western side; the Quanches, the old inhabitants of those islands, whose remains are said to be embalmed in the mummy caves of Teneriffe, spoke, as it appears, a dialect of the same language as the Kabyles and Berbers. The Felatahs, who have spread themselves over the interior countries of Nigritia, have been traced by a similar investigation to the mountainous districts above the Senegal, where the Foulahs, who speak the same language, have been long known to Europeans as a people in many respects distinguishable from the negroes. To the southward of the equator a connection still more extended has been discovered among the native tribes across the whole of the same continent from Caffraria and the Mosambique coast on the Indian Ocean, to the countries which border on the Atlantic and form a part of the region termed the empire of Congo.'

One of the most interesting and important works on language that has yet appeared is a posthumous work of the late Wilhelm von Humboldt, entitled 'Ueber die Verschiedenheit des Menschlichen Sprachbaues und ihren Einfluss auf die geistige Entwickelung des Menschengeschlechts,' Berlin, 1836. The reader may also refer to Dr. Becker's *Organism der Sprache*, to his German Grammar, and to Harris's *Hermes*.

LANGUE D'OC. [FRANCE—*Literature*.]

LANGUEDOC, one of the most extensive and important of the provinces into which, before the Revolution, France was divided. It was bounded on the north by Lyonnais and Auvergne, and by Rouergue and Querci, subdivisions of Guyenne; on the east by the Rhône, by which it was separated from Dauphiné and Provence; on the south by the Mediterranean, the province of Roussillon, and the Pyrenees; and on the west by Couserans and Comminges, and by Rivière Verdun, a subdivision of Armagnac, all in Gascogne. Its extent, as described above, includes the county of Foix, which is a subdivision of it, though it constituted a separate military government previous to the Revolution. Its subdivisions and area, exclusive of Foix, were as follows:—

District.	Capital.	Sq. Miles.
Vivarais	Viviers	2201
Rasez	Limoux	796
Carcassez	Carcassonne	561
Lauraguais	Castelnaudary and Lavaur	683
Velay	Le Puy	912
Gevaudan	Mende	2027

And the following dioceses:—

Nîmes	1246
Uzès	1159
Toulouse	1090
Montpellier	707
Lodève	272
Béziers	897
Narbonne	1433
Alby	1923
Montauban (part of)	208
	16,119

We borrow the above division from the 'Statistique de la France,' printed and circulated by the minister of public works, agriculture, and commerce of that kingdom, as being the most authentic source, and as giving the extent of each territorial division. The arrangement, comprehending districts partly feudal and partly ecclesiastical, is not good The dioceses given therein extended over the following feudal districts:—

	Capital.
Le Toulousain (or county of Toulouse)	Toulouse.
L'Albigeois	Alby.
The Marquisate of Mirepoix	Mirepoix.
The County of Narbonne	Narbonne.
The County of Montpellier	Montpellier.
The Viscounty of Béziers	Béziers.
The Viscounty of Lodève	Lodève.
The Viscounty of Nîmes	Nîmes.
L'Agadez, or district of Agde	Agde.
Les Cevennes, or the County of Alais	Alais.
L'Uzégeois, or Duchy of Uzès	Uzès.

The whole of the districts of the province were sometimes arranged under the three great divisions of Haut (Upper) Languedoc, Bas (Lower) Languedoc, and Les Cevennes. Toulouse was the capital.

The name Languedoc does not appear to have come into use until the thirteenth century. Two languages, or dialects, predominated at that time in France, which took their designation from their affirmatives. The dialect which prevailed north of the Loire was called Langue d'Oil, or Langue d'Oui; that of the south of France, Langue d'Oc; otherwise the Occitanian, or Provençal language. [FRANCE.] From the dialect the name passed to the district in which it continued to be spoken. The district however had been the theatre of events and changes of considerable interest at an earlier period.

It constituted part of the Roman conquests in Gaul before the general subjugation of that country by Cæsar. The 'Provincia' of the Commentaries of that general was bounded by the Rhône, the Cévennes, and the Pyrenees. The part west of the Rhône comprehended the greater part of Languedoc. The county of Toulouse formed the western extremity of Languedoc; and Cæsar informs us that the Tolosates, who occupied that district, were just within the Roman frontier. (*Cæs. de Bell. Gall.*, i., 10.) In the subsequent divisions of Romanized Gaul, Languedoc was chiefly included in the province of Narbonensis, and upon the subdivision of that province, in Narbonensis Prima. The Celtic tribes which inhabited it were: the Tectosages (about Carcassonne), the Tolosates (about Toulouse), and the Arecomici (between the Cevennes, the Rhône, and the Mediterranean, from Béziers to Uzès); these were three divisions of the Volcæ; the Atacini (on the Atax, or Aude), and a portion of the Consoranni (Couserans and Foix), the Gabali (Gevaudan), the Helvii (Vivarais), and the Vellavi (Velay). The Helvii were included in Viennensis, the Gabali and Vellavi in Aquitania Prima, which makes it probable that these tribes were not included in the 'Provincia' of the Romans before Cæsar's time. In the decline of the Roman empire the province of Narbonensis Prima was occasionally designated Septimania, from its seven dioceses of Toulouse, Béziers, Nîmes, Agde, Maguelonne (Montpellier), Lodève, and Uzès.

In the year 412, Languedoc, through which the Vandals and Alans had marched into Spain, was seized by the Visigoths under their king Ataulphus. [ATAULPHUS.] They however quitted it soon after to proceed to Spain: but upon their return from that country they received the cession from the Romans of the city and territory of Toulouse, with the parts of Aquitania west of it. They made Toulouse the capital of the kingdom which they established, the boundaries of which they soon extended to the banks of the Loire and the Rhône, comprehending the whole of Languedoc and several other provinces. The battle of Vouglé or Vouilli (A.D. 507) broke the power of the Visigoths; and Toulouse came into the power of Clovis, king of the Franks. [CLOVIS; FRANCE.] The greater part of the Narbonensis Prima of the Romans remained however to the vanquished nation, and bore under their sway the names of Gothia and Septimania; this province was under the government, in military and civil affairs, of a count or duke, an officer of the highest rank, appointed by the king of the Visigoths of Spain.

In the earlier part of the eighth century, the Saracens having conquered Spain, and put an end to the kingdom of the Visigoths, Septimania fell into a state of anarchy. It remained however in the hands of the Visigoths, and became the place of refuge for those who fled from the Saracens in Spain. In the year 719 the Saracens passed the Pyrenees under Zama their general. He took Narbonne, but failed in an attempt on Toulouse, then under the sway of Eudes, the Frankish duke of Aquitaine, who defeated and slew Zama. The Saracen army in consequence withdrew into Spain. They made a second attempt, which failed; but a third endeavour was more successful: the greater part of Septimania was conquered in A.D. 725 or the following years; and the ravages, if not the permanent conquests, of the Saracens, were extended even beyond its boundaries.

Pepin le Bref in the year 752 drove the Saracens from Languedoc. He took Narbonne after a siege or blockade of seven years; and then attacking Waiffre, duke of Aquitaine, reduced Toulouse, the Albigeois or district of Albi, and Gevaudan, which were in possession of Waiffre, who had become all but independent of the Frankish crown. Under Charlemagne, Toulouse was made the seat of a count or governor, and in the reign of Louis le Debonnaire, his son, the maritime part of Languedoc was formed, with the adjacent part of Spain, into a duchy, under the name of Septimania, or Gothia. This duchy was afterwards reduced to a marquisate, and the Spanish portion (the March of Spain) was taken from it and made a separate government. The marquisate of Septimania was subsequently united with the county of Toulouse; and by this junction the counts of Toulouse became masters of nearly the whole of Languedoc; and were enabled, during the feeble reigns of the later Carlovingian and the earlier Capetian kings, to act a leading part in the south of France. They were among the six great feudatories who afterwards became exclusively peers of France, and had the right of nomination to the vacant abbeys and dioceses within their dominions. They were feudal suzerains of Rouergue, Querci Auvergne, and Velay, and were possessors of some parts of Provence. Raymond IV., count of Toulouse, was one of the princes who took part in the first Crusade. He bore the titles of count of Toulouse and Provence, duke of Narbonne and marquis of Gothia, and was one of the most powerful princes of his time. He set out, A.D. 1096, at the head of an army of his own subjects, of Gascons, and of others, under the general designation of Provençaux; and in his march through Lombardy received such accessions to his force as to swell it to the number of 100,000. His division was accompanied by Adhemar, bishop of Le Puy, the pope's legate. He marched through Friuli and Dalmatia to Constantinople, and was the only one of the leading Crusaders who refused to do homage to the emperor Alexius for their expected conquests. In the march to Jerusalem, at Nice, at Dorylæum, and at the capture of Jerusalem, Raymond highly distinguished himself; and the historians of Languedoc state that the throne of Jerusalem was offered to him and refused by him before it was conferred upon Godfrey of Bouillon; but this is at least doubtful. Placed by the emperor Alexius Comnenus at the head of a body of Latin troops, supplemental to the first Crusade, Raymond was defeated by the Turks, and afterwards made prisoner at Tarsus in Cilicia by Tancred, one of his fellow-crusaders. Having obtained his release, he took several places in Syria, and died A.D. 1105, while besieging the city of Tarabolos, or Tripoli, in Syria.

Before his departure Raymond IV. had made over the government of his hereditary dominions, which extended from the Pyrenees to the Alps, to his son Bertrand, who, having secured possession of them after a severe struggle with the duke of Aquitaine, followed his father's example, and embarked, A.D. 1109, for the Holy Land in a fleet of forty vessels, each carrying a hundred knights. He was joined on his way by ninety Genoese and Pisan vessels; and after visiting Constantinople and Antioch, formed the siege of Tripoli, which his father had attacked in vain. Having taken the place, it became the capital of a county, a feudal dependency of the Latin kingdom of Jerusalem; which county Bertrand held during his life and transmitted to his younger son Pons, in whose posterity it remained until united with the principality of Antioch.

On the death of Bertrand, A.D. 1112, he was succeeded in his European dominions by his brother Alfonse Jourdain, who had been born in Palestine, A.D. 1103, and baptized in the river Jordan, from whence he took his name. During his minority Alfonse was despoiled of the county of Toulouse by the duke of Aquitaine; but was restored by the fidelity of the people of Toulouse, who seized the opportunity of the invader's absence to throw off the yoke. The fidelity of the same people afterwards preserved the county of Toulouse from the attack of Louis VII. (le Jeune), who laid claim to it in right of his wife Eleanor of Guienne. Alfonse, following the example of his father and brother, embarked in the second crusade, A.D. 1147, for the Holy Land; and died at Acre almost immediately upon his arrival, of poison administered to him by Melisende, queen of Jerusalem.

Raymond V., who, with his brother Alfonse II. succeeded to the county of Toulouse, had to maintain a struggle with Henry II. of England; who, having married Eleanor of Guienne, urged the same claim as her former husband Louis VII., who had divorced her. Henry advanced victoriously to the walls of Toulouse; but the arrival of Louis VII., who undertook the defence of Raymond, and threw himself with a handful of men into the place, induced him to raise the siege, professedly from respect to the standard of his suzerain, the king of France. In his retreat he took Cahors, the capital of Querci, and several other places from Raymond. The war was finally terminated by a peace, one of the conditions of which was that the count of Toulouse should acknowledge Henry as his suzerain, saving the allegiance which he owed to the king of France as lord paramount. Raymond was also involved in the disputes arising from the schism of the papacy. He recognised the anti-pope Pascal, and exiled all the ecclesiastics who refused to acknowledge him: this brought his domains under an interdict from Pope Alexander III. He was afterwards reconciled to the pope, abandoning the cause of Calixtus, the anti-pope who succeeded Pascal. At a later period Raymond was again embroiled with Henry II. of England and with Richard, son of Henry, to whom his father had ceded the duchy of Guienne, or Aquitaine. Raymond terminated his unquiet life A.D. 1194.

His successor, Raymond VI., is known by the misfortunes in which his protection of the Albigeois involved him. The extensive dominions of the counts of Toulouse contained a population more advanced in intellect and civilization than the other provinces of France; the corruptions of the Romish church had excited great attention, and the heresy, as it was termed, of the Albigeois, or Albigenses, had widely spread through Languedoc. [ALBIGENSES.] Raymond V. had desired to repress it, but the troubles of his reign had prevented it. In the time of Raymond VI. the pope Innocent III. despatched legates into the infected districts, with directions to claim the aid of the secular arm in the suppression of the new tenets. Raymond shrunk from the task of extermination; and although the menaces of the legates induced him in 1205 to promise upon oath to expel the Albigenses from his dominions, he does not appear to have taken any steps to fulfil his promise; and the refusal to bind himself to it by treaty brought a papal interdict on himself and his dominions. At length he signed the treaty, but the subsequent murder of Pierre de Castelnau, one of the papal legates, by an unknown assassin, whom Raymond was charged with employing, induced the pope to proclaim a crusade against him and the Albigenses. Those who engaged in it wore the cross on the throat, in contradistinction to those who embarked for the Holy Land, who wore it on the shoulder.

The irruption of 300,000 fanatics into Languedoc alarmed Raymond, who took every means to be reconciled to the church. He made his appearance before the council of Valence, and after submitting to be scourged at St. Gilles, by Milon, the pope's legate, he obtained absolution, and even assumed the cross against his own subjects. A subsequent refusal to deliver up those inhabitants of Toulouse who were suspected of heresy drew upon him again the thunders of the Church, and he had to visit Rome to obtain absolution of the pope. But submission seems to have availed but little. The crusading host, under the guidance of Simon de Montfort, earl of Leicester, extended its conquests in Languedoc. A new refusal to submit to the requirements of the council of Arles, A.D. 1211, drew upon Raymond fresh excommunication; and being now driven to despair, he determined to stand on his defence. His nephew, Raymond Roger, count of Carcassonne, endeavoured to defend Béziers and Carcassonne, but his resistance was in vain: the capture of the former, as well as that of Lavaur in the county of Albi, was followed by frightful massacres (A.D. 1209-1211), and Raymond Roger was himself taken at Carcassonne and subsequently poisoned. The unhappy Raymond now found himself not only abandoned but attacked by his own brother Baudouin, who joined the crusade. He was besieged in Toulouse, but a successful sortie raised the siege. His army was however subsequently defeated at Castelnaudary, and he obtained but a short remission by the suspension of the crusade by Innocent III. The war soon broke out again; and the count of Toulouse, with his ally the king of Aragon, who fell in the combat, having suffered a dreadful defeat at Muret, the contest was terminated by his submission, and the seizure of all his domains by Simon de Montfort, to whom the county of Toulouse, properly so called, was granted by the council of Montpellier in 1215. Only a portion of his domains remained to Raymond.

The affection of the people of Toulouse for their hereditary princes enabled Raymond, before his death to recover the greater part of his dominions. He entered Toulouse A.D. 1217, and though twice besieged, first by Simon de Montfort in person, who was killed before the place, and his son Amaury de Montfort, and the second time by Louis, son of Philippe II., king of France, he maintained possession till his death, A.D. 1222.

Raymond VII., son and successor of Raymond VI., pressed Amaury de Montfort so close, that he obliged him to retire into the domains of the French king, Louis VIII., to whom he ceded his right over the conquests made by the crusaders. Raymond had now to struggle with the power of the crown; and though the death of Louis VIII. delivered him from the hostility of that prince, he was obliged to purchase peace of his successor Louis IX., A.D. 1229, by the cession of many parts of his once extensive dominions. In his time the Inquisition was established at Toulouse, to extirpate the remains of the Albigenses; but the jurisdiction of the Inquisitors was so odious that it caused a revolt of the people, who drove them from the city. Raymond incurred repeated sentences of excommunication for his real or supposed connivance at the tumults of the people. He was subsequently engaged in hostilities with Louis IX. He died A.D. 1249, and in him ended the male line of the counts of Toulouse. His states came to Alfonse, count of Poitiers, and brother of Louis IX. of France, who had married Jeanne, heiress of Raymond. Upon the death of Alfonse and Jeanne, A.D. 1271, the county of Toulouse came to Philipe III., king of France, whose successors on the throne held the county till A.D. 1361, when it was united to the crown. The remainder of Languedoc had been in great part united to the crown by the kings Louis VIII. and IX., who had obtained them by force or cession from the counts of Toulouse.

The separate history of Languedoc terminates with the extinction of the county of Toulouse: subsequent events form part of the general history of France. The heresy of the Albigenses was in appearance suppressed, but the principle of opposition to the court and doctrines of Rome was probably smothered rather than extinguished; for when the Protestants of France were at a subsequent period numerous enough to make head against the crown, Languedoc was one of the provinces in which they most abounded. Even after Protestantism had been repressed in other parts of France, the Protestants made head against the government here. [Cevennes, Les.] The number of them in this part may be inferred from the estimate that nearly 200,000 were brought to abjure their religion by the stringent arguments of Louis XIV., beside those who emigrated to foreign countries; and even now the Protestants are tolerably numerous.

Under the monarchy Languedoc was one of the Pays d'Etats. The states consisted of the clergy, three archbishops, and twenty bishops; the noblesse, among whom the Count of Alais held the first place; and the Commons, consisting of the consuls and deputies of the episcopal and other towns. The archbishop of Narbonne was perpetual president of the states. Their chief business was to apportion among the different parts of the province the taxes levied by the king. Toulouse had a 'Parlement,' or court of justice, which acquired an odious celebrity from its unjust decision in the case of Calas in the middle of the last century.

LANGUEDOC, CANAL DE, otherwise **CANAL DU MIDI**. [France.]

LA'NIADÆ. [Shrikes.]

LANIO'GERUS. [Nudibranchiata.]

LANNER. [Falconidæ, vol. x., p. 181.]

LANNION, a town in the department of Côtes du Nord, in France, 313 miles west of Paris through Rennes and Guingamp. It is an ill-built town on the æstuary of the little river Guer, over which there are two bridges, uniting the town with its faubourgs or suburbs. The æstuary is navigable for vessels at high-water, and by it the town is enabled to carry on some trade in horses, wine, cider, wheat, oats, flax, hemp, and salt butter. There is a handsome quay. The population in 1836 was 5461. It is the chief town of an arrondissement containing 333 square miles, and comprehending 7 cantons, 62 communes, with a population in 1836 of 107,229.

LA'NSIUM, a genus of the natural family of Meliaceæ, established by the late Dr. Jack, and formed of the *Lansium* of Rumph, 1, p. 151, t. 54, which is the *Lansai* of Marsden's 'Sumatra,' pl. v., p. 101, and the *langsal* or *lanseh* of the natives of the Malay Islands. This forms one of the highly esteemed fruits peculiar to the Malayan Archipelago, or what was termed *India aquosa* by old writers, though unnoticed in many works where we might expect to find it fully described. The genus is characterized by—Calyx deeply 5-parted. Corol 5-petalled, petals roundish. The tube formed by the union of the stamens is subglobose, with its mouth nearly entire, having the 10 anthers included within it. Ovary 5-celled, cells with 1-2 ovules. Style short, columnar. Stigma flat 5-rayed; berry cortical, 5-celled, 5-seeded, with one or two cells only perfecting their seed. Seeds enveloped in a semitransparent pulpy tunic or aril, exalbuminous, cotyledons unequal, peltate, the short radicle being inserted into their centre. The Lanseh forms a moderate-sized tree with tomentose branches. Leaves alternate, pinnate; leaflets 7 to 9, alternate, short-pedicelled, elliptic-oblong, very smooth. The young leaves are pubescent on the under surface. Stipules none. Racemes springing from the trunk and naked branches, at first suberect, afterwards drooping by the weight of the fruit. The fruit is of an agreeable taste, according to Marsden, though the skin contains a colouring juice, extremely bitter, and which is apt to taint the fruit if not opened with care.

The Ayer Ayer is another fruit so nearly resembling the Lanseh in most particulars that Dr. Jack, hesitating to rank it as a species, mentions it as a permanent and well-marked variety, under the name var. β, L. aqueum. The fruit of the Ayer Ayer is rounder and the pulp more watery and dissolves more completely in the mouth than the Lanseh. Both are highly esteemed by the Malays, and are equally agreeable to the European palate. The juicy envelope of the seeds is the part eaten, and the taste is cooling and pleasant. (*Lin. Transact.*, xiv., p. 114.)

LANTA'NA, a genus of plants of the natural family of Verbenaceæ, named from one of the old names of Viburnum, which some of the species somewhat resemble in habit. They are often stated to be confined to America, but a species is found in Arabia, and two in India. They form small or moderate sized shrubs, often with rugose aromatic leaves, and a somewhat peculiar odour in the clustered flowers, which are either pink, yellow, white, or changeable. Piso states that three species, which are confounded together in Brazil under the name *Camara*, are there used for making medicated baths for diseases of the skin. Martius states that the flowers of some species are employed for making demulcent drinks in catarrhal affections. *L. macrophylla* is employed in infusions as a stimulant, and *L. pseudo Thea* as a substitute for tea.

LANTIER, E'TIENNE FRANÇOIS DE, born at Marseille, September 1, 1734, although passionately attached to literature, did not appear as an author till 1778, when his comedy of the 'L'Impatient' was performed after having been retained in manuscript for three years. Notwithstanding the very sinister predictions of some of his friends, the piece had a decided success; and thus encouraged, Lantier published his 'Tales,' in prose and verse, which latter La Harpe pronounced to be inferior only to those of Voltaire and Lafontaine. On his return from a journey to Italy, he was admitted into the academy of Marseille, (1786), and began collecting materials for his celebrated 'Voyages d'Anténor,' the idea of which had been suggested to him by his visit to Herculaneum. The success of this work, composed amid the storms of the Revolution, was almost unprecedented. Some critics would fain have persuaded the public that this delightful production was merely a feeble imitation of Barthélemy's 'Anacharsis,' although

Lantier had purposely abstained from reading the latter work until he had completed his own. In fact, although resembling each other in their general scope, the two works are very dissimilar in character and style, and in their respective merits. One proof of its popularity is, that 'Anténor' has been translated into German, Italian, Spanish, Portuguese, Russian, and modern Greek. He afterwards produced two other fictitious narratives of travels, 'Les Voyageurs en Suisse,' and 'Le Voyage en Espagne,' both of which possess considerable interest; also his 'Correspondance de Cézarine d'Arly,' a work captivating for the graces of its tone and style, and almost a literary prodigy when considered as the production of an octogenarian. Even ninety-one years had not extinguished his literary ardour, for at that very advanced age he composed a poem in eight cantos, entitled 'Geoffroy Rudel, ou le Troubadour.' He died at Marseille, where he had resided for the last twelve years, January 31, 1826, at the age of 92.

LANZI, LUIGI, an eminent modern Italian archæologist and writer on art, was born in the Marca d'Ancona, on the 14th of June, 1732. After receiving an excellent education at home, he entered the order of the Jesuits at the age of seventeen, and as soon as he had completed his own studies, which were directed chiefly to classical literature, distinguished himself as a zealous and able instructor of youth. Afflicting as the event was to him at the time, and it occasioned him a serious illness, the suppression of the order may be considered to have been a most fortunate one for Lanzi's reputation, since it threw him into a literary career which he would else probably not have entered. The first step towards it was his being appointed antiquarian, or keeper of the cabinet of medals, at Florence, by the grand-duke Peter Leopold, April 17th, 1775. One of his first literary productions was his 'Descrizione della Galleria,' which, greatly superior to the generality of productions of the same class, afforded proof of critical acumen and erudition. To this succeeded his dissertation on the sculpture of the antients, entitled 'Notizie Preliminari,' &c., 1789, and the celebrated 'Saggio di Lingua Etrusca,' a work of extraordinary study and research, which throws considerable light on a very obscure and difficult branch of archæology. Yet notwithstanding its intrinsic value it was from its nature calculated to interest only a small portion even of the learned world, and has therefore contributed less towards its author's fame with the European public than his 'Storia Pittorica.' This latter work, the first portion of which appeared in 1792, and to undertake which he had been excited by Tiraboschi, the historian of Italian literature, was the first attempt to give a comprehensive and continuous history of Italian painting, arranged according to schools and epochs, and written in a tone of impartial criticism; whereas prior to its appearance the numerous particular histories and artistical biographies presented little better than a confused mass of materials, and conflicting prejudices and opinions. Lanzi's object was to characterize all the various schools, and the chief masters in each, and also the changes in regard to style and taste which each had undergone; while the utility of the work as a book of reference is greatly increased by three excellent indexes. Hardly had its author completed the publication of the 'Storia Pittorica,' when the battle of Bassano, September 8th, 1796, drove him from that city, and compelled him to seek an asylum in Treviso, and afterwards in Udine, where he remained till the latter part of 1801, when he returned to Florence, having been restored to his former appointment in the museum. Here he wrote his three dissertations on the so-called Etruscan vases, and made a collection of lapidary inscriptions, but suffering from repeated apoplectic attacks and the infirmities of age, it was not until earnestly pressed by Cardinal Zondadari, archbishop of Sienna, that he prevailed upon himself to publish the latter, adding to them his own Latin poems, which are remarkable for their purity and graces of style. In addition to the above, and one or two minor productions, Lanzi published a translation of Hesiod in terza rima, first undertaken by him in his youth, and carefully corrected and touched up by him from time to time. His death was occasioned by apoplexy, March 30, 1810.

LAO'COON, according to antient fable, was the son of Priam (according to others, of Antenor), and a priest of Apollo during the Trojan war. While offering, in the exercise of his office, a bullock to render Neptune propitious to the Trojans, two enormous serpents issued from the sea, and, having first destroyed his two sons, whom he vainly endeavoured to save, attacked Laocoon himself, and, winding themselves round his body, crushed him to death in their folds. This dreadful punishment was inflicted by the goddess Minerva for the part Laocoon had taken in endeavouring to dissuade the Trojans from admitting into Troy the famous, and, as it afterwards proved to them, fatal wooden horse, which the crafty Greeks had consecrated to Minerva.

An enduring celebrity has been gained for this story from its forming the subject of one of the most remarkable groups in sculpture which time has spared to us. It represents the agonised father and his youthful sons, one on each side of him, writhing and expiring in the complicated folds of the serpents. The figures are naked, the drapery that is introduced being only used to support and fill up the composition. This superb work of art, which Pliny describes inaccurately as consisting of only a single block of marble (for in spite of this mistake there seems to be no doubt in the opinion of the learned that this is the identical group alluded to by that writer), originally decorated the baths of Titus, among the ruins of which it was found in the year 1506. The names of the sculptors who executed it are also recorded. They are Agesander, Polydorus, and Athenodorus, natives of Rhodes. Pliny (xxxvi. 5) says, 'Laocoon, which is in the house or palace (*domo*) of the emperor Titus, is a work to be preferred to all others either in painting or sculpture. Those great artists Agesander, and Polydorus, and Athenodorus, Rhodians, executed the principal figure (*eum*), and the sons, and the wonderful folds of the serpents, out of one block of marble.'

There has been much difference of opinion among antiquaries on several points connected with this group: first, as to the date of the artists; Winckelmann contending that they are of a good period of Greek art, and as early as Lysippus. A considerably later date is now however attributed to them; and the next question discussed has been, whether the sculptor was indebted for the subject to Virgil's fine description (*Æneid*, ii., v. 200), or whether the poet was indebted to the artist. With respect to date, the most careful consideration seems to fix these sculptors as late as the early emperors; and Lessing, whose work on the Laocoon deserves the attention of all who take an interest in the philosophy and capabilities of art, believes they lived in the reign of Titus. With regard to the subject, it is most probable that the story, being well known, offered advantages for illustration to the sculptor, as it did for description to the poet. As Virgil's priest was habited in his robes during the exercise of his priestly functions, and the group under consideration is entirely naked, the argument is additionally strengthened against the assumption that the artist borrowed from the poet. It is more natural to believe that each drew from a common source, and treated the subject in the way best adapted to the different arts they exercised; the sculptor's object being concentration of effect, the poet's amplification and brilliant description.

This group is justly considered, by all competent judges, to be a masterpiece of art. It combines, in its class, all that sculpture requires, and, we may say, admits of, and may truly be studied as a canon. The subject is of the most affecting and interesting kind; and the expression in every part of the figures reaches, but does not exceed, the limits of propriety. Intense mental suffering is portrayed in the countenances, while the physical strength of all the three figures is evidently sinking under the irresistible power of the huge reptiles wreathed around their exhausted limbs. One son, in whose side a serpent has fixed his deadly fangs, seems to be fainting; the other, not yet bitten, tries (and the futility of the attempt is faithfully shown) to disengage one foot from the serpent's embrace. The father, Laocoon himself, is mighty in his suffering: every muscle is in extreme action, and his hands and feet are convulsed with painful energy. Yet there is nothing frightful, disgusting, or contrary to beauty in the countenance. Suffering is faithfully and strongly depicted there, but it is rather the exhibition of mental anguish than of the ugly and undignified contortions of mere physical pain. The whole of this figure displays the most intimate knowledge of anatomy and of outward form; the latter selected with care, and freed from any vulgarity of common individual nature: indeed the single figure of Laocoon may be fairly referred to as one of the finest specimens existing of that combination of truth and beauty which is so essential to the production of perfect sculpture, and which can alone insure for it lasting admiration. The youths are of a smaller standard than the proportion of the father: a liberty hardly justifiable, but taken probably with the view of heightening the effect of the principal figure. The right arm of the figure of Laocoon is a restoration. Some have thought that the original action was not extended, but that this arm was bent back towards the head; and have supported their hypothesis by the fact of there being a rough and broken surface where they think the hand, or perhaps a fold of the serpent, may have come in contact with the hair.

It has been stated that the group was found in Rome in the year 1506. There is a curious letter, not generally known, but published by the Abbate Fea, from Francesco da San Gallo to Monsignore Spedalongo, dated 1567, in which the circumstances of the discovery are alluded to. He says, 'It being told to the Pope that some fine statues were found in a vineyard near S. Maria Maggiore, he sent to desire Giovanni da San Gallo (the father of the writer) to go and examine them—that Michel Angelo Bonarotti being often in their house, San Gallo got him to go also; and so,' says Francesco, 'I mounted behind my father (*in groppa a mio padre*), and we went. We descended to where the statues were; my father immediately exclaimed, "This is the Laocoon spoken of by Pliny." They made them enlarge the aperture or excavation so as to be able to draw them out, and then, having seen them, we returned home to dinner.' The group of 'Laocoon and his Sons' is now preserved among the treasures in art in the museum of the Vatican at Rome.

LAOMEDE'A, a genus of Polyparia, established by Lamouroux to include species ranked by previous writers of Sertularia. [SERTULARIDÆ]

LAON, a town in France, capital of the department of Aisne, 82 miles from Paris on the high-road by Avesnes and Maubeuge to Mons and Brussels. It is situated on a steep isolated hill about 300 feet high, which commands on every side an extensive view over the surrounding flat country. It is said to have taken its origin, in the reign of Clovis, from a castle which stood on this eminence. In the later period of the Carlovingian dynasty it was frequently the residence of the kings of France, and it continued throughout a part of the domain of the crown. It was before the Revolution the see of a bishop, a suffragan of the archbishop of Reims. The town consists of one principal street, rather narrow, and several smaller streets very narrow: it is surrounded by an antient wall, flanked with towers, and by a boulevard, or public walk, on the brow of the hill. At the foot of the hill are the suburbs. The population in 1836 amounted to 8320. The cathedral is a beautiful Gothic building with four towers, and there are five other churches. There are a seminary for the priesthood, a community of the Sœurs Gris, two hospitals, one of them for foundlings, and a poor-house. There are handsome barracks and a theatre. In the suburbs are potteries and tan-yards, lime-kilns, a ropewalk, and a manufactory of copperas. The neighbourhood produces grain and wine, and many artichokes are grown for the supply of Paris. There are a high-school, with a museum of natural history attached, a public library of 12,000 vols., and a drawing-school.

Laon was besieged in the civil contests of the Armagnacs and Bourguignons, and was taken from the League by Henri IV. in 1594. In 1814 it was the scene of a severe action between the French and the Prussians and other allies.

The arrondissement of Laon contains 948 square miles, and comprehends 11 cantons and 289 communes, with a population in 1831 of 164,114.

LAOS, the country of the Laos, or Lowas, comprehends the central portions of the peninsula without the Ganges, lying between 15° and 24° N. lat., and 96° and 103° E. long. It borders on the south on Siam and Cochin China, on the east on the last-mentioned country, on the north on China, on the north-west and west on the Birman empire. Its south-western corner is contiguous to the British province of Martaban, which was taken in 1826 from the Burmese. According to the calculation of Berghaus, its area covers 130,000 square miles, or about 18,000 square miles more than the British empire.

Being surrounded on all sides by countries whose governments have always shown a great degree of jealousy towards foreigners, our knowledge of this country is very scanty and unsatisfactory. The western portion of it, extending along the banks of the Saluen river, which divides Laos from Birma, is covered with mountain-ranges, which do not attain the snow-line, but rise in some parts to a considerable height, as the thermometer was observed to stand at 46° at eight o'clock in the morning. This mountain-region seems to extend over the whole country north of 20° N. lat.: it is intersected by wide level tracts and plains along the courses of the rivers, which are of great fertility, but low, and subject to frequent and extensive inundations. The south-eastern part, which is traversed by the river Maekhaun, or the river Camboja, seems to contain more level land than the rest of the country; but this opinion is only a supposition, as this part of the country has never been visited by Europeans. Along the eastern border of Laos there runs a mountain-range, about 100 miles wide, which separates it from Cochin China and Tonkin. It rises to a considerable height, but the elevation has never been determined. The greatest part of the country is covered with forests, and swamps or stagnant waters, which are produced by the inundations of the numerous rivers which descend from the high ranges surrounding the elevated table-land of Yunnan in China.

The largest of its numerous rivers are the Saluen [BIRMA, iv., 438], the Maekhaun [COCHIN CHINA, vii., 307], and the Menam, or river of Siam, which flows through the centre of the country between the two first-named rivers. It rises on the western declivity of the table-land of Yunnan, in two branches: the Mae-ghue, the western; and the Mae-praen, the eastern. They unite south of 22° N. lat., and the rivers, after their junction, preserve the name of Mae-praen, and also their southern direction. Where the Mae-praen approaches the boundary of Siam (near 18° N. lat.), its name is changed into that of Menam, under which it is known up to its mouth in the Gulf of Siam. It seems almost certain that a natural water communication exists between this river and its more eastern neighbour, the Maekhaun. At about 20° N. lat., the Maekhaun divides into two branches; of which the western, called Anan, runs south-south-west until it joins the Mae-praen, south of 19° N. lat. This natural canal is said to be navigable for river barges. The whole course of the river Menam probably exceeds 800 miles, and it is navigable for the greatest part of its course, though several rapids occur in it.

We have no account of the climate of Laos, but as it is observed that rice is the principal grain cultivated, and that no wheat is grown, we may consider that the lower portions do not materially differ in climate from Bengal. All fruits which grow in Southern Asia succeed, with one or two exceptions, and some of them are sent to the neighbouring countries, as oranges to Ava. Cotton is cultivated to a great extent, and much silk is collected, as well as lac-gum. Among the wild animals the elephant and rhinoceros are abundant. Cattle and buffaloes abound. In some of the northern districts the tea plantations are very extensive: the leaves of the plant are not dried, but salted for chewing, for which purpose they are used in many of the neighbouring countries. The mountainous parts, and especially those districts which are contiguous to Yun-nan, are very rich in metals. Gold abounds in many rivers, and silver-mines are worked to a great extent by Chinese miners. Copper occurs in many places, and tin in a few. Iron-ore is found farther south in the country, on the banks of the Saluen river, and the natives make good fire-arms. Rock-salt also occurs in these parts.

The inhabitants of Laos seem to be the original stock of a nation which is widely dispersed over the peninsula without the Ganges, to the east of the river Saluen. They resemble the inhabitants of Siam and Camboja in the form of their bodies and in language. Their language differs so little from the Siamese, that it can only be considered as a dialect of it. All the nations belonging to this stock are called Shan, which by Europeans has been changed into Siam. The inhabitants of Laos are distinguished among themselves by the names of Lan-pung-kau (white Laos) and Lan-pung-dam (black Laos), of whom the former seem to inhabit the more mountainous and elevated parts of the country, and the latter the plains. According to Gutzlaff they are inferior in civilization to the Siamese, except those who inhabit the southern districts of Yun-nan, and who have adopted the arts of the Chinese. Yet even the rest seem to have made considerable progress in agriculture, horticulture, and the various arts of civilized life. They are

Buddhists, and their sacred books are written in the Pali language. Though they have a national literature, they are not very anxious to study it. Their best books treat of the common occurrences of life, in prose.

Laos is divided into three great portions. The most northern, between the Saluen and Mae-praen, is called Upper Laos, or the country of the Lowa-Shan; its capital is Kemalatain. South of it lies Lactho, or the country of the Yun-Shan, with the capital Zaenmae, or Changmai. The south-eastern part is called Lanchang, or the country of the Shan. It is nearly unknown to Europeans, and its capital is said to be Lanchang, or Zandapuri. To these three great divisions is to be added Tarout, which lies north of Lanchang, and seems to be incorporated partly with Yun-nan and partly with Tonkin. It is also inhabited by the Shans.

Though this country in former times appears to have been a powerful and independent state, it has generally been subject to the neighbouring countries in modern times. Towards the end of the last century, the dominion of the Birmans seems to have extended over nearly the whole of this country, but since that time the greatest part has recovered its independence. But as it is governed by a great number of petty hereditary sovereigns, it has been unable to preserve its independence, and in modern times the southern districts seem to have fallen under the dominion of the Siamese government. Whether or not the king of Cochin China exercises any authority over Lanchang is not positively known, but it is probable that he does.

Laos seems to carry on an active trade with Siam, Birma, and China. It exports to Siam musk, gold, lac, slaves, ivory, rhinoceros horns, benzoin, hides and tiger skins, silk and silk stuffs, precious stones, and salt. Its commerce with Ava, the capital of Birma, is almost exclusively limited to that town, and Kemalatain, the capital of the Lowa-Shan. The merchandise is transported over high mountains on carts drawn by buffaloes. Laos exports to Birma cattle, gold, silver, precious stones, and fruits, and receives in return iron-ware, yellow and red sandal wood, cotton cloth, chintzes, and terra-japonica, opium, and other articles procured from Hindustan. The road which leads to Yun-nan appears also to cross the town of Kemalatain, and thence to ascend to the table-land of south-western China. The commerce between these countries seems to be very active, in spite of the numerous obstacles presented by a road leading over several mountain-ridges. The merchants of Laos export gold, precious stones, silver, tin, lead, common and red sulphur, cotton wool and yarn, salted tea, lac, sapan wood, brasilleto, and an officinal root, called cothua-boua. The Chinese bring to Laos musk, chowry-tails, and various other articles, raw and manufactured.

(Francis Hamilton, in the *Edinburgh Philos. Journal;* Crawfurd's *Embassy to the Court of Ava;* Gutzlaff, in the *Journal of the London Geogr. Society*, vol. iii.; and Richardson, in the *Asiatic Journal;* Berghaus, *Map* and *Memoirs*.)

LAPIS LA'ZULI. [LAZULITE.]

LA'PITHÆ. [CENTAURS.]

LAPLACE, PIERRE SIMON. A life of Laplace can hold no middle place between a short account for the general reader, and a detailed description of his labours for the reference of those who read his works. Independently of the latter being too long for this work, we have a specific reason for avoiding it, which will appear in the course of this article: namely, that the writings of Laplace do not give specific information as to what was done by himself and what by others; and that no one has yet supplied the deficiency. The few facts connected with his personal life are drawn from the éloge of Fourier, or from the 'Biographie des Contemporains.'

Pierre Simon Laplace was born, March, 1749, at Beaumont-en-Auge, near Honfleur, and was the son of a farmer. He received a good education, and appears at first to have turned his attention to theology; but as early as the age of eighteen he went to Paris, having previously taught mathematics at his native place. He had letters of introduction to D'Alembert, but finding that they procured him no notice from that philosopher, he wrote him a letter on some elementary points of mechanics, with which D'Alembert was so much pleased that he sent for Laplace the same day, telling him that he had found a better way of calling attention to his claims than by letters of introduction. Very shortly afterwards the recommendation of D'Alembert procured for Laplace a chair of mathematics at the military school of Paris. This took place in 1768 or 1769; in 1772 Laplace showed his powers in a paper on integration of equations of finite differences in the Memoirs of the Academy of Turin; and from that time his scientific life was one atchievement after another, until he attained a reputation almost Newtonian with the world at large, and of the highest extent and character among mathematicians, who, though they cannot even compare walks of so different a kind as those of Newton and Laplace, feel that the latter must be named next after Lagrange, and the two together above all the followers of the first.

The political life of Laplace was not so favourably distinguished. In 1799 the First Consul made him minister of the interior. With the views which Napoleon always professed with respect to science, it is not wonderful that he should have made the experiment of trying to strengthen his administration by the assistance of a philosopher whose rising fame made the French expect to claim a name which should rival that of Newton. But the experiment was not successful; and after a very short period the First Consul removed Laplace to the head of the sénat conservateur. The subsequent account given by Napoleon of his minister will be a part of the biography of Laplace in all time to come. 'A mathematician of the highest rank, he lost not a moment in showing himself below mediocrity as a minister. In his very first attempt at business the consuls saw that they had made a mistake. Laplace looked at no question in its true point of view. He was always searching after subtleties; all his ideas were problems, and he carried the spirit of the infinitesimal calculus into the management of business.' This pointed satire is not, we suspect, one of which the force will be always admitted; first, because it is so very like what a satirist ought to say of a mathematician; secondly, because the character of Laplace's mathematical writings is signally and ridiculously the opposite of all the preceding, as we shall presently notice. That Laplace was an incompetent minister is probable; but this is not the worst.

In 1814 he voted for the deposition of his benefactor, a step which might have been justifiable on public grounds: but nothing can excuse the suppression of the dedication to Napoleon, which stood at the front of his 'Théorie des Probabilités' during the prosperity of his benefactor, and no longer. Laplace, who had been created a count by Napoleon, and a marquis by Louis XVIII. immediately after the Restoration, did not appear at court during the short restoration of the former. Of his political conduct during the Revolution we have no account, except that he was at one time under the suspicion of the authorities, and was removed from the commission of weights and measures.

Any account of such a man as Laplace, written so short a time after his death, and in another country, must be looked upon as provisional. In giving all we know, we desire our readers to remember that no authentic Life of him has issued from the French press, except only the professed éloge of Fourier. If by stating those impressions as to his character which have been made upon many in this country, we should in any way be instrumental in inducing those who best knew him to destroy the basis on which they are formed, we shall do service to his reputation; but if that basis cannot be destroyed, we are only doing the duty of biographers. We say then, that in the suppression of the dedication, which we now cite entire, and which appeared in 1812, and not in 1814, there is a *primâ facie* appearance of ingratitude and pusillanimity, the evidence of which, if not answered, should be perpetuated.

'A Napoléon-le-Grand. — Sire, La bienveillance avec laquelle V.M. a daigné accueillir l'hommage de mon traité de Mécanique Céleste, m'a inspiré le désir de lui dédier cet ouvrage sur le calcul des Probabilités. Ce calcul délicat s'étend aux questions les plus importantes de la vie, qui ne sont en effet pour la plupart que des problêmes de probabilité. Il doit sur ce rapport interesser V. M., dont le génie sait si bien apprécier et si dignement encourager tout ce qui peut contribuer au progrès des lumières et de la prosperité publique. J'ose la supplier d'agréer ce nouvel hommage dicté par la plus vive reconnaissance, et par les sentimens profonds de l'admiration et de respect avec lesquels je suis, Sire, de V. M. le très humble et très obéissant serviteur et fidèle sujet, *Laplace*.'

As if to make such a suppression as striking as possible, Laplace had said, ten years before, in the dedication of the third volume of the 'Mécanique Céleste,' to the First Con sul, 'Puisse cet ouvrage, consacré à la plus sublime des sciences naturelles, être un *monument durable* de la reconnaissance que votre accueil et les bienfaits du gouvernement inspirent a ceux qui les cultivent. *De toutes les vérités qu'il renferme*, l'expression de ce sentiment sera toujours pour moi la plus précieuse.' Laplace did not live to publish the second edition of the 'Mécanique Céleste.'

After the final Restoration Laplace's only public employments were of a scientific character, and he died on the 5th of May, 1827. His last words were, 'Ce que nous connaissons est peu de chose; ce que nous ignorons est immense.'

'The Author of the Mécanique Céleste, to use a common synonyme for Laplace, must be an object of the admiration of posterity as long as any record of the eighteenth century exists. With the exception of some experiments made in conjunction with Lavoisier, to determine the quantity of heat in different bodies, we do not find that Laplace was employed in actual experiment. But for many years he was the head, though not the hand, of European astronomy; and most of the labours of observation were made in directions pointed out by him, or for the furtherance of his discoveries in the consequences of the law of gravitation. Before however we begin to speak of them, there is an important caution, for the want of which a reader of the Mécanique Céleste' might even overrate Laplace, great as he is.

The French school of writers on mathematical subjects has for a long time been wedded to the reprehensible habit of omitting all notice of their predecessors, and Laplace is the most striking instance of this practice, which he carried to the utmost extent. In that part of the 'Mécanique Céleste' in which he revels in the results of Lagrange, there is no mention of the name of the latter. The reader who has studied the works of preceding writers will find him, in the 'Théorie des Probabilités,' anticipated by De Moivre, James Bernouilli, &c., on certain points. But there is not a hint that any one had previously given those results from which perhaps his sagacity led him to his own more general method. The reader of the 'Mécanique Céleste' will find that, for any thing he can see to the contrary, Euler, Clairaut, D'Alembert, and above all Lagrange, need never have existed. The reader of the 'Systême du Monde' finds Laplace referring to himself in almost every page, while now and then, perhaps not twenty times in all, his predecessors in theory are mentioned with a scanty reference to what they have done; while the names of observers, between whom and himself there could be no rivalry, occur in many places. To such an absurd pitch is this suppression carried, that even Taylor's name is not mentioned in connexion with his celebrated theorem; but Laplace gravely informs his readers, 'Nous donnerons quelques théorêmes généraux qui nous seront utiles dans la suite,' those general theorems being known all over Europe by the names of Maclaurin, Taylor, and Lagrange. And even in his Theory of Probabilities *Lagrange's theorem* is only 'la formule (p) du numéro 21 du second livre de la Mécanique Céleste. It is true that at the end of the Mécanique Céleste he gives historical accounts, in a condensed form, of the discoveries of others; but these accounts never in any one instance answer the question—Which pages of the preceding part of the work contain the original matter of Laplace, and in which is he only following the track of his predecessor?

The consequence is, that a student who has followed the writings of Laplace with that admiration which they must command, is staggered when he comes afterwards to find that in almost every part of the work there are important steps which do not belong to Laplace at all. He is then apt to imagine that when he reads more extensively he shall find himself obliged to restore more and more to the right owner, until nothing is left which can make a reputation such as is that of Laplace with the world at large. Such an impression would be wholly incorrect; but it would be no more than the just reward of the practice of suppression. Nevertheless the researches on the figure of the planets in the 'Mécanique Céleste,' and the general method of the 'Théorie des Probabilités' for the approximation to the values of definite integrals, are alone sufficient, when all needful restoration has been made, to enable us to say, that Laplace was one of the greatest of mathematicians.

The two first volumes of the 'Mecanique Céleste' appeared in the year VII. of the Republic (which lasted from the 22nd of September, 1798, to the 21st of September, 1799), and may have been the inducement of the First Consul to make Laplace a member of the government. The third volume appeared in 1802, the fourth in 1805, and the fifth in 1825. One posthumous Supplement has appeared. The headings of the chapters throughout will be a more useful appendage to an article in a work of reference than any account which we could find room for, especially with regard to a philosopher whose discoveries are, like those of Newton, dwelt on in every popular work.

In vol. i. are found—

Book I. *On the General Laws of Equilibrium and Motion.*

Chapter 1. On the Equilibrium and Composition of Forces which act on a Material Point.

Chapter 2. On the Motion of a Material Point.

Chapter 3. On the Equilibrium of a System of Bodies.

Chapter 4. On the Equilibrium of Fluids.

Chapter 5. General Principles of the Motion of a System of Bodies.

Chapter 6. On the Laws of Motion of a System of Bodies, for all Relations between the Force and Velocity which are mathematically possible.

Chapter 7. On the Motion of a Solid Body of any Figure.

Chapter 8. On the Motion of Fluids.

Book II. *On the Law of Universal Gravitation, and on the Motion of the Centres of Gravity of the Heavenly Bodies.*

Chapter 1. On the Law of Universal Gravitation, collected from Phenomena.

Chapter 2. On the Differential Equations of the Motion of a System of Bodies acting on each other by their mutual Attraction.

Chapter 3. First Approximation to the Celestial Motions, or Theory of the Elliptic Motion.

Chapter 4. Determination of the Elements of the Elliptic Motion.

Chapter 5. General Methods for determining the Motions of the Heavenly Bodies by successive Approximation.

Chapter 6. Second Approximation to the Celestial Motions, or Theory of their Perturbations.

Chapter 7. On the Secular Inequalities of the Celestial Motions.

Chapter 8. Second method of Approximation to the Celestial Motions (by the Variation of Elements).

In vol. ii. are contained—

Book III. *On the Figure of the Celestial Bodies.*

Chapter 1. On the Attraction of Homogeneous Spheroids, terminated by surfaces of the second order.

Chapter 2. Development of the Attraction of all Spheroids in Series.

Chapter 3. On the Figure of Equilibrium of a Homogeneous Fluid Mass which has a Rotatory Motion.

Chapter 4. On the Figure of a Spheroid which differs little from a Sphere, and is covered by a stratum of fluid in equilibrio.

Chapter 5. Comparison of the preceding theory with observation.

Chapter 6. On the Figure of Saturn's Ring.

Chapter 7. On the Figure of the Atmospheres of the Heavenly Bodies.

Book IV. *On the Oscillations of the Sea and the Atmosphere.*

Chapter 1. Theory of the Ebb and Flow of the Sea.

Chapter 2. On the Stability of the Equilibrium of the Sea.

Chapter 3. On the method of taking into account, in the Theory of the Tides, the various circumstances peculiar to each port.

Chapter 4. Comparison of the preceding theory with observation.

Book V. *On the Motion of the Celestial Bodies about their Centres of Gravity.*

Chapter 1. On the Motion of the Earth about its Centre of Gravity.

Chapter 2. On the Motion of the Moon about its Centre of Gravity.

Chapter 3. On the Motion of the Rings of Saturn about their Centres of Gravity.

In vol. iii. are contained—

Book VI. *Particular Theories of the Planets.*

Chapter 1. Formulæ for the Planetary Inequalities depending on the squares and higher powers of the Excentricities and Inclinations of the Orbits.

Chapter 2. Inequalities depending on the Square of the Disturbing Force.

Chapter 3. Perturbations due to the Ellipticity of the Sun.

Chapter 4. Perturbations of the Motion of the Planets, arising from the action of their Satellites.

Chapter 5. Considerations on the Elliptic part of the Radius Vector.

Chapter 6. Numerical values of the quantities contained in the expressions for the Planetary Inequalities.

Chapter 7. Numerical expressions for the Secular Variations of the Elements.

Chapter 8. Theory of Mercury.

Chapter 9. Theory of Venus.

Chapter 10. Theory of the Motion of the Earth.

Chapter 11. Theory of Mars.

Chapter 12. Theory of Jupiter.

Chapter 13. Theory of Saturn.

Chapter 14. Theory of Uranus.

Chapter 15. On some equations of condition which exist between the Planetary Inequalities, and which serve to verify them.

Chapter 16. On the Masses of the Planets and the Moon.

Chapter 17. On the Formation of Astronomical Tables, and on the Invariable Plane of the Planetary System.

Chapter 18. On the Action of the Stars upon the Planetary System.

Book VII. *Theory of the Moon.*

General considerations not arranged as a chapter.

Chapter 1. Integration of the Differential Equations of the Lunar Motion.

Chapter 2. On the Lunar Inequalities due to the Non-sphericity of the Earth and Moon.

Chapter 3. On the Lunar Inequalities due to the Action of the Planets.

Chapter 4. Comparison of the preceding theory with observation.

Chapter 5. On an Inequality of long period which appears to exist in the Lunar Motion.

Chapter 6. On the Secular Variations in the Motion of the Moon and the Earth, which may be produced by the resistance of an Ethereal Fluid.

In vol. iv. are contained—

Book VIII. *Theory of the Satellites of Jupiter, Saturn, and Uranus.*

Chapter 1. Equations of Motion of the Satellites of Jupiter, taking into consideration their Mutual Attractions, that of the Sun, and that of the Oblate Spheroid of Jupiter.

Chapter 2. On the Inequalities of the Motion of Jupiter's Satellites, independent of the Excentricities and Inclinations of the Orbits.

Chapter 3. On the Inequalities of the Motion of the Satellites, depending on the Excentricities of the Orbits.

Chapter 4. On the Inequalities of the Motion of the Satellites in Latitude.

Chapter 5. On the Inequalities depending on the Squares and Products of the Excentricities and Inclinations of the Orbits.

Chapter 6. On the Inequalities depending on the Square of the Disturbing Force.

Chapter 6, the second (misprint). Numerical values of the preceding inequalities.

Chapter 7. On the Duration of the Eclipses of the Satellites.

Chapter 8. Determination of the Masses of the Satellites, and of the Oblateness of Jupiter.

Chapter 9. On the Excentricities and Inclinations of the Orbits of the Satellites.

Chapter 10. On the Libration of the Three First Satellites of Jupiter.

Chapter 11. Theory of the Fourth Satellite.

Chapter 12. Theory of the Third Satellite.

Chapter 13. Theory of the Second Satellite.

Chapter 14. Theory of the First Satellite.

Chapter 15. On the Duration of the Eclipses of the Satellites, containing the comparison with observation.

Chapter 16. On the Satellites of Saturn.

Chapter 17. On the Satellites of Uranus.

Book IX. *Theory of Comets.*

Chapter 1. Theory of the Perturbation of Comets.

Chapter 2. On the Perturbations of a Comet when it approaches very near a Planet.

Chapter 3. On the Action of Comets on Planets, and on the Masses of Comets.

Book X. *On Various Points of the System of the Universe.*

Chapter 1 On Astronomical Refraction.

Chapter 2. On Terrestrial Refraction.

Chapter 3. On the Extinction of the Light of Stars by the Atmosphere, and on the Atmosphere of the Sun.

Chapter 4. On the Measurement of Altitudes by the Barometer.

Chapter 5. On the Descent of Bodies which fall from a great height.

Chapter 6. On some cases in which the Motion of several Attracting Bodies can be rigorously obtained.

Chapter 7. On the Alterations which the Motion of Planets or Comets may undergo by the resistance of the media which they traverse, and by the gradual transmission of gravity.

Chapter 8. Supplement to the Theories of Jupiter, Saturn, and the Moon.

Chapter 9. On the Masses of the Planets and Satellites, and on Astronomical Tables.

Supplement to Book X. *On Capillary Attraction.*

Section 1. Theory of Capillary Attraction.

Section 2. Comparison with experiment.

In vol. v. are contained—

Book XI. *On the Figure and Rotation of the Earth.*

Chapter 1. Historical Notice.

Chapter 2. On the Figure of the Earth.

Chapter 3. On the Axis of Rotation of the Earth.

Chapter 4. On the Temperature of the Earth, and on the Diminution of the Length of the Day by its cooling.

Book XII. *On the Attraction and Repulsion of Spheres, and on the Laws of Equilibrium and Motion of Elastic Fluids.*

Chapter 1. Historical Notice.

Chapter 2. On the Attraction of Spheres, and the Repulsion of Elastic Fluids.

Chapter 3. On the Velocity of Sound, the Motion of Elastic Fluids, and on Aqueous Vapour.

Book XIII. *On the Oscillations of the Fluids which cover the Planets.*

Chapter 1. Historical Notice, especially on the Tides.

Chapter 2. New Researches on the Tides.

Chapter 3. Comparison with observations, as to the Heights of Tides.

Chapter 4. Comparison with observations, as to the Times and Intervals of High Water.

Chapter 5. On the Partial Tides of which the period is about a day.

Chapter 6. On the Partial Tides which depend on the fourth inverse power of the Moon's Distance.

Chapter 7. On the Tides of the Atmosphere.

Book XIV. *On the Motion of the Celestial Bodies about their Centres of Gravity.*

Chapter 1. Historical Notice of and Formulæ on the Precession of the Equinoxes.

Chapter 2. Historical Notice of and Remarks on the Libration of the Moon.

Chapter 3. Historical Notice of the Ring of Saturn.

Book XV. *On the Motion of the Planets and Comets.*

Chapter 1. Historical Notice.

Chapter 2. Considerations supplemental to the second book; on the Variation of Elements; on the Development of the Mutual Distance of Two Planets; on the Great Inequality of Jupiter and Saturn; on the Determination of the Orbits of Comets by observation.

Book XVI. *On the Motion of Satellites.*

Chapter 1. On the Motion of the Moon. Historical Notice.

Chapter 2. On the Lunar Theory of Newton.

Chapter 3. On a Lunar Inequality of long period depending on the Difference of the Two Terrestrial Hemispheres; and also on those depending on the Elliptic part of the Earth's Radius.

Chapter 4. On the Law of Universal Attraction.

Chapter 5. On the Motion of the Satellites of Jupiter. Historical Notice.

Chapter 6. On the Influence of the Great Inequalities of Jupiter on the Motion of his Satellites.

Chapter 7. On the Satellites of Saturn and Uranus.

SECOND SUPPLEMENT (the first follows the tenth book). An extended Theory of Capillary Attraction (no date).

THIRD (and posthumous) SUPPLEMENT (1827). On the Development of the Distance of Two Planets, and of its Elliptic Co-ordinates. On the Tides of the Atmosphere.

We have spoken freely of the defects of Laplace's character, both political and scientific, and it is now our more pleasing task to say a few words on the Mécanique Céleste, as a whole. We might dwell upon the great discoveries, such as those of the long inequality of Saturn and Jupiter, the cause of the acceleration of the moon's mean motion, the explanation of the peculiarities in the motion of Jupiter's satellites, with a long train of similar achievements. But this, though the most common method of describing the character of a philosopher, is not the sort of description which should be given of the Mécanique Céleste. Its bulk is about 2000 quarto pages; and, owing to the omission of all the steps which a good mathematician may be relied on as able to supply, it would, if expanded to the extent in which Euler would have written the same matter, have probably reached ten thousand pages. If all this work had been collected by one man, even from the writings of others, we should have called him the Delambre of the theory of gravitation, and should have prized his writings for their extent, their faithful representation of the state of the science at a particular time, and the diligence displayed in the undertaking. When to the preceding, which is forgotten in the splendour of some of the results, we add, that to Laplace is due the discovery of much, the development of more, and that by the employment of his own resources in a manner which takes all the originality and power of the investigator, and the arrangement and combination of the whole, we may begin to see how he has earned his fame.

There is moreover another consideration which applies to the author of the Mécanique Céleste, more than to any other except that of the Principia. When an investigator produces one result after another, upon detached and unconnected subjects, we may feel admiration of his skill and sagacity, but we can never know whether he followed a route with the determination of overcoming a specific difficulty, or not. He tells us where he succeeded, but not where he failed. It is otherwise when an original writer attempts a complete system, at every part of which he must work, and must show the world either a result or a blank. It is seldom that Laplace leaves off at the same point with his predecessors, though obliged, as just stated, to strive for pre-eminence on every single point. Had he consulted his own glory he would have taken care always to note exactly that part of his own work in which he had a forerunner; and it is not until this shall have been well and precisely done that his labours will receive their proper appreciation. His mathematical style is utterly destitute of the symmetry of that of Lagrange and the simplicity of that of Euler; and he is frequently even clumsy. He pays little attention to extreme correctness of form. Upon fundamental principles, whether of mechanics or analysis, he frequently needs a commentator, at least for the student.

Laplace explained his discoveries in a work entitled 'Exposition du Systême du Monde,' of which the fifth edition bears the date 1824. The account here given is in style and clearness of a superior kind, somewhat too egotistical, and partaking of the disposition to suppression already noticed. A similar companion to the Theory of Probabilities appeared as a preface to the work itself, and was published separately (fifth edition, 1825), under the title of 'Essai Philosophique sur les Probabilités.' A little treatise, published in 1821, called 'Précis de l'Histoire de l'Astronomie,' afterwards was made the fifth book of the fifth edition of the 'Systême du Monde.' His lectures on the elementary branches of mathematics are in the 'Leçons de l'Ecole Normale.'

Of the 'Théorie des Probabilités' we must speak precisely as of the 'Mécanique Céleste,' adding perhaps that there is no part of the latter in which more original power is displayed than in the former. The subject being somewhat isolated, its results are little known; they have however been extensively applied to astronomy, both by Laplace himself, and particularly by the German writers.

The 'Mécanique Céleste' was partly translated into English by a learned American writer, Dr. Bowditch, whose recent death, though it has prevented his superintending the close of his work, did not take place till the whole was ready for press. The well known work of Mrs. Somerville is a selection from the 'Mécanique Céleste,' involving all the fundamental parts of the theory of gravitation. The 'Systême du Monde' was translated by the late astronomer royal, Mr. Pond. The fundamental parts of the 'Théorie des Probabilités' will be found in the 'Encyclopædia Metropolitana,' article 'Theory of Probabilities;' and the method of using Laplace's results, with no other knowledge than that of common arithmetic, in the 'Essay on Probabilities' in Dr. Lardner's 'Cabinet Cyclopædia.' The forthcoming numbers of the 'Encyclopædia Britannica' will contain an article on Probabilities, in which the same results of analysis are treated.

It is sometimes stated by English writers that Laplace was an atheist. We have attentively examined every passage which has been brought in proof of this assertion, and we can find nothing which makes either for or against such a supposition. It is easy, with an hypothesis, to interpret passages of an author; but we are quite convinced that a person reading Laplace for philosophical information would meet with nothing which could either raise or solve a question as to the writer's opinions on the fundamental point of natural religion, unless it had been put into his head to look. If those who make the assertion have any private grounds for it, they should produce their evidence; but the assertion, whether considered with reference to the individual, or to the public before which it is made, should not be hazarded merely because a writer who is investigating such points as can be determined by experiment and analysis does not introduce his opinions on a question which cannot be submitted to calculation. An attempt to explain how the solar system might possibly have arisen from the cooling of a mass of fluid or vapour is called atheistical, because it attempts to ascend one step in the chain of causes; the Principia of Newton was designated by the same term, and for a similar reason. What Laplace's opinions were, we do not know; and it is not fair that a writer who, at a time of perfect license on such matters, has studiously avoided entering on the subject, should be stated as of one opinion or the other, upon the authority of a few passages of which it can only be said (as it could equally be said of most mathematical works) that they might have been written by a person of any religious or political sentiments whatever.

LAPLAND, the country of the Laplanders, comprehends the northern and north-eastern part of the Scandinavian peninsula. It is difficult to assign its boundaries. It seems that in the twelfth and thirteenth centuries all the country north of 64° N. lat., as far as Cape North Kyn and North Cape (71° 11′ and 71° 8′), between the White Sea on the east and the Norwegian Sea on the west, was entirely in possession of the people called Laplanders, and independent of any of the neighbouring kingdoms, but that along the northern coast of Norway the inhabitants of Teutonic origin advanced rapidly towards the north, probably attracted by the rich cod-fishery between the Lofoden Islands. Being settled there, and having tried to introduce agriculture with various success, they acquired great influence among the natives, and in the thirteenth century the Laplanders became subject to the king of Norway. But as this submission was rather nominal than real, the neighbouring nations, the Swedes and Russians, also settled in those districts which were nearest to their dominions. In consequence of these settlements and the changes introduced by more recent political events, Lapland is divided between Norway, Sweden, and Russia, and the settlers from these countries are now much more numerous than the original Laplanders.

Lapland probably comprises an area of about 120,000 square miles, of which about one-half is subject to Russia. It is divided from Swedish Lapland by the river Muonio, an affluent of the Tornea Elf, and by the last-mentioned river, and from that part of Lapland which is annexed to Norway by the Tana Elf; but a small tract of coast to the east of the mouth of the Tana Elf, and extending as far east as the Bugge Fiord, also belongs to Norway. Russian Lapland is divided between the two governments of Archangel and Uleaborg; in the former it constitutes the district of

Kola, and in the second that of Tornea. Swedish Lapland is divided between the two districts (lans) of Pitea and Umea, and that portion of the country which belongs to Norway is called Finmarken.

Along the Norwegian coast lies the mountain-range of the Kiölen, which rises, on the very shores of the sea, with an extremely steep ascent, so that at a distance of a few miles it attains the height of 2000 or 2500 feet, where it begins to be always covered with snow; some of its summits rise to a much greater elevation, as the Sutitielma (67° 10′ N. lat.), which attains more than 6000 feet. The eastern declivity of this range is less rapid, and the country, which is 20 miles distant from the highest part, exhibits only high hills. The highest portion of the range is chiefly composed of bare rocks, and it is only in a few places that it is covered with grass and low bushes; but stunted birch and some kinds of pines grow on the hills. These hills, between which are narrow valleys, partly occupied by large lakes and partly by forest trees, advance to a considerable distance from the principal range, and leave a more level tract only along the Bay of Bothnia, between 20 and 30 miles across. The most hilly part is south of the Lulea Elf, north of which river the country extends in rocky plains with a scanty vegetation, and mostly covered with swamps, at least during the greatest part of the year. The surface of these plains is gently inclined towards the Gulf of Bothnia, and the soil is of a better description where they approach the river Tornea and the boundary of Russia. In these parts they are covered with good forests intersected by extensive grassy tracts, which are used as meadows or pasture-ground. Between the Lulea and Calix Elf, and nearly at an equal distance from the Kiölen Mountains and the Gulf of Bothnia, are several isolated high hills, consisting entirely of iron-ore.

Russian Lapland presents a different aspect. It is an extensive plain, generally covered with sand, but some isolated hills rise on the plain to an elevation of several hundred feet. A large part of this plain is covered with trees, which however in the northern districts do not grow to a great height. Other districts of great extent are sandy deserts, and in a few districts, especially along the rivers and the numerous lakes, tracts occur which are used as pasture-grounds, and sometimes cultivated.

The climate is very cold. Three-fourths of the year the country is covered with snow, and the frost between November and March is very intense. The snow does not entirely disappear till the beginning or middle of June. The spring lasts only a couple of weeks. In July and August the heat is very great, and frequently insupportable, on account of the length of the days, which in the most southern districts last nineteen or twenty hours, and in the northern several weeks; near the most northern extremity there is day for three months. Between the 10th and 24th of August some night-frosts occur, which however are again followed by warm weather that continues during the re-remainder of that month and the first half of September, when the night-frost re-appears, and in October the regular winter begins. The great quantity of snow which falls during the winter gives origin to the numerous lakes.

Four nations inhabit Lapland—the Laplanders, Swedes and Norwegians, Finlanders, and Russians. The original inhabitants, the Laplanders, have been driven by the foreign settlers from the best part of the country, and occupy at present only the more sterile inland parts beyond the polar circle; but they visit with their herds of reindeer all the highest portions of the Kiölen range as far south as 63° N. lat., where reindeer moss is found. Their number does not exceed 7000, and they are divided into reindeer Laplanders and fishing Laplanders. The former live either entirely or mostly on the produce of their herds, which in summer they conduct to the more elevated parts of the mountains; they pass the winter in the level country, which is settled by the other nations. Some of them possess 500 and even 1000 head of reindeer; the richest are in Russian Lapland. The fishing Laplanders, who are most numerous in Russian Lapland, are dispersed among the lakes and along the banks of the rivers, where they live on the produce of their fisheries. The number of the Swedes and Norwegians is very considerable; they occupy those tracts which are adapted to agriculture, where they cultivate rye, barley, oats, and potatoes. Rye grows as far as 66° N. lat., barley and oats to 68°, and potatoes appear to succeed as far north as the two last-mentioned kinds of grain. The countries along both sides of the Gulf of Bothnia are occupied by the Swedes, whose settlements also extend many miles inland; they keep a number of cattle proportionate to the extent of their fields. But the best pasture-grounds and meadows are in possession of the Finlanders, who probably settled at an earlier date among the Laplanders than the other foreigners. They occupy large tracts in the level country, where they apply themselves to the rearing of cattle; they are distinguished by their skill in the management of the dairy. The Russians live only in the district of Kola, where they are chiefly occupied as fishermen or as merchants. Only a few of them apply to agriculture or the rearing of cattle.

Besides cattle, horses, sheep, and goats are numerous, but hogs are rare. Wild animals are numerous, as immense tracts are deserts, and probably uninhabitable. Some of the larger animals however are now scarce, as bears and beavers. Wild reindeer are still found in considerable numbers, as well as wolves, lynxes, wolverines, foxes, hares, squirrels, martens, and otters. Lemmings sometimes come down in large numbers from the Kiölen Mountains, and lay waste the low country. Among the birds are eagles, capercailies, woodcocks, and a variety of sea-birds, which are particularly numerous along the coast of Norway. Gnats abound, especially in Russian Lapland; and the Swedish naturalist Wahlenberg is of opinion that they serve as dung to the country, which would be still more sterile without them. The forests, which cover a considerable part of the surface of the country, consist mostly of birch, fir, pine, alder, and aspen. The soil, which is overgrown by these forests, is chiefly covered with reindeer moss (*Lichen Islandicus*), which also covers the lower declivities of the higher part of the Kiölen range, and on which the numerous herds of reindeer feed.

(For a more particular account of the Laplanders, see Sweden and Norway.)

(Bech's *Travels;* Schubert's *Reise durch Schweden, Norwegen, Lappland, Finnland, und Ingermanland.*)

LA PLATA. [Plata, La.]

LAPLY'SIA. [Tectibranchiata.]

LAPSE. [Legacy.]

LAPWING. [Plovers.]

LAR, LARISTAN. [Persia.]

LARASH. [Marocco.]

LARCENY (*latrocinium*, Latin; *larcin*, French) is the legal term for theft.

This crime was formerly divided into grand and petty larceny, distinguished by the value of the property taken at one and the same time. It was grand larceny where the value was more than twelve pence; petty larceny where the value did not exceed that amount: a distinction referable to times in which twelve pence was more than equivalent to as many shillings of the present currency. At common law the punishment of petty larceny was whipping or imprisonment; that of grand larceny was death, unless the offender were in a situation to claim benefit of clergy, of which mode of escaping punishment neither women, nor men who were unable to read, or who had been twice married, or who had married widows, or who, not being actually clergymen, had before taken the benefit of clergy, could avail themselves. [Benefit of Clergy.] By 4 George I., c. 11, grand and petty larceny were made punishable by transportation.

By 7 & 8 George IV., c. 28, the distinction between grand and petty larceny is abolished; and larcenies are now distinguished as simple or compound, sometimes called mixed, larcenies.

I. Simple larceny at common law is committed by wrongfully taking, against the will of the owner, and carrying away the goods of another, with the fraudulent and felonious intent wholly to deprive him of his property therein.

First, there must be a wrongful taking against the will of the owner, which taking may be either actual or constructive. Actual taking against the will of the owner is where goods are taken directly either out of the possession of their absolute owner, or out of the possession of a bailee, or temporary owner. Constructive taking against the will of the owner is either where the possession of goods is obtained from the owner with a preconceived intention on the part of the person to steal them, in which case the original taking is felonious, or where the owner, without divesting himself of the legal possession of the goods, delivers them into the hands of a person who afterwards converts them to his own use or to some other purpose inconsistent with the continu ance of the owner's property therein, in which case such conversion constitutes the felonious taking. The doctrine of constructive taking has given rise to many nice distinctions. Generally speaking, there can be no larceny where the possession is voluntarily parted with. Thus if I lend another my horse for a certain period, and he rides away with the horse and sells him, it is no larceny, but a civil wrong, for which the only remedy is by action. But where the possession of a horse is obtained on the pretence only of borrowing, and with the intent to keep or sell him, such parting with the possession by the owner will not diminish the criminal responsibility of the taker. Larceny is not committed when the possession is obtained in the first instance bonâ fide without any fraudulent intention. Thus where A saves goods from a house on fire, and takes them home, having at the time an honest intention of preserving them for the owner, although the next morning A conceals the goods and denies having had the possession of them, it is a breach of trust, and no felony. Where however the absolute or temporary owner bails or delivers goods to another, but retains the beneficial possession of them, a conversion of the goods by such bailee to his own use will be larceny. A servant entrusted with his master's goods, a shepherd with sheep, &c., who embezzles them, is guilty of larceny at common law, because in such cases the possession of the servant, &c. is in law the possession of the master. If the owner is, by whatever means, induced willingly to part with his *property* in the goods, and not merely with the possession of them, the offence does not amount to larceny; as where possession of goods is obtained under colour of a purchase actually completed, although with an intention of running off without paying for them. But where the owner of a horse on sale allows his paces to be tried by a person who mounts and rides off with the horse, it is larceny, as the owner never parted with the property, nor indeed with the possession, for goods in the presence of the owner are in law considered as in his possession, though used by another. Where A goes to B's shop in the name of C, and asks for a hat which C has ordered, and it is delivered to A, who converts it to his own use, it is no larceny, because by such delivery B parted with the *property* in the hat. But if upon A's asking for the hat, B had delivered two hats for C to choose from, and A had converted both or either to his own use, the offence would have been larceny, because B parted with the possession only, and not with the property, as the right of property would have remained in B until C had made his election, and the bare possession was obtained fraudulently.

Secondly, there must not only be a taking, but also a carrying away, technically called asportation, to constitute which the goods stolen must be actually removed from the position which they before occupied. Entire removal, to however slight a distance, is a sufficient asportation; as if a thief be detected whilst leading a horse out of a field. So where A goes to an inn, and says to the ostler, 'Bring out my horse,' pointing to B's horse as his own; whereupon the horse is led out; but before A can mount, B comes up. So where a guest, with intent to steal goods out of an inn, removes them down stairs; or a thief, intending to steal plate, takes it out of a chest and lays it upon the floor, or intending to steal a cask from a waggon, removes it from one end of the waggon to the other. But though there must be an actual removal of every part from its previous position, it is not necessary that each portion of the article stolen should be removed from the space which was previously occupied by other portions of that article. Thus where A in raising a bag from the bottom of a coach-boot removes each part of the bag from the space which that specific part occupied, though the whole bag be not removed from every portion of the space which the bag filled in that boot, the asportation is complete. So where A has drawn a book about an inch above the top of B's pocket, B puts up his hand, and A drops the book and it falls back into B's pocket, it is larceny. So where a package is, for the purpose of cutting it open and getting at the contents, merely set on end in the place where it had lain, and the thief is disturbed before he has effected his purpose, the larceny is complete. But where a severance is necessary before the thief can have the entire control over the article, the asportation is not complete until such severance is effected; as where goods in a shop are fastened by a string to the counter, or a purse is entangled with keys in the owner's pocket.

Thirdly, the thing taken must be goods; and at common law larceny could be committed only in respect of personal goods. Things real, or things annexed to the soil, technically called the realty, or which are connected with the soil and freehold, and which are therefore, in legal language, said to savour of the realty, were not subjects of larceny at common law. This rule was observed so strictly, that larceny could not be committed by stealing title deeds, nor by stealing growing corn, grass, trees, &c., unless severed from the realty by the thief or by the owner, or by a third person, and taken at another time.

The subject matter of larceny at common law must also have been of things *in possession*, as distinguished from things (technically called choses) *in action*, i.e. things which are of no intrinsic value, but are capable of being made available by action or demand, as deeds, bonds, bills, notes, and other securities for money, &c.

The inconvenience arising from these rules, which are adapted to a very different state of society, is remedied by several statutes passed during the last and the present century.

The objection founded upon the connection of the thing stolen with the realty is removed by several provisions of 7 and 8 Geo. IV., c. 29. That statute, sec. 23, makes the stealing of written or printed papers or parchments, being evidence of title to real estate, a misdemeanor punishable at the discretion of the court by transportation for seven years, or by fine or imprisonment, or both. It further enacts, sec. 38, that if any person steal or cut, break, root up, or destroy or damage, with intent to steal, any tree, sapling, or shrub, or any underwood growing in a park, pleasure-ground, garden, orchard, or avenue, or in ground adjoining to a dwelling-house (in case the value of the article or articles stolen, or the amount of the injury done, exceed one pound), he shall be guilty of felony, and liable to punishment as for simple larceny: so if the trees, &c. be growing elsewhere, and the value or amount of injury exceed five pounds. It further enacts (s. 39) that if any person steal or break, root up, destroy or damage, with intent to steal, the whole or part of any tree, sapling, or shrub, or any underwood, wheresoever growing, the value of the articles stolen or the injury done being to the amount of a shilling, every such offender, being convicted before a justice of the peace, shall for the first offence forfeit, over and above the value of the articles stolen or the amount of the injury done, a sum not exceeding five pounds; and any person so convicted who shall afterwards be convicted of any of the said offences is to be imprisoned and kept to hard labour for a term not exceeding twelve months; and if the second conviction take place before two justices, they may order the offender, if a male, to be whipped; and if any person so twice convicted afterwards commit any of the said offences, such offender is to be deemed guilty of felony, and is liable to be punished in the same manner as in the case of simple larceny. It further enacts (s. 42) that if any person steal, or destroy or damage, with intent to steal, any plant, root, fruit, or vegetable production, growing in any garden, orchard, nursery-ground, hothouse, greenhouse, or conservatory, every such offender, being convicted thereof before a justice of the peace, shall, at his discretion, either be committed to the common gaol or house of correction, there to be imprisoned only or to be imprisoned and kept to hard labour for not more than six months; or else shall forfeit, over and above the value of the articles stolen or the amount of the injury done, such sum not exceeding twenty pounds as to the justices shall seem meet; and that if any person so convicted shall afterwards commit any of the said offences, the offence shall be deemed felony, and shall be punishable as in cases of simple larceny.

By the same statute (s. 44) it is made felony, punishable as in cases of simple larceny, to steal, or rip, cut or break, with intent to steal, glass or wood-work belonging to any building, or lead, iron, copper, brass, or other metal, or any utensil or fixture fixed in or to any building, or anything made of metal fixed in land, being private property, or for a fence to any dwelling-house, garden, area, or in any square, street, or other place dedicated to public use or ornament; and by s. 37 it is made a felony, punishable as in cases of simple larceny, to steal, or sever with intent to steal, the ore of any metal, or any lapis calaminaris, manganese, or mundic, or any wad, black cawke, or black lead, or any coal or cannel coal, from any mine, bed, or vein thereof. The stealing of any chattel or fixture let to be used with any house or lodging is by the same statute (s. 45) made felony, punishable as simple larceny.

With respect to choses in action, the same statute enacts (s. 5) that if any person shall steal any tally, order, or other security, entitling or evidencing title to any share or interest in any public stock or fund, or in any fund of any body corporate, company, or society, or to any deposit in any savings' bank, or shall steal any debenture, deed, bond, bill, note, warrant, order, or other security for money, or shall steal any warrant or order for the delivery or transfer of goods or valuable things, the offence shall be deemed felony of the same nature and in the same degree, and punishable in the same manner as the stealing of any chattel of like value with the share, interest, or deposit to which the security so stolen may relate, or with the money due on the security so stolen or secured thereby, or with the value of the goods or other valuable thing mentioned in the warrant or order. It also enacts (s. 21) that if any person shall steal, or shall, for any fraudulent purpose, take from its place of deposit or from any person having lawful custody thereof, or shall unlawfully or maliciously obliterate, injure, or destroy any record, writ, return, panel, process, interrogatory, deposition, affidavit, rule, order, or warrant of attorney, or any original document belonging to any court of record, or relating to any matter, civil or criminal, begun, depending, or terminated in any such court, or any bill, answer, interrogatory, deposition, affidavit, order, or decree, or any original document belonging to any court of equity or relating to any cause or matter in any such court, the offence shall be a misdemeanor, and subject at the discretion of the court to transportation for seven years, or such other punishment by fine or imprisonment, or by both, as the court shall award. And by s. 22 the stealing, or, for any fraudulent purpose, destroying or concealing a will or other testamentary instrument, is a misdemeanor punishable by transportation for seven years, or by fine or imprisonment, or both.

The Post-Office Act, 7 Will. IV. and 1 Vict., c. 36, s. 26, makes the stealing and embezzling of post letters, letter-bags, &c., felony, punishable with a greater or less degree of severity, according to the nature of the offence and the existence or non-existence of a confidential character in the guilty party. [Post-Office.]

Fourthly, the goods taken should generally be the goods of another person.

If a man take his own goods supposing them to be the goods of another, no larceny is committed. It is otherwise where the taking is for the purpose of fraudulently charging another with the loss; as if a man steal his own goods for the purpose of charging the bailee, or of throwing the supposed loss upon the hundred. If a wife take and convert to her own use the goods of her husband, they being but one person in law, it does not constitute larceny.

A joint tenant or tenant in common of any personal chattel cannot commit larceny respecting such chattel as against his co-tenant. But if such chattel be bailed or delivered to the care or keeping of a third party for safe custody, and the effect of the taking be to charge such bailee, it amounts to larceny.

The converting of found goods by the finder to his own use does not amount to larceny, unless at the time of the conversion he knows, or has the means of knowing, who is the real owner.

No larceny can be committed of things which are not the subject of property, as a human corpse, or of things the use of which is common to all mankind, as running water, wild animals in their natural liberty, &c. It is otherwise of animals which are dead, or are reclaimed or confined, and which are useful to man as food or otherwise. But the stealing of dogs, cats, and ferrets, though tame and valuable, and of bears, monkeys, &c., though reclaimed or confined, does not amount to larceny. But by 7 and 8 George IV., c. 39, s. 33, the stealing of dogs and of beasts and birds, ordinarily kept in a state of confinement, is made cognizable by justices of the peace. And by s. 26, it is a felony, punishable as in cases of larceny, to course, hunt, snare, or carry away, or kill, or wound deer kept or being in the enclosed part of a forest, chase, or purlieu, or in enclosed land in which deer are usually kept. If in an unenclosed part, the offence is made cognizable by a justice of the peace, with power to impose a pecuniary penalty not exceeding 50*l.*; and a second offence, whether of the same description or not, is made felony, punishable as simple larceny.

Stealing oysters or oyster brood from a marked-out or known oyster bed, laying, or fishery, is made larceny by 7 & 8 Geo. IV., c. 29, s. 36.

Fifthly, there must be an intent wholly to deprive the owner of the goods stolen of his property therein, which intent constitutes the fraudulent and felonious character of the act. The most common motive for a theft, and the ordinary mode of depriving the owner of his property in the thing stolen, are the conversion of it to the use of the taker; and Blackstone and others have considered that such conversion to the use of the thief, or some benefit to be derived to him, is essential to the completion of the offence, agreeably to the definition of *furtum* in the civil law, 'contrectatio rei fraudulosa lucri faciendi causâ.' But it appears to be now settled that a wrongful destruction of the goods taken, whereby the owner is wholly deprived of his property therein, is sufficient to constitute this offence, although no benefit is sought to be derived to the taker.

Persons convicted of simple larceny are, by the 7 & 8 George IV., c. 29, made liable, at the discretion of the court, to be transported for seven years, or to be imprisoned for a term not exceeding two years, and, if males, to public whipping in addition to imprisonment; and the court is empowered to sentence the offenders to be imprisoned and kept to hard labour, and also to direct that they shall be kept in solitary confinement as to the court in its discretion shall seem meet. 7 Will. IV. & 1 Vict., c. 90, s. 5, restricts the courts from directing that any offender shall be kept in solitary confinement, for any longer period than one month at a time, or than three months in the space of one year. Where the party convicted is a person already imprisoned under sentence for another crime, the court is empowered by 7 & 8 George IV., c. 28, s. 10, to award imprisonment for the subsequent offence, to commence at the expiration of the imprisonment to which such person has been previously sentenced; and where such person is already under sentence either of imprisonment or of transportation, the court, if empowered to pass sentence of transportation, may award such sentence for the subsequent offence, to commence at the expiration of the imprisonment or transportation to which such person has been previously sentenced.

As cattle are necessarily left in fields and upon commons and wastes, without any person to attend them, the legislature has interfered to protect property of this description by heavier punishments than those inflicted in other cases of larceny. Cattle-stealers were by several statutes excluded from benefit of clergy; and upon the abolition of the distinction between capital and clergyable felonies by 7 & 8 George IV., c. 29, stealing any horse, mare, gelding, colt, or filly, or any bull, cow, ox, heifer, or calf, or any ram, ewe, sheep, or lamb, or wilfully killing such cattle with intent to steal the carcass or skin or any part of the cattle so killed, was made a felony punishable with death. But now under 7 Will. IV. & 1 Vict., c. 90, the punishment of this offence is transportation for not more than fifteen or less than ten years, or imprisonment not exceeding three years.

A person guilty of larceny may be indicted for the offence at the suit of the crown [Indictment]; and he might formerly have been appealed or accused in a private action brought by the party injured [Appeal] to punish the offender and obtain restitution. The appeal is now taken away; but the party injured, and indeed any other person, may prefer a bill of indictment without the leave or even the knowledge of the crown or its officers. But the crown may interpose by entering a nolle prosequi before judgment, or by pardoning the offender afterwards; whereas in an appeal the crown could neither stop the proceedings nor pardon the appellee, whose life after conviction and judgment was wholly at the mercy of the appellant.

II. Compound larceny is where the crime of larceny is accompanied by circumstances which the legislature has considered as aggravating the offence and requiring an increase of punishment.

Under 7 & 8 George IV., c. 29, s. 6, stealing from the person of another, whether openly or clandestinely, is a felony punishable by transportation for life or not less than seven years, or imprisonment for not more than four years with or without whipping. To constitute this offence the thing stolen must be completely removed from the person of the owner, though such complete removal is not necessary in cases of simple larceny. It is no answer to the charge, that such force or fear was used as would make the offence amount to robbery. [ROBBERY.]

Breaking and entering any church or chapel (by which is meant a chapel in connexion with the Established religion) and stealing therein any chattel, or breaking out of any church or chapel after having stolen any chattel therein, was made a capital felony by 7 & 8 George IV., c. 29, s. 10, but the punishment was mitigated to transportation for life or for not less than seven years, or imprisonment not exceeding three years with or without hard labour and solitary confinement, by 6 & 7 William IV., c. 4.

By 7 & 8 George IV., c. 29, s. 12, breaking and entering a dwelling-house and stealing therein any chattel, money, or valuable security to any value whatever, or stealing in a dwelling-house any chattel, money, or valuable security to the value of 5*l.* without a breaking and entering, was made a capital felony. The offence is now, under 7 Will. IV. & 1 Vict., c. 90, a felony punishable by transportation for not more than fifteen or less than ten years, or imprisonment not exceeding three years; and the same punishment is provided in cases where any such property is stolen in a dwelling-house, and any one being therein is by menace or threat put in bodily fear; and also in cases of breaking and entering a building within the curtilage of a dwelling-house and occupied therewith, and stealing in such building.

The same punishment is affixed to the offence of breaking and entering a shop, warehouse, or counting-house, and stealing therein any chattel, money, or valuable security; and to the offence of stealing, to the value of 10*s.*, any goods or article of silk, woollen, linen or cotton whilst laid, placed or exposed during any process of manufacture in a building, field, or other place; and to the offence of stealing goods in a vessel, barge, or boat in any port or upon any navigable river or canal, or any creek belonging thereto, or from a dock, wharf, or quay adjacent thereto; and to the offence of plundering or stealing any part of a vessel in distress, or wrecked, stranded, or cast on shore, or any goods or articles belonging to such vessel. (For the Roman law of theft see ROBBERY.)

LARCH TREE. [ABIES.—*Abies Larix.*]

LARCHE'R, PIERRE HENRI, born at Dijon in 1726, applied himself especially to the study of the Greek classics, and made himself known by several translations from them, the principal of which is his translation of Herodotus, with a commentary, Paris, 1786, a useful book, which was republished in an improved edition, 9 vols. 8vo., 1805. In 1774 Larcher published a 'Memoir on the Goddess Venus,' which obtained the prize of the Academy of Inscriptions, of which body he afterwards became a member. He had a controversy with Voltaire, in consequence of some strictures which he wrote on Voltaire's 'Philosophie de l'Histoire.' Voltaire replied in his usual sarcastic vein in the 'Défense de mon Oncle,' and Larcher answered him in the 'Reponse à la Défense de mon Oncle.' After the Revolution, Larcher was made a member of the National Institute. He died at Paris, in December, 1812.

Larcher's translation of Herodotus, which is his chief work, has the merit of being generally correct, but it has no recommendations of style, and as a work of art it altogether fails to represent the beautiful simplicity of the original. The commentary on the text is still useful, though it is far from containing all that might now be added in illustration of Herodotus. Larcher also translated the 'Anabasis' of Xenophon.

LARD. [FAT.]

LARDNER, NATHANIEL, D.D., born 1684, died 1768, devoted a long life to the prosecution of theological inquiry, to the exclusion of attention to almost any other subject. The results which he communicated to the world from time to time show at once the assiduity with which he laboured in this department, and the ability which he possessed to conduct his learned researches to a successful issue.

Dr. Lardner was an English Dissenting Minister, belonging to the denomination called Presbyterian. In early life he was a pupil of Dr. Joshua Oldfield, a minister of eminence in that denomination, but he took a course which many of the Dissenters of his time took, going abroad to prosecute his studies. He spent more than three years at Utrecht, where he studied under Græevius and Burmann, and was then some time at Leyden. He returned to England in 1703, and continued prosecuting his theological studies with a view to the ministry; but it was not till he was twenty-five that he began to preach.

The course of his after-life is soon described. He became private chaplain in the family of Lady Treby, who died in 1729; and was a lecturer at the Dissenting chapel in the Old Jewry. He was not acceptable as a preacher owing to the want of power to modulate his voice, arising from the imperfection of his sense of hearing.

The Dissenters have no means of placing their scholars in any situations which can leave them at liberty to prosecute those studies, the results of which are of the most essential benefit to the great interests which they hold peculiarly dear; so that Dr. Lardner was thrown for the most part upon his own resources while engaged in those profound inquiries which have gained for him a name among the first theological scholars of his age and country. His 'Credibility of the Gospel History,' the 'Supplement' to it, and his 'Jewish and Heathen Testimonies,' have received the testimony of the most distinguished persons, as constituting the most rational and unanswerable defence of Christianity that has yet been prepared. These are his great works, but there are beside them many other treatises in which he has brought his stores of learning to bear on questions which are important in Christian theology. The most remarkable of these his minor publications is his 'Letter on the Logos,' in which it distinctly appears that he was of the Unitarian or Socinian School.

The best edition of his works is that by Dr. Andrew Kippis; but it is no mean proof of the estimation in which they are held, that large as they are when collected together, the booksellers not long ago ventured on a republication of them.

LARES, among the Romans, were household gods; the guardians of their hearths and families. There is much dispute upon the etymology of this term. Apuleius derives it from *Lar, familiaris.* Ovid speaks of the Lares as the offspring of Mercury and Lara. From a passage in Virgil's 'Æneid,' ix., 255, it should seem that these Lares of the Romans were the *manes* of their ancestors. According to Ovid ('Fasti,' v., 146) there were generally two of them, who were sometimes represented with a dog at their feet. Others were clothed in the skin of a dog. They usually held a cornucopiæ in their hands as a symbol of good housekeeping. The festival of the Lares was celebrated on the kalends of May (Ibid., v., 129) when they were crowned with garlands and sacrifices were offered to them. Pitiscus records an inscription, 'LARIBVS PRO SALVTE ET INCOLVMITATE DOMVS Q. SERTORII.' There were not only *Lares domestici et familiares,* but *Lares urbani, rurales, viales, compitales, marini,* &c.

LARGHETTO (Italian), a musical term, a diminutive of Largo [LARGO], slow, but less so than Largo.

LARGO, in music (Ital. adverb, *largely, widely*), is the second in order of the five classes into which musical movement is divided [ADAGIO], and signifies *slowly.*

LARGS, a small town in the parish of Largs and county of Ayr, 65 miles south-west by west from Edinburgh. It is pleasantly situated on the shore of the Frith of Clyde immediately opposite to the island of Bute, and there are few situations which exhibit more romantic scenery. The church is of some antiquity, and the living, which is in the presbytery of Irvine and synod of Glasgow and Ayr, is in the gift of the Earl of Eglinton. The parochial school is well attended, and the master's salary is 20*l.*, exclusive of school fees. The market-day is Thursday, and the fairs are held the beginning of the months of February, June, July, and October. The population of the town and suburbs in 1831 was 2045.

LA'RIDÆ, the name given by Leach to the family of birds vernacularly known as *Sea-Gulls, Sea-Mews,* or *Gulls,* belonging to Mr. Vigors's fifth order *Natatores.*

Willughby, in his 'Ornithology,' under his section (vi.) 'Of *Sea-Gulls,* called in Latine *Lari,*' says in his first chapter of that section ('Of Gulls in General')—'Gulls are a whole-footed fowl, with an indifferent long, narrow, sharp-pointed bill, a little crooked at the end; oblong nosthrils; long and strong wings; short legs; small feet (for they do not swim much); a light body, but invested with many and thick-set feathers; a carrion carkass, the fat that is sticking to the skin (as in other birds); much upon the wing, very clamorous, hungry, and piscivorous.'

'These we divide into two kinds: 1st, *the greater,* which have tails composed of feathers of equal length, and an angular prominency or knob on the lower chap of the bill underneath to strengthen it, that they may more strongly hold fishes; 2nd, *the lesser*, which have a forked tail, and no knob on the bill (or, he adds in a marginal note, but a very small one). Both kinds may be divided into *pied* or *particoloured*, and *grey* or *brown*.'

Willughby places the Gulls between the 'Douckers, or Loons, called in Latine Colymbi,' and the 'whole-footed birds with broad bills,' the first members of which are 'the goose-kind,' commencing with the Swan.

Ray's 'Synopsis' places the Gulls between the Colymbi and the 'Aves Palmipedes rostro in extremo adunco, non serrato,' *Avis Diomedea* (Albatross), Shearwater, Puffinus, &c.; and he describes them as 'Palmipede Birds, with a narrow, sharp, but not hooked (*adunco*) bill, long-winged, and much given to flight (*volaticæ*), called *Lari*, in English *Guls* or *Sea-Mews*, and in some places *Sea-Cobs*,' with the following definition:—'The marks of Gulls are a strong, oblong, narrow, and acute bill, which is a little curved at the extremity, but in the smaller species straighter; *nostrils* oblong; *wings* oblong and strong; *feet* small; *body* very light, clothed with many and thick feathers; and to be clamorous, much on the wing, hungry, and piscivorous.'

He divides the Gulls into three sections: viz.,

1. The Three-toed Gulls, 'Lari tridactyli, seu postico digito carentes;'
2. Four-toed Gulls, 'Lari tetradactyli, seu postico digito donati;' and
3. Fork-tailed Gulls, 'Lari minores, caudâ forcipatâ' (Terns, &c.).

Brisson placed in his twenty-third order (consisting of birds with four toes, the three anterior joined together by membranes and the posterior separate, and with a toothless bill), the Gulls, Petrels, Puffin, Terns, Sea-skimmer or *Rhyncopsalia* (*Rynchops*, Linn.), &c.

The second division of the third order (*Anseres*) of Linnæus consists of those web-footed water-fowl which have an edentulous bill, and the following are the genera of that order: *Rhynchops*, *Diomedea*, *Alca*, *Procellaria*, *Pelecanus*, *Larus*, *Sterna*, and *Colymbus*.

M. Lacépède's second subclass of birds consists of those which have the lower part of the leg denuded of feathers, or many toes united by a large membrane. The first division of this subclass comprises those birds which have three anterior toes, and one toe or none behind. In the first subdivision, the first order (the twenty-second reckoning from the beginning), consisting of palmiped water-birds with a *hooked beak*, we find *Diomedea* and *Procellaria*, among other genera; and in the third (twenty-third reckoning from the beginning) are placed, also among other genera, *Rhynchops*. In the fourth (twenty-fifth reckoning from the beginning), with a *straight* and *slender bill*, we have the genus *Sterna*; and, in the next but one (twenty-seventh), *bill tumid* (bec renflé), we have the genus *Larus*, the intervening genus being *Recurvirostra* (Avosets).

M. Duméril's third family (twenty-second in the series), consists of the *long-winged Palmipedes*, and includes *Rhynchops*, the Terns, the Avosets, the Petrels, the Albatrosses, and the Sea-Mews.

In the method of M. Meyer, we find the first suborder (*Conirostres*) of his eleventh order, *Natatores*, comprising, among other genera, those of *Sterna*, *Larus*, and *Lestris*.

The long-winged *Natatores* (Longipennes) of Illiger consist of the genera *Rhynchops*, *Sterna*, *Larus*, and *Lestris*; and his *Natatores* with tubular nostrils (*Tubinares*), of *Procellaria*, *Haladroma*, *Pachyptila*, and *Diomedea*.

Cuvier's *Long-winged Palmipedes* comprise the Petrels, Albatrosses, Gulls, Terns, and *Rhynchops*.

The fourth family (Pelagians) of M. Vieillot's first tribe (*Teleopodes*) of the order *Natatores* consist of *Stercoraria*, the Gulls, Terns, and *Rhynchops*.

M. Temminck places the whole of the *Palmipedes* in one order.

M. De Blainville's *Natatores* consist of the *Macropteres* (Gulls), the *Syphonorhiniens* (Petrels), the *Cryptorhiniens* (Pelicans), and the *Colymbiens*. In his method as developed by M. Lherminier the Gulls (*Larus*) and the Petrels (*Procellaria*) are placed in his first subclass or *Normal Birds*.

Mr. Vigors (*Natural Affinities that connect the Orders and Families of Birds*, 'Linn. Trans.' vol. xiv.) states that *Phaëton*, a genus belonging to the immediately preceding family (*Pelecanidæ*) bears a considerable resemblance in general appearance and habits to *Sterna* belonging to the succeeding family of *Laridæ*, the structure of their foot alone effecting a separation between them. Even here however, he remarks, we may observe the gradation that exists between the feet of the two families; the web that unites the toes of the *Tropic*, as well as of the *Frigate Bird*, being but half the size of that of the *Pelecanidæ* in general; and thus their foot preserves a connexion with that of the *Terns*, where the same membrane is equally contracted. 'We thus,' continues Mr. Vigors, 'enter the family of *Laridæ* by means of *Sterna*, with which *Rhynchops*, Linn., most intimately accords in habits and external characters, notwithstanding the dissimilitude of the bill. The *Sterna Anglica*, or Gull-billed Tern of Col. Montagu, conducts us from these genera to the groups which compose the Linnæan *Larus*, now justly subdivided into two genera, the *Lestris*, Ill., and *Larus* of authors. From this group we are led to the genera *Diomedea*, Linn., and *Haladroma*, Ill., which are characterised by the absence of the hind toe, by means of the species *Larus tridactylus*, Lath., where, though the hind toe is not absolutely deficient, as might be inferred from the specific name, there appears but the rudiment of one, or rather a stump without a nail. The last-mentioned genus, *Haladroma*, originally belonged to the *Procellaria*, Linn., and was separated from it by its tridactyle foot Even in this character however it forms a passage from *Larus* to the groups that compose the genuine *Procellaria*, all of which are distinguished by the singular peculiarity of having no true hind toe, but a nail adhering to the tarsus in its place. We thus arrive at the Petrels, separated into the groups of the *Procellaria*, Auct., *Pachyptila*, Ill., *Puffinus*, Ray, and the section denominated by M. Temminck 'Les Petrels Herondelles.' These two latter groups appear to lead us back to the *Terns*, or *Sea-Swallows*, from whence we started. The whole of this family, which corresponds with the *Longipennes* of M. Cuvier, is distinctly characterized by the strength and expansiveness of their wings, with the aid of which they traverse immeasurable tracts of the ocean in search of their food, and support their flight at considerable distances from land, seldom having recourse to their powers of swimming. We may thus discern the gradual succession by which the characters peculiar to the order descend from the typical groups that swim and dive well and frequently, but make little use of their wings for flight, to the present groups, which are accustomed to fly much, but seldom employ their powers of swimming, and never dive. The family of *Laridæ* may thus be observed to stand at the very extremity of the order, and it assumes, as I have already observed, in conjunction with the other extreme groups, much of the habits of the land birds. A portion of the group before us, the *Petrels*, seem even to employ their feet in their own element as if on land, walking as it were, on the surface of the waters. We have thus arrived at the termination of the last family of the order, and have to look for its connexion with the first. This link is immediately supplied by the before-mentioned genus *Pachyptila*, in which the bill, broad and depressed at the base, assumes the character of that of the *Anatidæ*. There is indeed a considerable approximation and interchange of character between the two groups. The bill of some species of *Anser* may be observed to become gradually less broad and more compressed, so as to bring them closely to the *Petrels*; while again the web that connects their toes is equally curtailed in extent, until in one species, the *Semipalmated Goose* of Dr. Latham, figured in the supplement to his '*Synopsis*,' we may observe no greater web than may be seen among many of the *Sternæ*. On the other hand, the same membrane is so extended in some of the *Petrels*, as to equal the most dilated web observable among the *Anates*. We may also add that the divisions of the *Procellariæ*, as they approach the *Anatidæ*, become gradually more nocturnal in their habits, and thus adopt a character common to a great portion of the latter family. Here then in the fifth and last order of birds we perceive the families of which it is composed following each other in a regular series of affinities, which returns into itself with a continuity similar to that which has been equally apparent in every other great department of the class.'

M. Latreille places the Gulls, Puffins, *Pelecanoides*, Petrels, Albatrosses, Terns, Noddies, *Pachyptila*, and *Rhynchops* in his third family (*Longipennes*), of his seventh order

(*Palmipedes*), belonging, with the *Echassiers* (*Grallatores*), to his second section, *Aquatic Birds*.

The Prince of Musignano, in his 'Tabella Analitica de' Generi' (*Specchio Comparativo*), makes the *Longipennes* the first family of his order *Anseres*. He divides the family into two sections: 1. 'Narici senza margine rilevato,' consisting of the genera *Rhynchops*, *Sterna*, *Larus*, and *Lestris*. 2. 'Narici tubulose,' containing the genera *Procellaria* and *Diomedea*.

M. Lesson, in his 'Projet,' makes the *Palmipedes* (*Natatores*) his eighth order, being the third of his second section, *Aquatic Birds*. In the Table Méthodique, at the end of his 'Manuel,' his fourth family of *Palmipedes* is named *Laridæ*, and consists of the genera *Sterna*, *Rhynchops*, *Larus*, *Stercorarius*, *Diomedea*, *Haladroma*, *Procellaria*, *Pachyptila*, *Puffinus*, and *Thalassidroma*. The family is arranged by M. Lesson between the *Pelecanidæ* and the *Anatidæ*, which form his last family.

Mr. Eyton, in his 'Catalogue of British Birds,' enumerates the following genera and subgenera as constituting the family of *Longipennata*: Genus *Procellaria*, Linn.; subgenera *Puffinus*, Ray; *Fulmarus*, Stephens; *Thalassidroma*, Leach. Genus *Lestris*, Temm.; Genus *Larus*, Linn.; subgenera *Rissa*, Leach; *Larus*, Stephens; *Chroicocephalus*, Eyton; *Xema*, Leach; *Sterna*, Linn.; and *Anous*, Leach.

Mr. Swainson, who refers to Mr. Vigors's arrangement above noticed, speaks of the *Laridæ* as constituting a much more numerous family than either of the three, *Colymbidæ*, *Alcidæ* (Alcadæ), or *Pelicanidæ* (Pelecanidæ) previously adverted to by him. The structure of the *Laridæ*, too, he considers to be more perfect in a general sense, although inferior in that particular construction which constitutes the perfection of the order, namely, the power of swimming and diving. The wings, he remarks, are very long; and the feet, although webbed, enable these birds to walk about with perfect ease on the shore in search of food; the hind toe is very small, sometimes wanting; but the legs are nearly as long as in some of the wading birds, of which he considers them to be the representatives: the bill he notices as being slender, much compressed, and as gradually but not abruptly bent. After referring to their gregarious and omnivorous habits, their tolerable facility of swimming, their inability to dive, and their great power of flight, Mr. Swainson notices the genera in the following order, and expresses his views in the following terms:—

'The terns, or sea-swallows (Sterna), constitute the fissirostral type; they have remarkably long wings and slender bills; the tail is forked; and the plumage generally is of a delicate pearl white, with more or less black upon the head: the species are numerous, and occur in both hemispheres. The extraordinary genus *Rhynchops*, or Skimmer, although possessing much of the general habits of the terns, is eminently distinguished by the singular form of its bill, the upper mandible of which is considerably shorter than the under, and appears as if one-third of the length had been broken off: three species have been described, to which we add a fourth: they skim over the surface of the ocean with great swiftness, and scoop up small marine insects and other animals. The true or typical gulls (*Larus*) are a numerous race, dispersed in every clime, and so closely resembling each other in plumage, that many of the species are even now but imperfectly understood; they bear a close resemblance in general appearance to the terns, but the bill is stronger, and the upper mandible much more curved towards the end: many are of large size; and all are voracious devourers of fish, and of every marine animal, dead or alive, which is cast upon the shore: they particularly abound in northern latitudes, but seem to range over the whole world of waters. The parasitic gulls (*Lestris*) are the raptorial representatives, and are almost confined to cold regions; they are known by their stronger conformation, their different shaped bill, and the rough scales upon their feet: these birds, like the frigate cormorants, derive their chief supply of food by robbing their more feeble congeners; they pursue the largest gulls, and make them disgorge or relinquish their hard-earned game. The black-toed and the arctic gulls belong to this group, and both are occasionally seen on the northern shores of Britain. The genus *Diomedia* (Diomedea) includes the well-known and gigantic albatrosses, the most powerful and bulky of the whole family; they are oceanic birds, living almost constantly out at sea, but are more particularly abundant in the Pacific Ocean: we have no examples in Britain, or indeed in Europe: the extent of their outspread wings is enormous; yet their flight, except in stormy weather, is by no means lofty: like all the rapacious birds of the ocean, they are most voracious, and their flesh is rank and repulsive. The genus *Haladroma* comprises such of the albatrosses as have the bill more resembling that of the petrels, while they agree with the former in being destitute of a hind toe; but only one or two species have as yet been clearly ascertained. The true petrels (*Procellaria*) have the lower mandible truncated: we have a native example of this genus in the fulmar (*P. glacialis*), but nearly all the rest inhabit the antarctic regions; they are continually out at sea, even in the most violent storms: Cuvier mentions that their French name of *Petit Pierre* is derived from their habits of walking on the water by the help of their wings.* The shear-water petrel and some others have been separated under the very objectionable name of *Puffinus*, from the different construction of their nostrils and of the lower mandible: there is one species, the English puffin (*P. Anglorum*, Tem.), which appears to be confined to the northern coasts of Scotland. The genus *Thalassidroma*, Vig., differs from the other petrels, by having the legs longer and the bill somewhat shorter: it is composed of those small birds well known to sailors by the vulgar name of Mother Cary's chickens. We may here also mention the subgenus *Pachyptila*, as being that form which, of all this family, shows the nearest approach to the *Anatidæ*, with which we commenced the circle: the bill retains the general form of the petrels, but the base is considerably dilated, and its inner margins are found to be furnished with teeth-like laminæ. The most aberrant type of the *Laridæ* appears to be the genus *Dromas* of Paykull, a long-legged bird analogous to the flamingos: this we have never yet seen, but Temminck and others consider it has an affinity with the terns. The circle of the *Laridæ*, no less than that of the natatorial order, has now been traced, and we can only regret that our limited space prevents us from laying before the reader some of the very many analogies by which this arrangement is confirmed.'

In the 'Synopsis' at the end of the same volume, Mr. Swainson makes the *Gulls* a subfamily under the name of *Laridæ*, with this definition: 'Feet lengthened, formed both for walking and swimming:' the subfamily consists of the following genera and subgenera: Sterna, *Terns*, including *Sterna*, Linn.; *Thalassites*, Sw.; *Phæton*,† Linn.; *Rhynchops*, Linn.; and *Gavia*, Brisson; Larus, Linn., *Gull*; Lestris, Ill., *Jager*; Diomedea, Linn., *Petrels*; including *Procellaria*, *Diomedea*, Linn., *Albatross*; *Haladroma*, Ill.; *Thalassidroma*, Vig.; *Pachyptila*, Ill.; and *Dromas*, Paykull.

Having given a general sketch of the views of authors respecting this extensive family, we shall here confine ourselves to the *Gulls* only, including in that term the genera *Xema*, of Leach; *Larus*, of Linnæus; and *Lestris*, of Temminck. The other groups will be noticed under their respective titles as far as our space will permit.

Xema. (Leach.)

Generic Character.—*Bill* short, slender, straight, laterally compressed, its tip bent down; the lower mandible somewhat angulated beneath. *Nostrils* very slender, linear. *Legs* slender. *Tibiæ* naked on the lower part. *Tail* forked. (Gould.) Length about 14 inches.

Example, *Xema ridibundus*,‡—*Larus ridibundus*, Linn.

Description (*Summer plumage*).—Bill naked, skin round the eye, legs and feet, lively red; head and throat deep brown, between chocolate-colour and black; shoulders and back grey; outer edges of the quills (with the exception of that of the first, which is black) white, extremities of all but the first black, slightly tipped with white; rump, tail, and under surface white.

Winter plumage like summer plumage, saving the head, which is gradually changed from the deep colour abovementioned to pure white, by a process which Mr. Yarrell has proved to be different from moulting. (*Trans. Zool. Soc.*, vol. i., p. 13.)

Young of the Year.—Colour of *bill* and *tarsi* more obscure; top of the head and ear-coverts mottled with brown, which is also the colour of the back and shoulders, each feather having a lighter margin; tail broadly edged with black. (Gould.)

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* Cuvier's words, in speaking of the names of these birds, are: 'Celui de pétrel (petit Pierre) leur vient de l'habitude de marcher sur l'eau, en s'aidant de leurs ailes.'

† Phaëton.

‡ Genus Chroicocephalus of Eyton.

This bird is the *Mouette rieuse ou à capuchon brun* of the French; *Gabbiano cinerizio col rostro e colli piedi rossi*, *Gaimone*, and *Corvo bianco* of the Italians; *Laughing Gull*, *Pewit* or *Blackcap*, *Sea Crow* and *Mire Crow* of the Modern British; *Yr wilan benddu* of the Antient British.

The old birds in their complete winter plumage are, *Larus cinerarius*, Gmel.; *Larus procellosus*, Bechst.; *La petite mouette cendrée*, Briss.; *Die alte Lachmeve im winter Kleide*, Leisler, &c.; *Kleive Zee-meeuw*, Sepp.; *Gabbiano Cenèrino*, and *Gabbiano Moretta*, 'Stor. degl. Ucc.;' and *Red-legged Gull* of Latham.

In the summer or nuptial plumage the bird is *Larus ridibundus*, Linn., Gmel.; *Mouette rieuse à pattes rouges*, Briss.; *La Mouette rieuse*, Buff.; *Schwarzköpfige Meve*, Bechst., &c.; *Bruinkop Meeuw*, Sepp.; *Gabbiano Moretta*, 'Stor. degl. Ucc.;' and *Black-headed Gull* of Latham.

The young of the year are *Sterna obscura*, *Brown Tern*, and *Brown Gull* of Latham.

The young in their moult and in winter are, *Larus erythropus*, Gmel.; *La petite Mouette grise*, Briss.; *Larus canescens*, Bechst.; *Red-legged Gull*, Penn. 'Arct. Zool.;' *Brown-headed Gull* and *Red-legged Gull variety*, Latham. (Temm.)

Food, Habits, Reproduction.—The food of this species consists principally of insects, worms, spawn and fry, and small fishes. In habits it resembles generally the other Gulls, but it walks better. The nest, contrary to the nidification of the other Gulls, which generally form their nests on the ledges of rocks near the sea, is placed, as is the case with other Xemæ, in low situations, such as meadows in the neighbourhood of the sea or æstuaries, among the herbage on the ground. The eggs, which vary much, are generally of a deepish olive, sprinkled with large brown and blackish spots.

Localities.—Rivers, salt lakes, and fresh waters; in winter only on the shores of the sea; a bird of passage in Germany and France; very abundant in Holland at all seasons of the year. (Temminck.) Mr. Selby says that in Britain they are very regular in their migratory movements (for such their departure to and from the sea-coast may properly be termed), and that their return in spring may, in some cases, be calculated upon almost to a day.

Utility to Man.—Selby speaks of the eggs of this bird as being well flavoured, free from fishy taste, and, when boiled hard, as not easily distinguishable from those of the Lapwing, for which they are sometimes substituted. The young, he adds, are also eaten, although not held in such high estimation as they formerly were, when great numbers were annually taken and fattened for the table, and when the *Gullery* (or summer resort of the species) produced a revenue of from 50*l.* to 80*l.* to the proprietor. These are the *See-gulles* of the antient great festivals. In the Household Book of the fifth earl of Northumberland, begun in 1512, these *See-gulles* are among the delicacies for the principal feasts or his lordship's own *mees*, and they are charged at one penny or three halfpence each.

In Willughby's time the price was higher. He mentions a colony of these birds 'which yearly build and breed at Norbury in Staffordshire, in an island in the middle of a great pool, in the grounds of Mr. Skrimshew, distant at least thirty miles from the sea. About the beginning of March hither they come; about the end of April they build. They lay three, four, or five eggs, of a dirty green colour spotted with dark brown, two inches long, of an ounce and half weight, blunter at one end. The first down of the young is ash-coloured and spotted with black; the first feathers on the back after they are fledged are black. When the young are almost come to their full growth those entrusted by the lord of the soil drive them from off the island through the pool into nets set on the banks to take them. When they have taken them they feed them with the entrails of beasts, and when they are fat sell them for four pence or five pence a-piece. They yearly take about a thousand two hundred young ones; whence may be computed what profit the lord makes of them. About the end of July they all fly away and leave the island.'

Xema ridibundus (adult in summer plumage, and young of the year.—Gould).

Dr. Plott, in his 'Staffordshire,' adds to the history of the birds that bred in Pewit Pool, in the parish abovementioned, that they would breed on no other land than that of the proprietor of that place, and that on the death of the owner they deserted the pool for three years, but only retired to another estate belonging to the next heir. The Doctor was fond of the marvellous.

Larus.

Generic Character.—*Bill* of mean length, strong, straight, cultrated, the upper mandible having the tip incurved; symphysis of the upper mandible strongly angulated, and ascending from thence to the point. *Nostrils* placed in the middle of the bill, lateral, oblong, narrow, and pervious. *Tongue* pointed, with the extreme tip cloven. *Wings* long, acuminated. *Tail* even, or slightly forked. *Legs* placed near the centre of the body, of mean length and strength, with the lower part of the *tibiæ* naked. *Feet* of four toes, three before and one behind; the three in front united by a membrane; the hind one short and free. (Gould.)

Example, *Larus marinus*, Linn. (*Goĉland Noir Manteau* of the French; *Great Black-backed Gull*;* *Gwylan rûdd a gywn* (Wagel) of the Antient British).

Perfect Winter Plumage of Old Birds.—Summit of the head, region of the eyes, occiput and nape white; but all the feathers marked on their middle with a longitudinal stripe of bright brown; front, throat, neck, all the lower parts, back and tail, pure white; top of the back, scapulars, and the whole wing of a deep black, shaded with bluish; quills towards the end of a deep black, all terminated with a large white space; secondary quills and scapulars terminated with white; bill whitish yellow, angle of the lower mandible bright red; naked border round the eyes red; iris brilliant yellow marbled with brown; feet dirty white. Length twenty-six or twenty-seven inches; females twenty-four to twenty-five inches. (Temminck.) Willughby's specimen measured, 'from tip to tip of the wings distended,' sixty-seven inches.

M. Temminck observes (1820) that in this state the species had never been described. Willughby and Montagu however had each described one (the latter author in his Dictionary (1802)) almost in the perfect state, and it is now beautifully figured in Mr. Gould's great work on 'The Birds of Europe.'

Summer or Nuptial Plumage of Old Birds.—Summit of the head, region of the eyes, occiput and nape pure white without any brown; naked border round the eyes orange; rest of the plumage as in winter. In this state it is *Larus marinus*, Linn.; *Le Goĉland Noir Manteau*, Buff.; *Mantel Meve*, Bechst.; *Black-backed Gull*, Latham, &c. (Temm.)

Young of the year, and those one year old.—At this period the bird is *Larus nævius*, Linn.; *Larus marinus junior*, Lath.; *Le Goĉland varié ou grisard*, Buff.; and *Wagel Gull*, Lath. (Temm.)

The Young of the year have the head and the front of the neck greyish-white covered with numerous brown spots, which are largest on the neck; the feathers of the upper parts are blackish brown in the middle, all bordered and terminated with reddish white, which colour forms transverse bands on the coverts of the wings; lower parts of a dirty grey, striped with large zigzags and brown spots; feathers of the middle of the tail more black than white, the lateral ones black towards the end, and all bordered and terminated with whitish; quills blackish, a little white on the point; bill deep black; iris and naked circle brown; feet livid brown.

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* It is the *Great Black and White Gull* of Willughby; the provincial name is *Cobb*.

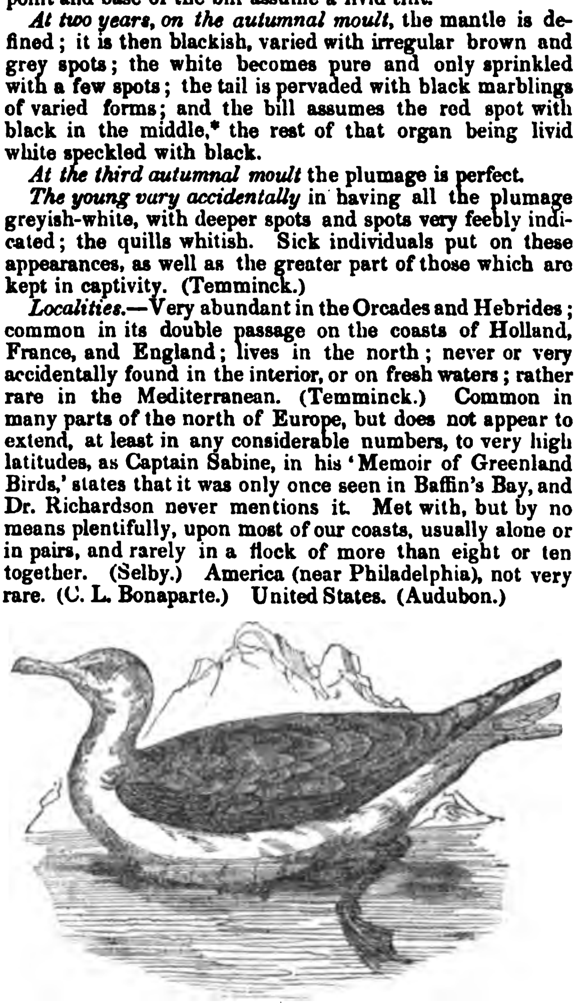
After the first year to the age of two years.—All these colours change no otherwise than that the blackish brown and yellow of the middle of the feathers occupy gradually less extent, giving place to pure white, which then surrounds all the feathers; the white begins to predominate over the grey in the lower parts, which have gradually less of the brown spots; the head becomes pure white, and the point and base of the bill assume a livid tint.

At two years, on the autumnal moult, the mantle is defined; it is then blackish, varied with irregular brown and grey spots; the white becomes pure and only sprinkled with a few spots; the tail is pervaded with black marblings of varied forms; and the bill assumes the red spot with black in the middle,[*] the rest of that organ being livid white speckled with black.

At the third autumnal moult the plumage is perfect.

The young vary accidentally in having all the plumage greyish-white, with deeper spots and spots very feebly indicated; the quills whitish. Sick individuals put on these appearances, as well as the greater part of those which are kept in captivity. (Temminck.)

Localities.—Very abundant in the Orcades and Hebrides; common in its double passage on the coasts of Holland, France, and England; lives in the north; never or very accidentally found in the interior, or on fresh waters; rather rare in the Mediterranean. (Temminck.) Common in many parts of the north of Europe, but does not appear to extend, at least in any considerable numbers, to very high latitudes, as Captain Sabine, in his 'Memoir of Greenland Birds,' states that it was only once seen in Baffin's Bay, and Dr. Richardson never mentions it. Met with, but by no means plentifully, upon most of our coasts, usually alone or in pairs, and rarely in a flock of more than eight or ten together. (Selby.) America (near Philadelphia), not very rare. (C. L. Bonaparte.) United States. (Audubon.)



Larus marinus. (Great Black-backed Gull, adult, in winter plumage.)

Food, Habits, Reproduction.—Fish, living or dead, fry, carrion, &c., form the food of this species, according to Temminck, who adds, that it rarely feeds also on bivalve shell-fish. 'It is,' says Selby, 'of very voracious appetite, and preys upon all kinds of animal substance that may happen to be cast on shore. It also keeps a close watch upon the lesser gulls, whom it drives from any food they may have discovered, appropriating the whole to itself.' Montagu notices the damage it does to fishermen by severing and devouring the largest fish from their hooks, if left dry by the ebbing of the tide. Flight slow, but buoyant. Cry strong and hoarse, to be heard from a great distance when the bird is on wing, and most frequent in the spring and breeding season. Very wary; keeping by the shores of the sea, which it only quits accidentally. *Nest* on the rocks, Temminck says, in the regions of the Arctic Circle. (Quære tamen; and note, Captain James Ross ('Last Expedition of Sir John Ross') does not mention it.) *Eggs* three or four, very deep olive green, with great and small blackish-brown spots (Temminck). Like those of the *Herring* and *Lesser Black-backed Gulls* in colour and markings, but are larger. (Selby.) The author last quoted says that its breeding stations in Britain are the Steep-holmes and Lundy Islands in the Bristol Channel, Souliskerry in the Orkneys, the Bass Island in the Frith of Forth, and one or two other stations upon the Scottish coast. Mr. Gould says that it also breeds in the marshes at the mouth of the Thames, making a nest on the ground of reeds, rushes, and flag-leaves.

Lestris. (Catarractes, Ray? Catarracta, Aldrov.?)

Generic Character.—*Bill* moderate, hard, strong, cylindrical, very compressed, hooked at the point, the *upper mandible* covered with a *cere*, the under mandible with an angle on the inferior edge. *Nostrils* approaching the point of the bill, diagonal, narrow, closed on their posterior part, and pervious. *Tarsi* long, naked above the knee. *Feet* having three toes before, entirely palmated; hind *toe* very small; *nails* large and hooked. *Tail* slightly rounded, two middle feathers elongated. *Wings*, first *quill-feather* longest. (Gould.)

Example, *Lestris parasiticus.*

Old of both Sexes in Perfect Plumage.—Front whitish; on the summit of the head a sort of hood of blackish-brown, terminating at the occiput; throat, region below the eyes, all the neck, the breast, the belly and abdomen, pure white; on the flanks some ash-coloured undulations; lower coverts of the tail, back, wings, and caudal feathers, uniform very deep ashy-brown, graduating into blackish on the end of the quills and tail-feathers; the two long tail-feathers terminated in a loose point (en pointe très-effilée); base of the bill bluish, point black; iris brown; feet deep black. Length 14 or 15 inches; the long feathers exceed from 3 to 5 or 6 inches. (Temm.)

In this state M. Temminck considers it to be *Larus parasiticus*, Linn., Gmel.; *Cataracta parasitica*, Retz; *Stercorarius longicaudus*, Briss., *Le Labbe à longue queue*, Buff.; *Stercoraria di coda longa*, 'Stor. degl. Ucc.;' *Die Polmoure*, Lepechin; *Struntmeve*, Bechst.; *Arctic Bird*, Edwards; *Arctic Gull*, Latham.

Middle Age.—All the upper parts spotless ashy-brown; lower parts a shade brighter, equally spotless; interior base of the quills and the upper part only of the caudal feathers pure white, the rest blackish-brown; the two long feathers gradually diminishing towards the end, which is terminated in a very loose point; bill and feet as in individuals with perfect plumage.

In this state the bird is *Larus crepidatus* of the first edition of M. Temminck's 'Manuel;' *Le Stercoraire* of Brisson; *Le Labbe ou le Stercoraire* of Buffon, especially Pl. Enl. 991, and more especially Edw., t. 149. (Temm.)

Young of the Year at the time of their leaving the Nest. Top of the head deep grey; sides and upper part of the neck bright grey, sprinkled with brown longitudinal spots; a black spot before the eyes; lower part of the neck, back, scapulars, small and great coverts of the wings, umber-brown, each feather being bordered with yellowish-brown, and often with reddish; lower parts irregularly variegated with deep brown and yellowish-brown on a whitish ground; abdomen and tail-coverts striped transversely; quill and tail feathers blackish, white at their base and internal barbs, all terminated with white; tail rounded only; base of the bill yellowish-green, black towards the point; tarsi bluish-ash; base of the toes and membranes white, the rest black; posterior nail often white. (Temm.)

In this state M. Temminck considers the bird to be *Larus crepidatus*, Gmelin; *Catarracta* (Catharacta) *Cepphus*, Brunnich; *Le Labbe ou Stercoraire* of authors; *Labbe à courte queue*, Cuv.; and *Black-toed Gull*[*] of Latham and Pennant.

Mr. Gould, whose figure we have copied, says that he believes the bird in question to be the true *parasiticus* of Linnæus, Buffon, and Temminck; and although Mr. Gould thinks it probable that the species undergoes variations in plumage similar to those of *Lestris Richardsonii*, he is by no means able, from his own knowledge, to state this to be the case, as in all the specimens which he had opportunities of examining the markings were clear and decided, the birds exhibiting a well-defined, dark-coloured cap on the head, light under parts, and very long middle tail-feathers.

Localities.—Shores of the Baltic, Norway, and Sweden; spreads itself habitually in the interior on lakes and rivers; of periodical or accidental passage in Germany, Holland,

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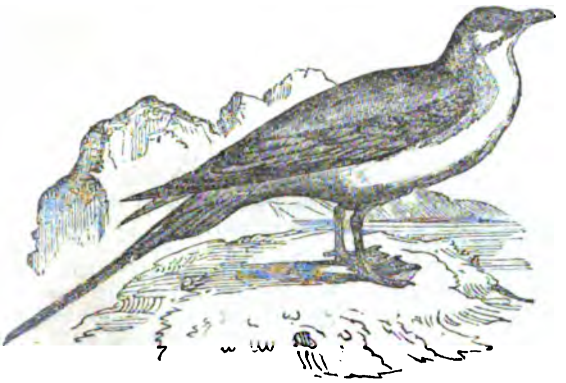
[*] The individual described by Willughby as *The Great Black and White Gull* (*Larus ingens marinus Clusii*), and hereinbefore noticed, seems to have been in this stage of plumage, or rather more varied. Willughby took 'a plaise entire' out of its stomach. He also mentions another (which he supposes was a young one) with the head and neck parti-coloured of black and white, and the back and wings paler.

[*] Yr Wylan ygafn of the antient British.

France, and Switzerland, where the young only ordinarily are seen: the old rarely wander. (Temminck.) 'In its young state, as the Black-toed Gull (*Larus crepidatus*) of authors, this species,' writes Mr. Selby, 'is not of unfrequent occurrence, during the autumnal months, upon the northern coast of England, to which it is attracted by the Gulls that follow the shoals of herring on their approach to the shallows for the purpose of depositing their spawn. Like the other Skuas, it obtains the greater part of its subsistence by continual warfare on the above-mentioned birds, vigorously pursuing and harassing them till they are compelled to disgorge the food previously swallowed. In this occupation its dark plumage and rapid flight are certain to attract the attention of the spectator: and there are few probably who have visited the coast of Scotland and the northern districts of England who have not witnessed and admired the aërial evolutions of the *Teazer*, and the distress of its unfortunate objects of attack. It is but very rarely met with beyond the precincts of the Shetland and Orkney Isles in its adult state, and only one instance has occurred within my own observation, namely, on an excursion to the Fern Islands in the month of May, when two of these birds flew ahead of the boat in a northerly direction, and which were perfectly distinguishable by their lengthened and slender middle tail-feathers, and the black and white of their plumage. This Skua does not appear to be a permanent resident in any part of the British dominions, for Low, in his *Fauna Orcadensis*, describes it as a migratory bird, arriving there and in Shetland in May, and departing in autumn, or as soon as the duties of reproduction have been effected.' Mr. Gould says that he has not been able to ascertain whether it breeds among the British Isles, and adds, that it is certainly of rare occurrence. Its natural habitat, he thinks, is more confined to the North, namely, the shores of the Baltic Sea, Norway, and the Polar regions. All our Arctic voyagers mention it, down to Captain James Ross inclusive; and it appears to be common to the Polar seas of Europe and America.



Lestris Parasiticus (Arctic Jager).*

Food, Habits, Reproduction.—The account given by Mr. Selby above will prepare the reader for the principal source whence this and other *Jager Gulls* derive their subsistence, namely, by pursuing and buffeting the peaceable gulls and compelling them to render up the produce of their toils. But they also feed on fish, insects, and worms, and Temminck particularly mentions the *Janthina*, or Oceanic Snail, as forming a part of its sustenance. In truth no animal substances seem to come amiss to it. Mr. Richards, of H.M.S. Hecla, saw this bird feeding on the bodies of some young children whose graves of ice had vanished, on the thaw, near Igloolik, on the 21st June, 1823. *Nest.*—Temminck says that it nestles not far from the sea-shore. Selby, who states that it breeds upon several of the Orkney and Shetland Isles, and that it is gregarious during that period, informs us that the situations selected are the unfrequented heaths at some distance from the shore, and that the nest is composed of dry grass and mosses. The eggs are two, of a dark oil-green with irregular blotches of liver-brown; and Mr. Selby adds that the bird at this time is very courageous, and, like the *Common Skua*, attacks every intruder by pouncing and striking at the head with its bill and wings. Occasionally it endeavours, according to the same authority, to divert attention by feigning lameness in the same manner as the partridge and the lapwing. In the appendix to Parry's Voyage (1819-20) this 'Arctic Lestris' is stated to be equally abundant in the islands of the Polar Sea as in Baffin's Bay. Captain Edward Sabine, who drew up the account, states that it is frequently met with inland, seeking its food along the water-courses which occupy the bottom of ravines; differing in this respect from the *Pomarine Lestris*, which is exclusively a sea-bird.

LARISSA. [THESSALY.]

LARKS. The reader will find, under the article FRINGILLIDÆ, a summary of the views of ornithologists as to the natural position of the *Larks*.

The subfamily *Alaudinæ* is thus characterized and developed by Mr. Swainson:—

Bill more lengthened than in any of the *Fringillidæ;* the tip entire or obsoletely notched. *Tertial quills* considerably lengthened, pointed, and generally as long as the quills. Claws very slightly curved; the claw of the outer toe always shorter than that of the inner toe; the hinder claw considerably lengthened, and either nearly straight or very slightly curved.

Alauda. (Linn.)

Bill cylindrical; *nostrils* concealed. *Wings* very long; no spurious quill; the first, second, and third quills longest, and nearly equal; the rest considerably graduated; tips of the lesser quills emarginate. *Tail* forked. Head crested. (Sw.)

Geographical Distribution. — Europe and America. (Swainson, but see below.)

Mr. Swainson considers this as the fissirostral type.

Example, *Alauda arvensis.* This is the *Alouette* and *Alouette ordinaire* and *Alouette des champs* of the French; *Lodola, Lodola canterina, Lodola di passo,* and *Lodola di montagna* of the Italians; *Feld Lerche* of the Germans; *Hedydd* and *Uchedydd* of the antient British; and *Skylark* (provincially *Lavrock*) of the modern British.

The Skylark is too well known, from its inexpressibly beautiful song chanted forth far up in the air when at liberty and in its natural state, to require any description.

Food.—Insects and their larvæ, with many sorts of seeds and grain.

Nest.—On the ground. *Eggs* four or five, greenish white, spotted with brown.

Localities.—All the parts of Europe; also in Asia and the northern parts of Africa, but not in the south of that vast continent (Temm.); the whole of Europe within the temperate zone, many parts of Asia, and the north of Africa. (Selby.)

Calendula. (Linn.)*

Generic Character.—*Bill* thick, much compressed; the culmen curved and convex; the commissure arched; the tip of the upper mandible wide above and inflexed. Wings long or moderate; the first quill very small and spurious; the second nearly equal to the third and fourth; lesser quills short, emarginate. Tail slightly forked. Lateral toes equal. Africa. The dentirostral type—*C. magnirostris,* 'O.s. d'Afr.,' pl. 193. (Sw.)

Subgenera:—*Myrafra,* Horsf.—Bill as in *Calendula.* Wings short, rounded; greater quills hardly longer than the secondaries and tertials; the first quill spurious, half the length of the second, which is shorter than the third; the third, fourth, fifth, and sixth equal, and longest. Tail short, even. Legs long. *M. Javanica,* 'Linn. Tr.' xiii. 159. (Sw.)

Braconyx, Sw. (Brachonyx.)—Bill as in *Calendula.* Hinder claw very short. Wings and tarsi much lengthened. Africa. (Sw.)

Agrodroma, Sw. (Anthus pars, Auct.)

Generic Character. — Bill slender, considerably compressed; both mandibles of equal length; the tip of the upper one not reflected over the lower, and with a small notch, almost obsolete. Wings long; the four first quills nearly equal; the rest rapidly diminishing, and emarginate at their tips; tertials lengthened, pointed, as long as the quills. Tail moderate, even. Legs pale, long, slender. Tarsus longer than the middle toe. Lateral toes equal, but the outer claw shorter than the inner. Colour brown, lark-like. Distribution universal. The insessorial or pre-eminent type—*Agrodroma rufescens,* 'Enl.,' 661, f. 1. (Sw.)

Generic Character.—Bill slender, compressed, thrush-

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* Cataractes parasiticus, Flem.; Arctic Skua, Selby.

* We cannot find this genus in Linne's last edition of the 'Syst. Nat.,' nor in Gmelin.

Macronyx. (Sw.)

like, entire; nostrils large, naked, the aperture lateral. Wings short; the primaries not longer than the tertials, the four first of equal length; secondaries long, emarginate. Tail moderate, even. Feet enormous. Tarsus and hinder toe very long, and of equal length. Lateral toes unequal, the inner shortest. Africa. The rasorial type—*M. flavicollis*, 'Ois. d'Afr.,' pl. 195; *M. flavigaster*, Sw., 'Birds of West Africa.' (*Naturalists' Library*, 'Ornithology,' vol. vii., p. 215.) (Sw.)

Certhilauda. (Sw.)

Generic Character.—Bill slender, lengthened, more or less curved; nostrils round, naked. Wings very long; the first quill spurious; the three next nearly equal. Tail moderate, even. Feet lengthened; the lateral toes equal; length of the hinder claw variable, although typically short and straight. Africa. The tenuirostral type—*Certhilauda longirostra*, 'Ois. d'Afr.,' 192; *bifasciata*, Rupp., 'Atlas,' plate 5; *nivosa*, Sw., 'Birds of W. Africa.' (vol. vii., p. 213.)

Such are Mr. Swainson's views as to the arrangement of this subgenus. [FRINGILLIDÆ, vol. x., p. 483.] The genus *Anthus*, Bechst., is placed by Mr. Swainson at the end of his subfamily *Motacillinæ* (Wagtails), under his family *Sylviadæ* (Warblers).

FOSSIL LARKS.

Dr. Buckland figures a lark '(*Alauda*) r and f' among the land Mammifers and Birds of the third period of the Tertiary series, in the first plate of the illustrations of his 'Bridgewater Treatise.' He had previously noticed the remains of the lark in Kirkdale Cave. (*Reliquiæ Diluvianæ*, pp. 15, 34, plate xi., f. f. 24, 25.)

LARNICA. [CYPRUS.]

LA'RRIDÆ, a family of Hymenopterous insects of the section Fossores, distinguished by the labrum being either entirely or partially concealed, and the mandibles deeply notched on the inner side near the base. It contains the following genera:—1. *Palarus* (Lat.), in which the antennæ are very short, and are gradually thicker towards the apex: the eyes are closely approximated posteriorly, and enclose the ocelli: the second cubital cell is petiolated. 2. *Tachytes* (Panzer), antennæ filiform, the basal joint slightly incrassated, the rest cylindrical; superior wings with one marginal cell, slightly petiolated and three submarginal cells, the third narrow and oblique; mandibles with a dentate process on the inner side near the base. *T. pompiliformis* is about 2½ lines in length; black, with the basal segments of the abdomen red. It is not an uncommon insect in various parts of England. 3. *Larra:* this genus differs from *Tachytes* (which is *Lyrops* of Illiger) in having no tooth on the inner side of the mandibles at the base; the eyes not being approximated posteriorly, and the metathorax and abdomen being decidedly larger. 4. *Dinetus:* eyes converging posteriorly; antennæ filiform in the female, with the first joint incrassate, in the male larger, with a deep lateral impression, the four following joints submoniliform, and the five next slightly compressed and convoluted, the remaining three filiform; superior wings, with one appendiculated marginal cell, and three submarginal cells. But one species of this genus has been found in England. 5. *Miscophus* (Jurine) has one marginal cell, which is not petiolated, to the superior wing, and two submarginal cells, the second being petiolated; the antennæ are filiform in both sexes. There is but a slight projection at the base of the mandibles. *M. bicolor* (Jurine) is the only species found in England, where it is apparently rare. (Shuckard's 'Essay on the indigenous Fossorial Hymenoptera.')

LARUNDA. [LÆMODIPODA.]

LARVA, a term applied to that state in which an insect exists immediately after its exclusion from the egg, and which precedes the pupa state. The animals commonly called *Grubs*, *Maggots*, and *Caterpillars* are larvæ. Grub appears to be a general term analogous to larva; the term maggot is most generally applied to the larva state of Dipterous insects; and caterpillar, in the most common acceptation of the term, is used to designate the larva state of Lepidopterous insects. These three terms however are used in a very vague manner.

The most striking difference perhaps which exists between the larva and the perfect insect consists in the superior powers of locomotion and consequently better developed skeleton possessed by the latter.

Though larvæ never possess wings, they vary much as regards the development of the locomotive organs, and as these are more or less perfect, so does the larva resemble or recede from the insect in its imago state. Hence Messrs. Kirby and Spence divide larvæ into two sections: those which, in general form, more or less resemble the perfect insect; and those which are unlike the perfect insect. The larvæ of both sections moult, or cast their skin, several times during their progress to maturity; the number of moults varies according to the species, and the period intervening between the moults depends upon the length of the insect's existence in the larva state. In these moults, not only is the whole external covering of the insect cast, but even the lining of the intestinal canal and of the tubes of the tracheæ is shed.

The greater portion of the larvæ of the orders *Orthoptera*, *Hemiptera*, and *Homoptera*, excepting that they have no wings, bear a considerable resemblance to the perfect insect, and hence belong to the first of the sections just mentioned. As however the muscles which serve to support and give motion to the wings are attached to the skeleton of the thorax, so, as might be expected, we find this part in the perfect insect more unlike that of the larva perhaps than any other; and again where (as in the imago state of *Scutellera*) a portion of the thorax is greatly produced behind and serves to protect the wings when folded,—the larva, having no wings, does not possess this peculiarity.

Belonging to the second division, in which the larva does not resemble the perfect insect, are the orders *Hymenoptera*, *Coleoptera*, *Neuroptera*, *Lepidoptera*, and *Diptera*.

The larvæ of Hymenopterous insects are usually of a short ovate form, and soft and fleshy substance, devoid of legs or distinct head, and the body lies in a bent position. In the *Tenthredinetæ* (Latreille) however we have a remarkable exception, the larvæ of these insects not only being furnished with six legs attached to the thoracic segments, but also possessing a great number of prolegs.* These prolegs are usually sixteen in number, and attached in pairs to the abdominal segments; in some there are but fourteen, and in others only twelve prolegs. The larvæ of the *Tenthredinetæ* very much resemble those of Lepidopterous insects, but differ in the greater number of their prolegs; the head is large, rounded, flattened in front, and vertical in position; the body is always bent under, and when touched they roll themselves up like the Iuli. In the genus *Pamphilius* (Lat.), the larva possesses six thoracic legs, but no prolegs.

The larvæ of the Coleoptera are most commonly of an elongate, cylindrical, or slightly depressed form; the thoracic segments are almost always provided with six legs, and there are seldom any prolegs on the abdominal segments. The head is furnished with *mandibles*, *maxillæ*, *labrum*, *labium*, and *antennæ*, and very frequently with *ocelli*. The parts of the mouth and the *antennæ* however do not resemble those of the perfect insect. The antennæ are usually very small and composed of but three or four distinct joints. The ocelli of the larva are replaced by compound eyes in the perfect insect. The thoracic segments are often protected by a horny plate on the upper surface: the prothorax, which is usually the largest, is generally so protected. The legs, of which these segments have each a pair, are of moderate size in most larvæ of this order, and composed of a *coxa*, *trochanta*, *tibia*, and *tarsus;* the last however appears to be represented by a small jointless claw. The body is often soft, but sometimes, like the thorax, protected by horny plates, as in some of the Carabidæ, Silphidæ, &c. In the *Carabidæ*, *Staphylinidæ*, and indeed many families, it is somewhat depressed. In many of the Heteromerous insects it is cylindrical, of a coriaceous texture throughout, and the terminal segment is often furnished with horny appendages at the apex, and one or two prolegs beneath. The larvæ of many of the *Elaterides* are also of a coriaceous texture and cylindrical form, and the terminal segment of the abdomen is generally furnished with horny appendages. These appendages are indeed very commonly met with in Coleopterous larvæ. In those species belonging to the sections *Lamellicornes*, *Rhyncophora*, and *Longicornes*, however, we have not met with them, and the body is always of a soft and fleshy texture. The larvæ of the two last-mentioned sections have extremely minute legs.

Order *Neuroptera*.—In this order the larvæ very much resemble in general appearance many of those of the order

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* The prolegs are fleshy, without joints, and, when they occur, are found attached to the abdominal segments, in these respects differing from the true legs, which are horny and jointed, and attached to the thoracic segments.

Coleoptera: they always possess six thoracic legs, but seldom any prolegs. In the case-worms (*Trichoptera*) and some others there are a pair of prolegs attached to the terminal segment of the abdomen.

Order *Lepidoptera*.—Here the larvæ (or caterpillars) are soft and fleshy, and usually of a cylindrical form. They possess six thoracic legs and generally ten prolegs. The prolegs vary in number, and are attached in pairs to the under side of the abdominal segments; but none are ever found on the fourth, fifth, tenth, or eleventh segments. In the larvæ of the *Geometræ* there are but four prolegs, two of which are attached to the anal segment, and the other two to the ninth. Some of the *Tinnæ* have but two prolegs, and these are anal. In the genus *Apoda* (Haworth) the larvæ have no distinct prolegs, but in their stead a number of small transparent shining tubercles, without claws. 'The prolegs of almost all Lepidopterous larvæ are furnished with a set of minute, slender, horny hooks, crotchets, or claws, of different lengths, somewhat resembling fish-hooks, which either partially or wholly surround the apex like a palisade. By means of these claws, of which there are from forty to sixty in each proleg, a short and a long one arranged alternately, the insect is enabled to cling to smooth surfaces, to grasp the smallest twigs to which the legs could not possibly adhere; a circumstance which the flexible nature of the prolegs greatly facilitates.' 'When the sole of the foot is open, the claws with which it is more or less surrounded are turned inwards, and are in a situation to lay hold of any surface; but when the animal wishes to let go its hold it begins to draw in the skin of the sole, and in proportion as this is retracted the claws turn their points outwards, so as not to impede its motion.' (Kirby and Spence's *Introduction to Entomology*.)

The larvæ of Dipterous insects are for the most part soft and fleshy, and without legs; none have true jointed legs: some however have prolegs. The head is usually soft and indistinct, but in certain species the head is somewhat corneous, and of a determinate shape.

LARVA'RIA, the name of an obscure group of tertiary fossils, proposed by M. Defrance. (Blainville, *Actinologie*, p. 442.)

LARYNGITIS. [CROUP.]

LARYNX is the organ of the voice; its frame-work is composed of five cartilages, which are capable of being moved on each other in various directions by muscles, so as to act upon two elastic bands, on which the voice essentially depends, and which are called the vocal ligaments.

Fig. 1.

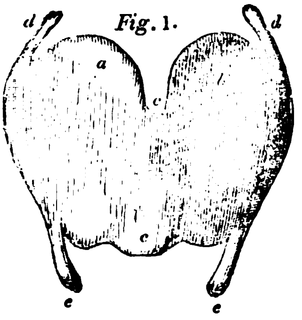


Fig. 4.

Fig. 3.

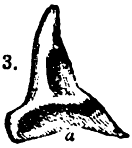
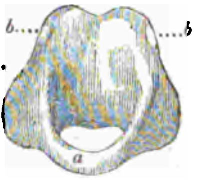


Fig. 2.



The first, the thyroid cartilage (*fig.* 1), consists of two plates (*a, b*) of dense, tough, fibro-cartilaginous substance, of an irregularly quadrilateral form, which are united at the lower part of their anterior edges (*c, c*) at an angle of about 60°. The prominence of this angular union is felt in the front of the throat, forming what is called the Pomum Adami; at the sides of and behind which the form of the cartilage may be easily traced out with the fingers. The posterior edge of each plate bears at each angle a process or horn (*d, d, e, e*), by which the thyroid cartilage is attached by ligaments above to the hyoid bone, and below to the cricoid cartilage.

The cricoid cartilage (*fig.* 2) has somewhat the form of a signet ring. It is enclosed within the angle of the thyroid cartilage, beneath whose lower edge the front and narrowest portion (*a*) of its ring may be felt, with an interval of about a quarter of an inch between them. It has an articulating surface on each side, by which it is moveably connected with the inferior horns of the thyroid cartilage; and two other smooth convex surfaces (*b, b*), on its upper and posterior edge, by which it is articulated with the two arytenoid cartilages.

The arytenoid cartilages have each the form of an irregular triangular pyramid (*fig.* 3). They are placed upon the upper edge of the broad part of the cricoid cartilage, just within the most expanded part of the angle formed by the receding plates of the thyroid. The base (*a*) by which each is articulated with the cricoid is slightly concave, perfectly smooth, and capable of moving to a certain extent in every direction.

The epiglottis (*fig.* 4) is of a somewhat ovate form. It is attached by its apex to the angle of union of the plates of the thyroid cartilage, and projects obliquely backwards and upwards over the cricoid and arytenoid cartilages like a shield, guarding them from the contact of foreign bodies passing from the mouth.

These cartilages are connected chiefly by elastic ligament which is arranged in bands of varying thickness throughout the whole of the larynx; uniting the upper edge of the thyroid cartilage to the os hyoides, and its lower edge to the cricoid cartilage; passing also from the arytenoid cartilages to the epiglottis, and uniting the rings of the trachea and bronchi; affording to all a firm but yielding connection, and endowing them by its elasticity with the power of resounding in accordance with the vibrations originating in the vocal ligaments.

The vocal ligaments are two narrow bands of highly elastic tissue, stretched between the anterior angle of the thyroid and the anterior surfaces of the arytenoid cartilages. The substance of which they are composed is a yellowish, dense, fibrous tissue, which is placed in those parts of the body where a permanent elasticity is required, as in the spaces between the laminæ of the vertebræ, the coats of arteries, the rings of the trachea, &c. In *fig.* 5, a profile view of the right vocal ligament is drawn: *a, a, a* is the outline of the thyroid cartilage, of which part of the left side is removed; *b* is the cricoid cartilage, and *c* the arytenoid cartilage of the right side; *d, d* is the vocal ligament. In *fig.* 6, the view of the vocal ligaments *a, a* is taken as seen from above; they are attached anteriorly to the inside of the thyroid cartilage at *b*, and posteriorly to the front of the arytenoid cartilages *c, c*. Between them is the aperture through which we breathe, the glottis *d*. It is bounded posteriorly by the inner edges and anterior angles of the arytenoid cartilages; anteriorly by the inner edges of the vocal ligaments. When at rest, as during quiet breathing, the glottis is of a somewhat lanceolate form (*fig.* 11, as outlined by the dots), but when speaking or singing it is very much narrowed (*fig.* 11, the continued lines).

Fig. 5.

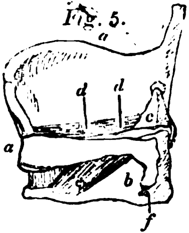


Fig. 7.

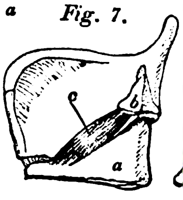
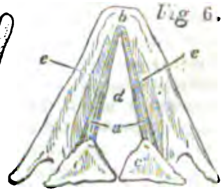


Fig. 6.



The muscles acting on the parts of the larynx just described are arranged symmetrically and attached to corresponding points on each side of the larynx; and their names are compounded of those of the cartilages on which they are inserted, as follows.

The crico-thyroideus (*fig.* 8, *a, a*, and *fig.* 5, *e*) is attached on each side, at one of its extremities, to the upper edge of the narrow front part of the cricoid cartilage; and at the other, to the lower edge of the thyroid, just before its lower horn. Its fibres are directed upwards and backwards, and its immediate action would therefore be to approximate the adjacent edges of the thyroid and cricoid cartilages. But the thyroid is fixed on each side by a ligament passing from its inferior horn to the side of the broad part of the cricoid (*fig.* 5, *f*), and the crico-thyroid muscle will therefore produce a rotatory motion of the cricoid cartilage around the horizontal axis drawn through *f*. When the anterior edge of the cricoid cartilage is thus raised towards the anterior angle of the thyroid, its posterior and upper part will be moved backwards and downwards to a greater distance from the front of the thyroid; and if the arytenoid cartilages be fixed on the top of the cricoid, they will of course move with it in the same direction. The distance between their anterior edges and the angle of the thyroid (see *fig*. 5) will thus be increased, and the vocal ligaments (*d*, *d*), which are attached to those points, will be proportionally stretched.

The thyro-arytenoidei (*fig*. 6, *e*, *e*) are attached anteriorly by the sides of the angle of the thyroid cartilage to the outer side of, and above, the vocal ligaments, and posteriorly to the anterior angles and outer edges of the arytenoid cartilages. Their simplest action will therefore be to approximate the same points which the preceding muscles render more remote; they will thus shorten and relax the vocal ligaments. Some of their fibres extend on each side for a short distance above and below the vocal ligaments; those below have the power of narrowing the access to the glottis, while those above the ligaments may compress together the sides of the larynx directly over the glottis. Lastly, there are other fibres which are attached to the outer edges of the vocal ligaments themselves.

The crico-arytenoidei postici (*fig*. 9, *b*, *b*) are attached to the posterior surface of the cricoid cartilage (*a*, *a*), and pass obliquely outwards, to be inserted into the outer angle of the arytenoid cartilages. In contracting therefore, if the arytenoid cartilages be moveable, they will draw their anterior angles outwards, and thus increase the width of the glottis; but if the arytenoid cartilages be fixed by other muscles, the crico-arytenoidei postici will merely draw them backwards and stretch the vocal ligaments.

Fig. 8.

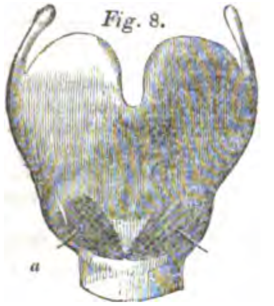
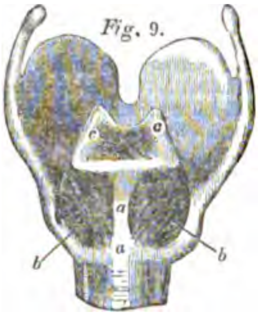


Fig. 9.



The crico-arytenoidei laterales (*fig*. 7, *c*) are attached on the one hand to the inner sides of the cricoid cartilage (*a*), and on the other to the outer angles of the arytenoids (*b*); they rotate the latter inwards, so as to approximate their front portions and narrow the anterior part of the glottis.

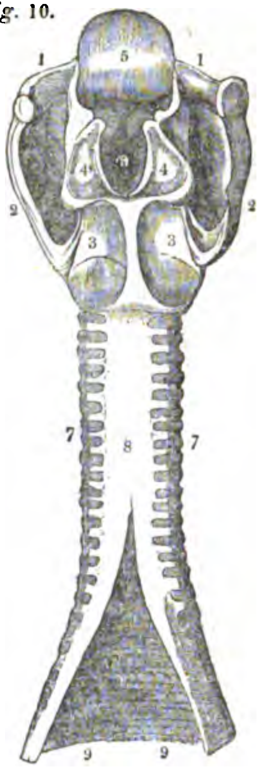
The posterior arytenoid muscles (*fig*. 9, *c*, *c*) lie behind the arytenoid cartilages, and consist of fibres passing transversely and obliquely from one to the other. They therefore simply approximate these bodies, and narrow or close the back part of the glottis.

The simplest actions of all these muscles in regard to the voice may therefore be thus stated: the crico-thyroidei stretch the vocal ligaments; the thyro-arytenoidei relax them; the crico-arytenoidei postici open the glottis; the crico-arytenoidei laterales and the arytenoidei postici narrow or close it.

A band of muscular fibres may be also mentioned as passing from the arytenoid cartilages to each side of the epiglottis, and thus serving to draw down the latter so that it may cover the glottis more closely than when left to its own elasticity.

Below, the larynx opens into the trachea (*fig*. 10, 8), which is continued into the chest, and there divides into two branches, the bronchi, whose ramifications and terminations form the air-passages and air-cells of the lungs. The lungs, being exactly contained in the cavity of the chest, are compressed by the contractions of its walls. The walls of the chest are therefore the power by which the air is forced from the lungs through the glottis, for the production of the voice, and it is by their more or less powerful contraction that the various degrees of intensity of the same note are produced. The trachea is composed of a series of cartilaginous incomplete rings, which are united behind by muscular fibres, and are connected together by longitudinal elastic bands. It is thus capable of variations both of length, breadth, and tension; and of entering into vibrations with the column of air contained in it, and of assisting in communicating those vibrations through its branches to the walls of the chest.

Fig. 10.



1, 1, Os hyoides; 2, 2, Thyroid cartilage; 3, 3, Cricoid cartilage; 4, 4, Arytenoid cartilages; 5. Epiglottis; 6, Aperture of communication between glottis and pharynx; 7, 7, Rings of trachea; 8, Situation of transverse posterior muscular bands; 9, 9, Portion of trachea cut open from behind.

At the upper part of the trachea the windpipe gradually narrows towards the glottis (see view of its section in *fig*. 12); and above the glottis it suddenly dilates, so that the edges of the elastic vocal ligaments stand out from the wall of the larynx, and have space in which they may vibrate freely, like the lips in the mouthpiece of a trumpet. About half an inch higher the passage again contracts, so as to form a narrow recess on each side, directly above the vocal cords. This is called the ventricle of the larynx, and the prominent bands above it are called the false vocal cords, or the upper ligaments of the larynx. They are formed of elastic tissue, like the inferior or true vocal ligaments, but in less quantity, and mixed with fatty tissue, so that they do not vibrate so freely. The walls of the ventricle are capable of being approximated by some of the fibres of the thyro-arytenoid muscles, which are thinly distributed upon them; and thus the recess may be nearly obliterated, and the upper ligaments brought almost into contact.

The highest part of the larynx is formed by two folds of membrane passing from the arytenoid cartilages to the epiglottis (*fig*. 10), forming an oval aperture which admits of variations of size by the action of the muscles already mentioned. At this aperture the larynx communicates with the upper and most expanded part of the pharynx, the cavities of the mouth and nose, and the frontal and other sinuses which open into the latter. These sinuses are walled round by bone, but the pharynx, and its communications with the mouth and nose, as well as the external apertures of the two latter cavities, are in great part muscular, and may be thus subject at will to alterations of form, size, and tension.

The larynx has been compared to a variety of musical instruments, and it will be seen that in its different parts it unites the principles of several. In its essential vocal apparatus it most nearly resembles the reed instruments, as the reed-pipes of the organ, the clarionet, &c., or rather a modification of them, in which the vibrating body is not fixed in its dimensions as a metallic tongue, or a reed, but consists of a lamina of elastic membrane, capable of varied degrees of tension, as well as of alterations in its length. No musical instrument has yet been constructed on this principle, unless we consider as such the various kinds of trumpet in which the vibrations are produced by the air impelled against the edges of the lips, rendered more or less tense by the action of their orbicular muscle. The principle has been applied in the formation of artificial larynges by Biot, Cagniard de la Tour, Willis, &c., who have chiefly used caoutchouc membrane; and by Müller and Henle, who have employed besides, either the vocal ligaments themselves, or laminæ of the elastic coat of an artery. The most complete examination of the subject is that made by Müller, and published in the first part of the second volume of his 'Physiologie des Menschen.'

It is evident that by adapting to one of the open extremities of a tube two portions of thin elastic membrane, so that their opposite edges leave a narrow space in the middle, through which the air blown into the other end of the tube may pass and excite vibrations, one obtains an imitation of the essential vocal apparatus of the larynx; the trachea being replaced by the tube, the vocal ligaments by the bands of elastic membrane, and the glottis by the space between them, while the parts above the glottis may be imitated by adapting tubes of different sizes and forms above the membranes.

In such an apparatus Mr Willis found (*Cambridge Philosoph. Trans.*, 1832) that in order that two laminæ of elastic membrane enclosing a narrow interval should produce sound, the parts near their edges must be parallel to each other. Applying this law to the case of the larynx, he observes that something more is necessary for speaking or singing than a certain degree of tension of the vocal ligaments, for they are always more or less tense; and even when their tension is increased, and all the cartilages are in the position for producing sound, we may yet breathe quietly, the edges of the vocal ligaments not being parallel.

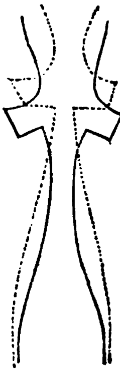


Fig. 12.

Fig. 11

Fig. 12 represents two vertical transverse sections of the larynx, the continued line indicating the position of its parts when not sounding, the dotted line the same parts in the vocalizing position, in which the edges of the ligaments are parallel to each other. Mr. Willis considers it to be one of the functions of the thyro-arytenoid muscle to place the ligaments in this essential position.

When the vocal ligaments are thus placed, the modulations of the notes are effected by changes in their length and tension; for, like those of other elastic membranes stretched at both ends, they follow in many respects the same laws as cords. [CORD.] Thus, the degree of tension being the same, the height of the note is inversely as the length of the membrane; and the length being the same, the height of the note, as expressed by the number of vibrations, is directly as the square root of the power employed in producing the tension. The application of these laws to the vocal ligaments was experimentally proved by Müller. In a part of his experiments on the dead larynx he succeeded in producing the complete scale of notes and half-notes through a range of 2½ octaves, by gradually increasing the tension of the vocal ligaments by weights appended to one of their extremities. The weights produced extension in the same direction in which the crico-thyroid muscles act, when, the arytenoid cartilages being fixed, they throw them backwards with the cricoid as already explained. If instead of stretching the vocal ligaments they were left to their own elasticity, or still more relaxed by artificial means, in imitation of the action of the thyro-arytenoid muscles, still lower notes could be produced.

In the course of these experiments Müller found that the tones of the dead larynx, which in the lower notes closely resembled the chest-notes of the human voice, were very apt, as they ascended in the scale, to assume the characters of the falsetto voice. He was thus led to discover the mode in which the latter class of notes (whose origin had long been the subject of great doubt) is produced. In sounding the chest-notes and in the common voice of speaking, the whole vocal ligaments vibrate, and with them part of the ventricles, and of the thyro-arytenoid muscles; but in the falsetto notes it is only the thin edges of the ligaments which are thrown into vibrations. He found also that he could prevent the tones of the chest-notes from breaking into those of the falsetto, as he ascended in the scale, by compressing the part of the larynx immediately below the glottis, in imitation of the action of the lower fibres of the thyro-arytenoid muscles.

As in all reed instruments, the velocity of the current of air exciting the vibrations of the vocal ligaments has an influence on the note produced; thus Müller found that the natural note of the vocal ligaments at a given tension could be raised to its fifth by blowing with increased force. He believes that in singing the same note with varied degrees of force a compensation is effected by lessening the tension of the ligaments in the same proportion as the velocity of the current is increased; but it seems more probable that the tension of the ligaments is always the same for the same note, while it is the office of the epiglottis to prevent the notes from rising with the increased force of the air. It may effect this on a principle discovered by M. Grenié (Magendie's *Précis de Physiologie*, i. 253), who found that to remedy the inconvenience arising from the ascent of the note when the current of air blown into a reed organ-pipe was increased, it was sufficient to place within the pipe directly over the reed a supple elastic tongue, which shielded it very nearly in the same manner as the epiglottis covers the vocal ligaments.

Müller found that sounds were most easily produced from the dead larynx when the anterior angles of the arytenoid cartilages were in contact, so that only that part of the glottis was open which is bounded by the vocal ligaments. The tension of the ligaments being fixed, the same note could be produced whether the glottis were widely open or nearly closed; but it is probable that, though not essential, the varying apertures of the glottis are auxiliary to the complete and pure sounds of the different notes; for Magendie (l. c., p. 247) distinctly saw it become narrower as the notes emitted by a dog were higher; and in singing high notes one clearly feels that the air passes through a narrower aperture and with more difficulty than in singing the low notes.

The notes produced at the glottis are subjected to modifications in timbre, strength, and purity, by the parts connected with the larynx both above and below the vocal ligaments. To illustrate this, one need only refer to the difference of tone which may be drawn from a clarionet-reed when it is only attached to the mouth-piece, and when the mouth-piece is fixed on the body of the instrument. This part of the subject has been particularly illustrated by M. Savart, Mr. Wheatstone, and Mr. Bishop. It is well known that in all reed-instruments, unless the tube or body be adapted to the reed so as to be capable of the same number of vibrations as it is, there is always a discordance of sounds. If for example the tube be unalterable in length, while the reed is capable of varied modifications of pitch, the sounds will be irregular in intensity, and in some parts of the scale will be totally extinguished. Thus it is that in organs, in each pipe, the tongue and the tube have to be adapted to each other, and that in clarionet-playing much of the perfection of the tone depends on the adaptation of the pressure of the lips on the reed to the length of the tube as determined by the number of holes covered by the fingers. Savart (*Journal de Physiologie*, t. 5) has shown that if the walls of the tube, instead of being fixed in their dimensions like those of reed-instruments, be capable of varying degrees of tension, an extraordinary variety and fulness of notes may be produced; and that the shrill whistle of the bird-call (with which he compared the larynx) is, with the same essential principle for the original formation of sound, converted into a full round tone. In the human body such a tube exists on both sides of the glottis, and is in both parts capable of varieties in tension, size, and form. Thus the trachea may be acted on by its posterior muscles and its elastic bands; and to a far greater extent the parts above the glottis will vary in their conditions. In singing an ascending scale of notes, if the finger be placed in the interval between the angle of the thyroid cartilage and the front of the hyoid bone, it will be found that as the notes emitted become higher the interval diminishes and the whole larynx rises. Thus the tube above the glottis is shortened, just as in all wind-instruments the body is shortened by opening the holes at their sides, or by pushing one part of the tube within another. At the same time the lips are drawn in and compressed, the arches of the palate approximated, the uvula tightened, the back of the tongue and soft palate drawn near each other, and the oval aperture into the larynx constricted, all tending together, by a diminution of the size and an increase of the tension, to accord with the diminished length of the tube, that their vibrations may be in correspondence with those of the vocal ligaments. As the voice passes through the descending scale, the opposite changes occur; the vocal ligaments lengthen and are less tense, the larynx descends, the cavity of the mouth is expanded, and all the tissues are relaxed. Hence it is that the singer, when his voice is exerted in its highest notes, feels the greatest fatigue in the parts about the palate and pharynx; while in singing the lower notes he remains unwearied far longer, and at last feels fatigue chiefly in the muscles of the chest.

It is difficult to determine the circumstances on which the differences of the timbre of the voice in different persons depend. The difference between the male and female voices is probably owing to the comparative shortness of the vocal ligaments in the latter. According to Müller their average length in man is 18½ millimetres, in woman only 12¼, or nearly as 3 to 2. But to account for the differences of tenor and bass, or of soprano and alto voices, no good evidence has yet been collected. The average compass of the voice is two octaves, but in different parts of the scale in different persons; thus a bass voice commonly has its lowest note four or five notes lower than a tenor, while a tenor has its highest note from four to five notes above the highest note of the bass voice. A soprano voice again has its lowest note at nearly the same part of the scale as the highest note of a bass voice; and thus the whole compass of the human voice, from the lowest of the bass to the highest of the soprano, would be nearly four octaves. The voices of children resemble very nearly those of women, but in males a remarkable change takes place at puberty, when the voice is said to crack; the change from the shrill treble voice of the boy to the fuller and rounder tone of the man is sometimes perfected almost suddenly; but in most cases it is for some time in progress, wavering between the two extremes, deep and manly during quiet enunciation, but when any exertion is used, suddenly starting up again to the shrill tones of boyhood. In old age, the cartilages of the larynx becoming bony, the ligaments hard and unyielding, and its muscles pale and powerless, the voice completely alters; it trembles as if there were not sufficient strength in the muscles to maintain a due tension of the vocal ligaments; it becomes harsh and monotonous, and

> 'Turning again towards childish treble,
> Pipes and whistles in the sound.'

Much yet remains unknown of the actions of the various parts of the larynx, but enough has been said to prove that it is perhaps the most perfect piece of complex mechanism in existence. Judging of it, as we must do, by comparison with the imperfect contrivances of art, it is not possible that we should be able to discern all the beauties of an instrument which in a space of about six inches by two produces a range of notes of between two and three octaves, all of perfect clearness and harmony, and with a tone far superior to any yet known—which is capable at the same time of giving a wide range of expression, and varied degrees of power—of executing difficult and intricate passages with the greatest rapidity and distinctness—and which above all will last for years without need of repair, and is even improved by a judicious use. The larynx fulfils all this, and is besides subservient to other functions of vital importance to the whole body. In breathing for example, its exquisite sensibility is immediately excited by the contact of any foreign substance, or of a deleterious gas, and the glottis is firmly closed by the thyro-arytenoid muscles, to prevent the entrance of the noxious body into the lungs. The same action occurs as we swallow each portion of our food, to prevent any of it passing into the lungs; and if a particle by accident touch the glottis, coughing is excited to ensure its speedy removal. Again, when about to make a violent exertion, a man first draws a full breath, and fixes his chest that he may have a firm support for all the muscles of his limbs; the same little muscles assist in this action by closing the glottis, and thus preventing any portion of the air from being forced from the chest, however great the exertion of the muscles attached to its walls.

LA'SCARIS, CONSTANTINE, a descendant of the imperial family of that name, emigrated from Constantinople at the time of the Turkish conquest to Italy, where Francesco Sforza, duke of Milan, entrusted him with the education of his daughter Ippolita, who married Alfonso duke of Calabria, son of Ferdinand king of Naples. Lascaris afterwards went to Rome and Naples, where he taught Greek and rhetoric. He lastly repaired to Messina, where he was treated with great distinction, and where he died towards the end of the fifteenth century, leaving his valuable MSS. to the senate or municipal council of Messina. Those MSS. were afterwards transferred by the Spaniards to the Escurial Library.

Lascaris published a Greek Grammar, Milan, 1476, which was afterwards translated into Latin, and went through several editions at Venice from the Aldine press, under the title of 'Compendium octo Orationis Partium,' &c. He also wrote two Opuscula on the Sicilians and Calabrese who had written in Greek, which were published by Maurolico in 1562, and also a 'Dissertation on Orpheus,' printed long after in the first volume of the 'Marmora Taurinensia.'

LA'SCARIS, ANDREAS JOHANNES, of the same family, but somewhat younger than the preceding, called Rhyndacenus, because he came from some place in Bithynia, near the banks of the Rhyndacus, left Greece at the time of the Turkish conquest, and repaired to Florence, where Lorenzo de' Medici took him under his patronage, and afterwards sent him to Greece in order to collect valuable MSS., of which Lascaris brought back a considerable number to Italy. After the death of Lorenzo, Lascaris went to France, and gave lessons in Greek at Paris. Budæus was one of his pupils. In 1503 he was sent by Louis XII. on a mission to Venice; after fulfilling which he went to Rome, where Leo X. gave him the direction of the Greek college which he had just founded. In 1518 Lascaris returned to Paris, and was employed, together with Budæus, in collecting and arranging the royal library of Fontainebleau; after which Francis I. sent him again to Venice as his ambassador. At last Pope Paul III. having pressed him very urgently to come to Rome, Lascaris set out, notwithstanding his advanced age and his infirmities; but a few months after his arrival at Rome he died, in 1535, being about ninety years of age. Lascaris published or edited the following Greek works:—'The Hymns of Callimachus,' with scholia; 'Commentaries on Sophocles;' a Greek Anthology, fol., 1494; 'Scholia on the Iliad,' and a dissertation, with the title, 'Homericarum Quaestionum et de Nympharum antro in Odyssæa Opusculum,' Rome, 1518. Some other works are also attributed to Lascaris, such as 'De veris Græcarum Literarum formis ac causis apud Antiquos,' Paris, 1536, and a collection of epigrams in Greek and Latin, Paris, 1527.

LASER, a highly esteemed gum-resin among the antients, which had become rare even in the time of Pliny, but which is described by Dioscorides (lib. iii., c. 84), and still more fully by Theophrastus, under the name of silphion (σιλφιον, lib. vi., c. 3). In the edition of Bodæus à Stapel a most elaborate dissertation may be seen, in which apparently almost everything that occurs respecting it in antient authors is brought together. Though the whole plant appears latterly to have been called silphion, this name was originally that of the root. The stem of the plant is called magúdaris (μαγύδαρις) by Theophrastus, the leaf máspeton (μάσπετον), the seed phyllon (φύλλον). These names are however differently applied by other authors. Laser was subsequently called *lasaron*, and was applied to the juice alone. This was in such high estimation as to have been sold for its weight in gold, having many marvellous properties ascribed to it, but it was probably useful only as a stimulant to some of the functions and as an antispasmodic. The country where it was produced has been clearly laid down as the Cyrenaica regio, and the physicians of Cyrene, we know, early attained a high reputation. Theophrastus gives a wider extent of distribution along the north of Africa, stating at the same time that the greater portion was collected near the Syrtes. Dioscorides gives Syria, Armenia, Media, and Libya as the countries whence it was procured. The produce of this plant having been so valuable, it necessarily became a considerable source of revenue, and was represented on the coins of Cyrene [vol. viii., p. 265]; another is represented in the above edition of Theophrastus (p. 598) with the head of a beardless man on the obverse, while a third is described as figured in Viviani's 'Flora Libyca,' in which the figure is bearded, but in all the plant is exactly the same.

From the descriptions and representations of the plant on those coins, there can be no doubt of its being one of the Umbelliferæ, and it has successively been thought to be *Laserpitium Siler* and *gummiferum*, *Ligusticum latifolium*, *Ferula tingitana*, &c. But as the natural history of the countries becomes investigated, whence the antients obtained the substances they have described, these doubts give way to certainties, or very near approximations to the truth. Della Cella, who travelled in the Cyrenaica in 1817, having found an umbelliferous plant on the mountains of Cyrene, and the only one at all resembling the representation on the coins, would appear to have finally determined the question. This plant has been described by Viviani, in his 'Flora Libyca,' and named *Thapsia Silphion;* it is very closely allied to *T. garganica* of De Candolle, and a description of it may be seen in Dr. Lindley's 'Flora Medica,' p. 52. The root is said to yield a juice which, according to the testimony of the natives of the country, is possessed of very valuable medical properties. M. Pacho, who travelled subsequently in the same country, thinks he has found the Laser, or Laserpitium, in Cyrenaica and Marmarica, and has called the plant *Laserpitium Derias*. (*Voyage dans la Cyrenaique*, Paris, 1827.)

There appear however to have been from the earliest times two kinds of Laser. Thus Pliny, 'Diu jam non aliud ad nos invehitur laser, quam quod in Perside aut Media et Armenia nascitur large, sed multo infra Cyrenaicum.' Dioscorides also states some to have been procured from Armenia and Media. Hence it is probable that some similar substance was substituted for the more highly esteemed Cyrenaican juice, when this became scarce. There can be very little doubt that assafœtida was at one time substituted for it, at least since the time of the Arabs, for Avicenna describes his *hulteet*, which is assafœtida, as of two kinds, one fœtid, and the other fragrant, the latter from the 'regio Chiruana' in the Latin translation; while *Anjidan*, which are the seeds of the assafœtida plant, are translated Laserpitium. That assafœtida was an article of export from Persia in very early times, we know, from seeing it noticed in the Sanscrit Amara Kosha, which is at least of as early a date as the commencement of the Christian æra. The juice and seeds of the assafœtida are likewise both used as medicinal substances, and the former esteemed even as a condiment by Asiatic natives. While the root of the Silphium, which grew on Paropamisus with pines, is mentioned by Arrian as affording food to numerous herds of cattle. This has been stated by Mr. Moorcroft to be the case, even in the present day, with another umbelliferous plant in the same regions, that is, *Prangos pabularia*, which is therefore conjectured by Dr. Royle to be one of the kinds of Silphium.

LASIOPY'GA. [PYGATHRIX.]

LASSO, ORLANDO DI (or Orlandus Lassus, a very distinguished name in musical history) was born in 1520, at Mons in Flanders, but, says Thuanus, was, on account of his fine voice, forced away, while a boy, by Ferdinand Gonzago, and detained by him in Sicily and in Italy. Afterwards, continues the same historian, being grown up, he taught during two years at Rome. He then travelled in France and England with Julius Cæsar Brancatius, and subsequently lived some years at Antwerp. On the invitation of Albert, duke of Bavaria, he next proceeded to Munich, where he married. But Charles IX. of France, who not only consented to but assisted in the massacre of the Huguenots, and whose conscience-pangs, like those of Saul, admitted of no alleviation, save that afforded by music, offered Orlando the high and lucrative situation of *maître-de-chapelle* at his court, which the composer accepted, and, with his family, was on his way to Paris, when the death of the king arrested his progress, and he returned to Munich, where he died in 1594, having long enjoyed so high a reputation, that a poet said of him—

'Hic ille Orlandus Lassus qui recreat orbem.'

His compositions are very numerous, and all show great knowledge of his art, much invention, and a manly determination not to be shackled by the rules and examples of the bigoted musicians of his time. 'He was the first great improver of figurate music,' Sir John Hawkins remarks; and Dr. Burney tells us that in his songs *alla Napolitana* 'the chromatic accidental semitones are expressed by a sharp, and no longer left to the mercy and sagacity of the singer, as was before the constant custom.' After his death, Rudolph, his eldest son, published a collection of his works, in seven volumes, under the title of *Magnum Opus musicum Orlandi de Lasso, complectens omnes cantiones quas Motetas vulgo vocant, a* 2 *ad* 12 *voc.*, &c.; and at Munich is preserved among the musical archives a precious manuscript of his compositions, ornamented with superb vignettes. In the British Museum is a Latin motet by Orlando; and specimens of his genius are given by Hawkins and Burney, in their histories of music.

LATAKIA. [SYRIA.]

LATAKOO, or LÆTAKOO, are two towns in the central part of Southern Africa, about 20 miles distant from each other. The south-western is called New Latakoo, or Kuruman. They are situated east of 24° E. long., and near 27° S. lat., nearly at an equal distance from the Atlantic and Indian Oceans, and not far from the line which separates the western deserts from the better-watered and more populous districts which extend eastward to the Indian Ocean. The latter seem to have a much more broken and hilly surface than the sandy districts on the west. These two towns, like some others in this part of the world, must be considered as the first attempts of the wandering nations inhabiting this country to form fixed settlements. In 1814 each of them contained a population of about 5000 souls, and consisted of low and dirty huts.

LATA'NIA, a genus of Palms of the tribe Borassineæ of Martius, which has been so called from the name *latanier*, of one of the species *L. borbonica*, indigenous in the Isle of Bourbon. The other species, *L. rubra*, a much smaller plant, and remarkable for its red-coloured leaves, is a native of the Isle of France. Both are moderate sized, with all the leaves of a palmate fan shape, the flowers yellow, and the drupes yellowish coloured. The leaves, like those of other palms, are employed by the natives for covering their huts, as well as for making fans and umbrellas. The leaf-stalks are split and employed for making baskets, sieves, &c. The fleshy part of the fruit is astringent, and the kernel bitter and purgative; and the sap is possessed of remarkable antiscorbutic properties, according to the statement of French authors.

LATERAN, the name of a church, Basilica Lateranensis, with a palace and other buildings annexed to it, situated at the south-eastern extremity of Rome, near the walls of Aurelian and Honorius, in the older and now desolate part of the city. This group of buildings is called 'in Laterano,' from being built on the estate once belonging to Plautius Lateranus, who was put to death by order of Nero (Tacitus, *Ann.*, xv. 60). It appears that the later emperors had a palace on the spot, and that Constantine had a church or chapel annexed to the palace. This was the beginning of the splendid church of St. John in Laterano. Constantine, or some of his successors, gave up the palace to the bishops of Rome, and the Lateran, till the beginning of the fourteenth century, was the residence of the popes, who enlarged the adjoining church at different times, and made it their episcopal or patriarchal church, which it continues to be. The pope, in his quality of bishop of Rome, goes to take solemn possession of it after his election, and he officiates there on certain great festivals, for which reason it is styled the head church in the world, 'Ecclesiarum Urbis et Orbis Mater et Caput.'

Many councils have been held in the palace of the Lateran, five of which are styled Œcumenic, or universal, at least for the Western church, and some of them were held in the most important periods in church history; two of them, concerning the quarrel with Henry IV. and V. of Germany, about the investitures, the council of 1179 against the Waldenses and Albigenses, and above all the Concilium Lateranense of 1215 held by Innocent III., which was attended by more than a thousand fathers, and in which the Albigenses were condemned and the dogma of transubstantiation was defined. The palace of the Lateran fell to ruin during the long residence of the popes at Avignon in the fourteenth century, and a fire broke out in 1308, which consumed the greater part of it, as well as the church. The church was restored, but the palace was abandoned, and Gregory XI., when he transferred the papal see to Rome in 1377, fixed his residence in the Vatican palace, which then came to be considered as the residence of the pontiffs till the seventeenth century, when they went to reside on the Quirinal. Sixtus V. however in 1586 ordered a new palace to be built next to the Lateran church, which was not finished until more than a century after his death, and is that which now exists. It is used at present as an asylum for the poor; and there is also a large hospital on the other side of the square. The whole vast mass of buildings called by the name of Lateran has been much changed from what it was when the popes resided here. The old plan and former appearance of the place may be seen in the work of Rasponi, 'De Basilica et Patriarchio Lateranense,' libri iv., Rome, 1656. The interior of the Basilica, or church, in its present state, was completed in the seventeenth century by Clement VIII. and Innocent X., and the splendid front was raised by Clement XII. The church has five aisles, and is enriched with pillars of valuable and rare marble, statues, paintings, gildings, and bronzes. The middle gate, which is of bronze, and of masterly workmanship, was taken from the Æmilian Basilica in the Forum. The statue of Constantine, under the portico, was found in the Thermæ of that emperor on the Quirinal Mount. The ceiling of the centre aisle, which is carved and gilt, is one of the richest in Europe. The bronze mausoleum of Martin V. is in the central aisle. Among the side chapels that belonging to the Corsini family is one of the richest in Rome; the pillars, walls, and pavement are of valuable stones, and the mausoleum of Clement XII. (Corsini) consists of a beautiful urn of porphyry, which lay under the portico of the Pantheon. The altar of the sacrament is adorned with four fluted columns of gilt bronze, which, it is said, came from the temple of Jupiter Capitolinus. The cloisters, which date from the thirteenth century, have some curious monuments of the middle ages. In every respect the church of the Lateran is one of the most interesting in a city abounding with magnificent churches.

The obelisk of Syene granite which stands in the square at the back of the church is the highest in Rome, and perhaps in the world: its shaft, which is broken into three pieces, is 105 feet 7 inches English in height, and 37 feet 6 inches in circumference at the base; the whole height of the obelisk, pedestal and ornaments included, is about 150 feet. This obelisk was brought by Constantine from Heliopolis to Alexandria, and Constantius had it removed to Rome in a galley built for the purpose, rowed by 300 men: after ascending the Tiber the obelisk was conveyed on rollers through the gate of Ostia and the Piscina Publica into the Circus Maximus, and was raised by a very laborious process which is described by Ammianus Marcellinus. The obelisk is covered from the base to the very pointed top with exquisite sculptures, and is supposed by some to contain the inscription which was translated into Greek by Hermapion, and which records the victories of Rhamses, but Champollion says that the Lateran obelisk was raised in honour of Thoutmosis II.

The Baptistery of Constantine, which adjoins the church, is rich in marble pillars and paintings, and it contains the oldest baptismal fount which was used in Rome.

The church of St. John in Laterano is collegiate: its chapter of canons and prebendaries, instituted by Boniface VIII. in 1300, has at its head a Cardinal Archpriest.

Near this church is a detached building called La Scala Santa, because the staircase in it is said to contain a number of steps from the house of Pilate, which Jesus Christ ascended, and which are held in great veneration. Pious people ascend them on their knees, and to prevent the steps from being worn out, they have been covered with boards.

The gate of San Giovanni, through which passes the high road to Naples, is the antient Porta Asinaria, and the first object that strikes the traveller on entering Rome by it is the handsome Basilica of the Lateran, with its adjoining palace and other buildings rising on the slope of the Cœlian Hill, and rendered more imposing in their appearance from standing insulated in the midst of solitary fields and gardens which occupy all this side of the area of Rome.

LATHE. [*Kent.*]

LATHE. [*Turning.*]

LATHRIA. [*Muscicapidæ.*]

LATIMER, HUGH, bishop of Worcester, the son of a farmer in Leicestershire, was born about the year 1472. He was educated first at a grammar-school, and afterwards at Cambridge, where he took a degree, previous to entering into holy orders. The preaching of Bilney directed his attention to errors in the doctrines and discipline of the church of Rome; the subject soon engrossed his mind, and his 'heretical preaching,' as it was then called, caused a remonstrance to be made by the divines of Cambridge to the diocesan bishop of Ely, and his interference was requested. The bishop, a mild and moderate man, visited Cambridge, but used no further harshness towards him than to forbid his preaching within the diocese, an obstacle which he overcame by gaining the use of a pulpit in a monastery exempt from episcopal jurisdiction. Latimer's eloquence, his moral conduct and kindness of disposition, together with the merits of his cause, gained him a large number of hearers. He was at this time a person of sufficient importance to be esteemed worthy of persecution, and was dealt with accordingly, but it was not until Henry VIII. had been thirty years upon the throne, that he became distinguished as one of the principal reformers.

Cromwell, the king's favourite, had already given him a benefice in Wiltshire, where he had preached the Reformed doctrines with such plainness as to cause the bishops to cite him to London to answer for his heretical opinions. Cromwell continued afterwards to be his friend and patron: he rescued him from the perils of the citation, recommended him to Anne Boleyn, who appointed him her chaplain, and soon afterwards the bishopric of Worcester was conferred on him (1535). The duties of this see he performed in the most active and exemplary manner, and while holding visitations, giving instructions, and correcting abuses, never failed to promote the Reformation to the utmost of his power. Thus did he employ himself for three years, at the expiration of which passed the act of the Six Articles (Burnet, vol. i.), from which he so totally dissented, that he resigned his bishopric. Shaxton, bishop of Winchester, followed his example, but Cranmer retained his office.

Latimer now sought retirement in the country, where he would have continued to reside, had not an accident befallen him, the effects of which he thought the skill of London surgeons would alleviate. He arrived in London when the power of Cromwell was nearly at an end, and the mastery in the hands of Gardiner, who no sooner discovered him in his privacy, than he procured accusations to be made against him for his objections to the Six Articles, and he was committed to the Tower. Different causes being alleged against him, he remained a prisoner for six years; and not until the accession of Edward VI. did he obtain his liberation. The parliament then offered to restore him to his see, but he was obstinate in his refusal to receive it: his great age, he said, made him desirous of privacy. In this reign we find him the accuser of Bonner, occasionally the adviser of the king, and continually the strenuous reprover of the vices of the age; but the reign was short, and with it expired Latimer's prosperity. In July, 1553, king Edward died; in September Mary had begun to take vengeance on the Reformers, and among others Latimer was committed to the Tower. Though he was at least eighty years old, no consideration was shown for his great age; and he was sent to Oxford to dispute on the corporal presence. He had never been accounted very learned: he had not used Latin much, he told them, these twenty years, and was not able to dispute; but he would declare his faith, and then they might do as they pleased. He declared, that he thought the presence of Christ in the sacrament to be only spiritual: 'he enlarged much against the sacrifice of the mass; and lamented that they had changed the communion into a private mass; that they had taken the cup away from the people; and, instead of service in a known tongue, were bringing the nation to a worship that they did not understand.' (Burnet, vol. ii.) They laughed at him, and told him to answer their arguments; he reminded them that he was old, and that his memory had failed; the laughter however continued, and there was great disorder, perpetual shoutings, tauntings, and reproaches. When he was asked whether he would abjure his principles, he only answered, 'I thank God most heartily that he hath prolonged my life to this end, that I may in this case glorify God with this kind of death.' On the 16th of October, 1555, he was led to the stake with Ridley, gunpowder being fastened about his body to hasten his death; it took fire with the first flame, and he died immediately. Latimer published several of his sermons at different times. They have been reprinted in 2 vols. 8vo., London, 1825.

Latimer was remarkable for moral excellence and simplicity rather than for learning, and for zeal rather than for ability: he was a good but not a great man. (Burnet's *Reformation;* Le Bas's *Life of Cranmer;* Moreri, *Dic. Historique; Biog. Dic.*)

LATI'NI was the name of one of the oldest known nations of Italy, who are said to have come down at some remote time, long before the building of Rome, from the central Apennines in the neighbourhood of Reate (the modern Rieti), into the lower country between the Anio, the Tiber, the Alban Mountains, and the sea, which was afterwards called Latium. Varro, who derived his information from the old traditions existing at Rome in his time, says that they were a branch of the aborigines or oldest inhabitants of the peninsula, who were considered by some as indigenæ or autochthones of the country, whilst others, and Dionysius among the rest, thought that they were descendants of an Arcadian colony settled in Italy long before the Trojan war, and identical with the Œnotrians. These aborigines met in the lowlands the Siculi, who are represented by some as a colony from the West, perhaps from Spain, and by others as indigenous in Italy, and identical with the Tyrrheni. These Siculi, or Siceli, were partly driven by the aborigines to the southwards, and the rest amalgamated with the new comers, and thus the nation was formed called afterwards Latini Prisci, and by Ennius called Casci, which in the Sabine or Oscan language, according to Varro, meant old, or the earliest, and the word is still used, as Micali observes, in the dialects of the Papal provinces of Sabina and Umbria in the same sense. These Latins appear to have formed their settlements in the lowlands by small communities, perhaps small tribes or even families, a circumstance which would account for the great number of villages or towns spread over a limited surface. Several of these became in course of time considerable places, long before the existence of Rome. Such were Laurentum, Lanuvium, Lavinium, Aricia, Gabii, Tusculum, Tibur, Præneste, Labicum, Collatia, Cora, &c. [Latium.] The story of Æneas landing at the mouth of the Tiber, assisting the Latins against the Rutuli, and marrying Lavinia, the daughter of King Latinus, is probably an embellishment invented in aftertimes by Roman pride or Greek flattery. [Æneas.] Some of the earlier Greek writers said that Rome was a Greek colony. (Niebuhr, *History of Rome*, vol. i., 'The Preliminary History of Rome.') Parties of Greek or Trojan emigrants may have landed on the coast of Latium at various times, and given rise to these various stories. That there was a strong mixture of Grecian blood in the Latin race seems not to be doubted, and a comparison of the elementary parts of the Greek and Latin languages proves at least that those who used these tongues were sprung from or related to a common stock. [Language.] The Latin communities were united by religious rites. Cato in his 'Origines' says that the temple of Diana in a grove near Aricia was resorted to for their common sacrifices by the Aricini, the Tusculani, the people of Lanuvium, of Laurentum, of Cora, and also by the Rutuli, a people at one time distinct from the early Latins, and inhabiting a nook of land near the sea-coast, between the Latins and the Volsci, and whose capital was Ardea. The Numicius was the boundary between the Rutuli and the Latins of Laurentum. The Rutuli are mentioned as a wealthy people in the third century of Rome, in the time of Tarquinius Superbus (Livy, i. 57); their wealth was probably the fruit of their maritime trade. Ardea is said to have sent a colony to Saguntum in Spain. The Rutuli however appear also as forming part of the Latin Confederation, and there was a temple dedicated to Venus between Lavinium and Ardea which was under the care of the Ardeates, and whither all the Latin communities sent deputies on particular occasions. At other times the deputies of the Latin towns assembled at the Lucus Ferontinæ, where the wood of Marino now is. (Livy, i., 50; vii., 25.) The indigenous deities of the Latins were Saturnus, who first taught agriculture to their ancestors the aborigines, Janus, and Faunus, who delivered his oracular answers from the depth of the forest of Albunea. Venus and others appear to have been of later introduction into the Latin mythology.

The Latini are described as a race robust, hardy, frugal, and warlike, and their early union with Rome, great part of whose population was recruited amongst them, contributed mainly to the growth and success of that republic. Their morals were simple; it is recorded by Athenæus and A. Gellius, on the testimony of earlier writers, that their women did not drink wine, and the custom of being saluted on the cheek by their relatives is said to have been introduced in order to ascertain their abstemiousness. Their towns were strong, both by their position and their massive walls, traces of which still exist on the sites of antient Præneste, Tusculum, and other places of dates anterior to Rome, and are ascribed by some to the Tyrrhenians, who preceded the Latini, and have been confounded with the Pelasgians. The foundation of Alba is involved in great obscurity, but the fact of its being an important town several centuries before the existence of Rome is indubitable. [Alba Longa.] Whether Alba was at the head of the Latin Confederation, or was the centre of another confederation distinct from that of the Latins though connected with it, has been a matter of doubt. Niebuhr adopts the latter supposition. A distinction is made by Livy between the Albans and Latins. The dictator of Alba is not called the dictator of the Latins. The founders of Alba were either emigrants from Lavinium, who built a town and set up an independent state for themselves, according to Livy's story of Ascanius, or they were strangers, probably a tribe from the mountains, who built a new town, which in course of time ruled over part of Latium and sent colonies to Lavinium and other places on the coast which had become deserted. Alba is said to have ruled over thirty colonies, and a like number of thirty towns is mentioned as constituting the Latin confederation in the Roman period.

Passing over the obscure period between the building of Alba and that of Rome, we find the Latins coming into contact with the latter city, which, although built on Latin ground, and itself a colony of Alba, paid no great deference to its mother-country or elder neighbours. Rome, according to tradition, was a city of refuge, and its population a medley of various races, who did not acknowledge any ties with or duties towards others. Their first quarrel was with the Sabines, with whom afterwards they made an alliance; next with the Etruscan townships bordering on the Tiber, and the turn of the Latins came later. We find Rome in alliance with Lavinium, notwithstanding the murder of Tatius, the Sabine king, and the ally and partner of Romulus, which had occurred there out of private revenge.

Under Tullus Hostilius war broke out between Rome and Alba, which ended in the destruction of Alba and the removal of the inhabitants to Rome. The other Latin cities appear to have taken no part in the war, but on the contrary entered into an alliance with Rome. (Livy, i. 32.) In the following reign of Ancus Marcius, the first war of the Latins against Rome is mentioned: the result was that Politorium, Tellenæ, and Ficana were taken by the Romans, and the inhabitants transferred to Rome, where they were settled on Mount Aventine. Tarquinius the elder, the successor of Ancus, attacked the Latin towns separately, and took Appiola, Corniculum, Cameria, Ficulnea vetus, Crustumerium, Ameriola, Medullia, and Nomentum, after which peace was made, but it is not said on what conditions. Servius Tullius obtained, by agreement with the leaders of the Latin cities, what his predecessors could not obtain by force, namely, that the Latins should unite with the Romans in building a temple to Diana on the Aventine, to be common to both people. This was considered as an acknowledgement that Rome was the head of the Latin nation. The Sabines were also included in the compact, and the temple was declared to be an inviolable asylum for individuals of the three nations. It was likewise agreed that, after the annual sacrifices, conferences should be held between the deputies of the various nations, and matters in dispute should be settled in a friendly manner. This wise measure greatly contributed to consolidate the strength of Rome. It was in consequence of this arrangement that Tarquinius Superbus, who was anxious to secure to himself a party among the leaders of the Latin towns, and had given his daughter in marriage to Mamilius, one of their chiefs, convoked them to an assembly in the wood of Ferentina, where he got rid by an atrocious stratagem of Turnus Herdonius of Aricia, who is represented as the leader of the opposition among the Latins. (Livy, i., 50, 51.) Tarquin then persuaded the Latins not only to renew the treaty with Rome, but to acknowledge him as their princeps, or chief, and to send their youth to serve no longer as auxiliaries, but mixed with the Romans in the same legion. He united a century of Latins and a century of Romans in every maniple commanded by a Roman centurion. All this, together with his treatment of Gabii, shows that Tarquin had succeeded in making himself real master of Latium. Tarquin also assumed the presidency of the Feriæ Latinæ, or festivals of the Latin state, which by an antient usage were held once a year on the summit of the Alban Mount, and were dedicated to Jupiter Latiaris or Latialis; and he made these solemnities common to the Romans, the Latini, and the Hernici. Deputies from the three nations and from other allied districts attended, each bringing their victims. The sacrifices lasted three days, some say six, after which a 'visceratio,' or distribution of meat, took place among the deputies. These feriæ continued, bating some temporary interruptions, to be held down to the latest period of the Roman republic, and one of the two consuls always attended them. (Cicero, *De Nat. Deor.*, i., 6; *Ep. ad Fam.*, viii., 6; *Divinat.*, i., 11.)

After the expulsion of the Tarquins, the Latin cities, partly to free themselves from Roman supremacy, and partly instigated by Mamilius, Tarquin's son-in-law, and the other connexions of the Tarquins, rose in arms, and a war ensued between them and Rome, which ended in the total defeat of the Latin forces by the Roman dictator Posthumius, near the lake Regillus, between Labicum and Gabii, B.C. 499. Peace was made three years after, on condition that the Latins should expel the refugee partisans of the Tarquins. These lenient conditions were probably agreed to by Rome, from apprehension of the approaching struggle with the Volsci. A few years later, under the consulship of Spurius Cassius and Postumus Cominius, a solemn 'fœdus,' or treaty of alliance, was made between Rome and the Latins, by which was renewed the isopolitan franchise formerly existing in the time of Servius in each of the two nations with respect to the other, as being on a footing of perfect equality, though probably with no interchange of the respective political franchise. This treaty is known in the Roman writers by the name of the Cassian League, Cassianum fœdus: the conditions were engraved on a brass column mentioned by Livy, and the substance of them is given as follows by Dionysius, who took them from Macer, who had seen the inscription:—'There shall be peace between the Romans and the Latins so long as heaven and earth shall keep their place; neither state shall war against the other, nor instigate foreign states to do so, nor grant a passage through its territory to foreign armies against its ally; but when either suffers damage or vexation, the other shall loyally render it protection, help, and succour. The booty and everything gained in a joint war shall be shared equally. Private suits shall be decided within ten days in the place where the cause of litigation arose. No article shall be erased from this treaty nor added to it, except by the common consent of the Romans and of the commonwealth of Latium.' Thus far Dionysius, but it appears also from other authorities that the Latins shared with the Romans, or held by turns, the command of the combined forces of the two states. (Niebuhr, vol ii., 'The League with the Latins.') Seven years after this league Spurius Cassius concluded a treaty with the Hernici on similar terms; and it is remarkable that in some cases, as at Antium, colonies were sent consisting of equal portions of the three nations.

The league of the Latins with Rome lasted for about a century, till the irruption of the Gauls, during which period there were but few occasional interruptions of the harmony between the two states. To one of these Rome had given a strong provocation. The people of Ardea and those of Aricia having referred to the arbitration of the people of Rome their dispute concerning a territory to which both laid claim, the cause was pleaded before the Roman tribes; and just as the votes were going to be collected, an old man, eighty-three years of age, called Scaptius, rose, and said that he remembered, when serving in a former war, to have noticed the territory in question as belonging to the town of Corioli, which was taken by the Romans, and that therefore the land had become Roman property. Upon this the tribes decided the question against both parties, saying that the territory belonged to the Roman people. In vain the consuls appealed to their honour and equity not to act as judges in their own cause. The land was taken possession of. The consequence was that Ardea offered to join the league of the Volsci and Æqui against Rome, but was deterred from so doing by receiving from the Roman senate hopes of redress. Soon after a dispute broke out at Ardea between the patricians and plebeians of that place, on account of a young woman who had two suitors, one of each class; and this led to a civil war. The patrician party proved the stronger within the town, and drove out the plebeians, who, being joined by a party of the Volsci, after plundering the lands of the patricians, laid siege to the town. The patricians applied to the Roman senate for assistance. The consul M. Geganius Macerinus, being sent to their assistance, B.C. 443, defeated the besiegers, and took Cluilius, the Volscian commander, prisoner. But these disturbances thinned Ardea of her inhabitants, and the senate took this opportunity of sending thither a colony to strengthen the place against any future attempts of the Volsci; and at the same time directed the triumviri, who had the conduct of the colony, to divide the principal part of the disputed territory above-mentioned among the original inhabitants of Ardea. The triumviri, after fulfilling their mission, settled at Ardea as colonists, in order to evade the annoyances which they would have met on their return from the tribunes of the people for having divided among the Ardeates a territory which the people of Rome had formerly adjudged to themselves. (Livy, iii., 71 and 72; and iv., 9, 10, and 11.) Not long after this the people of Labicum, a Latin city, having joined the Æqui, who were at war with the Romans, and plundered the city of Tusculum, another Latin city, friendly to Rome, the Romans attacked, defeated them, and took their town. But these were but partial and temporary ruptures. The bulk of the Latins appear to have remained faithful to the Cassian alliance. The Latin state consisted of thirty towns, which appear to have been independent municipalities; they had their patricians and plebeians; each had its senate and its own magistrates, the chief of whom was styled dictator. Deputies from each town constituted the senate or assembly of the whole state, which met at the grove of Ferentina. A dictator, probably taken by turn from the dictators of the respective cities, was the temporary head of the whole state, presided at the Latin festivals on the Alban Mount, and signed treaties, such as that of alliance with the consul Spurius Cassius. Concerning the constitution and laws of the Latin people previous to their final union with Rome, Sigonius (*De Jure antiquo Italiæ*) and Niebuhr (*History of Rome*, vol. ii., 'The Latin State') have endeavoured to collect all that can be gleaned from scattered passages of the antient writers.

After the invasion of the Gauls and their retreat from Rome, we find both the Latins and the Hernici, at least in part, joining the Volsci, Æqui, and the Etruscans, the old enemies of the Romans, and endeavouring to annihilate the city, which was just rising from its ruins. Camillus defeated the Latin towns one after the other. Tusculum having humbled itself, and sent a deputation, headed by its dictator, to the Roman senate to deprecate its wrath, was forgiven, and shortly after obtained the 'civitas,' or Roman citizenship, which enabled its inhabitants to have a domicile at Rome, to vote in the Roman comitia, and to aspire to the public offices of the Roman republic. The Prænestini were defeated, and their town surrendered by capitulation to the dictator Titus Quintius, who brought from it to Rome the statue of Jupiter Imperator, which was placed in the capitol. Soon after, B.C. 376, we find the Latins, after again joining the Volsci, encamped with them near Satricum, a Volscian town on the borders of the Latini. Being defeated after an obstinate engagement by the Roman military tribunes Æmilius and Valerius, the Volsci forsook their allies, and the people of Antium submitted to the Romans, upon which the Latins in a fit of rage burnt Satricum, sparing only the temple of Matuta, an antient deity of the country. From Satricum they turned against their Tusculan countrymen for having accepted the Roman citizenship; they entered Tusculum by force; but the inhabitants took refuge in the citadel, and the Romans under L. Quintius and Servius Sulpicius coming to their assistance, the Latins were surrounded and slaughtered. After a war with Tibur, which led to no definite result, peace was granted, B.C. 357, to the Latins on their demand, and they consequently furnished again a large auxiliary force to Rome, agreeably to former treaties, after an interruption of many years, which assistance, as Livy (vii. 12) acknowledges, came very acceptably at a time when the Romans were engaged in war with the Etruscans and the Hernici; besides being threatened by the Gauls, who still hovered about the country. When however, some years after, the Gauls, though repeatedly defeated, appeared again in force and overran the plains of Latium, the coasts of which were at the same time infested by Greek pirates, the Latin towns, in a meeting which they held at the wood of Ferentina, sharply replied to the Romans, who insisted upon their speedily furnishing their contingents, 'that the Romans ought not to talk so imperiously to those whose assistance was to them of vital importance; that the Latins would fight rather for their own liberties than for the purpose of extending the dominion of others.' (vii. 25.) Soon after that time, the Carthaginians are mentioned by Livy as having entered into a treaty with Rome; but Polybius gives us the text of a former treaty, said to have been concluded between the two republics in the first year after the expulsion of the Tarquins, in which Ardea, Antium, Aricia, Circeii, and Terracina are mentioned as towns subject to Rome, and included within the protection of the treaty; but another part of Latium is mentioned as not subject to Rome, on which the Carthaginians might land, and carry off the booty and prisoners, but not build forts, or make any permanent settlement. This treaty, if really of the time of the Tarquins, which is doubted, would confirm the notion that the Roman power under the last kings was much greater than is commonly supposed, a notion which is supported by Niebuhr. See also Heyne's dissertation on the treaties between Rome and Carthage, in the *Götting. Anzeigen*.

The first Samnite war, which broke out B.C. 342, in consequence of the people of Capua applying to Rome for protection against their stronger and fiercer neighbours, and placing themselves and their country under the Roman dominion, having ended with a peace two years after, the Samnites turned their armies against the Sidicini, who inhabited the country between the Liris and the Vulturnus. The Sidicini sought assistance from the Latins, under whose protection they placed themselves. The Latins, joined by the Campanians, who took an unfair advantage of the Roman protection to satisfy their old grudge against the Samnites, entered their territory and ravaged it. The Samnites appealed to the Roman senate, requesting them to restrain the Latins and Campanians, if they were both dependents of Rome; if not, the Samnites claimed to be allowed to oppose force to force. The answer of the senate was cautious: 'The Campanians had given themselves up to Rome, and therefore Rome would oblige them to keep quiet; but as for the Latins, there was nothing in their stipulations with Rome that forbade them making war with whomsoever they pleased.' This answer increased the audacity of the Latins, and in their frequent councils they began to plan together with the Volsci and Campanians a new war against Rome. Even the Roman colonies of Circeii, Velitræ, and others, joined the Latin league. This having come to the knowledge of the Romans, the senate requested that ten of the chief men among the Latins, 'principes Latinorum,' should come to Rome to explain matters. Among them was one L. Annius of Setia, who was that year one of the two prætors, or chief magistrates, of the whole Latin confederation. When in the presence of the Roman senate, after boasting of the power of the Latins and their allies, and of their being fully able to assert their own independence, he proposed that, for the sake of former connexion and consanguinity between them and the Romans, peace should be concluded upon a solid and equitable foundation. With a view to this he required 'that the Latins should have the appointment of one of the two consuls, and of one half of the senate, so that Rome and Latium should form in future but one country and one republic, of which Rome would be the capital, and all the people be called Romans.' This apparently not unreasonable proposal offended Roman pride, and the consul T. Manlius Torquatus, a man of more than Roman sternness and inflexibility, exclaiming against the insolence of a man of Setia, swore that if the Patres Conscripti should be so insane as to accept his proposal, he would himself come armed into the senate and kill any Latin he should meet there. The senate declared war against the Latins, and the two consuls, Manlius Torquatus and Decius Mus, marched each with an army, through the territory of the Marsi and Peligni (the modern Abruzzo Ultra), and being joined on their march by the Samnites, encamped near Capua, in front of the Latin and Campanian united forces. Here Manlius gave a dreadful instance of Roman severity, in causing his own son to be beheaded for having engaged in a skirmish with the enemy contrary to his orders.

The decisive battle took place in the plain near the base of Vesuvius, and it was one of the hardest fights in which the Romans had ever engaged, for, as Livy observes, in giving a description of the order of battle (viii. 8), the Latins were in every respect so much like the Romans, and fought so much like them, that it more resembled a contest among countrymen and relatives than a fight between strangers. The 'hastati,' or first line, of the Roman left wing, commanded by Decius, began to give way before the charge of the Latins, and fell back upon the second line, or 'principes,' when, at this critical moment, Decius, devoting his life to the Dii Manes for the safety of his country, and mounting his horse, rushed into the midst of the Latin ranks, broke through their first line, and at last fell covered with wounds. The Latins, though somewhat confounded by this desperate onset, continued to fight bravely, and pushed forward their triarii, or third line, whilst the consul Manlius kept back his third line, kneeling and concealed in the rear, as a last reserve. When he saw the whole Latin force engaged and already breaking through his line, he ordered his reserve to attack the enemy. This decided the victory; the Roman triarii were fresh; the Latins, being weary and taken by surprise at the moment when they made sure of victory, gave way, their ranks were broken, and hardly one-fourth part escaped to Minturnæ. After sustaining a subsequent defeat at Trifanum, the Latins made their submission, when part of their land was taken from them and appropriated to the Roman people. The people of Laurentum however, who had taken no part in the war, were excepted from the confiscation, and their fœdus, or treaty of alliance, with Rome was renewed. In the following year however several of the Latin cities rose again; but instead of uniting their armies in the field, they kept their men within their respective walls ready to sally out; and whenever the Romans attempted the siege of one, all the rest lent assistance to the besieged. The strength of the Latins was in their numerous fortified towns, inhabited by a warlike people, though inferior to the Romans in discipline, training, and moral perseverance. The Romans laid siege to Pedum; but the inhabitants of Præneste, Tibur, Velitræ, and others, came immediately to its assistance, and the consul Æmilius raised the siege. Latium, as Livy observes, was in a state that was neither peace nor war. In the next year (B.C. 337) the consul L. Furius Camillus, grandson of the deliverer of Rome, took the field: he entered Pedum by storm, and, together with his colleague, reduced successively the other Latin towns, and placed garrisons in them. On his return to Rome he made his report to the senate: he told them that it was in their power to destroy the Latin towns, and make a vast solitude of that fine country from which they had derived the best part of their strength in former wars; but he advised them to attach the people to themselves for ever by giving them the Roman citizenship, and thus to strengthen the sinews of the republic. The senators, adopting mercy as the wisest course, made however a distinction according to the conduct and merits of the various Latin cities. Lanuvium and Nomentum received the Roman citizenship; Tusculum was confirmed in the possession of it; Aricia was kept for a time as a subject town, but was afterwards admitted to the franchise; Tibur and Præneste had their lands confiscated, not so much for the late revolts as for their former association with the Gauls, a barbarous and ferocious people. Velitræ, as being an old Roman colony, was more severely treated: its walls were razed, and its senators banished beyond the Tiber, under severe penalties if any of them should be found on the left or Roman bank of the river. Their lands were given to colonists. A fresh colony was sent to Antium, and the old inhabitants were allowed to inscribe themselves as colonists; but their ships were taken from them, and they were forbidden to go any more to sea. The other Latin townships, according to Livy (viii. 14), were deprived of the rights of connubium and commercium, which they had enjoyed by the fœdus or treaty made under Spurius Cassius and Postumus Cominius. The general assemblies of the Latin cities at the wood of Ferentina were of course at an end. Thus terminated the existence of the Latins as an independent people: they became subjects of Rome, excepting the few towns above mentioned which had the

Roman citizenship, wholly or in part, with or without the suffragium, or vote; for this is not always stated by the historian. The Latins, after that epoch, are no longer mentioned as socii, but distinguished from the genuine Romans as being 'Latini nominis.' It would appear however from some passages of Cicero, that in course of time the Latin townships in general were allowed to resume most of the rights which had belonged to them by the Cassian treaty, and that they continued to elect their own municipal magistrates. (Sigonius, *De Jure antiquo Italiæ*, b. i., 'De Jure Latii.')

During the second Punic war Hannibal tried to work upon the feeling of dissatisfaction which he knew must exist in the breasts of many of the Latins, as well as other nations of Italy which had been conquered by Rome; and accordingly, after the battles of Trebia and Thrasymene, he separated the Latin and Campanian from the Roman prisoners, and released the former without ransom. The Latins however, unlike the Campanians, Samnites, Hirpini, Lucanians, and others, who went over to Hannibal, remained faithful to Rome, whose armies were repeatedly recruited among them during that long and fearful contest. This loyalty of the Latins, and the policy of confirming them in it, seem to have made an impression on the minds of some of the Romans, as we find it proposed in the Senate in the fifth year of the war to select two senators out of each Latin town to fill up in the Roman Senate the place of those who had fallen in battle. But most of the fathers, and especially L. Manlius, a descendant of Torquatus, who had fiercely opposed a former proposal of a similar nature, exclaimed against what they considered as an indignity; and Fabius Maximus put an end to the question by declaring that it was the most dangerous cord that could be touched at that time, when the faith of the allies of Rome stood upon so precarious a tenure, and that the very recollection of such a subject having been agitated in the Senate ought to be obliterated and buried in secresy in the bosom of each senator.

The Latins remained for two centuries and a half in the same dependent condition, without the rights of citizenship ('sine civitatis jure'), until the breaking out of the Social or Italian war. The tribune Livius Drusus proposed that the full Roman citizenship should be extended to them, as well as to the other nations of Italy, which had formed treaties of alliance with Rome. Drusus however was murdered, and his motion was dropped for a time. But when the Marsi, Samnites, Peligni, Campanians, and Lucanians rose in arms, and constituted themselves into a confederation, of which they made Corfinium the capital, and after they had defeated several Roman armies, the consul L. J. Cæsar (B.C. 91) advised and obtained the passing of a law which gave the Roman franchise to all the people of Italy who were allies of Rome and had remained faithful in that emergency. This franchise, or civitas, is stated accordingly to have been granted to the 'socii,' or allies, who had furnished their contingents, and to the Latins, who are mentioned distinctly from the rest. By this grant, the freemen of the Latin towns were placed so far on a level with the Roman citizens, as to enjoy the full Roman franchise, to be admitted into the Roman rustic tribes, have votes, and be eligible to public offices. Thus the distinction between the Romans and the real or original Latins was obliterated, but another class of nominal Latins sprung up in the following year, in the consulship of C. Pompeius Strabo, when the Latinitas, or right of Latin colonies, was granted to the towns of Transpadane Gaul. This leads us to speak of the Jus Latii, or 'Jus Latinum,' as distinguished from the Civitas, or Jus Civium Romanorum.

LATI'NUM JUS, JUS LA'TII, LATI'NITAS, sometimes also called simply **LATIUM**, was one of the various civil conditions under which the inhabitants of the Roman world were classed and comprised. The primary distinction of persons was that of freemen and slaves. A slave had no rights whatever; he was merely 'res,' a thing, the property of his master, the same as his cattle. Freemen were divided, according to the Roman polity, into 1. Cives Romani; 2. Latini; 3. Peregrini, or aliens. The Roman citizen lived under the civil law of Rome, which determined his rights and duties, and he might aspire to the offices and honours of the Roman state.

The second civil condition in the Roman state was that of 'Latini,' or those whose rights and duties were defined by the 'Jus Latinum.' They formed a considerable and important class, and ranked next to the Roman citizens in privilege. This class however was differently formed, and enjoyed different rights at various periods of the history of Rome.

The old inhabitants of Latium, whilst they continued fœderati or confederates of Rome under the Cassian treaty, enjoyed several of the rights of Roman citizens. The rights of a Roman citizen were of two sorts, private, or civil, and public, or political. The principal private rights were the 'jus libertatis,' or personal freedom, by which the Roman citizen was master of his own person, could not be arbitrarily imprisoned nor punished, except after legal trial, and could not be scourged on any account; the 'jus connubiorum,' by which he was enabled to contract a legal marriage with a Roman freewoman, or with those Latinæ or Peregrinæ who enjoyed the privilege of the connubium, and by which his children were also Roman citizens; the jus patrium, the consequence of the connubium, which gave him that unbounded authority over his children which was peculiar to the Roman law, and which no other people were possessed of (Gaius, i. 55; Justinian, *Institutiones*, i. 9); the jus legitimi dominii, which included the ability of acquiring property, by testamentary gift, mancipatio or nexum, usucapion, cessio, &c.; and the jus testamentorum, by which he was enabled to bequeath property by will.

The chief public or political rights were, the jus census, or having his name registered in one of the tribes and centuriæ; the jus suffragiorum, or right of voting in the comitia; the right of appeal to the comitia from the sentence of the magistrate; and the jus honorum, by which he was enabled to aspire to any of the dignities in the state. Now the freemen of the Latin confederate towns lived under their own laws, and therefore were not under the civil law of Rome; they had their own forms of marriage, of testaments, &c., which were valid in their own courts, but not at Rome; they had not the same paternal authority as the Romans over their offspring; they could not purchase, possess, or inherit property at Rome or in the Roman territory; their persons were not under the protection of the Roman law; they might be sent away from Rome, and they and the other Italian socii were sent away repeatedly, among other instances, under the consulship of Lucius Crassus and Mutius Scævola, in the year B.C. 96, just before the beginning of the Social war, to which that expulsion greatly contributed. It would seem however that all the towns of Latium were not on the same footing in these respects, and that some of them had adopted of their own choice certain Roman laws, and by so doing had become, according to the Roman legal term, 'populi fundi,' that is to say, had entered within the pale of those particular Roman laws, and had the benefit of their provisions even at Rome. (Cicero, *Pro Balbo*, viii.) Whether the Latin confederates had the connubium, or right of intermarriage, has been questioned by some; Niebuhr however (vol. ii., 'On the Franchise of the Latins') maintains that they had.* As for the public or political rights of Rome which mainly constituted what was called the 'civitas,' the Latins were not 'censi' at Rome, and they could not aspire to the honours and offices of the Roman state, except those who had previously filled certain municipal offices in their own town for a time, after which, by transferring their domicile to Rome and inscribing their names in one of the tribes, they acquired the civitas and all its rights and privileges. It appears also that there were other means by which a Latin or other Italian freeman might obtain the Roman civitas, by rendering some important service to the Roman state. With regard to the right of suffrage, it is not clear under what conditions the municipes of the Latin cities enjoyed it, but it appears that they came at times to vote at Rome on certain occasions, but then they had no fixed tribe, and voted in a tribe which was drawn by lot, and they might, as it has been said already, be ordered away by the magistrates previous to the day of voting, as was done by the consul Virginius, the colleague of Spurius Cassius. In the year B.C. 123, they came to Rome to vote in favour of the laws proposed by Caius Gracchus, but the consul C. Fannius ordered them away immediately. The civil condition of the Latins, or Jus Latinum, was therefore inferior to that of the Romans, but next to it in importance, and a kind of intermediate step towards obtaining it. They had, even at Rome, some advantages over the Peregrini, or aliens, who were domiciled in that city.

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* Notwithstanding all that has been written on the subject, it is not so easy to say precisely what the connubium was. The only intelligible definition is that of Gaius (i. 56), who, when speaking of the marriage of a Roman citizen with a Roman woman or with a Latina or Peregrina with whom the connubium existed, observes that the effect of the connubium was that the children followed the condition of the father, were consequently Roman citizens and subject to the patria potestas. That the like consequence followed if a Latin married a Roman woman, as to the rights of such children as Latin citizens, is merely the corresponding and correlative part of the connubium. But that the connubium alone enabled a Latin citizen who married a Roman woman to confer on his children the rights of Roman citizens, and himself to acquire the patria potestas, seems inconsistent with the notions of Roman citizenship. The subject of the Jus Latii, and of the connubium in connection with it, is very difficult to understand, and the obscurity is by no means diminished by the way in which Niebuhr has handled it.

When the Romans began sending out colonies to several towns of Latium, such as Ardea, they probably placed the colonists on the same footing as the old Latin inhabitants, namely, under the Jus Latinum. And afterwards they followed the same system with regard to colonies which they sent to other parts of Italy, and which were called Latin colonies, though this name did not mean that they consisted of Latins, but that the colonists, whether Romans or Latins or from other parts of Italy, were placed, with regard to Rome, on the same footing as the inhabitants of Latium. The two principal advantages of their condition were, that they enjoyed municipal independence, had their own senate, chose their own local magistrates, and were not subject to the Roman prætor; and 2nd, that those who filled important municipal offices for one year in the colony acquired the full right of the Roman civitas, and, by transferring their domicile to Rome, might aspire to all the honours and offices of the republic.

At the time of the second Punic war there were thirty of these colonies in various parts of Italy. Twelve of them, after the battle of Cannæ, being weary of the protracted war, refused to give any further assistance in men and money against Hannibal, saying that the Romans ought to make peace with Carthage. These colonies were Ardea, Nepete, Sutrium, Alba, Carseoli, Cora, Suessa, Circeii, Setia, Cales, Narnia, Interamna. (Livy, xxvii. 9.) The other colonies remained faithful, continued to furnish their contingents, and were thus the means of saving Rome from destruction. These, it would appear from a passage of Cicero (*Pro Cæcina*, 35), received as a reward the commercium with Rome, or the faculty of acquiring Quiritarian ownership (Gaius, ii. 40), of taking by testamentary gift from Roman citizens, and of making a will according to Roman forms, &c.

When by the Julian law the people of Latium and other allies received the full Roman franchise, the Latin colonies shared also the boon. They obtained the civitas, all their citizens had the same civil rights as those of Rome, and if they came and settled at Rome, they enjoyed all the political rights. At this period therefore the old Latinitas, as a distinct civil condition of part of the inhabitants of Italy, was at an end.

But in the following year, under the consul Cn. Pompeius Strabo, the towns of Transpadane Gaul, which were filled with a mixed population of Italians and Gauls, had adopted the Latin language, and remained faithful to Rome in the midst of the defection of the Social war, were raised to the rank of Latin colonies, though no colonists were sent to them. By this new Latinitas, which was called 'Minus Latium,' or the 'lesser Latin franchise,' compared with the old Latinitas, the Transpadane towns continuing to govern themselves according to their own laws, were allowed the commercium, but not the connubium, with Rome; and they obtained such share of political privilege that persons who filled magistracies and offices of honour in such towns thereby acquired the full Roman franchise, and they alone. Afterwards many other towns and provinces were raised to the rank of Latin colonies in the same degree; as, for example, the towns of Sicily obtained it from Julius Cæsar.

This is the Latinitas, or Jus Latinum, which existed in later ages of the republic and under the empire, until Caracalla bestowed the Roman citizenship upon the provinces. The principal conditions of this Latinitas are expressed in the following passages of the fragments of Ulpianus:—(Tit. v., s. 4) 'Connubium habent cives Romani cum civibus Romanis: cum Latinis autem et Peregrinis ita, si concessum sit.' (Tit. ii., s. 16) 'Latinus habet quidem testamenti factionem.' (Tit. xix. s. 4) 'Mancipatio locum habet inter cives Romanos et Latinos colonarios, Latinosque Junianos, eosque Peregrinos quibus commercium datum est.' In the above passage there is another kind of Latini mentioned, namely, the Latini Juniani. This was a new kind of Latinitas, introduced by the Lex Junia Norbana, passed under the consulship of M. Junius Silanus and C. Norbanus Flaccus, in the tenth year of the reign of Tiberius, and the twentieth of our æra. By this law freedmen who were emancipated without certain forms (Gaius, i., 17, 22, &c.) and their offspring were placed not under the Jus Civium Romanorum, but under the Jus Latinum, and this even under peculiar restrictions. They had the commercium, but not the connubium. (Savigny, *Ueber die Entstehung und Fortbildung der Latinität als eines eigenen Standes im Römischen Staate*, in the *Zeitschrift für Geschichtliche Rechtswissenschaft*, 4th vol., 2nd No., Berlin, 1823.) Justinian (*Cod.*, b. vii., ch. 6) at last abolished this Junian or individual Latinitas, and as the Latinitas of the colonies had ceased long before, all distinction between Latin and Roman was then at an end.

The great importance which the Romans attached to the grant, not only of the political franchise or suffrage, but also of the connubium and commercium, was an effect of their exclusive policy. When they subdued a confederate people, such as most of the Italian nations were, they left to each town its laws and its local magistrates, but forbade the general assemblies of the nation; they restricted or entirely forbade the intercourse between one town and another, so that the people of each could not marry out of their respective district. They pursued afterwards the same policy in the countries which they conquered beyond the limits of Italy, as in Macedonia, which they divided into four parts, forbidding all communication between them.

We must now speak of the Jus Italicum. Sigonius understood it to be a sort of middle condition, between that of the Latini and that of the Peregrini, or aliens, with regard to Rome. But Savigny contends, and apparently with reason, that the Jus Italicum did not affect single individuals, but whole towns, namely, provincial towns out of Italy, to which it was granted, and that it consisted—1st, in the right of having their own free institutions and administration; 2nd, in being free from tax to Rome; 3rd, in having the ownership of property in the territory of those towns regulated according to the Quiritarian or Roman laws, and consequently subject to usucapion, cessio juris, mancipatio, and vindicatio. This last provision was an important security to property, and it placed the towns Juris Italici above all other provincial towns, whether governed by a prætor from Rome or liberæ, which had not the same right. Towns having the Jus Italicum are mentioned by Pliny in Spain and Illyricum; Constantinople is mentioned in the Theodosian code as enjoying the Jus Italicum, and in the Pandects (*De Censibus*, b. l., tit. 15) other towns are mentioned as possessed of the same right. (Savigny, *Ueber das Jus Italicum*, in the *Zeitschrift* above mentioned. See also, on the whole of this intricate matter concerning the Jus Latii and Jus Italicum, Sigonius, *De jure Antiquo Italiæ*; Cicero, *Pro Balbo*, with the *Notes* of Grævius and Manutius; Niebuhr's *History of Rome*.)

LATITUDE. [Longitude and Latitude.]

LATITUDE, METHODS OF FINDING. [Longitude and Latitude, Methods of finding.]

LATIUM, the country of the antient Latins, had at first for its boundaries on the west the Tiber, which divided it from Etruria; on the north, the Anio, which separated it from the Sabini; and on the south, the Tyrrhenian Sea. To the east and south-east its boundaries on the side of the Volsci are not so clear. In the first period of Roman history the Latin territory does not seem to have extended to the eastward beyond the Alban Mount, nor beyond a line drawn from that point to the sea-coast, leaving outside of it Satricum, Corioli, and Antium, which in the earlier ages of the republic appear as Volscian towns. And yet in the first treaty with the Carthaginians, said to have been concluded soon after the expulsion of Tarquin, Antium, Circeii, and Tarracina or Anxur, are reckoned as towns of Latium. Præneste however and Tibur appear from the first as Latin towns, the former being the advanced post of Latium on the side of the Hernici, who inhabited the mountainous tract between the Trerus (Sacco), the Upper Anio, and the Liris. Tibur, also a town of the Latini, was divided by the Anio from the territory of the Sabini. But the boundary of the Latin territory seems to have crossed the Anio below Tibur, and to have extended across to the Tiber above the influx of the Allia, so as to include the towns of Nomentum and Crustumeria. At the time when the Latins entered into a fœdus, or league, with Rome in the consulship of Spurius Cassius and P. Cominius, we find the Latin cities or townships forming the Latin nation enumerated by Dionysius as follows: Ardea, Aricia, Bubentum, Corni or Corniculum, Carventum or Carnentum, Circeii, Corioli, Corbio, Cora, Fortinium (perhaps Foretii), Gabii, Laurentum, Lanuvium, Lavinium, Labicum, Nomentum, Norba, Præneste, Pedum, Querquetulum, Satricum, Scaptia, Setia, Tellene, Tibur, Tusculum, Toleria, Tricrinum, Velitræ. (Niebuhr, *Hist. of Rome*, vol. ii., note 21.) At that time therefore the Latin boundaries had encroached on the Volscian territory, and extended as far eastward as a line beginning from the sea-coast beyond Circeii, ascending northwards along the course of the Ufens, and including that part of the Lepini Montes on which Setia, Norba, and Cora stood. Antium, although encompassed by the Latin territory, did not belong to it, and was at war with Rome at the time of the Cassian treaty between Rome and the Latins. The sites of several of the above towns are unknown; Carventum and Toleria stood near Labicum, Corbio was on Mount Algidus, and Scaptia near Velitræ. Six centuries later Pliny (*Hist. Natur.*, iii.), in giving a list of the townships of the Prisci Latini, or old Latium, reckoned not less than fifty-three towns or communities which had become extinct long before his time, without leaving any traces behind, 'interiere sine vestigiis,' namely: Satricum, Pometia, Scaptia, Pitulum, Politorium, Tellene, Tifata, Cænina, Ficana, Crustumerium, Ameriola, Medullia, Corniculum, Saturnia (on the Palatine before Rome was built), Antipolis, which stood on Mount Janiculum, Antemnæ, Camerium, Collatia, Amitinum, Norba, Sulmo (at the foot of the Lepini, between Norba and Setia); and the following which used to share with the above the sacrifices on the Alban Mount—the Albenses, the Albani, Æsolani, Acienses, Abolani, Bubetani, Bolani, Cusvetani, Coriolani, Fidenates, Foretii, Hortenses, Latinienses, Longulani, Manates, Macrules, Mutucumenses, Munienses, Numinienses, Olliculani, Octulani, Pedani, Pallustini, Querquetulani, Sicani, Sisolenses, Tolerienses, Tutienses, Vitimellarii, Vilienses, Venetulani, Vitellenses. All these, says Pliny, were at one time 'clara oppida,' towns of some note in antient Latium. Independent of these there were still existing in Pliny's time—Ardea, Antium, Aricia, Alba Longa, Apiola, Algidum, Aurunca, Artona, Bovillæ, Cora, Circeii, Corbio, Fabium, Ficulnea, Forum Appii, Gabii, Laurentum, Labicum, Lavinium, Lanuvium, Mugilla, Nomentum, Norba, Ostia, Præneste, Setia, Suessa Pometia, Troia, Tibur, Tusculum, Ulubræ, Velitræ, all towns of the old Latium. It is surprising to see such a number of towns (and the existence of most of them is of historical certainty) in a small province, about 50 miles in length from the Tiber to Circeii, and about 30 in its greatest breadth from the Sabine Hills to the sea, a considerable part of this tract being even then occupied by marshes or by a barren soil of volcanic formation.

After the final conquest by Rome of the Volsci, the Hernici, and the Aurunci, the name of Latium was extended to the whole country inhabited by these three people, in addition to the country of the old Latins, and this was called Latium Novum. It extended to the eastward as far as the Liris, and included also a district on the left bank of that river, which once belonged to the Volsci, with the towns of Arpinum, Aquinum, Interamna, Atina, and Casinum. The other towns of this new Latium were Privernum, Tarracina, Amyclæ, Fundi, Caietæ, Formiæ, and, farther inland in the country of the Hernici, Anagnia, Ferentinum, Frusino, Verulæ, Aletrium, Signia, Tregillæ, and Fabrateria. Latium was in its extended sense bounded by Campania and Samnium to the east, by the Sabini to the north, the Tiber to the west, and the sea to the south. Under Augustus, Latium and Campania constituted the first of the eleven regions into which Italy was divided by that emperor.

The physical geography of Latium and the actual state of the country are given under CAMPAGNA DI ROMA, except the easternmost part of the new Latium, namely, the districts of Gaëta and Sora, which belong to LAVORO, TERRA DI. (Corradino and Volpi, *Vetus Latium Profanum*. 10 vols., 4to.; Cluverius, *Italia Antiqua;* Bonstetten, *Voyage au Latium;* Petit Radel; Madme. Dionigi; Dodwell; Sir W. Gell.)

LATREILLE, PIERRE-ANDRE', a French naturalist, particularly distinguished in the department of entomology, was born at Brives on the 29th November, 1762. Having shown an early taste for the study of natural history, and for literary pursuits generally, the Baron D'Espagnac, governor of the Hôtel des Invalides, brought him to Paris in 1778, and placed him in the college of the Cardinal Lemoine, to be educated for the church. Here he formed a friendship with the Abbé Haüy, who was a professor at the college. In 1786 he retired into the country, where he devoted all his leisure time to researches on insects. On going to Paris two years afterwards he formed an acquaintance with Fabricius, Olivier, and M. Bosc. Some curious plants which he presented to Lamarck procured him also the friendship of that great naturalist, whom he afterwards assisted in his lectures, and succeeded as professor in the Museum of Natural History. A memoir on the *Mutilles* of France (hymenopterous insects), which was inserted in the Acts of the Society of Natural History at Paris, procured him, in 1791, the title of correspondent to this Society, and, shortly afterwards, of the Linnæan Society of London. At this period he also wrote some of the articles on entomology in the 'Encyclopédie Méthodique.' Hitherto he had only devoted a small portion of his time to scientific pursuits, not allowing it to interfere with the duties of his profession; but the Revolution, which created so many reverses of fortune, obliged him to pursue for a living that study which he had only cultivated before as an amusement.

Being an ecclesiastic, he was devoted to persecution, and twice condemned to banishment, but he escaped this punishment through the influence of his scientific friends. Returning to Paris in 1798, he was named a correspondent of the Institute; and through the recommendation of Lacépède, Lamarck, Cuvier, and Geoffroy St. Hilaire, he obtained employment in the Museum, where he was appointed to arrange the collection of insects. When Lamarck became blind, Latreille was named assistant professor, and he continued Lamarck's lectures on the invertebrate animals till that naturalist's death, in 1829, when he filled the vacant chair of zoology.

The number of his literary productions is very considerable: 'Le Magazin Encyclopédique' of Millin; the 'Annales' and the 'Mémoires du Muséum;' and the 'Bulletin de la Société philomathique,' contain many papers and observations by him. In 1802 he published the 'Histoire des Fourmis,' which also contained several memoirs on other subjects, as on bees and spiders. Among his publications there is one which has been highly spoken of, and which differs in its object considerably from his other writings: this is a dissertation on the expedition of the consul Suetonius Paulinus in Africa, and upon the antient geography of that country. His memoirs upon the sacred insects of the Egyptians, and on the general geographical distribution of insects, excited the attention of all naturalists. Latreille's 'Précis des Caractères génériques des Insectes' (Brives, 1796) was the first work in which these animals were distributed in natural families, and it formed the basis of his 'Genera Crustaceorum et Insectorum' (Paris, 1806—1809, 4 vols. 8vo.), which is by far the best of all his productions. His 'Considérations générales sur l'Ordre naturel des Animaux composant les classes des Crustacés, des Arachnides, et des Insectes,' and the third volume of the 'Règne Animal' of Cuvier, are only extracts, more or less modified, of this work. The system by which the insects are arranged in the 'Règne Animal' (the entomological part of which, it must be remembered, was written by Latreille, though it all stands under the name of Cuvier) is pronounced by Mr. Swainson to be 'the most elaborate and the most perfect in its details that has yet been given to the world.' It soon superseded that of Fabricius. 'It possesses the advantage of being founded on a consideration of the entire structure of these animals, and hence gives us the first example, in theory, of the natural principle of classification.' In Sonnini's edition of Buffon, Latreille has given a general history of insects; he also wrote a 'Histoire des Salamandres,' and many other works.

Latreille, by the almost universal consent of naturalists, stood at the head of the department of entomology in his own and other countries. He deserved this place by his knowledge of the external and internal organization of insects, and by his acquaintance with their manners and habits.

Latreille was elected a member of the Academy of Sciences in 1814, and was made in 1821 Chevalier of the Legion of Honour. He died at Paris, 6th February, 1833, at the age of 70.

LATROBITE occurs crystallized and massive. Primary form a doubly oblique prism. Cleaves parallel to the primary planes. Fracture uneven. Hardness, 5·0 to 6·0. Scratches glass, but is scratched by felspar. Colour pale red. Lustre vitreous. Translucent, opaque. Specific gravity, 2·72 to 2·8. Heated on platina by the blow-pipe, gives a globule of an amethystine pale red colour; with phosphoric salt gives a yellow globule with a nucleus of silica.

Massive Variety.—Amorphous; colour pale red.

Found at Amitok Island, Labrador, and in Finland.

Analysis by Gmelin:—

Silica . . .	44·653
Alumina . .	36·814
Lime . . .	8·291
Oxide of Manganese .	3·160
Magnesia . .	0·628
Potash . . .	6·575
Water . . .	2·041
	102·162

LATUS RECTUM. [ELLIPSE; HYPERBOLA; PARABOLA.]

LAUD, WILLIAM, was the son of a clothier at Reading in Berkshire, where he was born on the 7th of October, 1573. Laud was sometimes reproached during his prosperity with the meanness of his birth, which however was not more humble than that of most of the churchmen of his time, and indeed of preceding times; for in truth Laud himself was mainly instrumental in rendering the Church of England the resort of men of good or noble family as a profession.

Laud received his early education in the Free Grammar-School of Reading, from whence, in July, 1589, he was removed to Oxford and entered a commoner of St. John's College, where he successively obtained a scholarship and fellowship.

Even at the university Laud had the character of being 'at least very Popishly inclined.' Heylyn informs us that Dr. Abbot, master of University College, who was afterwards Archbishop of Canterbury, 'so openly branded him for a Papist, or at least Popishly inclined, that it was almost made an heresy (as I have heard from his own mouth) for any one to be seen in his company, and a misprision of heresy to give him a civil salutation as he walked the streets.'

In 1605 Laud had been appointed chaplain to Charles Lord Mountjoy, Earl of Devonshire. Laud, who held marriage to be an indissoluble sacrament, who raised a flame in Scotland by enforcing this point, and who censured in the high commission, and even imprisoned for adultery (which imprisonment he himself allows in his diary to be more than the law allowed), nevertheless performed the rites of marriage between his patron and Lady Rich, whose husband was then living, and who had previously carried on an adulterous intercourse with Lord Mountjoy.

On the death of the earl of Devonshire in 1608, Laud was appointed one of the chaplains of Neile, then bishop of Rochester, from whom he obtained considerable church preferment. His patron Neile, on his being translated to the see of Lichfield, and before his giving up the deanery of Westminster, which he held *in commendam* with his bishopric of Rochester, obtained for him the reversion of a prebendal stall there.

In 1611 he became president of St. John's College, Oxford; and it was now that Laud began seriously to turn his attention towards the church.

In 1616 the king conferred upon him the deanery of Gloucester, having some time previously appointed him one of his chaplains in ordinary. In 1617 he accompanied king James into Scotland for the purpose of modelling the Scottish church after the fashion to which he and Laud were desirous of bringing the church of England. On the 22nd of January, 1620, he was installed prebendary of Westminster, and on the 18th of November, 1621, consecrated bishop of St. David's. It was expected that Laud would have been made dean of Westminster in the place of Williams, who having been sworn privy-counsellor, and nominated to the see of Lincoln, received on the 10th of July the custody of the Great Seal on its being taken from Bacon. But Williams possessed such interest at court, that when he was made bishop of Lincoln he retained his deanery *in commendam*, together with the other preferments which he held at that time, viz. a prebend residentiary's place in the cathedral church of Lincoln, and the rectory of Walgrave in Northamptonshire; so that, observes Heylyn, 'he was a perfect diocese within himself, as being bishop, dean, prebendary, residentiary, and parson; and all these at once:' besides being at the same time keeper of the great seal of England.

Laud says, in his 'Diary,' that he resigned his presidentship of St. John's College, November 17th, 1621, 'by reason of the strictness of that statute which I will not violate, nor my oath to it under any colour:' yet the king had given him leave to hold it; but in truth avarice was never one of Laud's vices.

In May, 1622, the conference between Laud and Fisher the Jesuit took place. It was held in the presence of the marquis of Buckingham, who shortly after, as Laud himself informs us, 'was pleased to enter upon a near respect to him, the particulars of which were not for paper.' On the 15th of June he became 'C.' to Buckingham. It is thus he writes it in his 'Diary:' Some call it chaplain; others, among whom is Heylyn, confessor. It is certainly not usual for a nobleman even of the highest rank to have a bishop for his chaplain.

Laud was a great dreamer of dreams, and though he repeatedly affirms the contrary, he evidently attached much importance to them. The following extract from his 'Diary' is a specimen:—'December 14, Sunday night, I did dream that the lord keeper was dead; that I passed by one of his men that was about a monument for him; that I heard him say his lower lip was infinitely swelled and fallen, and he rotten already. This dream did trouble me.'

The lord keeper (Williams) had become jealous of Laud's growing favour with Buckingham, and he was incautious in betraying this jealousy. 'January 11, I was with his majesty to show him the epistle that was to be printed before the conference between me and Fisher the Jesuit, Maii 24, 1622, which he was pleased to approve. The king brake with me about the book printed then of the visitation of the church. He was hard of belief that A. B. C. was the author of it. My lord keeper mett with me in the withdrawing-chamber, and quarrelled me gratis.'

Laud's rise was now rapid. In 1626 he was made bishop of Bath and Wells, and dean of the Chapel Royal. On March 8th of this year he has the following entry in his 'Diary:'—'Dreamed that I was reconciled to the church of Rome.' In 1627 he was made a privy-counsellor. On the 11th of July, 1628, he says, 'My congé deslier was signed by the king for the bishopric of London.' About this time, on his acquainting the king with certain rumours spread abroad against him (Laud), Charles replied, 'That he should not trouble himself with such reports, till he saw him forsake his other friends.'

On the death of Buckingham, Laud plunged completely into his political career. Charles now looked upon him as his principal minister. It was at this time that the close union commenced between Laud and Strafford.

Laud commenced his career of statesmanship with a zealous persecution of the Puritans, or religious sectarians. Leighton, a physician, having published a book against the bishops, called 'Sion's Plea,' was sentenced by the court of Star Chamber to have his ears cropped, his nose slit, his forehead stigmatized, and to be whipped. Between the sentence and the execution of it Leighton escaped out of the Fleet, but he was retaken in Bedfordshire, and underwent this atrocious punishment.

In 1630 Laud was chosen chancellor of the university of Oxford. In 1632 he obtained for his creature Francis Windebanke the office of secretary of state; and in the same year Dr. Juxon was, he says in his Diary, sworn dean of his majesty's closet—'that I might have one that I might trust near his majesty.' Heylyn remarks, on the above proceedings, 'So that Windebanke having the king's ear on one side, and the clerk of the closet on the other, he might presume to have his tale well told between them; and that his majesty should not easily be prepossessed with anything to his disadvantage.'

On the 16th of August, 1633, Laud was appointed archbishop of Canterbury: he has the following entry in his Diary:—'August 4. That very morning (of Abbot's death) there came one to me, seriously, and that avowed ability to perform it, and offered me to be a cardinal: I went presently to the king and acquainted him both with the thing and the person.' 'August 17, Saturday. I had a serious offer made me again to be a cardinal: I was then from court, but so soon as I came thither (which was by Wednesday, August 21), I acquainted his majesty with it. But my answer again was, that something dwelt within me which would not suffer that till Rome was other than it is.'

Laud made a declaration that in the disposition of ecclesiastical benefices he would give a preference to the single man over the married, *ceteris paribus*. The close union between the English church and the aristocracy appears to have commenced about this time. 'Under Laud,' remarks Heylyn, in his quaint phrase, 'the clergy were grown to such esteem for parts and power, that the gentry thought none of their daughters to be better disposed than such as they had lodged in the arms of a churchman; and the nobility grown so well affected to the state of the church, that some of them designed their younger sons to the order of priesthood, to make them capable of rising in the ascendant.'

Laud's letters to Wentworth, afterwards earl of Strafford, exhibit a more faithful mirror of the man's character than is anywhere else to be met with. His Diary, though it bears sufficient impress of his peculiar spirit, discloses his character but imperfectly, particularly as there are many apparently important facts only hinted at, and names of which only the initials are given. The history of his troubles and trial, by himself, and the voluminous life by Heylyn, were expressly written to vindicate his conduct and character. In perusing the letters between Laud and Wentworth the reader feels as if allowed to be present at a confidential conversation between those personages. The letters of Strafford, along with many indications of a violent, arbitrary, overbearing temper, exhibit evidence of strength and sagacity, and sometimes even of greatness of mind. Of the last-mentioned quality the reader will in vain search for any trace in the letters of the prelate. In courage and violence he did not yield to Strafford; but narrowness and littleness appear to have been the distinguishing characteristic of Laud's mind, and yet, contracted though his intellectual range was, some parts of his 'Conference with Fisher the Jesuit,' besides great scholastic learning, display considerable acuteness and no mean powers of reasoning.

On the 5th of February, 1634, Laud was appointed one of the great Committee of Trade and the King's Revenue; and on the death of Weston, lord high treasurer, the management of the treasury was committed by letters patent under the great seal to certain commissioners, of whom Laud was one. In the year following Laud and the Church of England attained a very high, perhaps it may be said the highest point of their prosperity. Laud thus records the event in his 'Diary:'—'March 6, Sunday, William Juxon, lord bishop of London, made lord high treasurer of England: no churchman had it since Henry VII.'s time. I pray God bless him to carry it so, that the church may have honour, and the king and the state service and contentment by it; and now if the church will not hold themselves up under God, I can do no more.'

The following passage from a letter of the Rev. G. Garrard, master of the Charterhouse, a correspondent of Strafford's, presents a lively picture of the state of feeling then prevalent among the clergy. It shows how near having an altogether ecclesiastical government England then was:—'The clergy are so high here since the joining of the white sleeves with the white staff, that there is much talk of having a secretary a bishop, Dr. Wren, bishop of Norwich, and a chancellor of the exchequer, Dr. Bancroft, bishop of Oxford, but this comes only from the young fry of the clergy; little credit is given to it, but it is observed they swarm mightily about the court.'

In a letter of 6th July, 1635, Laud thus speaks of the raising of ship-money:—'As the last year there was money raised upon the ports, according to antient precedent, for the setting out of the navy, which is now at sea, and there God bless it, so we are now going to prepare for a greater navy against the next year; and because the charge will be too heavy to lay it upon the ports, or maritime counties only, therefore his majesty hath thought fit, *a paritate rationis*, and for the like defence of the kingdom, to extend it to all counties and corporations within England and Wales, that so the navy may be full, and yet the charge less, as coming from so many hands. I pray God bless this business, for if it go well, the king will be a great master at sea, and in those active times we, by God's blessing, may be the more safe at land.' How effectively this money was applied to its ostensible object, the defence of the coasts and the putting down of piracy, may be gathered from the following passage in a letter to Wentworth during the following year:—'The mischief which the most Christian Turks did about Plymouth is most true, and I pray God it do no mischief about our shipping business this ensuing year.'

On the 14th June, 1637, sentence was passed in the Star Chamber against Bastwick, Burton, and Prynne, for libels, as Laud informs us in his 'Diary,' 'against the hierarchy of the church.' The archbishop does not however give any definition of what he meant by a libel against the hierarchy of the church. Prynne's sentence was, to be fined 5000*l.* to the king, to lose the remainder of his ears in the pillory, to be branded on both cheeks with the letters S. L. for Schismatical Libeller, and to be perpetually imprisoned. The sentence of Bastwick and Burton was nearly similar. Most people thought these men's punishment sufficiently severe: not so the primate, as will appear from the following passage of a letter to Wentworth, of August 28th, 1637:—

'I have received the copy of the sentence against Paterson, and am verily of your lordship's mind, that a little more quickness in the government would cure this itch of libelling, and something that is amiss besides.'

But the termination of Laud's career was now approaching. On the 18th of November, a few weeks after the meeting of the Long Parliament, he was impeached of high treason by the House of Commons, and committed to the Tower. It is impossible here to enter into the details of the archbishop's trial, of which he has himself written a full, and, on the whole, faithful account. (*History of his Troubles and Trial*, folio, London, 1695.) He defended himself throughout with courage and ability. The judges gave it to be understood that the charges contained no legal treason; whereupon the Commons changed the impeachment into an ordinance for his execution, to which the Lords assented. Laud produced a pardon from the king, which was disregarded. On this proceeding we quote the following remark from a modern publication:—'Laud's cruelty and bigotry and insolence in the execution of his high office ought assuredly not to have gone unpunished; but the sentence against him was perhaps the most unjustifiable act of the zealots of the Long Parliament, and was not less illegal than that which afterwards condemned Vane to the block; and in this appears strongly one of the disadvantages of government by a large assembly of men. The odium of Vane's death fell altogether upon Charles and Clarendon, and is of power sufficient, being thus concentrated, to brand their memory to all time. The odium of the death of Laud, being divided among so many, has neither brought with it individual infamy nor was likely to produce individual remorse.' (*Westminster Review*, vol. xvii., p. 508.)

It would be unjust to Laud not to mention his benefactions to learning. Besides making valuable donations of books and MSS. to the university of Oxford, he founded in that university a professorship of Arabic in 1636, and endowed it with lands in the parish of Bray, in the county of Berks. His conduct to John Hales, known by the appellation of the 'ever-memorable,' is also recorded to his honour. Hales had written a short tract on schism, which was much at variance with Laud's views of church government: this tract had been circulated in MS. Hales, in an interview with Laud, refused to recede from his free notions of ecclesiastical power, but promised that he would not publish the tract. Laud conferred on him a canonry of Windsor.

Laud was beheaded on the 10th of January, 1640-1.

(Laud's *Diary;* Heylyn's *Life of Laud;* Strafford's *Letters and Despatches.*)

LAUDANUM. [Opium.]

LAUENBURG, or **SAXE-LAUENBURG,** a duchy in Germany subject to the king of Denmark, is situated on the right bank of the Elbe, between 53° 22′ and 53° 47′ N. lat., and 10° 3′ and 11° 5′ E. long. It is bounded by the territories of Hanover, Mecklenburg, Holstein, Lübeck, and Hamburg, and has an area of 420 square miles, with a population of 37,500 inhabitants professing the Lutheran religion. The face of the country is level, with only a few hills: the soil is in some parts very fertile, while in others there are tracts of sand or extensive heaths; there are also large turf-moors and considerable forests, of which the largest is that called the Sachsenwald. The rivers are the Elbe, Bille, Stecknitz, and Trave, which afford ample means for inland trade; and the Stecknitz Canal, between the Elbe and the Trave, opens a communication with the Baltic at Lübeck. The most considerable lakes are those of Schaal and Ratzeburg. Its natural productions are corn, flax, timber, turf, horned cattle, sheep, poultry, fish, &c., more than sufficient for home consumption. The inhabitants are chiefly engaged in agriculture and the carrying trade both by land and water; and their exports are pretty considerable, especially of timber and fuel. They have no manufactures.

Lauenburg had formerly its own dukes, whose family became extinct in 1689, on the death of Duke Julian Francis. It was then taken possession of by George William duke of Brunswick-Lüneburg as a portion of the dominions of Henry the Lion, conformably to a convention concluded in 1639 between the dukes of Brunswick-Lüneburg and Lauenburg, and being incorporated with Brunswick-Lüneburg, subsequently formed part of the electorate of Hanover. In 1805 it was taken possession of by the Emperor Napoleon, and in 1810 incorporated with the new French department of the Mouths of the Elbe. In 1814 Lauenburg was restored to its former sovereign George III. as king of Hanover; but by the rather complex arrangements subsequent to the peace of 1815, Sweden, which had deprived Denmark of the kingdom of Norway, ceded Swedish Pomerania to Denmark, and Prussia ceded East Friesland to Hanover, in exchange for the duchy of Lauenburg, Hanover however retaining the small tract on the left bank of the Elbe and the detached bailiwick of Neuhaus on the right bank (making together 105 square miles, with 10,000 inhabitants). Prussia then exchanged Lauenburg with Denmark for Swedish Pomerania; but as the latter province was more valuable, Prussia paid to Denmark two millions of Prussian dollars. It also paid a debt of 600,000 Swedish bank dollars, which Sweden owed to Denmark, and paid besides 3,500,000 dollars to Sweden.

The chief towns are *Lauenburg* (3500 inhabitants) on the Elbe, at the mouth of the Delvenau or Stecknitz Canal, by which goods are conveyed from the Elbe to Lübeck; *Ratzeburg*, the capital, a well-built town on an island in the Ratzeburg Lake, has extremely fine views over that great lake: it is connected with the left bank by a causeway, and with the right by a bridge 1100 feet in length (population 2500 inh.); *Möllen* on the Stecknitz, the burying-place of the famous Till Eulenspiegel, of whom various relics are still shown there.

LAUGHARNE. [CAERMARTHENSHIRE.]

LAUGHTER, as physically defined, is a peculiar agitation of the body, as it were, an organical titillation, which rising suddenly and irresistably, affects at once the face and throat, the thorax and the abdomen. Although this physical phenomenon is usually more or less loud, it is sometimes almost imperceptible, and only traceable by a slight muscular motion of the face and mouth. While however the corporeal phenomenon is so simple, the nature of the mental state, and of the object by which it is produced, is more complicated and debateable. On this subject a great variety of opinions has prevailed. Among the antients there is more of unanimity than among the moderns. According to Aristotle, the ridiculous is some error in truth or propriety, but at the same time neither painful nor pernicious (*τὸ γάρ γελοῖον ἐστὶν ἁμάρτημά τι καὶ αἶσχος ἀνώδυνον καὶ οὐ φθαρτικόν. De Poet.*, 6, § 1). Nearly coincident with the foregoing is the view of Cicero, who while he declares that the ridiculous is incapable of any rigorous definition, admits that the chief, if not the sole object of laughter, is that which, without impropriety, marks out and exposes an impropriety ('Hæc enim ridentur vel sola vel maximè quæ notant et designant turpitudinem quandam non turpiter:' *De Oratore*, 2, n. 235). Quintilian considers it to be absolutely indefinable ('Anceps ejus rei ratio est,' lib. vi., c. 3). At the same time, by adducing the opinion of Cicero, that the improper and the deformed constitute the province of ridicule, and affirming that ridicule is near allied to contempt ('a derisu non procul abest risus:' *Ibid.*), he approximates to the strong opinion of Hobbes among moderns, according to whom, the source of laughter is 'a sudden glory arising from conception of some eminency in ourselves, by comparison with the infirmity of others, or with our own formerly' (*Human Nature*, ch. ix., s. 13). With Hobbes's opinion, that of Helvetius coincides, who makes pride the source of laughter. Beattie and Priestley agree in making the ridiculous to arise out of a misrelation or incongruous union of objects; while Lord Kames considers a contrast to be the essence of the laughable. The latter view is adopted by Mendelsohn and J. Paul Richter. The former (*Dialogue* iii., *Klein phil. und æsth. Schriften*) makes it to be grounded on a contrast between perfection and imperfection, which however must be unimportant and but slightly interesting to us, and must amount to no more than an extravagance or inconsistency. The latter (in his 'Vorschule d. Æsthetik,' p. 143) makes the ridiculous to be the contrary of the sublime, and consequently the infinitely small. Closely coincident with this view is that of Campbell ('Philosophy of Rhetoric,' bk. i., ch. ii.), who observes that 'ridicule in futile objects hath a similar effect to that produced by what is called the vehement in solemn and important matters.' Lastly, Kant (*Kritik d. Urtheilskraft*, p. 225, 2nd ed.) makes the ridiculous to arise from the sudden conversion into nothing of a long-raised and highly-wrought expectation.

According to Shaftesbury ('Characteristics;' 'Essay on Wit and Humour') ridicule is the test of truth, and he adduces in support of his view the words of Gorgias of Leontini, 'Confute ridicule by seriousness and seriousness by ridicule' (*τὴν μὲν σπουδὴν διαφθείρειν γέλωτι, τὸν δὲ γέλωτα σπουδῇ.* Arist., *Rhet.*, lib. 3, ch. xviii.). In order to adjust the sentence to his own view, Shaftesbury adopts the Latin version, 'seria risu, risum seriis *discutere*;' it is however clear from the context where the passage is quoted, that Gorgias was there recommending an orator to endeavour to remove the impression, which his opponent may have made upon his auditors, by employing a directly opposite style of address. But the maxim of Shaftesbury admits only of a negative application, for ridicule, at most, is only fitted to refute error. In truth however it is not properly levelled at the false, but at the absurd in tenets and opinions. The ridiculous is not any fixed and constant property of certain objects, but it is purely relative and dependent upon the subjective states and conditions of individual minds. The simpleton and the boor laugh heartily at what scarcely provokes a smile in the educated man and the sage; and on the other hand, much will excite a laugh in the latter, which would not move a muscle in the face of the former. Such again is the effect of a gay or a gloomy temperament, that a Democritus will laugh where a Heraclitus would weep.

LAUMONITE occurs crystallized and massive. Primary form an oblique rhombic prism. Cleaves parallel to all the faces of the primary form and to the diagonal planes. Fracture uneven. Hardness, scratched by carbonate of lime. Colour white, sometimes yellowish and reddish. Streak white. Lustre vitreous and pearly. Translucent, opaque. Specific gravity 2·3. The crystals fall to powder by exposure to the air, on account of the loss of water.

Massive Varieties amorphous, structure granular.

Gelatinizes in nitric acid. Before the blowpipe swells up before fusion, and gives a white enamel, which, by a continued heat, is converted into a transparent glass.

It is found in Scotland, Ireland, France, Hungary, and Iceland.

Analysis by Gmelin—

Silica . . .	48·30
Alumina . . .	22·70
Lime . . .	12·10
Water . . .	16·
	99·10

LAUNCESTON (also called *Dunheved*), a corporate town in the county of Cornwall, of which it is usually regarded as the capital. It is pleasantly situated on a steep hill rising from the banks of the Attery, a few miles above the confluence of that stream with the Tamar, and 210 miles west-south-west from London. The houses are in general mean and irregularly built, and the streets narrow and inconvenient. Within the last few years the town has been greatly improved, and is now lighted with gas, the expense of which is defrayed by a rate.

Both the assizes for the county of Cornwall were formerly held at Launceston (by virtue of a charter from Richard, king of the Romans), but by the stat. 1 Geo. I., c. 45, the summer assizes were removed to Bodmin, and in consequence of the completion of new courts at the latter place in 1838, and the situation of the county gaol there, both assizes are now held at Bodmin.

The corporate revenue, arising principally from tolls, markets, fairs, &c., amounted in 1835 to 285*l.* per annum, which was about sufficient to cover its ordinary expenditure.

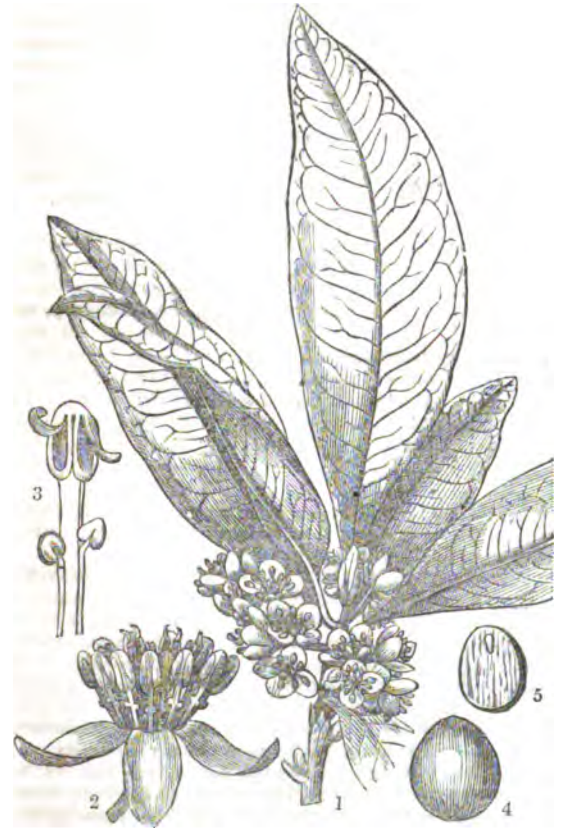
Until the passing of the Reform Act the borough had returned two members to parliament continuously from the reign of Edward I., the right of election being vested exclusively in the mayor, aldermen, and freemen. By the Reform Act, Launceston and the adjoining borough of Newport are included in a district, and both together now return one member. Launceston is one of the polling places for the eastern division of the county.

The remains of the antient castle of Launceston are very remarkable. King, in his *Munimenta Antiqua*, vol. iii., describes it minutely, and assigns to it the most remote antiquity, on account of its dissimilarity from castles built by the Romans, Saxons, Danes, or Normans.

The church, dedicated to St. Mary Magdalen, is in the diocese of Exeter, and the living, a paid curacy of the net annual value of 116*l.*, was, until the passing of the Municipal Corporation Reform Act, in the patronage of the corporation. It is a very remarkable structure, composed of granite, ornamented with scriptural devices, and curious carved work.

The grammar-school of Launceston was originally endowed by Queen Elizabeth, and subsequently by the duke of Northumberland. In the year 1811 the corporation erected a new school-house at an expense of 1000*l.*, but the first master having absconded, and the second resigned, no new appointment has been made since the year 1821 (*Corp. Reports*, 1835), neither has the revenue been received since that date, in consequence of which the house has become dilapidated and no longer fit to be inhabited. The fees were six guineas per annum, on the payment of which the school was open to the children of any inhabitant. The population of the town in 1831 was 2231, and had increased about 50 per cent. since the census of 1801. (*Parliamentary Papers*; Gilbert's *Parochial History of Cornwall*, vol. ii., p. 417; &c.)

LAURA'CEÆ, a natural order of apetalous Exogens, consisting entirely of trees and shrubs, inhabiting the warmer parts of the world, and in most cases aromatic, on which account several are mentioned in works on officinal plants. The best known species in Europe is Laurus nobilis, the Sweet Bay, a beautiful evergreen, whose fragrant leaves are commonly employed to flavour confectionary. [LAURUS.] Other products of the order are, cinnamon and cassia; sassafras, whose bark has great reputation in North America as a powerful sudorific; Pichurim beans, an indifferent substitute for nutmegs; and finally, not to mention other useful substances, camphor, obtained by the Chinese from the Camphora officinarum by means of dry distillation.



1, A flowering branch of Laurus nobilis; 2, One of the flowers, much magnified; 3, A stamen, with a pair of glands on its filament, and the anther opening by two recurved valves; 4, a seed; 5, a section of the same, exhibiting a minute embryo.

In general it may be expected that the trees of this order are valuable as aromatics and stimulants, although but a comparatively small number has yet been brought into use. They are known by the peculiar structure of their flowers, which have no corolla, stamens in one or several rows, often in part gland-like and sterile, a simple one-celled superior one-seeded ovary, and especially by the anthers bursting with recurved valves.

LAUREATE, POET, an officer in the lord chamberlain's department of the royal household. The appellation 'laureate' seems to have been derived through the Italian, from the Latin *laurus*, 'a bay,' in allusion to the antient practice of crowning poets. Petrarch received the crown at Rome in 1341, and Tasso in 1594. The earliest mention of a poet-laureate in England, under that express title, is in the reign of Edward IV., when John Kay received the appointment. Warton however, in his 'History of English Poetry,' shows that the poet-laureate is undoubtedly the same officer who, in the reign of Henry III., is styled *Versificator regis*, the 'king's versifier,' and to whom a hundred shillings were paid as his annual stipend. Ben Jonson is said to have been the poet-laureate to King James I. In the reign of Charles I., 1630, the first patent of this office appears to have been granted, which fixed the salary or pension attached to it at 100*l.* a year, with an additional grant of a tierce of Canary wine from the king's stores. The succession of poets-laureate since the time of Charles II. has been—John Dryden, Nahum Tate, Nicholas Rowe, Laurence Eusden, Colley Cibber, William Whitehead, Thomas Warton, Henry James Pye, and Robert Southey. A commutation was agreed to of 27*l.* for the allowance of wine, by the last poet-laureate.

(Warton, *Hist. Engl. Poetry*, vol. ii., pp. 131, 132; Hawkins's *Hist. of Music*, vol. iv., p. 13.)

LAURINE, an acrid and bitter principle contained in the berries of the laurel; its smell resembles that of laurel oil. It is insoluble in water, and little soluble in cold alcohol, but more so in boiling alcohol and in æther; it crystallizes from solution in needles. When heated it melts, and volatilizes without leaving any residue. To sulphuric acid it first imparts a yellow and afterwards a reddish-yellow colour; in cold nitric acid it liquefies, and floats upon its surface; it bears considerable resemblance to solid expressed oils, but has not been analyzed; the berries contain only about one per cent. of this substance.

LAURUS, a genus of the natural family of Lauraceæ, to which indeed it has given its name. It includes as a species one of the most celebrated trees of antiquity, and until recent times some of the most elegant and useful of the vegetable kingdom, as among them were the trees yielding the camphor of Japan, Cinnamon, both of China and of Ceylon, Cassia bark and buds, the Malabathrum leaf of the antients, with the less known Culilawan and Sintoc barks, as well as the American Persea, Pichurim, and Sassafras. Most of these are however now placed in distinct genera by the latest authors who have paid attention to the subject, as Nees von Esenbeck and Blume, as will be noticed in the articles dedicated to the different substances.

The camphor-tree is admitted by all authors to be the Laurus camphorifera of Kaempfer, now the *Camphora officinarum* of Nees, a native of Japan and of the province of Fokien in China, and also of the island of Formosa, whence, according to Mr. Reeves, the chief portion of the camphor of commerce is brought to Canton. As the wood is said to be valuable, the root, refuse wood, and smaller branches are cut into chips, covered with a little water, and the camphor separated by sublimation. [CAMPHOR.] It is necessary to distinguish this camphor from that produced in Borneo and Sumatra by Dipterocarpus, or Dryobalanops Camphora.

The kinds of cinnamon are not so clearly settled, as there is both a Ceylon and a Chinese cinnamon. The former however is no doubt produced by *Cinnamomum zeylanicum*, and the latter by the *C. aromaticum* of Nees. This cinnamon is of superior quality, at least some of it, and is preferred by the Chinese to that of Ceylon, and said to be produced in Cochin China chiefly in the dry sandy districts lying north-west of the town of Faifoe, between 15° and 16° N. lat. Mr. Crawfurd (*Embassy to Siam*, p. 478) informs us that there are ten varieties of it, and that it is not cured, like that of Ceylon, by freeing it from the epidermis. Dr. A. T. Thomson gives this as one of the characters by which cassia may be distinguished from cinnamon. It is possible therefore that some of it may be imported into Europe, and sold as cassia, though Mr. Marshall states that the cassia bark of the shops is only a coarse cinnamon obtained from the thick roots or large branches of the cinnamon-tree.

Cassia buds, or Flores Lauri Cassiæ, are the dried receptacles of some species of this family, by some supposed to be the above C. aromaticum, but it has been pointed out by Loureiro, and is named C. Loureirii by Nees. It is a native of Cochin China towards Laos, and of Japan.

It has sometimes been doubted whether the substances we now call *cinnamon* and *cassia* are exactly the same things as those to which the antients applied these names. It is very certain that the substances which formed such highly esteemed articles of commerce must have possessed some remarkable physical and sensible properties not common in products beyond the tropics. The aromatic principle is that which is most conspicuous in the products of the tropical zone, and is found probably in most of the substances which the antients obtained from the East, at least Dioscorides has described them all together. It would be difficult even with our present knowledge to find any other substances which would equally well answer the antient descriptions, without going still farther east. The Greek name of cinnamon is *κιννάμωμον*, which Herodotus says his countrymen learnt from the Phœnicians, and the Hebrew, we know, is *kinnemon*. It is remarkable that the Malay name is kayu-manis, which Mr. Marshall says is sometimes pronounced as if written *kaina-manis*. By the Hindus cinnamon is called *dar-cheenee*, indicating that they obtained it from the Chinese; and Professor Wilson has lately proved that there was commerce by sea with China at a very early period, and, what is still more remarkable, that the navigators were Hindus.

The Culilawan bark, often written Culibaban, or Culitlawan, said to be derived from *kulit*, bark, and *lawan*, clove, in some measure resembles Cassia. It is one of those which has been known in Europe since the seventeenth century, but has been little used in modern times, though Blume describes it as possessed of remarkable properties in curing diseases. Analyzed by M. Schloss, it was found to yield a resin, a volatile oil, and a bitter extractive substance. A volatile oil obtained from it in Amboyna is used as a stimulant, according to Labillardiere. It was formerly employed in Europe as an aromatic stimulant, and must be useful in cases where such remedies are indicated. The tree yielding it is a native of Amboyna, and is called Cinnamomum Culilawan by Blume.

The Laurel, or Sweet Bay, now alone remains in the genus Laurus, and is the L. nobilis of Linnæus, a native of the north of Africa and south of Europe, and of Asia; at least it has been so long naturalized in these countries that it would be difficult to ascertain whence it was originally introduced. It is the *δάφνη* of the Greeks, and is known to the Arabs by the name *ghar*, with *zafne* as its Greek synonyme. The berries are even found in Indian bazaars by the name *hubal-ghar*.

The Bay-tree attains a height of 20 or 30 feet, and is cultivated in gardens, not only on account of its elegant appearance, but also for the aromatic fragrance of its leaves, which are evergreen, lanceolate, wavy at the margin, and quite smooth. The flowers are small, four or five clustered together in the axils of the leaves, of a yellowish-white colour, and dotted. The fruit is small, ovate, dark purple coloured, and a little succulent. It is endowed with aromatic properties as well as the leaves, whence both have long been used in medicine as stimulants and carminatives, as well as a fatty oil expressed from the seed, which however, retaining a portion of the volatile oil, has a fragrant smell. The term bachelor has by some been supposed to be derived from the former practice of crowning candidates for honours with bay-leaves and berries, whence the terms *baccalaureus* and laureate.

LAUSANNE, the head town of the Canton de Vaud, in Switzerland, is situated about a mile and a half from the northern shore of the Leman lake, on three steep hills, divided by deep ravines, and which are projections of the ridge of Jorat, on the central high land of the Canton de Vaud. The highest of these ridges, upon which the old cathedral is built, is 500 feet above the lake, and about 1700 above the sea. The situation of Lausanne is picturesque, but the interior of the town is far from pleasing; the streets are mostly narrow, very steep, and ill paved. The cathedral, a vast Gothic structure of the eleventh century, is the handsomest in Switzerland, is adorned with a lofty tower, and also a spire 200 feet high. The church of St. Francis is also a very old building, and is memorable for the council assembled there in 1449, in which Felix V. solemnly resigned the papacy in order to restore peace to the Western church. [AMADEUS VIII.] The castle, formerly the residence of the Bernese bailiffs or governors, is now the government-house, and the legislative council of the canton assembles in one of its halls. The other remarkable buildings of Lausanne are—1, the college, or academy, which contains the various classes of belles-lettres, theology, and law, the normal school, or school for teachers, the cantonal library, with 33,000 volumes, the library for the students, and a museum containing collections of mineralogy, botany, zoology, &c.; 2, the penitentiary, established in 1822, which is considered a model of its kind; 3, the new building of the charity-schools, which are possessed of a capital of about 10,000*l.* sterling; 4, the casino, or club-house; 5, the old episcopal palace near the cathedral, which now contains the hospital, the prisons, and the elementary schools.

At the census of 1835 Lausanne contained 12,030 inhabitants, exclusive of the numerous visitors of all nations who constantly resort to it. The bulk of the inhabitants are of the Swiss Protestant church, and the town is divided into four parishes. There is a Catholic congregation, who built for themselves a church in 1835. The Lutherans have a chapel, which is also used by the English, who are always in considerable numbers here, and for whom there is a clergyman of the Church of England generally residing at Lausanne.

The Canton de Vaud is essentially agricultural, and Lausanne has no extensive or important manufactures. There are above 500 'rentiers,' or persons who are possessed of independent income, about 200 shopkeepers, 400 journeymen labourers or mechanics, 1300 servants, 150 individuals employed under government, 98 inns and public-houses, and about 30 factories of various kinds, tanners, spinners, paper-makers, printers, lithographers, &c. Some trade is carried on in wine, which is the staple produce of the country. (Leresche, *Dictionnaire Geographique de la Suisse*.)

The environs of Lausanne are delightful, on account of the variety of sites, the richness of the vegetation, the numerous fine country-houses with which the neighbourhood is studded, and the splendid scenery embracing the whole basin of the lake, the Alps of Savoy, those of the Valais, and the chain of the Jura. Society at Lausanne is also very pleasant, and easily accessible to strangers. A rapid descent of little more than a mile leads from Lausanne to the village of Ouchy, on the shore of the lake, where the steam-boats from Geneva and Villeneuve daily put in. The house and garden in which Gibbon wrote the greatest part of the 'Decline and Fall' are still shown at Lausanne. Gibbon's library, of more than 2000 volumes, many with marginal notes in his own hand, which had remained at Lausanne ever since his death, was sold a few years since, when most of the books were purchased by Englishmen. [VAUD, CANTON OF.]

LAUSITZ, or LUSATIA, UPPER and LOWER, formed, before the partition of which we shall presently speak, a margraviate, and extended from 50° 50′ to 52° 16′ N. lat., and from 13° 20′ to 15° 15′ E. long. It was bounded on the north by Brandenburg, on the east by Silesia, on the south by Bohemia, and on the west by Saxony. The area was 4336 square miles, and the population about half a million of inhabitants. Upper Lausitz is the larger portion of the margraviate, its area being 2289 square miles. The surface is in general a sandy plain. Along the southern frontier runs a mountain-chain called the Wolische Kamm, which is connected on the east with the Riesengebirge, and on the west with the Erzgebirge. The ridge of this chain, which properly belongs to Bohemia, is the greatest elevation of Upper Lausitz. The rock is granite and porphyry, frequently interrupted by basalt; only on the southern side there is sandstone. Towards the north the country declines into the sandy plain. All the rivers rise in the above mountain-chain, and flow northwards to Brandenburg and Meissen, or eastwards towards Silesia. The principal are the Black Elster, which receives the Schwarzwasser, the Spree, and the Neisse, with their numerous affluents. The first two flow into the Elbe, and the last into the Oder. The Pulsnitz divides Upper Lausitz from Meissen, and the Queiss divides it from Silesia. The alternation of plain and mountainous tracts gives Upper Lausitz a great variety of picturesque and beautiful scenery. Though the country is very carefully cultivated, it produces scarcely half as much corn as the numerous population requires. Flax is grown everywhere, but scarcely a sixth part of what is wanted for the manufactures. Here and there some buckwheat and millet are grown. Potatoes are very abundant. Timber is plentiful in some parts, but scarce in others; it is most abundant in the north-west corner, where resin, pitch, and tar are prepared. The breed of horned cattle is good; that of sheep is much attended to, and has been greatly improved by the introduction of merinos. The Wends (or Vandals) rear great numbers of good horses, and are famous for breeding vast quantities of geese. The breeding of bees has been very particularly attended to, and there is a Bee Society under the patronage of the king of Saxony. In the northsome bog ore is found, which employs a few forges: and large quantities of alum are obtained in the Muskau Heath. In the south there are extensive turf moors, and near Zittau there are mines of coal. The great majority of the population are employed in manufactures; in the towns they make woollens and stockings, and in the villages, several of which have from 3000 to 5000 inhabitants, they weave various sorts of goods, which formerly included linen of all kinds. The damask-weavers of Gross Schonau near Zittau, a village with 4000 inhabitants, manufacture table-linen, the brilliancy and fineness of which have never yet been equalled by any other damask manufactory. The great wholesale trade which the merchants of Upper Lusatia formerly carried on with their manufactures, especially that of linens, has very much declined within these fifteen years; but considerable quantities of woollens and table-linen are still exported to Italy, Russia, and America.

Lower Lausitz, which is the northern part of the margraviate, is the smaller portion, its area being only 2047 square miles. A great portion of it is covered with moving sands, and there are large marshes on the banks of the rivers, the principal of which are the Oder, the Spree, and the Neisse. Agriculture is in a backward state: there are raised however some wheat, barley, and millet for exportation, and tobacco, flax, and hops are cultivated to a considerable extent. Horses and horned cattle are few in number; sheep and swine are in abundance. The breeding of bees is very general. Timber is more plentiful than in Upper Lausitz, and the Spree Wald is a considerable forest. There are no minerals of any importance. The manufactures are linen and woollen; the linen manufacture, though important, is far inferior in extent to that of Upper Lausitz.

After the immigration of the northern hordes Lausitz was inhabited by tribes of the Slavonian Sorbi, the ancestors of the present Wends, who were subdued in 928 by Henry I., king of the Germans, and converted to Christianity in 968 by Otho I. From that time its history presents a continual change of masters. In 1620 Lausitz and Silesia having revolted in consequence of the religious oppression of the emperor Ferdinand II., John George I., elector of Saxony, reduced those provinces to obedience in the name of the emperor, and retained Lausitz as a security for 6,000,000 florins due to him by the emperor for the cost of his expedition. In the treaty of Prague, 1635, it was wholly ceded to the elector as a fief of Bohemia, and remained united with Saxony till the peace of Tilsit, 1807, when the circle of Kottbus, which is wholly surrounded by it, and till then had belonged to Brandenburg, was incorporated with it: but by the decision of the Congress of Vienna in 1815 Saxony was obliged to cede the whole of Lower Lausitz and the half of Upper Lausitz to Prussia; so that the Prussian portion of the antient margraviate has an area of about 3216 square miles, and is divided between the governments of Frankfort and Liegnitz. The part left to Saxony forms the circle of Lausitz, and has an area of 1120 square miles (some writers say only 820, giving 300 more to Russia), with 224,584 inhabitants, of whom 35,000 are Wends, who still retain their own language, which differs very little from the other Slavonian dialects, and have partly their own peculiar costume and many national habits, to which they are passionately attached. They are a well-made, robust, brave, and industrious race of men. (Hassel, *Handbuch*; Stein, *Geog. Lexicon*; Schlieben, *Vaterlandskunde*.)

LAVA, in geology, the most general designation of the mineral substances which are erupted in a melted state from volcanic vents. The situation of volcanos now extinct may often be recognised by their solidified products, even when the characteristic conical figure of volcanic mounds has been destroyed by time; and it is commonly supposed that 'volcanic rocks' may be distinguished from 'trap rocks,' the effects of heat in antient geological periods, by some peculiarities of aggregation, which appear due rather to the dissimilar circumstances under which the lava was solidified than to any essential difference in the chemical constitution or mineral components.

Dr. Daubeny presents, in his 'Essay on Volcanos,' p. 381, the following general view of the appearance and heat of lava: 'When observed as near as possible to the point from whence it issues, it is for the most part a semifluid mass of the consistence of honey, but sometimes so liquid as to penetrate the fibre of wood. It soon cools externally, and therefore exhibits a rough unequal surface, but, as it is a bad conductor of heat, the internal mass remains liquid long after the portion exposed to the air has become solidified. The temperature at which it continues fluid is considerable enough to melt glass and silver, and has been found to render a certain mass of lead fluid in four minutes, which, placed on red-hot iron, required double that time to enter into fusion.'

Lavas vary so much in chemical composition and mineralogical aspect, that it might seem impossible to reduce them to a general rule. Yet as among the older products of heat we distinguish two principal groups depending on the relative abundance of felspar and hornblende (or augite), so among the products of modern volcanos a similar consideration clears away much of the perplexity which belongs to this subject.

According to Von Buch, almost all lavas are to be viewed as a modification of trachyte, consisting essentially of felspar and united with titaniferous iron, to which they owe their colour and their power of attracting iron; they generally contain glassy felspar; and often enclose augite, leucite, hornblende, mica, olivine, specular iron, and many other minerals, developed by crystallization from the fused mass. Trachyte, one of the most prevalent of all volcanic products, consists chiefly of felspar (90 per cent.), and includes almost every conceivable modification between porphyry and obsidian.

Basalt, another of the characteristic volcanic rocks, contains, besides much felspar, a considerable admixture of augite or hornblende, and is rich in oxide of iron, sometimes titaniferous.

If lava were wholly felspathic it would consist principally of silica, alumina, and potash, as in column 1, the average of seven analyses of felspar: if wholly hornblendic, as in column 2, which expresses the composition of hornblende from the Vogelsberg, according to Bonsdorff; if wholly augitic, as in column 3, which is the analysis of black augite from Ætna by Vauquelin.

	(1.)	(2.)	(3.)	(4.)
Silica . .	64·0	42·2	52·0	51·
Alumina .	18·9	13·9	3·3	19·
Lime . . .	0·8	12·2	13·2	9·5
Magnesia .	—	13·7	10·0	—
Potash . .	13·7	—	—	—
Soda . . .	—	—	—	4·0
Oxide of iron	0·8	14·6	14·7	14·5
&c. . . .	—	—	6·8	—

The fourth column gives, for comparison, the result of Dr. Kenneay's examination of the compact lava from Catania. Soda, an ingredient of compact felspar, appears more frequent in lavas than potash, which belongs to common felspar; magnesia is not common, its place in the chemical aggregate being probably occupied by oxide of iron. [AUGITE.]

Trachyte is conjectured by Dr. Daubeny to be derived from granite; and some volcanic products present in their chemical composition a remarkable analogy to that of granite. Obsidian, of which a specimen from Hecla yielded to Vauquelin—

Silica	78	Lime	·1
Alumina	10	Soda	1·6
Potash	6	Oxide of iron	1·

is by the same writer spoken of as derived from trachyte.

In comparison with this we may place the composition of granite as calculated by M. De la Beche from its constituents, viz.:

Silica	74·8	Magnesia	1·0
Alumina	12·8	Oxide of iron	1·9
Potash	7·5	&c.	0·3
Lime	0·4		

The certainty with which the mineral ingredients of lava can be identified depends principally on the degree of crystallization which circumstances have permitted, and this on the rate of cooling and pressure to which the melted masses have been subjected. There is in lava every degree of variation, some specimens being of granitic, others of earthy, compact, resinous, or vitreous texture. Yet in most cases the method of mechanical analysis proposed by Cordier will determine, what very often a lens detects, the real mixture of various minerals in what seems a homogeneous mass. According as felspar or augite predominates, volcanic rocks have been classed, by Cordier and most writers, as trachytic and basaltic. Mr. Scrope (*Journal of the Royal Institution*, vol. xxi.) has proposed an intermediate group to be called greystone. He states that in trachyte, felspar (or its substitute) exists in the proportion of 90 per cent. and upwards, in greystone more than 75 per cent., and in basalt less than 75 per cent. The specific gravity of trachyte is about 2·7, of greystone 3·0, of basalt even 3·5; differences which correspond with their chemical composition. The colours yielded by these rocks, when melted by the blowpipe, afford a good test for the fine-grained sorts. The glass from trachyte is light coloured and nearly transparent; greystone gives a darker glass with green or black spots; basalt is changed to a dark green or black enamel. According to conditions of solidification,—in water, in air, or in fissures of the earth,—the minerals which occur in lava are variously distributed so as to give it porphyritic, amygdaloidal, or concretionary characters; and the masses appear compact, porous, cellular, vesicular, cavernous, spumous, or filamentous—and all these circumstances are observable in glass and other products of artificial heat, which are subject to unequal rates of cooling and under different circumstances. [VOLCANO.]

LAVAL, a town in France, capital of the department of Mayenne, 169 miles west of Paris, through Dreux, Alençon, and Mayenne. The town is situated on the slope of a hill on the right or west bank of the Mayenne, and consists of steep, narrow, crooked, and dirty streets. The principal suburb, which is on the left bank of the Mayenne, is better built: it is about a third as populous as the town. The buildings of the town are mostly antient. There is on the bank of the river an antient castle of great extent: it was in former ages the residence of the dukes of Laval, and, after them, of the dukes of La Tremouille; it is now used as a prison. It has a lofty round keep or donjon. Another building somewhat more modern is used as a court of justice. There are three churches; those of La Trinité and St. Vénérand exhibit a curious mixture of antient and modern architecture. There is a handsome linen-hall in the upper part of the town; and two 'places' or squares laid out as promenades. The population of Laval in 1836 was 17,810. The chief manufacture of the town is of linen-thread, damask table-cloths, and other linen goods, calicoes, handkerchiefs like those of Madras, flannels, and other woven fabrics: there are several tan-yards, and two establishments for sawing marble. Considerable trade is carried on in wool, iron, wood, and seed. There is a large weekly linen market, and five yearly fairs. In the neighbourhood, which is agreeable and fertile, there are potteries, lime-kilns, iron-works, and a marble quarry. The town has two hospitals, a high school, a public library, and a nunnery, according to the rule of La Trappe.

Laval was taken by the Vendeans in 1793. It was the country of Ambroise Paré, father of surgery in France.

LAVA'NDULA SPICA, native of the south of Europe, of which there are two varieties, if not distinct species, termed L. latifolia and L. angustifolia. The former is also called spike lavender, or simply *spike*, and the oil which it yields differs considerably from the oil of L. angustifolia, or L. vera, and is termed oil of spike or foreign oil of lavender. This sort is much less fragrant, of a deeper green colour than the oil of the true lavender, and is merely used in painting, or to adulterate the genuine oil, which is so extensively employed in the preparation of perfumes.

The flowers of the L. angustifolia are the parts employed in medicine. They should be collected before they are expanded, as they are then possessed of a more powerful aromatic odour and a hot bitterish taste. By distillation they yield an oil, which is yellowish, but by rectification becomes nearly white. It has the agreeable strong odour of lavender, and a burning bitterish taste. It is very limpid, but becomes thicker by time. The specific gravity is variable; that of the rectified oil is about 0·872. The freshly-rectified oil of lavender acts on litmus paper, reddening it more powerfully than when a year old. In the cold it deposits a lavender-camphor, or stearopten. It is often adulterated by oil of turpentine and oil of spike. The oil dropped on sugar relieves slight spasms of the stomach; when diffused by alcohol in water it constitutes the spirits of lavender. The compound tincture of lavender is useful in similar cases, and is the best means of covering the disagreeable taste of aloes.

LAVA'TER, JOHN CASPAR, was born in 1741 at Zürich, where his father was a physician. The severity of his mother oppressed his youthful mind, and in his juvenile days he was remarkable for a fantastic solitary disposition, and an aversion to school. He soon discovered a decided tendency to religion, and in early years he had a great predilection for singing hymns and reading the Bible. He made no great progress in philological studies, but had an aptitude at expressing his thoughts and feelings which admirably qualified him for the office of clergyman. In 1763 he travelled through Leipzig and Berlin in the company of Fuseli, and to Barth in Swedish Pomerania to study theology under the celebrated Spalding. In 1764 he returned to his native town, and occupied himself with his duties as a preacher, biblical studies, and poetical composition. The poems of Klopstock and Bodmer had produced an effect on his mind, and in 1767 he published his admired 'Swiss Songs,' and in the following year his 'Aussichten in die Ewigkeit' ('Prospects of Eternity'). In 1769 he was made deacon of the Orphan-house church at Zürich, where the extraordinary effect of his sermons, his immaculate life, and benevolent disposition made him the idol of his congregation, while his printed sermons sent forth his fame to distant parts. His 'Physiognomic Fragments' appeared in 1775, in 4 vols. 4to., a work which has since been translated, abridged, and illustrated in every variety of form. In early life he had become acquainted with men of various characters, and had observed corresponding points of resemblance in the character of their mind and their features; and as he had a disposition to generalize particular observations as much as possible, he endeavoured to raise physiognomy to the rank of a science. He collected likenesses from all parts, made *silhouettes* of his friends, and the result of this pursuit was the celebrated work above mentioned. It is said that in after-life Lavater had less faith in physiognomy than at first. He always firmly clung to his peculiar religious views, which were a mixture of new interpretations with antient orthodoxy, of philosophical enlightenment with extreme superstition. One leading article of his faith was a belief in the sensible manifestation of supernatural powers. His disposition to give credence to the miraculous led him to believe the strange pretensions of many individuals, such as the power to exorcise devils, to perform cures by animal magnetism, &c. Some even suspected him of Catholicism. It is singular enough that while his mystical tendency rendered him an object of ridicule to the party called the *enlightened* (Aufgeklärte), the favour he showed to many new institutions offended some religionists of the old school, who regarded any innovation in the received plans of education with horror. The extent of the prejudices of this last-named class may be gathered from Jung Stilling's life, where the author says that in some German towns the writer of any romance or any song, not being a hymn, was esteemed a free-thinker, and that even his (Stilling's) own religious works, from their being composed in a romance form, gained him that character. However, many of the religious world, even of those not immediately belonging to his congregation, regarded Lavater with great veneration, and, opening a correspondence with him, looked to his letters as the great source of their spiritual consolation. In the latter years of Lavater his writings were less esteemed; his poems were compared with those of more recent German writers, and lost by the comparison; while a free-thinking spirit was on the increase, which checked all sympathy with his warm religious feelings. The lonely position of the old pious and superstitious believers in Germany, at a time when the free-thinking spirit that preceded the French Revolution made constant innovations on all they held sacred, is pathetically described in the last part of Stilling's 'Life.' The beginning of the Revolution Lavater regarded with pleasure; but his love changed to horror after the decapitation of the king. On the appearance of the Revolution in Switzerland, he mounted the pulpit with the greatest zeal, and there, as well as in all public assemblies, declaimed against the French party with an excess of animation and courage. When, on the 26th September, 1799, Massena took Zürich, Lavater, who was busied in the streets exciting the soldiery and aiding the sufferers, was shot by a grenadier. It is said that this grenadier was not one of the enemy, and that the act was that of an assassin; and it is further supposed that Lavater knew the man, but from a Christian spirit of forgiveness never betrayed him. He suffered a long time from this wound, but did not die till the beginning of 1801. During his illness he wrote some papers on the times and some poems, which are considered to be among his best productions.

LAVAUR. [Tarn.]

LAVENDER, the name of hoary, narrow-leaved, fragrant bushes, inhabiting the south of Europe, the Canaries, Barbary, Egypt, Persia, and the west of India, with generally blue flowers, arranged in close terminal simple or branched spikes. Twelve species are described, of which two only are of general interest, namely, the common Lavender (*Lavandula vera*) and French Lavender (*L. spica*), both natives of sterile hills in the south of Europe and Barbary. The former yields the fragrant *oil of lavender*, so extensively employed in perfumery; and the latter *oil of spike*, employed by painters on porcelain, and in the preparation of varnishes for artists.

LAVER, a substance sometimes used as food, consists of the fronds of marine plants belonging to the genera Porphyra and Ulva. Common purple laver is furnished by Porphyra laciniata and vulgaris, two species common on rocks and stones in the sea on many parts of the British coast. They derive their botanical name from their beautiful purple or violet colour, which is produced entirely by the multitudes of spores, arranged in twos, threes, or fours, with which the whole frond is filled. Green laver is the Ulva latissima, a very common plant in the sea on rocks and stones, not only in Great Britain, but also on the coasts of India, New Holland, the Cape of Good Hope, and South America. According to Lightfoot the Scottish Islanders ascribe to it anodyne properties, and bind it about the temples to assuage the pain of headache in fevers, and to procure sleep.

In the Western Isles of Scotland, we are informed by the same authority, the inhabitants gather it in the month of March; and after pounding and stewing it with a little water, eat it with pepper, vinegar, and butter; others stew it with leeks and onions. In England laver is usually stewed and rendered palatable with lemon-juice; to many persons it is however nauseous, and it has been suggested that its introduction to fashionable tables was the sly contrivance of some medical practitioner who wished to prescribe it for the benefit of his scrofulous patients. (Greville's *Algæ Britannicæ*, p. 169.)

LAVOISIER, ANTOINE LAURENT. This distinguished and truly eminent chemical philosopher was born at Paris on the 16th August, 1743. His father, who was opulent, spared no expense in his education, in which he acquired at the College Mazarin a profound knowledge of astronomy, mathematics, botany, and chemistry.

After some hesitation as to what particular science he should more particularly dedicate himself, he was determined in the choice of chemistry by the brilliant discoveries with which Dr. Black and others had then recently enriched that science. When only twenty-one years of age he obtained the prize offered by the government for the best essay on lighting the streets of Paris; and it is stated, that in order to enable himself to judge of the intensity of the light afforded by lamps, he kept himself during six weeks in a room from which the light of day was entirely excluded.

In 1768 he was admitted an associate of the French Academy, and finding that he incurred considerable expense in the prosecution of his chemical researches, he asked, and in 1769 obtained, the appointment of one of the farmers-general of the revenue, and his purse and his laboratory were equally open to the young inquirers in science. He was afterwards appointed to superintend the numerous saltpetre-works of France.

During the reign of terror he was accused of having, as a farmer-general, mixed water and noxious ingredients with tobacco: to avoid arrest he secreted himself for some days; but hearing that his colleagues, and among them his father-in-law, were imprisoned, he voluntarily surrendered himself, and was condemned to death. In answer to a request for a respite of some days, in order to finish some experiments with which he had been recently engaged, and which he stated were of importance to the interests of mankind, he was coldly informed by the public accuser that the republic had no need of chemists, and that the course of justice could not be delayed. Deeply regretted by every man of science and by the numerous friends whom his amiable manners had attached to him, he was consigned to the guillotine on the 8th May, 1794, leaving a widow, who many years afterwards was married to Count Rumford.

His publications were numerous and highly important; for besides the larger works which we shall presently mention, he was the author of nearly sixty memoirs printed in the 'Memoirs' of the Academy, and other periodicals. His principal separate works are: 'Opuscules Chimiques et Physiques,' 2 vols. 8vo., 1775; 'Traité Elementaire de Chimie,' 2 vols. 8vo., 1789; 'Instructions sur les Nitrières, et sur la Fabrication de Salpêtre,' 8vo., 1777.

In a posthumous and incomplete publication, consisting of two octavo volumes, entitled 'Mémoires de Chimie,' Lavoisier, alluding to the term commonly employed of the *French theory*, claims it entirely and exclusively as his own; and although it will be impossible for us to enter minutely into a consideration of the Lavoisieran or antiphlogistic theory, yet we shall state, from his 'Elemens de Chimie,' his peculiar views on some important subjects, and one of the first of these is the nature of heat. Having mentioned its expansive and repulsive powers, he says that 'it is difficult to comprehend these phenomena without admitting them as the effects of a real and material substance, or very subtile fluid, which insinuating itself between the particles of bodies separates them from each other.' He admits that the doctrine is hypothetical, but asserts that it explains the phenomena of nature in a satisfactory manner, and that considering it as the cause of heat, or the sensation of warmth, he at first gave it the name of *igneous fluid* and *matter of heat*, but afterwards, in a work on chemical nomenclature by himself, Morveau, and Berthollet, he adds, 'We have distinguished the cause of heat, or that exquisitely elastic fluid which produces it, by the term of caloric, without being obliged to suppose it to be a real substance, but as the repulsive cause which separates the particles of matter from each other.' *Free* caloric he defines to be that which is not united in any way with any other body; *combined* caloric is that which is fixed in bodies by affinity or elective attraction, so as to form part of the substance of the body; and by *specific* caloric of bodies he understands the respective quantities of caloric requisite for raising a number of bodies of the same weight to an equal temperature, and the proportional quantity depends on the *capacity* of bodies for caloric.

His analysis of atmospheric air and the re-combination of its elements, though not quite correct, was nevertheless ably conceived and executed. He heated some mercury in a mattrass connected with a glass receiver with about 50 cubic inches of atmospheric air; he then found that a portion of the mercury was converted into small red particles, which did not increase after the heat had been continued for twelve days; and he then observed that only about 42 of the 50 cubic inches of atmospheric air remained unabsorbed, and this he found was no longer fit for respiration or combustion. On submitting the red particles of mercury to heat, they were separated into mercury and about 8 inches of gas, which eminently supported both respiration and combustion; and having several times repeated the experiment, he mixed the residual unabsorbed portion of the air with that which was obtained by heating the red particles of mercury, and he found that air was reproduced precisely similar to that of the atmosphere, and possessing nearly the same power of supporting respiration and combustion.

Lavoisier admits that the experiment does not show the exact quantity of the two airs which constitute the atmosphere, for he states that the mercury will not separate the whole of the respirable portion, and consequently part of it remains 'united to the mephitis.'

Lavoisier also mentions some experiments which he performed with this highly respirable air thus obtained by the intervention of mercury from the atmosphere, and he notices the brilliant effects of the combustion of charcoal and phosphorus, and adds, 'This species of air was discovered almost at the same time by Dr. Priestley, M. Scheele, and myself. Dr. Priestley gave it the name of *dephlogisticated air;* M. Scheele called it *empyreal air;* I at first named it *highly respirable air,* to which has since been substituted the term of *vital air.*'

It is greatly to be regretted that so eminent a philosopher should so far have forgotten what was due both to others and himself as to have made such a statement as this. It was one of the last acts of Dr. Priestley to publish, however unwillingly, that he first stated to Lavoisier himself, at his own table in Paris, in the year 1774, the fact of his having discovered this gas, in the presence of persons whom he names. Nor indeed is this the only instance, to use a gentle expression, in which Lavoisier exhibited a want of candour unworthy, not merely of a philosopher, but of a man. (See the *Doctrine of Phlogiston established,* by Dr. Priestley, Northumberland, 1800.)

In 1778 he published a paper in the Memoirs of the Academy, entitled 'General Considerations on the Nature of Acids, and on the principles of which they are composed.' In this paper it is attempted to be proved that all acids owe their properties to the presence of oxygen, and that when bodies were deprived of oxygen they lost their acidity. This doctrine of the universal acidifying power of oxygen was generally adopted until Davy proved that what had been called oxymuriatic acid had not been decomposed, and that with hydrogen it formed muriatic acid; he first however distinctly proved that certain bodies, such as carbon and sulphur, were actually converted into acids by the union with oxygen; but by a too hasty generalization he was led to adopt principles which the further progress of science has proved to be untrue.

It is to be observed that Lavoisier did not discover any one of the elementary gaseous fluids. Mr. Cavendish had clearly described the properties of hydrogen before he began his career; and oxygen, azote, and chlorine were discovered, the two first in Britain and the last in Sweden, after Lavoisier commenced his chemical researches. In one particular case he indeed denies the existence of a well known fact, namely, that gunpowder can be fired in vacuo, but then the fact is irreconcilable with his theory.

The inquiries of Lavoisier had the principal share in introducing that reform in the nomenclature of chemistry which ended in the expulsion of the phlogistic theory; and it is correctly stated by Professor Brande, 'that in this reform Lavoisier took the lead, and though his original investigations connected with it are few and comparatively unimportant, he availed himself with so much skill of the labours of others, by placing them in new points of view and exhibiting their unexpected applications, as to render them almost his own. Lavoisier's character has, in some measure, suffered by the misguided zeal of his admiring commentators, who, not satisfied with allowing him due merit for the logical precision and sagacity of induction which he brought into chemistry, have represented him as having the experimental activity of Priestley and the laborious diligence of Scheele. But Lavoisier, though a great architect in the science, laboured but little in the quarry; his materials were chiefly shaped to his hand, and his skill was displayed in their arrangement and combination.'

LAVO'RO, TERRA DI, a denomination meaning 'a tract of good arable land,' is the modern name of a province of the kingdom of Naples, corresponding to the greater part of the antient Campania Felix. [CAMPANIA.] It is bounded on the north by Abruzzo, on the east by the province now called Sannio and formerly Contado di Molise, on the south by the province of Naples, on the west by the Mediterranean, and on the north-west by the Campagna di Roma in the Papal State. The boundary-line between the two states runs nearly parallel to, and at a short distance from, and sometimes on the right and sometimes on the left bank of the Upper Liris, beginning above Sora, which is near the northern extremity of Terra di Lavoro, at the foot of the Apennines of Abruzzo, down to the confluence of the Sacco with the Liris below the Papal frontier town of Ceprano. From that point the boundary-line diverges from the Liris to the westward, and follows a mountainous ridge which forms part of the chain of the Mounts Lepini, separating the basin of the Liris from that of the Pomptine Marshes, and terminating abruptly on the coast at Terracina. Two roads lead from the Papal State into the province of Terra di Lavoro; one by Terracina between the mountains and the sea-shore, and the other by the valley of the Sacco, which opens into the valley of the Liris at Ceprano. This last road, which follows the track of the antient Via Latina, has been comparatively neglected, although it offers the shortest and pleasantest communication between Rome and Naples, until 1831, when the present king of the Two Sicilies, Ferdinand II., restored the carriage-road from San Germano to Ceprano by way of Arce, and built a bridge over the Melfa, a mountain-stream which is an affluent of the Liris.

The province of Terra di Lavoro spreads in a semicircular shape between the lower ridge of the Apennine chain, which divides it from the inland provinces of the kingdom, the shores of the Mediterranean sea, and the volcanic group of mountains which encircle the bay of Naples, and which are included in the metropolitan province. Terra di Lavoro is divided into five districts, namely. 1. Nola, to the south-east, which embraces the fertile plain between the group of Mount Vesuvius and the Apennine ridge, which bounds on the south the valley of Avellino and Benevento. [AVELLINO.] The plain of Nola looks like an immense grove of tall elms and poplars planted in rows to support the vines which grow at their feet, and which twist around them, and hang in festoons from tree to tree. Between the lines corn and pulse are sown without fallows; but in order to prevent the ground from becoming exhausted, early crops of lupines and beans are raised, which are hoed up before they bear fruit, and are buried for manure. The soil is a rich sandy loam. 2. West of Nola is the district of Caserta, which includes the central part of Campania, and is watered by the Volturno. The plains of Caserta and Capua near the mountains are tolerably healthy, well cultivated, and extremely productive; but the lower plain of the Volturno, from Capua to the sea, is very unhealthy: it is chiefly occupied by herds of horned cattle. The stream Sapone, which rises in the hills above Teano and spreads into the plain below north-west of the Volturno, forming pools of stagnant water, contributes to poison the atmosphere of this region. A range of hills, the Massicus of the antients, here divides the basin of the Volturno from that of the Liris or Garigliano. 3. West of the above range begins the district of Gaëta, which includes the lower valley of the Liris and the plain of Fondi, which is separated from the Liris by the mountains of Itri, or Formian Mount. The low lands of the Garigliano are as unhealthy and desolate as those of the Volturno; but where the Formian Hills stretch near the coast the country is healthy, fruitful, and well cultivated. The plain of Fondi is very unhealthy, owing to a stagnant lake near that town. 4. North of Capua and beyond the defiles of Mount Tifate, the district of Piedimonte occupies the valley of the Upper Volturno to beyond Venafro, and as far as the great chain of the Apennines of Abruzzo. This part of the country is healthier, the low lands are cultivated with wheat and maize, and the lower slopes of the mountains are planted with olive trees, while the higher grounds afford pasture or are covered with chestnut trees. 5. North-west of the district of Piedimonte, and divided by it from an offset of the Apennines, lies the district of Sora, which embraces the valley of the Upper Liris. This is in great measure a mountainous district, cold in winter, different in character from the rest of the province, and partaking of the nature and climate of Abruzzo. The people are healthy and industrious, and fairer complexions, especially among the women, are to be found in this district than in the maritime parts of the country. Keppel Craven, in his 'Excursions into the Abruzzi,' 2 vols. 8vo., London, 1837 has given the latest account of the inland districts of Terra di Lavoro.

The population of the five districts is as follows:—Nola, 117,500 inhabitants; Caserta, 193,000; Piedimonte, 86,000; Gaëta, 102,650; Sora, 102,800. The population is essentially agricultural; and by the last census there were 135,546 men employed in agriculture, who, with their families, might be reckoned to constitute about three-fourths of the population. There were also 7692 shepherds, and only 500 seamen. The clergy consisted of 3470 priests and 825 monks: there were also 1732 nuns. Good silks are made in the royal manufactory of Santo Leucio, near Caserta; cottons and woollens at Piedimonte; common woollen cloth at Arpino; and there are extensive tanneries at Santa Maria di Capua.

The principal towns of the province of Terra di Lavoro are:—1. Caserta, which is the residence of the intendente, or governor of the province, and of the civil and criminal courts, has 12,000 inhabitants, and is remarkable for the adjoining palace and gardens, which form one of the most magnificent royal residences in Europe. The two principal fronts of the palace are 787 feet in length, and contain four stories of 37 windows each; the two other sides are 616 feet long, and consist also of four stories of 27 windows. In the interior are four courts, and in the centre of the palace is a superb staircase, crowned by a circular hall, affording communication with the various sets of apartments. The richest marbles are displayed in profusion, most of them being from the quarries of the kingdom. Swinburne, in his 'Travels,' gives a list of them, amounting to 21 different sorts. The chapel is cased with pannels of yellow marble and adorned with paintings. The theatre is a masterpiece of art; antique columns of alabaster support the roof and divide the house into forty-six boxes, richly decorated. The gardens are adorned with an artificial cascade, the water of which is brought by an aqueduct from the neighbouring mountains. 2. Nola, a very old town and a bishop's see, with 9000 inhabitants, contains several churches and convents, and extensive barracks. A quantity of pottery has been dug up in the neighbourhood, resembling the Etruscan vases, and known by the name of Nolan or Campanian vases. 3. Maddaloni, a pretty town at the foot of the mountains, has a royal college and 10,000 inhabitants. 4. Capua, on the Volturno. 5. Santa Maria di Capua has 9000 inhabitants, and a considerable inland trade. In the immediate neighbourhood are the remains of the amphitheatre of antient Capua, which stood near the present site of Santa Maria. 6. Between Capua and Naples is the pretty town of Aversa. North of Capua are:—7. The modern town of Piedimonte, which is near the site of the antient Allifæ, and is well built; the inhabitants, who amount to 10,000, have an appearance of industry and comfort above their neighbours. 8. Venafro, on the high road to Abruzzo, in a country abounding with olives, has 3000 inhabitants. 9. Cajazzo, with 5000 inhabitants. 10. San Germano, a modern town with 5000 inhabitants, and a secondary or grammar school, is situated on the road leading to Rome by the valley of the Sacco, and near an important frontier pass between the two states. The monastery of Monte Casino is on a steep hill above San Germano. 11. Sora, higher up the Liris, at the foot of the Apennines, is a bishop's see, and has several churches and 7000 inhabitants. 12. Isola di Sora, in an island of the Liris, which forms a fine cascade above it, has 3000 inhabitants, and paper, iron, wire, and cloth manufactories. 13. Arpino. 14. Aquino. 15. Atina, among the mountains, in a healthy situation, has 8000 inhabitants and many antiquities. Its women are celebrated for their beauty. 16. Sessa (Suessa Aurunca), on a hill not far from the high road to Rome, has 4000 inhabitants, several churches and convents, and some remains of antiquity. 17. Teano, once the capital of the Sidicini, has now 4000 inhabitants, a cathedral, and seminary. A few miles south of Teano is Calvi, the antient Cales, now deserted on account of the bad air. Farther west the high road to Rome passes over a fine suspension bridge which has been lately thrown over the Garigliano, or Liris, by the present king Ferdinand II. Not far from this spot stood the antient Minturnæ. Beyond it is (18) Gaeta. Next, passing through Itri, which is perched on a steep mountain, and is remarkable for its wretched appearance and the squalid look of its inhabitants, we reach (19) Fondi, a bishop's see and a frontier town, near the borders of the Papal State, in a fertile but unhealthy plain, with 5000 inhabitants, and some remains of antient walls, of the construction called Cyclopean. The antient Via Appia, with its old pavement, forms the principal street of the town.

In the valley of the Liris is the town of Pontecorvo, belonging to the Pope, with a small territory, surrounded on all sides by the Neapolitan province of Terra di Lavoro; it has a population of 6500 inhabitants.

The area of the province of Terra di Lavoro is reckoned at 2310 English square miles; and it contains thirty towns and 412 villages and hamlets. (Petroni, *Censimento dei Reali Dominj di quà dal Faro;* Neigebaur, *Gemälde Italiens;* Serristori, *Saggio Statistico;* Sir R. Colt Hoare; Keppel Craven, &c.)

LAW. In treating of the word *law* we will first explain its etymology, and the etymology of the equivalent words in the principal languages of the civilized world; we will next determine the strict and primary meaning of law, together with its various secondary meanings; we will afterwards state the most important species of law, in the strict sense of the word; and finally, we will make a few remarks on the origin and end of law.

1. *Etymology of Law, and the equivalent words in other languages.*—In the Greek language the most antient word for law is *thémis* (θέμις, which contains the same root as τίθημι), meaning 'that which is established or laid down.' In Homer θέμις signifies a rule established by custom, as well as by a civil government: it also signifies a judicial decision or decree, a legal right, and a legal duty. (*Iliad*, i. 238; *Od.* xiv., 56; *Od.*, xvi., 403; *Il.*, xi. 770; *Il.*, ix. 156, 298; and see Passow in v.) θεσμὸς and τεθμὸς are two very antient Greek words, having the same origin and meaning as θέμις. The common Greek word for law, after the Homeric period, is νόμος, which first occurs in the 'Works and Days' of Hesiod (v. 274-386, Gaisford), and contains the same root as νέμω, to *allot* or *distribute.* The only word which the Greek language possessed to signify a *legal right* was δίκαιον, or δικαίωμα. (See Hugo, *Geschichte des Römischen Rechts*, p. 962, ed. xi.)

Jurisprudence was never cultivated as a science by the Greeks before the loss of their independence. Many causes concurred to prevent the Greeks from adding jurisprudence to the numerous subjects which they first subjected to a scientific treatment. The chief of these causes was perhaps the generally *arbitrary* character of the Greek tribunals, both in the democratic and oligarchical states. The Lacedæmonians had no written laws (see Aristotle's account of the jurisdiction of the Ephors in *Polit.*, ii. 9; compare Müller's *Dorians*, b. iii., ch. 6, s. 2; ch. 11, s. 2; and see Justinian's *Institutes*, lib. i., tit. 2, s. 10), and they were besides too great contemners of learning and science to cultivate law in a systematic manner. The Athenians possessed a considerable body of written laws, and, with their extraordinary talent both for speculation and action, they would probably have contributed something towards reducing law to a science, if the large numbers of the judges (δικασταί) in their courts had not led to a popular and rhetorical treatment of the questions which came before them, and, by diminishing the sense of personal responsibility, facilitated arbitrary decisions. (Xen., *Mem.* iv. 4, 4.)

For the first scientific cultivation of law the world is indebted to the Romans. 'How far our ancestors,' says Cicero, 'excelled other nations in wisdom, will be easily perceived on comparing our laws with the works of their Lycurgus, Draco, and Solon; for it is incredible how rude and almost ridiculous every system of law is, except that of Rome.' ('Incredibile est enim, quam sit omne jus civile, præter hoc nostrum, inconditum ac pœne ridiculum.' *De Orat.*, i. 44.) Apart from the general ability of the Romans in the business of civil and military government, the systematic cultivation of law in Rome is perhaps owing chiefly to the fact that the Roman tribunals were composed of a single judge, or magistratus. (Hugo, *Ibid.*, p. 345.) The persons filling the offices of *prætor urbanus* and *prætor peregrinus* (the magistrates who ultimately exercised the chief civil jurisdiction) were changed annually; and it was found convenient that every new prætor should, on his accession to his office, publish an authentic statement of the rules which he intended to observe in administering justice. In process of time these rules, known by the name of the *prætor's edict*, were handed down, with little alteration, from one prætor to another; and they furnished a text for the commentaries of the Roman lawyers, many of whose expository writings were drawn up in the form of treatises *ad edictum.*

The scientific cultivation of law among the Romans naturally led to the formation of a technical legal vocabulary in their language. The Latin is accordingly very rich in legal terms, many or most of which have been retained in the modern languages of western Europe, especially in those countries whose legal systems are founded on the Roman law. The only terms, however, with which we are at present concerned are those which denote the most general notions belonging to the subject of jurisprudence. *Lex*, which has the same etymological relation to *lego* that *rex* has to *rego*, meant properly a measure proposed by a magistrate in the *comitia*, or assembly of the people. A *lex* was not necessarily a rule, and might relate to a special case (Hugo, *Ibid.*, p. 327); but as most of the *leges* proposed by the magistrates were general, the word came to signify a written law. *Jus* denoted law generally, whether written or unwritten; it also denoted a legal right or faculty. *Lex* signified '*a* law;' *jus* 'law' generally. (Austin's *Province of Jurisprudence*, p. 307.)

The Romance languages have retained the word *lex* in the Latin acceptation (*legge* Italian, *ley* Spanish, *loi* French). They have however lost the word *jus* (though they retain many of its derivatives), and have substituted for it words formed from the passive participle of *dirigo* (*diritto* Italian, *derecho* Spanish, *droit* French), probably after the analogy of the German *recht*.

Nearly all the Teutonic languages (including the Anglo-Saxon) possess some form of the word *recht*, with a double sense equivalent to the Latin *jus*, namely, *law* and *faculty*. The modern English uses *right* in the sense of *faculty* alone. The High German has *gesetz* (from *setzen*, 'to place,' like θεσμὸς and θέμις), for a written law equivalent to *lex*. The Low German languages have, instead of *gesetz*, a word formed from *legen*, to lay down, which in Anglo-Saxon is *laga* or *lag*, in modern English *law*. The word *law* however, in modern English, has not the limited sense of *gesetz*, but is coextensive with the Latin *jus*, when the latter does not signify *faculty*. We do not wish to dwell unnecessarily on these etymologies, but we will shortly notice that, besides *regt*, the Dutch language has the word *wet* in the sense of *law*. This word is derived from the antient *withan*, Gothic, 'to bind,' and is equivalent etymologically to the Latin *obligatio*. The English verb *to wed* is the same word. *Ehe*, which signifies *marriage* in modern German, originally meant *law* or *ordinance* (*Nibelungen Lied*, v. 139, 5061); so that the Dutch *wet* and the English *wed* stand to one another in the same relation as the antient and modern senses of *ehe*.

2. *Proper and improper Meanings of the word Law.*—A *law*, in the strict sense of the word, is a general command of an intelligent being to another intelligent being.[*] Laws established by the sovereign government of an independent civil society are styled *positive*, as existing by *positio*. [Sovereignty.] When law is spoken of simply and absolutely, *positive* law is always understood. Thus in such phrases as 'a lawyer,' 'a student of law,' 'legal,' 'legality,' 'legislation,' 'legislator,' &c., positive law is meant. Positive law is the subject-matter of the science of jurisprudence. [Jurisprudence.] Every general command of a sovereign government to its subjects, however conveyed, falls under the head of positive laws. The general commands of God to man (whether revealed or unrevealed) are called the laws of God, or the Divine law: they are sometimes also known by the name of 'natural law,' or 'law of nature.' The Divine law (according to the phraseology just explained) is the standard to which all human laws ought to conform. On the mode of determining this standard some remarks will be made lower down.

Besides positive law, which is known to be a command enforced by a sanction[†], and the Divine law, which is presumed to be so, there are some classes of laws which are not commands, though they bear an analogy, more or less remote, to laws properly so called. Thus by the term 'law of nations,' or 'international law,' are signified those maxims or rules which independent political societies observe, or ought to observe, in their conduct towards one another. An independent political society is a society which is not in the habit of rendering obedience to a political superior; consequently, an independent political society cannot receive a command or be subject to a law properly so called. But inasmuch as the maxims of international morality are general, and determine men's wills by the fear of provoking the hostility of other independent societies against their own country, there is a close analogy between the so-called 'law of nations' and positive law. We may here remark incidentally that the term 'jus gentium,' as used by the Roman lawyers (with whom it originated), has a totally different meaning from 'law of nations,' as used in modern times. According to their phraseology, *jus civile* consists of those rules of law which are peculiar to any independent state; *jus gentium* consists of those rules of law which are common to all nations. ('Quod quisque populus ipse sibi jus constituit, id ipsum civitatis est, vocaturque *jus civile*, quasi proprium jus ipsius civitatis. Quod vero natura vel ratio inter omnes homines constituit, id apud omnes perseque custoditur, vocaturque *jus gentium*, quasi quo jure omnes gentes utuntur.' *Inst.*, lib. i., t. 2, s. 1, and Gaius, i. 1.) In the language of the Roman jurists *jus naturale* is commonly equivalent to *jus gentium*. (See *e.g. Inst.*, lib. i., t. 2, s. 11.) Concerning a peculiar meaning attributed to *jus naturale* in a passage of Ulpian (*Dig.*, lib. i., tit. 1, fr. 1, s. 3; *Inst.*, lib. i., tit. 2, *ad. init.*), see the remarks of Mr. Austin, in his 'Province of Jurisprudence,' p. 108. Other classes of laws not imperative, but having as close an analogy to laws proper as the maxims composing international law, are the 'law of honour' and the 'law of fashion;' the laws of certain sports and games, such as the laws of the turf, the laws of whist, cricket, chess, &c., also stand in a similar predicament. The term *law* is also employed in certain cases where the analogy to laws properly so called is much more remote. Instances of this usage are such expressions as the 'laws of motion,' the 'law of attraction or gravitation,' the 'law of mortality' in a given country, the 'law of population,' the 'laws of human thought,' the 'law of a mathematical series.' In laws of this class (which may be styled 'metaphorical laws') there is no command and no intelligence to work upon; nothing more is signified than that there is a certain uniformity of phenomena, analogous to the uniformity of conduct produced in men by the operation of a law properly so called. [Analogy, p. 488.]

3. *Species of Positive Law.*—The positive laws of any country, considered as a system, may be divided with reference to their *sources* (or the modes by which they become laws) into *written* and *unwritten*. This division of laws is of great antiquity; the expression *unwritten laws* occurs in Xenophon's 'Memorabilia,' in a conversation attributed to Socrates (iv. 4, 19), in the 'Antigone' of Sophocles (v. 450-7, comp. *Aristot. Rhet.*, i. 13, 2), in the 'Republic and Laws of Plato' (v. 563 and 793, ed. Steph.), and in Demosthenes (*Aristocrat.*, p. 639, ed. Reisk.). In these passages it appears to signify those rules of law or morality which (being founded on obvious dictates of utility) are nearly common to all countries. Unwritten law, in this sense, nearly corresponds with the *jus naturale* of the Roman lawyers. In the language of the Digests and the Institutes, the terms *written* and *unwritten law* ('jus quod constat ex scripto aut ex non scripto') are used in a more precise manner, to signify those laws which had been promulgated by the Roman legislature in writing, and those rules of law which had been tacitly adopted by the same legislature from usage.[*] For (as it is stated in a passage of the Digests) 'since the laws derive their binding force from nothing but the decision of the people, it is fitting that those rules which the people have approved of without reducing them into writing should be equally obligatory. For what difference is there whether the people declares its will by vote, or by its conduct?' ('Quum ipsæ leges nulla alia ex causa nos teneant quam quod judicio populi receptæ sunt, merito et ea quæ sine scripto populus probavit, tenebunt omnes; nam quid interest, suffragio populus voluntatem suam declaret, an rebus ipsis et factis?' *Dig.*, lib. i., t. 3, fr. 32.)

Sir William Blackstone divides the law of England into 'the *lex non scripta*, the unwritten or common law, and the *lex scripta*, the written or statute law.' 'The *lex non scripta*, or unwritten law (he further says), includes not only general customs, or the common law properly so called, but also the particular customs of certain parts of the kingdom; and likewise those particular laws that are by custom observed only in certain courts and jurisdictions.' 'When I call these parts of our law *leges non scriptæ* (he proceeds to say), I would not be understood as if all those laws were at present merely *oral*, or communicated from the former ages to the present solely by word of mouth. It is true indeed that, in the profound ignorance of letters which formerly overspread the whole Western world, all laws were entirely traditional, for this plain reason, because the nations among which they prevailed had little idea of writing. . . . But with us, at present, the monuments and evidences of our legal customs are contained in the records of the several courts of justice, in books of reports and judicial decisions, and in treatises of learned sages of the profession, preserved and handed down to us from the times of highest antiquity. However, I therefore style these parts of our law *leges non scriptæ*, because their *original* institution and authority are not set down in writing.' (1 *Com.*, p. 63.) In this passage Blackstone clearly explains that unwritten law is so called, not because it does not exist in writing, but because it was not promulgated by the legislature in a written form. His statement of the sorts of laws severally comprehended by the classes of written and unwritten law in England is erroneous. Written law comprehends not only the statutes made by the parliament or supreme legislature, but also the written regulations issued by subordinate legislatures, as orders in council, and rules of court made by the judges. Unwritten law, moreover, comprehends not only the common law which is administered by the courts styled 'courts of common law,' but also the greatest part of the law styled 'equity,' which is administered by the courts styled 'courts of equity.'

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[*] 'Lex nil aliud quam *regula imperans*,' says Bacon, *De Augm. Scient.* lib. viii., aph. 83. The word *regula*, or *rule*, is ambiguous: it sometimes signifies a *norma*, maxim, or canon simply; it sometimes signifies a *norma*, maxim, or canon, accompanied with a command. Moreover, it is a metaphor to say that the rule or *norma* itself commands. Bacon's definition would therefore be more precise if expressed as follows:—'Lex est norma summi imperantis.'

[†] A sanction is the evil with which any one is visited in consequence of disobedience to a command.

[*] The distinction of law into written and unwritten does not seem to have been regularly made by the Roman jurists; for it does not occur in Gaius, from whose Commentaries the substance of the second title of the first book of the Institutes is borrowed. The distinction in question is introduced, both in the Digests and the Institutes with a reference to the Greek writers, doubtless philosophers.

Unwritten law has been called by Mr. Bentham *judge-made law;* a name which correctly denotes the mode by which it becomes law.

It may be remarked that a written law is called *a* law, but that a rule of unwritten law is never called *a* law. This phraseology corresponds to the distinction between *lex* and *jus*, and *gesetz* and *recht*, which was explained above.

Positive laws are also divided, according to their *source*, into laws made by *supreme*, and laws made by *subordinate* legislatures. In other words, laws may be issued by the sovereign legislature, or by functionaries deriving their authority from the sovereign legislature.

The *sources* of law are not unfrequently confounded with its *causes;* in other words, with the facts which induce the sovereign to invest certain maxims with the legal sanction. Thus it is fancied that a rule of customary or consuetudinary law exists as law, by virtue of custom or usage, and not by virtue of the authority of the sovereign or his representative, who has imparted to it a binding force. This subject is clearly explained in Mr. Austin's 'Outline of a Course of Lectures on General Jurisprudence,' pp. 10, 11.

The laws of a state, considered as a system, may be divided, with reference to their *subject-matter*, into *public* and *private*. The division of *jus* into *jus publicum* and *jus privatum* originated with the Roman jurists, and occupies a conspicuous station at the beginning of the Digests and Institutes. No trace of this division exists, as far as we are aware, in any Greek author. *Jus publicum* is defined to be 'quod ad statum rei Romanæ spectat,' 'quod in sacris, in sacerdotibus, in magistratibus consistit.' *Jus privatum* is that 'quod ad singulorum utilitatem pertinet.' The institutional treatises of the Roman lawyers appear to have been confined to *jus privatum;* the Institutes of Justinian do not touch upon *jus publicum*, except in the final chapter *De Publicis Judiciis*, and this chapter is wanting in the Commentaries of Gaius, on which the Institutes of Justinian are mainly founded. Hence it appears that the Roman lawyers included under *jus publicum* not only the powers of the sovereign, and the rights and duties of persons in public conditions, but also criminal law. Their definition of *jus publicum*, however, does not properly include criminal law, and the term, as used by later writers, has not in general this extension. *Publicus* is the adjective of *populus*, and signifies that which belonged to the sovereign body of citizens; hence *jus publicum* signified that law which concerned the government of Rome, and its magistrates and other functionaries. *Privatus* seems to have meant originally that which was *separated* or *set apart* from any common stock; hence it came to signify that which did not concern directly the *public* or state.

The formal division of law into public and private is not to be found in the institutional treatises of English law. It is however used by Lord Bacon, in his treatise 'De Augmentis,' lib. viii., aph. 80; where he advises that, after the model of the Roman jurists, *jus publicum* should be excluded from institutional treatises.

Sir W. Blackstone, in the first book of his 'Commentaries,' treats of the rights and duties of persons, in their public and private relations to each other (pp. 146, 422). The former branch of this division, which occupies chapters 2 to 13, comprehends *jus publicum*, in its limited sense, which nearly corresponds to the English term 'constitutional law.' The *droit politique* or *constitutionnel* of Mr. Bentham, in his 'Traités de Legislation' (tom. i., p. 147, 325-6, ed. 1802), is also equivalent to *jus publicum*, in its strict sense. (Austin's *Outline*, p. lxvii.)

Positive law is further divided, with reference to its subject, into the *law of persons* and the *law of things*. The Roman jurists, who were the authors of this division, arranged these two classes under the head of *jus privatum*, together with a third, viz. the *law of actions*, or of judicial procedure. A full explanation of this important division is not consistent with the purpose of the present article: we extract a brief and lucid statement of it from Mr. Austin's 'Outline' already cited. 'There are certain rights and duties, with certain capacities and incapacities to take rights and incur duties, by which persons, as subjects of law, are variously determined to certain classes. The rights, duties, capacities, or incapacities, which determine a given person to any of these classes, constitute a *condition*, or *status*, which the person occupies, or with which the person is invested. The right, duties, capacities, and incapacities, whereof *conditions* or *status* are respectively constituted or composed, are the appropriate matter of the department of law which commonly is named the *law of persons: jus quod ad personas pertinet*. The department, then, of law which is styled the law of persons is conversant about *status* or *conditions:* or (expressing the same thing in another form) it is conversant about persons (meaning *men*) as bearing or invested with *persons* (meaning *status* or *conditions*). The department of law which is opposed to the law of persons is commonly named the *law of things; jus quod ad res pertinet*. The law of things is conversant about matter, which may be described briefly in the following manner: it is conversant about rights and duties, capacities and incapacities, in so far as they are *not* constituent or component parts of *status* or conditions. It is also conversant about persons, in so far as they are invested with, or in so far as they are subject to, the rights and duties, capacities and incapacities, with which it is occupied or concerned (pp. xvi., xvii.). The most important conditions or *status*, composing the law of persons, are *public* or *political*, and *private*. The former species includes all persons sharing the sovereign power and all public functionaries; the latter includes the conditions of husband and wife, parent and child, master and servant, guardian and ward, &c. The term *jus publicum*, when used in a precise sense, is equivalent to the former of these species. It may be remarked, that the erection of certain aggregates of rights and duties into a *status* is more or less arbitrary; and that the jurist must be guided by considerations of method and convenience, concerning which no very precise rules can be laid down. For example, in a country where a large sum of money was expended by the government in the relief of the poor, and where a large part of the working classes consisted of *paupers* (or persons receiving legal relief), it might be expedient to make the rights and duties of a pauper a condition, or *status*, in the law of persons. In a country where the legal relief of the poor was insignificant in amount, the rights and duties of a pauper would be more conveniently introduced in the law of things. Sir W. Blackstone, misled by the ambiguity of the Latin word *jus*, has rendered *jus personarum* and *jus rerum* by '*rights* of persons,' and '*rights* of things.' The origin of this portentous blunder is explained in Mr. Austin's 'Outline,' p. lxiii.

Positive law is also divided, with reference to the legal consequences of a breach of legal duty, into *civil* and *criminal*.

Civil law is that department of law in which every breach of a duty may be made the subject of a legal proceeding, for the purpose of conferring on the person wronged a right from the enjoyment of which he is excluded by the defendant, or of obtaining from the defendant compensation for a right violated by him. *Criminal law* is that department of law in which every breach of duty may be made the subject of a legal proceeding instituted by the sovereign or his representatives, for the purpose of inflicting punishment on the person charged with the breach of duty. The scope of a civil action is the redress of the plaintiff, by conferring on him the right, or compensation for the violation of a right, which he claims from the defendant. The scope of a criminal action is to inflict punishment on the defendant for the breach of a legal duty which is imputed to him. *Penal* law is not identical with *criminal* law; for an act or omission may be liable to legal punishment in consequence of an action instituted by a *private person*. The action in English law termed a *qui tam* action is partly a civil and partly a penal, but is in no respect a criminal action. It has been already stated that the term *jus civile* originally signified the peculiar law of Rome. In modern times it has acquired, in many or most civilized countries, the limited sense which has just been explained. The term *crimen* was used by the Roman jurists as equivalent to *delictum publicum*, that is, a delict which was the subject of a *judicium publicum* (Hugo, *Ib.* pp. 368, 959). (On the contents of the French *code civil* see CODES, LES CINQ). *Civil* and *Criminal* delicts or injuries are terms which, in strictness, are unknown to the English law. A criminal proceeding is, in the language of the English law, styled a *plea of the crown*, as being a penal action instituted by the crown. The court recently created by statute in London is however styled the central *criminal* court. By the *civil law*, in England, is commonly understood the Roman law generally, or that portion of it which is received in the ecclesiastical courts.

Law is sometimes opposed to *equity*. *Equity*, in this sense, implies an arbitrary or discretionary power in the tribunal to decide, not according to prescribed rules of law, but according to its own conceptions of moral justice. In the language of the English law, *common law* is opposed to *equity*, concerning which opposition see EQUITY. *Common law* is so denominated as being founded on usages common to the whole nation, and not peculiar to a certain district. (1 Blackst. *Comm.*, p. 67-8.) In like manner, 'the Book of *Common* Prayer' is so designated in order to distinguish it from forms of prayer intended for *private* devotion. It may be remarked, that, in the language of the Roman law, *jus civile* is opposed to *jus prætorium* (the law made by the judicial legislation of the prætors), in the same manner that, in the language of the English law, *common law* is opposed to *equity*.

A *law* is likewise opposed to a *privilegium*. *Privilegium* is an antient term of the Roman law, inasmuch as it occurred in the Twelve Tables. (Cicero, *Leg.*, iii. 19.) It signified, according to its etymology, a measure directed at a single person (*hominem privum*), as distinguished from a law which applies to *classes* of persons; for, as it is stated in a fragment of Ulpian preserved in the Digests, 'jura non in singulas personas, sed generaliter constituuntur.' (Lib. i., tit. 3, fr. 8.) The latter part of the word *privilegium* is connected with *lex*; but we have already stated that *lex* originally did not necessarily signify a rule. More properly, however, a *privilegium* signifies a special command of the sovereign, not founded on an existing general command or law. Such a *privilegium* may either be beneficial to the person or persons affected by it, as an exemption from all personal actions which the king of England can (or could) grant by his *writ of protection* (Blackst. 3 *Com.*, p. 289); or it may deprive him of some of his rights, or inflict some punishment upon him. The difference between a law and a *privilegium* is explained by Sir W. Blackstone as follows: 'Municipal (*i. e.* positive) law is a *rule*; not a transient sudden order from a superior to or concerning a particular person, but something permanent, uniform, and universal. Therefore a particular act of the legislature to confiscate the goods of Titius, or to attaint him of high treason, does not enter into the idea of a municipal law; for the operation of this act is spent upon Titius only, and has no relation to the community in general; it is rather a sentence than a law. But an act to declare the crime of which Titius is accused shall be deemed high treason; this has permanency, uniformity, and universality, and therefore is properly a rule' (or law). (1 *Com.*, p. 44.) The distinction here adverted to is that meant by the Greek writers when they speak of governments administered according to law, and governments administered not according to law. (See particularly Aristotle, *Polit.*, iv., 4, 5.) In the latter class of states, the acts of the government were a succession of *privilegia* (generally styled by the Greeks ψηφίσματα, although ψηφίσματα were often *laws*, strictly so called). Montesquieu's distinction between monarchy and despotism is founded upon the same principle. (*Esprit des Lois*, ii. 1.) Government by *privilegia* is properly called *arbitrary* government, the government being administered not according to rules, but according to the *arbitrium* of the sovereign one or many.

Concerning the difference between the making of laws and the execution of them, or (as they are termed) the *legislative* and *executive* functions of government, see LEGISLATION.

Law is sometimes opposed to *fact*; that is to say, the rule of law is distinguished from the facts or events to which it is applied in practice. In this sense it is said that every one is presumed to know the law; whereas ignorance of the fact is an excuse. (For the doctrines of the Roman law on this subject, see *Dig.*, lib. xxii., t. 6.) The distinction between law and fact is important in our system of jurisprudence, with reference to trial by jury; for, according to the theory of our law, the judge decides concerning the law, and the jury concerning the fact. This maxim is however little more than theory; for in practice the jury, by its power of returning a general verdict, is judge both of the law and the fact. [JURY.] On certain questions which necessarily arise in the administration of justice, and which are questions neither of law nor of fact (such as 'due diligence,' 'reasonable notice,' 'probable cause,' &c.) see an article in the *Law Magazine*, vol. xii., pp. 53-74.

Laws, considered singly, have been divided into numerous species, as declaratory, remedial, penal, repealing, &c. laws. Concerning these see Austin's *Province of Jurisprudence*, p. 22, and Dwarris *on Statutes*, ch. 10.

4. *Origin and End of Positive Law.*—It has been above stated that all positive laws are commands, direct or indirect, of the person or persons exercising supreme political power in an independent society. Consequently the notion that positive laws are derived from a compact between sovereign and subjects (styled the *original* or *social contract*) is a delusion.

The proper end of positive law is the promotion of the temporal happiness, or well being, of the community over which the law extends. Thus Aristotle, in his 'Politics,' says that 'political society was formed in order to enable men to live, and it continues to exist in order that they may live happily.' (l. 2.) 'Finis et scopus (says Lord Bacon) quem leges intueri atque ad quem jussiones et sanctiones suas dirigere debent, non alius est quam ut *cives feliciter degant*.' (*De Augm.*, lib. viii., aph. 5.) The meaning of Aristotle and Bacon, in the passages just cited, was no other than that expressed by Mr. Bentham in his well-known formula, that the end of political government is 'the greatest happiness of the greatest number.'

We have stated that the proper end of positive law is the promotion of the *temporal* happiness of the community. The end of the political union is the promotion of the happiness of its members in the present state of existence; that is to say, in the existence which is comprehended between birth and death. The promotion of men's happiness in the existence which commences after death is the end of the religious or ecclesiastical union. (See Warburton's *Divine Legation*, b. 1, s. 2, vol. i., p. 215, 8vo. ed.)

From the benevolence of the Deity, it is presumed that those rules which tend the most to produce the happiness of his creatures are most agreeable to him; and consequently the term 'Divine law' (also called natural law) is used to signify those maxims to which human laws ought to conform. In the vast countries where the Mohammedan and Brahminical religions prevail, a great proportion of the positive law is supposed to be derived from the direct revelation of a supernatural being; and therefore the Divine law and the positive laws of the state in great measure coincide. The Christian dispensation however does not (like the Jewish) contain any system of rules out of which a body of positive law can be formed, or which can be enforced by a civil government. Consequently, in Christian countries a very small part of positive law is founded upon precepts derived from immediate revelation: the far greater part of positive law is or ought to be fashioned upon rules of Divine law, which are only discoverable by a process of inference from the phenomena of human society.

LAW, JOHN, of Lauriston, was born about the year 1681 at Edinburgh, in which city his father exercised the trade of a goldsmith. His mother being heiress of an estate called Lauriston is the reason why, in conformity with the Scottish custom, Law is known by that name or title also. In very early life, in consequence of the reputation of possessing great talents, he was engaged to arrange the revenue accounts of Scotland, an employment which may have mainly contributed to fix his mind upon financial schemes. About this time he proposed the establishment of a bank which should issue paper-money to the amount of the value of all the lands in the country, thus confounding credit or security with currency, and imagining that the latter could never be in excess so long as the property which the paper issues were supposed to represent should be in existence. Law lost his father when he was little more than of age. He was handsome in person and of graceful carriage, fond of society, and courted by it. Finding that his patrimony would not suffice for the supply of his extravagance, he had recourse to the gaming-table. During this career he fought a duel, and having killed his antagonist, he fled the country and visited Italy. His course of life must still have been very irregular, for it appears that he was banished successively from Venice and from Genoa, after which he wandered from one Italian city to another practising the arts of a gambler. Law next went to Paris, where he soon succeeded in ingratiating himself with the regent duke of Orleans, and in inoculating him with his plans of finance. By the persuasion of Law the first public bank of circulation was established by the regent in 1716, and its management was entrusted to the projector. This bank obtained the privilege for twenty years of issuing notes, which however were to be exchangeable on demand for coin of the established weight and fineness at the pleasure of the holder. The public debt of France at that time amounted to 1500 millions of livres, or about 70 millions sterling, and was so depreciated in the public estimation as to be unsaleable, except at 60 to 70 per cent. discount. Law's bank was projected with the view of paying off this debt, by giving the public creditor the option of subscribing for bank shares and paying for the same in the public stock at par. With the view of inducing the public to purchase the bank shares, a patent, giving possession of the country of the Mississippi, under the name of Louisiana, which had been granted in 1712, to the sieur Crozat, was purchased, and the Mississippi Company was formed, with a capital of 100 millions of livres, and allied to the bank, having secured to it for twenty-five years the sole right of trading to that quarter, and also of prosecuting the Canada beaver-trade. Still further to assist the scheme, the receivers-general of taxes were directed to make all their payments in the paper of the bank. With all these advantages it was yet a long time before the favour of the public was so far gained that the subscriptions amounted to 100 millions of livres. In 1718 the Mississippi Company had the entire farming or monopoly of tobacco granted to it for nine years, and thereupon sent great numbers of planters, artificers, and labourers to Louisiana. In the following year the French East India Company and the Senegal Company were both incorporated with the Mississippi Company, which then enjoyed the monopoly of the trade of France 'from the Cape of Good Hope eastwards to all the other parts of Africa; to Persia, India, China, Japan, and the Isles, even to the Straits of Magellan and Le Maire.' The prospect of advantages to be derived from these various sources soon began to operate upon the public; and such numbers crowded forward to make investments in the stock of the Mississippi Company, that in August, 1719, its price was driven up to 500 per cent. It may serve to show the feverish state of excitement then prevalent to state, that on the rumour of Law being seized with illness, the stock fell from 500 to 445 per cent., and that his convalescence raised it again to 610 per cent. In the month just named the general farm of all the public revenues was granted to the Company, all of whose privileges were by the same *arrêt* prolonged to the year 1770, in consideration of which concessions the Company agreed to advance to the government, for paying off the public debt, 1200 millions of livres, about 50 millions sterling, at 3 per cent. A further sum of 50 millions of livres was paid by the Company for the exclusive privilege of coining during nine years. In a few weeks the stock rose in price to 1200 per cent., when 150 millions of livres were added to the capital by fresh subscriptions at 1000 per cent., and, to take every advantage of the existing mania which had seized all classes, the new capital was divided into very small shares. By this means the Company was enabled to lend to the government an additional sum of 300 millions of livres at 3 per cent. In the midst of all this speculation, the bank having issued notes to the amount of 1000 millions of livres, upwards of 40 millions sterling, there was such an abundance of money afloat, that the prices of all commodities rose exorbitantly, and land was sold at fifty years' purchase. At this time Law was considered to be a man of so great consequence, that his levée was constantly crowded by persons of eminence from all parts of Europe, who flocked to Paris that they might partake of the golden shower. From November, 1719, to the following April, the price of Mississippi stock continued to rise, until it reached 2050 per cent. On the 21st of the following month a royal *arrêt* appeared, which suddenly produced an entire revulsion in the public feeling. Under the pretence of a previous depreciation of the value of the coin, it was by this arrêt declared necessary to reduce the nominal value of bank notes to one-half, and of the actions of the India or Mississippi Company from 9000 to 5000 livres. It is not possible adequately to describe the calamitious effects produced throughout France by this step. The bank notes could no longer be circulated at more than one-tenth of their nominal value; and the parliament having represented the fatal consequences of the *arrêt*, another was issued, stating that 'the king being informed that his reduction of bank bills has had an effect quite contrary to his intention, and has produced a general confusion in commerce; and being desirous to favour the circulation of the said bank bills for the conveniency of such as give or take them in payment, and having heard the report of the sieur Law, he has ordained that bank bills be current on the same footing as before the above *arrêt*, which he hereby revokes.'

The charm was however broken. This and ten other *arrêts* which were issued in the course of a month from its date could not restore the confidence of the public. Law found it prudent to retire from the management of the public finances, and for his personal protection a guard was assigned to him. Many prudent persons applied themselves earnestly to realise their property, and to send it for safety to other countries, which proceeding occasioned the issue of a royal *ordonnance*, in which such a course was forbidden upon pain of forfeiting double the value, while all investments in the stocks of foreign countries were prohibited on the like penalty. By these means the public alarm was carried to its height. The bank notes being generally refused in all transactions of business, an arrêt appeared forbidding any person to refuse them, under penalty of double their nominal value; and this occasioning a still greater run upon the bank, another arrêt was issued on the same day, ordering the bank 'to suspend the payment of its notes till further orders.'

By these proceedings many thousands of families, once wealthy, were suddenly reduced to indigence; and Law, who was the original concoctor, and had been the chief instrument in carrying out these vast financial delusions, was obliged to quit France with an inconsiderable fortune, the wreck of what he might at one time have realised; he resided for some time in different places in Germany, and settled at length at Venice, where he died in 1729.

In 'A Discourse upon Money and Trade,' which he wrote and published in Scotland, Law has left a record of the flattering but visionary views which led him to his financial schemes.

LAW, WILLIAM, born 1686, died 1761, the author of various works of practical divinity, of whom we should have known little, had it not happened that he was for some time living in the family of Mr. Gibbon, father of the historian Gibbon, which leads to the introduction of some valuable notices of his life, habits, and opinions, in the beautiful fragment of autobiography which the historian prepared. The piece is printed in Lord Sheffield's edition of 'The Miscellaneous Works of Edward Gibbon,' and to that work we refer for the details, giving here only a very slight outline.

He was born in Northamptonshire, went to Cambridge with a view of entering the Church; took the degrees of B.A. and M.A.; was of Emanuel College, and in 1711 elected a Fellow. On the accession of King George I. he refused to take the oaths prescribed by act of parliament, and in consequence vacated his fellowship. It was soon after this that he entered the family of Mr. Gibbon, who resided at Putney. Here he continued several years, and his connection with the family became perpetuated to his death in consequence of a design which Miss Hester Gibbon, the sister of the historian, formed, and executed, of retiring from the world in company with her friend Mrs. Elizabeth Hutcheson, and living a life of charity and piety, with Mr. Law for their chaplain. They fixed upon King's Cliff, the place of Mr. Law's birth, as the spot to which they retired; and there Mr. Law lived the last twenty years of his life, dying April 9, 1761.

Mr. Law was the author of various works, in which he recommends the exercise of a piety which approaches to the character of ascetic, and which it is almost impossible for any one to practise who is not in a great degree relieved from the necessity of attention to the ordinary business of life. The most popular of them is entitled 'A Serious Call to a Devout and Holy Life,' a work containing many passages of great beauty, and many spirited sketches of various characters to be found in the world, which has had great influence on many minds, and might awaken a proper spirit of seriousness in all. Dr. Johnson said of this work, that it first led to his thinking in earnest of religion.

LAW, EDMUND, D.D., bishop of Carlisle, born 1703, died 1787. This amiable and learned prelate was the son of a clergyman in the northern part of Lancashire, and passed from the grammar-schools of that part of the kingdom to St. John's College, Cambridge. As soon as he had taken a degree he was elected Fellow of Christ's College, and in 1737 was presented by the university to the rectory of Graystock in Cumberland. To this, in 1743, was added the archdeaconry of Carlisle, which brought with it the living of Salkeld, on the pleasant banks of the Eden. In 1756 he resigned his archdeaconry and returned to Cambridge, having been elected master of St. Peter's College.

In this, the first period of Dr. Law's life, he had published those writings which show at once the peculiar turn of his own mind, and have given him a place among the best and wisest instructors of their species. His first work was his translation of Archbishop King's 'Essay on the Origin of Evil,' with copious notes, in which many of the difficult questions in metaphysical science are considered. This was soon followed by his 'Enquiry into the Ideas of Space and Time,' &c. Both these works were produced before he left Cambridge; but it was in his retirement at Salkeld that he prepared his 'Considerations on the Theory of Religion,' with 'Reflections on the Life and Character of Christ,' a work of singular beauty, not to be read by any person without edification and improvement.

To his Cambridge appointment of master of Peter House was soon added those of university librarian and professor of casuistry. He was made archdeacon of Stafford, had a prebend given him in the church of Lincoln, and, in 1767, one of the rich prebends in the church of Durham. The next year he was appointed to the bishopric of Carlisle.

In 1777 he published his edition of the works of Locke, with a life of the author.

The peculiar character of Dr. Law's mind appears to have been acquired in a great measure by a devoted study of the writings of that philosopher. From him he seems to have derived that value which he set on freedom of inquiry, in relation to theological as well as to every other subject, which led him to take part in the great controversy respecting subscription, and which he freely exercised himself. The most striking proof of this is afforded in the edition of his 'Considerations,' printed in the latter part of his life at a press at Carlisle, in which are many important alterations. From Locke also he seems to have derived his notions of the proper mode of studying the Sacred Scriptures in order to come at their true sense. He was in short an eminent master in that school of rational and liberal divines which flourished in England in the last century, and is adorned by the names of Jortin, Blackburne, Powell, Tyrwhitt, Watson, Paley, and many others.

This account of Dr. Law is derived for the most part from a notice of his life by Archdeacon Paley, inserted in Hutchinson's 'History of the County of Cumberland.'

He left a large family, of whom two of the sons became bishops, one being the present bishop of Bath and Wells, and another was the late Lord Ellenborough.

LAW-MERCHANT. [LEX MERCATORIA.]

LAWES, HENRY, a composer to whom English music is much more indebted than its two historians seem to have been inclined to admit, was a native most probably of Salisbury, of which cathedral his father was a vicar-choral, and was born in the year 1600, as appears from an inscription under his portrait, now in the episcopal palace of that city. He received his professional education under John Cooper, an Englishman, who having travelled and studied in Italy, thought fit to Italianize his names, and is generally mentioned as Giovanni Coperario. In 1625 Lawes was appointed one of the gentlemen of the chapel, and afterwards clerk of the cheque to Charles I. In 1633, in conjunction with Simon Ives, he produced the music to a mask presented at Whitehall by the members of the four inns of court, under the direction of such grave personages as Noy the attorney-general, Hyde, afterwards earl of Clarendon, Whitelocke, Selden, &c., and received one hundred pounds for his share in the business.[*] About the same time he composed the music to Milton's 'Comus,' which was performed at Ludlow Castle in 1634. He was well acquainted with the best poets of his time, and set many of their verses to music, particularly Waller's. He also lived much with persons of rank, whose poetical effusions were, in abundance of instances, made vocal by the notes of Lawes. These appear in the publications of his time, but chiefly in his three sets of 'Ayres and Dialogues for One, Two, and Three Voices,' published in 1653, 1655, and 1669, comprising about 150 songs, duets, and trios, printed in *lozenge* notes, in type of an indifferent kind, with no accompaniment but an unfigured base, and therefore not very appreciable in the present day, except by tolerably good harmonists, who to musical knowledge add some acquaintance with the style of our old music and its notation.

Lawes continued in the service of Charles till the king's death. He then had recourse to teaching, in which pursuit his time was much occupied, for his superior taste and ability, his good sense and gentlemanlike manners, occasioned his instructions to be eagerly sought after. At the Restoration he resumed his places in the chapel-royal, and composed the anthem for the coronation of Charles II. He died in 1662, and his remains were deposited in Westminster Abbey.

From the cold language in which Hawkins and Burney speak of Henry Lawes, and more especially from the disparaging expressions of the latter, we are much disposed to think that neither was acquainted with the best of his productions. The song in 'Comus,' 'Sweet Echo,' inserted by Hawkins, is a very poor specimen of his genius. Had either of those historians looked carefully into his three books of airs, &c., they could not but have found enough to convince them of his invention and judgment; enough to prove that the encomiums of contemporary poets, especially Milton, himself an expert musician, were sincere and deserved. How beautifully in 'Comus' does the great poet allude to his friend's compositions, where, speaking of him as 'The Attendant Spirit' (a character personated in the Mask by the composer himself), he says—

'Thyrsis? whose artful strains have oft delay'd
The huddling brook to hear his madrigal,
And sweeten'd every musk-rose of the dale.'

And in his thirteenth sonnet, addressed to Lawes, beginning—

'Harry, whose tuneful and well-measur'd song,'

he bears honourable testimony to the moral worth and judgment of the musician, which, he says, distinguished him 'from the throng.' The opinion of Waller is not less favourably and strongly expressed; and Herrick, in his 'Hesperides,' is almost enthusiastic in praise of the truly English composer —for it is a gross mistake to suppose that Lawes adopted the style of the Italian music fashionable in his time. In a preface to his first book he defends himself against the charge of imitation; and an impartial comparison of his best airs with those of his foreign contemporaries will not only prove him to be an original composer, but that the English in his time, and indeed long after, could boast a school of music peculiarly their own.

LAWES, WILLIAM, brother of the preceding, was educated under the same master, and for a time also held the situation of gentleman of the chapel. During the civil wars he entered the royalist army, and had the rank of captain; but with a view to his personal safety, lord Gerrard made him a commissary. Disdaining however the security offered, he was killed at the siege of Chester in 1645. The king was so much affected by his loss, that he expressed his sorrow in remarkably strong terms, and even went into mourning for his self-devoted servant.

William Lawes was an able musician; he composed much for voices and instruments, as well as many excellent part-songs, rounds, &c., which are to be found in the publications of the day. In Boyce's Collection is an anthem of his, which puts him on a level with most of the church composers of his time. But his chief work is a collection of Psalms for three voices, set to the well-known paraphrase by Sandys.

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[*] Hawkins, iii. Langbaine however says that William Lawes was the coadjutor of Ives.

LAWN, a space of ground covered with grass, kept short by mowing, and generally situated in front of a house or mansion, or within the view from such. The number of evergreen exotics which survive our winters, and the verdure of the grass in summer, are peculiar features of England in comparison with continental Europe, where in general the grass is either burned up in summer, or the exotics are destroyed by the severity of winter. The management of a lawn is with us therefore a subject of interest to every possessor of a garden.

Previous to laying down, the ground intended for a lawn should be properly trenched and drained, in order that such trees and shrubs as may afterwards be planted upon it should succeed well. The direction of the trenches should be towards a drain, to which, if possible, their bottoms should form a regularly inclined plane, for the purpose of affording the means of escape for the water, which, in retentive soils more especially, would otherwise stagnate. Although trees and shrubs are absolutely necessary for giving due effect to the scenery of a lawn, yet in the latter, one open extensive space, lying in the full view from the windows of the house, must be preserved. For this portion, digging instead of trenching may be found sufficient; but the openings, which ought to command views from this principal area, should be trenched, as well as for the shrubs and trees; for if the operation were only performed with regard to the latter, the water would not find such free egress from the bottom as would be the case if the mode of trenching were adopted as is above recommended.

After trenching, the soil should be allowed to subside, and the greatest care should be taken to make the surface perfectly even, otherwise a great expense will be afterwards incurred by the loss of time in mowing, which can neither be so quickly nor so well performed where the surface is uneven.

If turf can be readily procured, a lawn is at once produced; and by such means a more uniform distribution of grass may be obtained than by any other means. The surface of a well-fed meadow, or of an old common, closely cropped by sheep and geese, affords the best kind of turf; and if any tall or coarse grasses should be mixed with it, no inconvenience will arise, for everything of this sort will eventually disappear under close mowing; and such only as are dwarf and suited to the soil will ultimately remain. Where a turf is to be produced by sowing, the seeds of such species as are indigenous to the locality, and possess at the same time the property of being dwarf and fine, are to be preferred; but in the event of this method of forming a lawn being adopted, it is always desirable that a narrow slip of good turf should be carried all round the circumference. The following species may be mentioned as proper for a lawn in average situations:—Lolium perenne, or rye-grass; Poa trivialis or pratensis; Anthoxanthum odoratum, or sweet vernal; Cynosurus cristatus, or crested dogstail, with a considerable quantity of Medicago lupulina, or black nonsuch, and Trifolium repens, or Dutch white clover. If the situation is particularly dry, Festuca ovina, or sheep's fescue, should be substituted for Lolium perenne; if very low and wet, then the place of the latter may be filled with Alopecurus pratensis, or meadow foxtail. All these grasses may be procured of dealers in agricultural seeds; it is however better for persons in the country to collect for themselves such as can be found in their neighbourhood, for then they can depend upon their being genuine. The utmost care should be taken to avoid the introduction of Dactylis glomerata, or cocksfoot grass, and Holcus lanatus, or mollis, for these hard, harsh, stubborn grasses resist the effects of mowing for a long time.

The process called inoculating, or of making lawn by sowing the ground with fragments of turf, and rolling them in, cannot be recommended when a lawn is required to look particularly well, for it is a long while before the surface of the ground becomes uniform under such circumstances.

Lawns, when once established, require only to be kept neat by the ordinary routine of rolling, mowing, and sweeping, except keeping the surface perfectly even, by making up small hollows, with screened mould, early in spring. When lawns become worn out, a top-dressing of any finely-divided manure will refresh them: malt-dust applied in October is excellent for this purpose; and at the same time an additional quantity of grass-seed may be sown. Where the walks are straight, the edges of the lawn adjoining them should be perfectly straight also, and care should be taken that the grass-edging is kept rolled down and pared, so as never to exceed an inch and a half above the level of the walk.

LAWRENCE, ST., River. [CANADA.]

LAWRENCE, SIR THOMAS, was born in April or May, 1769, at Bristol. His father had been brought up to the legal profession, which he however never followed. Having contracted what the world calls an improvident marriage with a beautiful and accomplished young lady, daughter of the Rev. W. Read, vicar of Tenbury, he obtained some years afterwards, through the interest of an aunt of Mrs. Lawrence, the office of supervisor of excise at Bristol, which he resigned soon after the birth of his son Thomas, and became landlord of the White Lion inn. Not succeeding at Bristol, Mr. Lawrence, in 1772, was enabled by his friends to become landlord of the Black Bear at Devizes, where he remained till 1779. This inn was at that time much frequented by the rich and fashionable, who resorted to Bath, and generally stopped at Devizes. It was here that young Lawrence manifested that decided predilection for the art in which he subsequently attained such eminence. He drew striking likenesses with the pencil and pen while a child in petticoats. He was likewise remarkable for the feeling and taste with which he recited poetry, in which he had been trained by his father, who never failed to introduce him to his guests, who were delighted both with his genius and his extraordinary personal beauty. It was in 1775, when he was only six years old, that Mr. (afterwards Lord) Kenyon and his lady had their portraits in profile taken by the infant artist. They were deficient in force, but the execution was extremely easy and spirited, and the likenesses accurate. Very soon after this event he was sent to a highly respectable school, kept by Mr. Jones, near Bristol, but he was removed when only eight years old; and this was all the regular education that he ever had. In 1779 Mr. Lawrence failed, and was obliged to leave Devizes, whence he went to Weymouth. In 1782 Mr. Lawrence settled at Bath, and placed his son for a time as a pupil under Mr. Hoare, a crayon painter, of exquisite taste, fancy, and feeling, from whom young Lawrence acquired that grace, elegance, and spirit, which qualified him to be so pre-eminently the painter of female beauty. At the age of thirteen he received from the Society of Arts the great silver pallet, gilt, with an additional present of five guineas, for a copy in crayons of the 'Transfiguration.' Sir Thomas frequently declared that this honour had given a great impulse to his enthusiastic love of the art. Nor did he confine himself to portraits. At the age of nine he copied historical pictures in a masterly style, and at the age of ten ventured on original compositions of the highest order, such as 'Christ reproving Peter for denying him,' 'Reuben requesting his Father to let Benjamin go to Egypt,' 'Haman and Mordecai,' &c. It was in 1787 that Lawrence's father resolved to bring his son to London, and took apartments in Leicester-square. He was soon introduced to Sir Joshua Reynolds, who gave him good advice and encouragement, and always received him with kindness. It was in the same year (1787) that he first exhibited at Somerset-House, where seven of his pictures, all female portraits, were admitted. From that time his fame and his practice rapidly increased, though he had some formidable competitors, one of whom was Hoppner, who was patronized by the Prince of Wales. In 1791 he was chosen associate of the Royal Academy. In 1792 George III. appointed him to succeed Sir Joshua as principal painter in ordinary, and the Dilettanti Society unanimously chose him for their painter. From that time forward every exhibition at Somerset-House offered fresh proofs of his talents. Yet these pictures were but a small portion of those which he executed.

We cannot dwell on particulars, but we must not pass over the honourable commission which he received from King George IV. (then Prince-Regent) to paint the portraits of the sovereigns and the illustrious warriors and statesmen who had been the means of restoring the peace of Europe. He commenced his labour in 1814 with portraits of the king of Prussia, Blücher, and Platoff, who were then in England. In April, 1815, the prince conferred the honour of knighthood upon him. In 1818 he proceeded to the congress of Aix la-Chapelle, thence to Vienna, and in May, 1819, to Rome, where his magnificent portraits of Pope Pius and of Cardinal Gonsalvi were enthusiastically admired. The collection of portraits executed in obedience to this commission is now in the Waterloo Hall at Windsor Castle. 'Among so great a number of portraits,' says Dr. Waagen, 'all cannot be equal in merit. I was particularly pleased with those of the Pope, Cardinal Gonsalvi, and the emperor of Austria. Besides the graceful and unaffected design, the clear and brilliant colouring, which are peculiar to Lawrence, these are distinguished by greater truth of character and a more animated expression than is generally met with in his pictures.' The praise here given to Sir Thomas Lawrence is just, but it is not complete: he possessed the happy talent of idealizing his forms, without departing from nature or destroying the likeness. He evidently profited, as Mr. Howard observes, by the sound advice given him by Sir Joshua Reynolds, 'not so to imitate the old masters as to give a richness of hue rather than the ordinary hues of nature, but to paint what he saw;' but at the same time 'not to fall into the vulgar error of making things too like themselves.'

In speaking of the merits of Sir Thomas, his admirable portraits of beautiful children deserve especial mention, the engravings from some of which are universally known. Though Sir Thomas had in his childhood attempted historical compositions, which gave ample promise of future excellence, he was so absorbed by portraits, that he had no time to devote any adequate attention to historical painting. Some of his pictures of the Kemble family may indeed be almost considered as historical; and in 1797 he exhibited at Somerset-House a picture of Satan calling his Legions, after Milton, which he himself considered as one of his best works. But the opinions of critics and connoisseurs on the merits of this celebrated picture are so different, and even so diametrically opposed to each other, that it would be evidently unsafe to admit it as a proof of either his ability or inability to attain the dignity of history.

While Sir Thomas was absent on the Continent, Mr. West, the venerable president of the Academy, died in March, 1820, and Sir Thomas was chosen, without opposition, to succeed him. He returned in April, loaded with honours and presents which he had received abroad, to meet with equally flattering distinctions at home, which he continued to enjoy without interruption till his death, which took place at his house in Russell-square, on the 7th January, 1830, in the 61st year of his age.

Though Lawrence had no school education, he had acquired a vast fund of various and extensive knowledge: he was well acquainted with the literature not only of his own country, but of the rest of Europe. His addresses to the students of the Royal Academy were full of good advice, and delivered with a kindness of manner which proved his sincere wishes for their welfare and success. To the merits of his brother artists, whether dead or living, he was ever just, and no feeling of envy or jealousy seems ever to have ruffled the innate benevolence of his mind. It might have been expected that he could not fail to accumulate a large fortune; but as this was not the case, ever-busy calumny was ready to accuse him of gambling, a vice to which he was so far from being addicted, that he renounced billiards, in which he greatly excelled, because, as he said, 'Though I never played for money, my play attracted much attention, and occasioned many and often very high bets. Next to gambling itself is the vice of encouraging it in others; and as I could not check the betting, I have given up my amusement.' Very early drawbacks for the assistance of his family, a style of living at the outset perhaps rather too expensive, an utter carelessness of money, as he himself says, extensive assistance to artists less fortunate than himself, and, above all, the vast expense of procuring that unrivalled collection of drawings by the great masters which has been so unhappily dispersed since his death, are fully sufficient to account for his not growing rich.

Sir Thomas Lawrence was never married. It appears that he was once engaged to a beautiful and accomplished young lady, the daughter of Mrs. Siddons; but difficulties arose, and the lady died of a pulmonary complaint some years afterwards. Sir Thomas remained single; but many of the noblest efforts of his art perpetuate the resemblances of the several branches of the Kemble family, for which he always felt the strongest attachment and admiration. One of his very last performances was an exquisite portrait of Miss Fanny Kemble, of whose talents he expressed the highest opinion. He painted this picture with remarkable ardour, and spoke of it when finished as one of his most successful works.

LAWSO'NIA, a genus of plants of the natural family Lythrariæ, which, consisting of only one or two species, may be found in most Oriental regions in gardens or in field cultivation. The genus is characterized by having a four-partite calyx, four unguiculate petals, eight stamens, a sessile ovary, the capsule scarcely dehiscent, or rather forming a globular membranaceous four-celled berry, with several angular seeds in each cell. It is disputed among botanists whether this genus consists of one or of two species; in the latter case, one being armed with thorns, was called *L. spinosa*, and the other being without any, was named *L. inermis*, by Linnæus. De Candolle has followed Lamarck in uniting them together under the name *L. alba*, stating that when young the plant is unarmed, but when older becomes thorny from the hardening of the smaller branches. The author of this article has cultivated both for several years in India, and found they retained their characteristic differences when raised from seed and grown in the same place, and under similar circumstances. The natives of North India distinguished the unarmed species by the name *phoolke*, or flowering *mhendee*. It is a much smaller plant, but flowers most abundantly. The thorny species is called *mhendee;* this, besides being a larger plant, contains a greater proportion of colouring matter, and is extensively cultivated in the vicinity of Sidoura, near the north-west bank of the Jumna. The flowers of both are corymbose, white, and powerfully fragrant; the leaves smooth, opposite, oval, lanceolate. To the latter species or variety the Arabic name *hinna* or *henna* is more especially applied, which in many of their medical works, as in that of 'Serapion,' is described under that of *al kanna*, where it is interesting to observe he quotes the description by Dioscorides of *kupros* (κύπρος) as applicable to this plant. This *kupros*, or Cyprus, is moreover supposed to be the *copher* of Scripture. (*Canticl.*, i. 12.) Besides the similarity of name, no plant is more likely to have been alluded to in the above passage, as no other is more highly esteemed or more frequently employed than the hinna, and it would appear to have been applied to the same purposes from very remote antiquity. All Oriental travellers describe the use of this plant by Asiatic women in dyeing their nails and the tips of their fingers, as well as the soles of their feet, of an orange hue with the leaves of the hinna. It is also used by the men for dyeing their beards, the orange colour being afterwards converted to a deep black by the application of indigo. That this plant was similarly used from very early times is highly probable from the allusions to it by poets, as well as from some of the Egyptian mummies appearing as if the nails had been similarly dyed.

LAY-BROTHERS, pious but usually illiterate persons, who devoted themselves in some convent to the service of the religious. A lower class of these were *Oblati*, who devoted themselves to more menial servitude. There were also *Fratres ad succurrendum*, assistant brothers, who wore only a short scapulary, while the professed lay-brother had the habit of the order. The institution of lay-brothers of the professed kind began in the eleventh century. The Jesuits termed their lay-brethren *coadjutores.* (Fosbrooke's *British Monachism*, 4to edit., p. 265-269.)

LAYBACH. [ILLYRIA.]

LAYERING is an operation by which the propagation of plants is effected by laying down or bending the shoots, so that a portion of them can be covered with earth. A shoot so operated on is called a *layer*, and the point which furnishes the layers bears the name of *stool.* Some plants are so much disposed to emit roots that if their branches happen to come in contact with the earth they immediately begin to strike. But although it may be easily imagined that the observation of this common circumstance has led to the artificial practice, yet some additional operations besides that of merely bringing a shoot in contact with the earth are found necessary for many plants on which this mode of propagation is practiced. The principle by which the operation is rendered effectual for the object in view is the following:—When the shoot of a species not freely disposed to send forth roots has merely its bent part inserted in the earth, the woody matter organized by the leaves passes down to the roots nearly as usual; but if the communication along the alburnum is interrupted by an acute bend, twist, or incision, a *callus* will be formed, from which by degrees spongioles are emitted, and thus roots ultimately produced.

The part of the shoot intended to form a layer should be divested of leaves where it is to be covered with the mould, and a slit should be made on the bent part, or the branch should be twisted half round at the bend so as to disarrange the woody tissue, or the bark should be half or three-quarters *ringed:* the shoot is then fixed down by pegs or hooked sticks, cut down to within an inch or so of the ground, and covered with good mould, which must afterwards be kept tolerably moist. In general roots are emitted in a few weeks, and by the end of a season young plants are obtained quite fit for transplantation. Some plants however require to be left for two years *on the stools* before they are removed, and there are some which can hardly be made to root at all in this manner.

Plants so situated as to render it impossible to bend their branches to the ground may nevertheless be layered by having their shoots introduced into a pot or box of soil elevated to them, and supported in a convenient position. This is a common practice among the Chinese, who cause branches of trees to root in this manner by partially ringing them, and covering the parts so ringed with a ball of clay, which is kept moist.

LA'ZULITE, LAPIS LA'ZULI, occurs crystalline and massive. Primary form of the crystal a cube, but occurs in imbedded rhombic dodecahedrons. Cleavage parallel to the planes of the dodecahedron. Fracture uneven. Hardness 5·5 to 6. Colour azure and different shades of blue; streak, paler blue. Lustre vitreous. Translucent, opaque. Specific gravity 2·76 to 2·94.

Massive variety amorphous, sometimes in grains, imbedded. On charcoal fuses, when pure, into a white glass. It is brought from Persia and China, and is employed in the manufacture of Ultramarine.

Analysis by Gmelin.		By Fuchs.	
Silica	49·0	Phosphoric Acid	41·81
Alumina	11·0	Alumina	35·73
Lime	16·0	Magnesia	9·34
Soda and Potash	8·0	Silica	2·10
Oxide of Iron	4·0	Protoxide of Iron	2·64
Magnesia	2·0	Water	6·06
Sulphuric Acid	2·0		
			97·68
	92·0		

It seems improbable that so different results should be obtained from the same mineral. Dr. Thomson admits the presence of phosphoric acid; the analysis by Fuchs is therefore most probably the correct one.

LAZZARO'NI. [NAPLES.]

LAZZERETTO is the name given to certain buildings and enclosures which are annexed to seaport towns, chiefly in the Mediterranean, for the sake of keeping therein confined the crews of ships and passengers arriving from Turkey, or other places where the plague, or other disease deemed contagious, is known to prevail. The persons thus confined are said to be in quarantine, from the Italian word *quaranta,* 'forty,' because the period of confinement for those arriving from actually infected places is forty days, after which, if no one has fallen ill, they are set at liberty. A lazzeretto generally consists of various detached buildings with courts between, the whole surrounded by a wall, and placed in airy situations outside of the town, and on the seashore, and in some instances on a small island or rock near the coast. Besides the lodging-houses for persons in quarantine, there are large warehouses in which goods capable, or supposed to be capable, of communicating the disease, such as wool, cotton, leather, &c., are purified. This purification is effected by spreading them out in the air for a length of time, and stirring and turning them about, which is done by the 'guardiani,' or keepers of the establishment, who, it is supposed, if there were any infection, would speedily take it. These 'guardiani' are kept in strict quarantine, but are well paid for the confinement and risk. These establishments are kept under very strict regulations, any infringement of which is visited by severe penalties, amounting in some cases to death. The principal and best regulated lazzerettos are those of Venice, Leghorn, Marseilles, Trieste, Genoa, Messina, and Malta. The name 'lazzeretto' is derived from St. Lazarus, who, in the Roman calendar, is the patron of lepers, and as leprosy was a very common disease in Italy and other parts of Europe during the middle ages, the hospitals in which lepers were confined obtained the name of lazzeretto, and the lepers themselves were called lazzari, a word which has perpetuated itself in the lazzaroni, or lowest class of the inhabitants of Naples, because, as some believe, of their dress, which resembles that which was worn at one time by the lepers. Houses for lepers in England, were often called lazar-houses. John Howard wrote 'An Account of the principal Lazarettos in Europe,' 4to., 1789, republished in London, 4to., 1791. From this work it appears, that the lazzeretto of Venice was the earliest; and that the rules and tariffs of the other lazzerettos in Europe were copied from it. The health-office in that city, by which the lazzeretto is conducted, was instituted by a decree of the senate in 1448, during a time of pestilence.

LEA RIVER. [ESSEX; HERTFORDSHIRE.]

LEACH, WILLIAM ELFORD, was born at or near Plymouth in Devonshire in the year 1790. He was brought up to the medical profession, and graduated as a physician, but he devoted himself to the study of zoology, and attained, at an early age, a high reputation, both at home and abroad, as an original and scientific naturalist. In 1813 he was appointed one of the curators of the natural history department in the British Museum, which situation he held until 1821, when his career was cut short by the loss of his health and reason, probably brought on by too close an application to study. He retired into the country, and shortly afterwards went abroad, where he spent most of the remainder of his life, residing chiefly in Italy, attended by a devoted sister. After a long suspension of his studies, he in a great measure regained his mental faculties, and resumed his favourite occupations: the letters which he wrote to his scientific friends in England exhibit the same devotion to the study of nature which distinguished the brighter years of his life. He returned to his native country for a short time, but afterwards took up his abode again in Italy, where he died suddenly of cholera, on the 25th of August, 1836, at the age of 46.

Dr. Leach published many new genera and species in the different classes of vertebrated animals, particularly in birds, but it is in entomology and malacology that his labours are most known, and his improvements of the greatest importance. We are chiefly indebted to him for the first introduction into this country of a natural system of arrangement in conchology and entomology, and for the adoption of the general and scientific views of those subjects which originated with Cuvier and Latreille. Among his literary contributions he wrote several papers in the 'Linnæan Transactions,' on insects, and published a general arrangement of the classes Crustacea, Myriopoda, and Arachnides, in the same work, which was considered as the best classification of these animals before the work of Dr. Milne Edwards appeared. Dr. Leach was the author of a paper in the 'Philosophical Transactions,' on the genus Ocythoë, in which he endeavours to prove that it is a parasitical inhabitant of the argonaut, or paper nautilus shell: he also wrote 'Malacostraca podophthalma Britanniæ,' which was illustrated with beautiful plates: eight parts of it were published in London in 1815-16. He was the author of the 'Zoological Miscellany,' three volumes of which came out in London from 1814 to 1817; and he wrote several articles in Brewster's 'Encyclopædia' and the 'Dictionnaire des Sciences Naturelles.' His principal work, 'The Natural History of the Mollusca of Great Britain,' is in the possession of his friend Mr. Bell, and has not yet been published.

LEAD. The properties of this metal are, that it has a bluish-grey colour, and is of considerable brilliancy when fresh surfaces are formed by cutting; if it has not been cooled too rapidly, it is so soft, that even when in pieces of considerable thickness, it may be easily bent. It soils slightly, and leaves on paper or cloth a mark after friction resembling that of plumbago. Its specific gravity is 11·445, but when impure not greator than 11·352. Lead may be reduced to thin laminæ, but its tenacity is extremely slight; so that a wire about $\frac{1}{10}$th of an inch in diameter breaks with a weight of 30 pounds. It fuses at about 612°, and when slowly cooled crystallizes in octohedrons. It is not a volatile metal, for in close vessels it may be heated to whiteness without subliming. When exposed to the air it absorbs oxygen and carbonic acid slowly, and acquires a superficial coating of carbonate of lead. In distilled water which has been freed from and kept from the contact of the air, it undergoes no change; but if it be exposed to air and water, it is oxidized and converted into carbonate of lead with considerable rapidity; this carbonate has the appearance of minute shining brilliant scales. The presence of saline matter in the water, even though air be present, very much retards the oxidation of the lead, and a very minute quantity of some salts even prevents this effect altogether. Thus phosphates, sulphates, chlorides, and iodides, owing to the compounds which are formed being difficultly soluble, are highly preservative; and so small a quantity as $\frac{1}{30000}$th part of the phosphate of soda or iodide of potassium in distilled water prevents the lead from being much corroded, the small deposit which is formed preventing the further corrosion of the metal. Though at common temperatures lead is slowly acted upon by the oxygen of the air, yet, as we shall presently more particularly mention, it is readily oxidized when the heat is raised.

ORES OF LEAD.—The ores of lead, strictly speaking, are few in number; indeed the only one which can properly be considered as a working ore is the sulphuret, but there are various combinations of lead occurring in nature, of which we shall give a brief account, after first mentioning

Native Lead.—This is of very rare occurrence, and in some cases of very questionable origin. It has been found in small masses in the lava of Madeira, and also in the neighbourhood of Alston in Cumberland; it is in small globular masses, imbedded in galena, or sulphuret of lead, and a slaggy substance, accompanied with blende and crystals of quartz.

Protoxide of Lead: Native Massicot.—This occurs in amorphous masses. Fracture earthy. Brittle. Specific gravity 8·0. Colour yellow. Opaque. Externally dull, internally of a semi-metallic lustre.

It melts readily by the blow-pipe, and, according to Dr. John, it consists of—

Protoxide of lead	87·382	
Carbonic acid . .	3·846	
Lime and oxide of iron	0·481	
Silica (ferruginous) .	2·404	
		94·113

Deutoxide of Lead: Native Red Lead; Native Minium.—Occurs amorphous and pulverulent; colour carmine red. Hardness 2·0 to 2·5. Specific gravity variously stated. Dull. By the blow-pipe on charcoal it is reduced to the metallic state. It is supposed to arise from the decomposition of sulphuret of lead and the oxidation of the metal. It occurs in Yorkshire, Suabia, Siberia, and some other places.

Chloride of Lead: Cotunnia; Cotunnite.—Occurs in small flat colourless crystals in Cornwall, and at Vesuvius in acicular crystals of an adamantine lustre inclining sometimes to pearly or silky. Specific gravity of the chloride from Vesuvius 1·897.

Fuses by the blow-pipe, is soluble in a large quantity of water, and, according to Berzelius, consists of—

Chlorine	25·48	
Lead	74·52	
		100·

Di-chloride of Lead: Berzelite.—Occurs in crystalline masses, with a fibrous and radiated structure, on earthy black ore of manganese. Hardness 2·5 to 3. Specific gravity 7·0 to 7·1. It is found in the Mendip Hills in Somersetshire. According to Berzelius it consists of—Lead 83·20; Chlorine 13·77; Carbonic acid 1·03; Silica 1·46; Water 0·54.

Sulphuret of Lead: Galena.—This almost universally diffused ore occurs in attached *crystals* and *massive*. Primary form the cube; the cleavage easy, parallel to its faces. Fracture conchoidal. Hardness 2·5 to 2·7. Scratched by carbonate of lime. Colour lead grey. Lustre metallic. Opaque. Specific gravity 7·568. *Massive varieties:*—Amorphous, structure granular, compact.

By nitric acid it is converted into white insoluble sulphate of lead. By the blow-pipe on charcoal the sulphur is first dissipated, and then metallic lead is obtained. In Cornwall and Scotland the veins of this ore traverse primary rocks. In Derbyshire it occurs in veins or beds in transition rocks. It very commonly contains a considerable portion of silver, and is often mixed with small quantities of some other metals. Galena is very commonly associated with calcareous and fluor spar, blende, calamine, carbonate and sulphate of barytes, and in Greenland with cryolite and spathose iron.

Analysis by

Dr. Thomson.		Bendant.	
Lead .	85·13	Lead .	79·6
Sulphur .	13·02	Sulphur .	13·4
Iron .	0·50	Silver .	7·
	98·65		100·

Seleniuret of Lead.—Occurs massive. Structure granular. Colour lead-grey; resembles fine-grained sulphuret of lead, but is softer, and rather more blue. Lustre metallic, but rather dull. Opaque. Specific gravity from 7·187 to 7·697. When heated in a tube selenium sublimes; by the blow-pipe on charcoal it burns with a blue flame, and the peculiar odour of selenium. It occurs in the Harz.

According to the analysis of Rose, it consists of—

Selenium . . .	25·59	
Lead	71·81	
		99·40

Having described the principal native binary compounds of lead, we proceed to notice those which are composed of an *acid* and *oxide of lead*, remarking that it is the *protoxide* only which combines with acids.

Carbonate of Lead.—Occurs *crystallized* and *massive*. Primary form a right rhombic prism; cleaves parallel to the primary planes. Fracture conchoidal. Hardness 3·0 to 3·5. Brittle. Colour white, yellow, grey, and greyish-black, sometimes tinged green or blue by ores of copper. Lustre on the cleavage planes adamantine, on the fracture surfaces resinous. Translucent, transparent, and doubly refractive. Specific gravity 6·3 to 6·6. Phosphoresces when powdered and thrown on hot coals. Soluble in nitric acid with effervescence. By the blow-pipe on charcoal decrepitates, becomes yellow, and is reduced. *Massive varieties:*—Amorphous; structure columnar, granular, compact. Analysis by Dr. John:—Carbonic acid 15·5; oxide of lead 84·5. It occurs in most lead-mines, and is sometimes used as an ore of lead.

Sulphate of Lead: Anglesite.—Occurs crystallized and massive. Primary form a right rhombic prism. Cleaves parallel to the primary planes. Fracture conchoidal. Hardness 2·5 to 3. Colourless generally, but has sometimes shades of yellow, green, grey, brown, and black. Lustre nearly adamantine. Transparent, translucent. Specific gravity 6·23 to 6·31. Analysis by Klaproth:—Sulphuric acid 24·8; oxide of lead 71; water 2. Occurs in Anglesey, Cornwall, the Harz, &c.

Phosphate of Lead: Pyromorphite.—Primary form a rhomboid. Commonly occurs in hexagonal prisms, and cleaves parallel to its planes, and to the truncations on its terminal edges. Fracture imperfect, conchoidal, uneven. Hardness 3·5 to 4. Colour various shades of green, yellow, brown, and grey. Lustre resinous. Transparent, translucent. Specific gravity 6·911 to 7·098. It also occurs botryoidal and reniform. Analysis by Wöhler:—Phosphoric acid 15·72; oxide of lead 82·30; muriatic acid 1·98. Occurs in most lead-mines, especially in those of Saxony.

Oxide of lead also occurs in combination with certain acids whose bases are metallic.

Arseniate of Lead: Gorlandite.—Occurs in *crystals* and *massive*. Primary form a rhomboid; usual form an hexagonal prism, which cleaves parallel to its lateral planes. Hardness 3·5 to 4·0. Colour pale yellow, yellowish and reddish brown. Lustre resinous. Transparent, translucent. Specific gravity uncertain, stated variously from 5·0 to 6·4, and 6·9 to 7·3. Analysis by Wöhler:—Arsenic acid 21·20; phosphoric acid 1·32; oxide of lead 75·59; muriatic acid 1·89. Found in Cornwall and in France.

It also occurs reniform. Structure compact, opaque. Lustre resinous. Colour brownish-red. Found in Siberia.

Chromate of Lead.—Primary form an oblique rhombic prism. Cleavage parallel to the lateral planes of the primary form. Fracture conchoidal. Hardness 2·5. Colour aurora-red. Lustre adamantine. Translucent. Specific gravity 6·004. It occurs also *massive*:—amorphous; structure columnar, granular. Analysis by Pfaff:—Chromic acid 32; oxide of lead 68. It is found in Siberia and Brazil.

Molybdate of Lead: Carinthite.—Primary form a square prism. Cleavage parallel to the primary planes. Fracture slightly undulating. Hardness 3·0. Colour different shades of yellow, greenish, and red. Lustre resinous. Translucent. Specific gravity 6·69 to 6·76. It rarely occurs massive. Analysis by Berzelius:—Molybdic acid 39·14; oxide of lead

60·86. Found chiefly in Carinthia, but also in North America, &c.

Tungstate of Lead: Scheelate of Lead.—Primary form a square prism. Cleavage parallel to the planes of the primary form. Fracture conchoidal and shining. Hardness 3·0. Colour yellowish white and brownish. Lustre resinous. Translucent. Specific gravity 8·0. Analysis by Lampadius:—Tungstic acid 51·72; oxide of lead 41·28. It is found in Bohemia and Carinthia.

Vanadiate of Lead: Johnstonite.—Occurs crystallized and in small globular concretions. Primary form a rhomboid. Fracture conchoidal. Brittle. Colour straw yellow to reddish brown. Dull, opaque. Specific gravity 6·99 to 7·23. Analysis by Berzelius:—Vanadiate of lead 74; chloride of lead 25·33; oxide of iron 0·63. Found at Tampico in Mexico, and Wanlockhead in Scotland.

There occur, besides the minerals which we have described, some other compounds of lead and different metals, for an account of which we refer to Phillips's 'Mineralogy' and Dr. Thomson's 'Outlines of Mineralogy and Geology.'

We now proceed to mention some artificial compounds and salts of lead, confining our description to such as are most curious in a scientific point of view or most useful in the arts. And first of the compounds of *Oxygen and Lead*, of which there are four: the first is the

Suboxide of Lead.—When lead is moderately heated in contact with air, a grey powder is formed upon it, which according to Berzelius is suboxide of lead, and Dulong states that oxalate of lead when decomposed by heat yields the same compound. It is a dark-grey powder, which is not soluble in acids, but resolved by them into protoxide and metallic lead. It is an unimportant substance, and is a di-oxide, consisting of

One equivalent of oxygen	8
Two equivalents of lead .	208
Equivalent	216

Protoxide of Lead; frequently called *Massicot.*—It may be procured by exposing lead to the action of heat and air, and is in fact so obtained in the process of making red-lead. It may also be obtained by decomposing nitrate of lead in a red heat. Its properties are, that it has a pale yellow colour; is insoluble in water, but readily dissolved by most acids, and is also taken up by the alkalis potash and soda, but not by ammonia. *Litharge* is also a semi-crystalline protoxide of lead, obtained in separating silver from lead ores. Of all the oxides of lead the protoxide is the only one which combines with acids to form salts, and they are all of them more or less poisonous. Protoxide of lead is composed of

One equivalent of oxygen	8
One equivalent of lead .	104
Equivalent	112

Deutoxide of Lead: Red Lead; Minium.—Is procured by exposing the protoxide to the long continued action of heat and air, by which it acquires more oxygen and becomes of a fine red colour; it is largely used as a pigment, and is especially employed in the manufacture of flint glass. It is not soluble in the alkalis, nor do the acids form salts with it, but they act upon it so as to separate it into protoxide, which dissolves, and binoxide likewise, which remains unacted upon. It is partially decomposed, and gives out oxygen when strongly heated, and also by the action of sulphuric acid. It is composed of—

Four equivalents of oxygen	32
Three equivalents of lead .	312
Equivalent	344

Binoxide or Peroxide of Lead is formed by treating the deutoxide either with nitric or acetic acid; when this is done the equivalent of red-lead is separated into 2 equivalents of protoxide, which are dissolved, and one equivalent of binoxide, which remains in the state of an insoluble brown powder. It is decomposed by the action of light, by a strong heat, and also by being converted into protoxide of lead and oxygen. It is not applied to any purpose whatever, and consists of—

Two equivalents of oxygen	16
One equivalent of lead	. 104
Equivalent	120

Chloride of Lead.—When laminated lead is heated in chlorine gas, or when hydrochloric acid is added to a solution of acetate or nitrate of lead, chloride of lead is formed; when obtained by precipitation it is a colourless somewhat crystalline powder, which melts by the application of heat, and assumes on cooling a horny appearance, whence it was formerly called *horn lead.* It is sparingly soluble in water, and when a hot solution has been made, minute shining colourless crystals of chloride are deposited on cooling; these have a sweetish taste, and are not altered by exposure to the air.

It is composed of—

One equivalent of chlorine . .	36
One equivalent of lead . .	104
Equivalent	140

Oxichloride of Lead is used as a pigment by the name of *patent yellow*, and is prepared by the action of protoxide of lead upon common salt; for this purpose common salt may be made into a paste with about five times its weight of litharge and water. Action immediately commences, the mixture becomes alkaline owing to the presence of soda, while the chlorine of the salt unites with the protoxide of lead, and forms a white oxichloride, which by the application of heat becomes yellow; when it has been fused it acquires a crystalline texture on cooling.

It is probably composed of—

One equivalent of chlorine . .	36
Ten equivalents of oxide of lead .	1120
	1156

Sulphuret of Lead may be formed by melting a mixture of sulphur and lead-filings; in appearance it very much resembles lead, and is composed of—

One equivalent of sulphur . .	16
One equivalent of lead . .	104
Equivalent	120

It may also be obtained by adding hydrosulphuric acid to any solution of oxide of lead; the sulphur of the acid combines with the lead of the oxide, and a black precipitate is immediately formed, which, when dried and fused, has the usual appearance of sulphuret of lead.

Iodide of Lead is formed by adding a solution of lead to one of iodide of potassium; a yellow powder is precipitated, which is sparingly soluble in boiling water, and separates, on cooling, in brilliant flakes.

It is composed of—

One equivalent of iodine . .	126
One equivalent of lead . .	104
Equivalent	130

It has already been mentioned that acids combine only with the protoxide of lead; but with this several salts of great use in medicine, the arts, and scientific chemistry, are formed.

Carbonate of Lead.—This compound is very largely employed as a pigment under the name of *White Lead.* Various processes are adopted for its preparation, the oldest (which is still preferred by many manufacturers) is that of exposing sheet-lead to the action of the vapour of vinegar, in earthen pots, heated by tanners' spent bark. It is also prepared by passing the carbonic acid obtained by burning charcoal into a solution of di-acetate of lead, which is thereby converted into acetate of lead, which remains in solution, and carbonate of lead, which is precipitated. The acetate of lead is again converted into di-acetate by the addition of fresh portions of oxide of lead, and again precipitated. Carbonate of lead may also be procured by decomposing the acetate or nitrate of lead by carbonate of potash or of soda.

Carbonate of lead is a dense white powder, which is composed of—

One equivalent of carbonic acid .	22
One equivalent of oxide of lead .	112
Equivalent	134

It is decomposed by heat, which expels carbonic acid and leaves protoxide of lead, and also by the stronger acids.

Nitrate of Lead is formed either by dissolving the metal or the oxide in the acid; a colourless solution is thus obtained, which by evaporation yields colourless octohedral crystals of nitrate of lead. They decrepitate when heated moderately, and if strongly heated they are decomposed, yielding nitrous acid vapour and oxygen, protoxide of lead remaining in the retort. This salt is soluble in about 8 parts of water at 212°, crystals depositing as the solution cools; it is insoluble in alcohol; the alkalis precipitate white hydrated oxide of lead; the carbonates, carbonate of lead; and hydrosulphuric acid throws down sulphuret of lead.

It is composed of—

One equivalent of nitric acid .	54
One equivalent of oxide of lead .	112
Equivalent	166

When nitrate of lead is boiled in water with an additional quantity of oxide, there is formed either a di-nitrate or tri-nitrate of lead, according to the quantity used; these are both very slightly soluble in water, and decomposed by carbonic acid.

Sulphate of Lead is readily obtained by adding sulphuric acid or a sulphate to nitrate of lead. It is a dense white substance, which is insoluble in water, little acted upon by acids, but is dissolved by potash and soda. It is applied to no particular use.

It consists of—

One equivalent of sulphuric acid .	40
One equivalent of oxide of lead .	112
Equivalent	152

Phosphate of Lead is also a white insoluble powder, but, unlike the sulphate, it dissolves readily in dilute nitric acid.

Acetate of Lead, frequently called *Sugar of Lead*, is very largely employed for various purposes. It is prepared by dissolving litharge in acetic acid, and evaporating the solution to its crystallizing point. The crystals are generally minute and prismatic; they are colourless, nearly inodorous, and have a sweetish astringent taste. This salt is soluble in about four times its weight of water at 60°, and much more so in boiling water. It is decomposed by the same substances as decompose the nitrate, and with similar results.

It is composed of—

One equivalent of acetic acid . .	51
One equivalent of oxide of lead .	112
Three equivalents of water . . .	27
Equivalent	190

When this salt is boiled in water with an equivalent of oxide of lead, di-acetate of lead is formed, which is used in medicine under the name of Goulard's Extract of Lead; and it is employed also in the manufacture of white lead, being decomposed by carbonic acid.

Chromate of Lead is largely employed as a pigment. It is of a beautiful yellow colour, and is prepared by mixing a solution of acetate or nitrate of lead with one of chromate of potash.

Characters of the Salts of Lead.—Those which are soluble have a sweetish taste: they give a white precipitate with the alkaline carbonates, which are dissolved by potash and soda, but not by ammonia. Ferrocyanide of potassium gives a white precipitate of ferrocyanide of lead; sulphuric acid and sulphates throw down insoluble white sulphate of lead; hydrosulphuric acid and hydrosulphate of ammonia precipitate black sulphuret of lead. Iodide of potassium and chromate of potash give yellow precipitates. Chlorides also throw down chloride of lead from solutions, unless they are extremely dilute. Zinc and cadmium separate metallic lead.

ALLOYS OF LEAD.—Lead fused with a fourth of its weight of potassium gives a solid brittle mass; it also unites with sodium, but the compound is less fusible. Alloyed with antimony lead forms *type-metal*, and common pewter consists of about 80 parts tin and 20 lead; equal parts of tin and lead form *plumbers' solder*. Mercury and lead combine very readily, but with copper it is difficult to unite it; with bismuth it combines easily, and with iron it forms two alloys. When iron and lead are fused together, the portion at the bottom of the crucible contains lead with a little iron, while the upper portion is iron with a little lead.

LEAD.—*History, Manufacture, and Trade.*—(French, *Plomb*; Italian, *Piombo*; Spanish, *Plomo*; Portuguese, *Chumbo* (all from the Latin *Plumbum*); German, *Blei*; Dutch, *Loot*; Russ., *Swinetz*). When newly melted, lead is of a silvery whiteness, but when it has been for a short time exposed to the air it assumes a dull and peculiar bluish tint, which is commonly designated *lead colour*. Lead is easily malleable, and exhibits this peculiarity, that it does not increase its specific gravity nor become harder through compression when subjected to the hammer. It is only in a very slight degree elastic, and is consequently not sonorous.

Lead was known and used by the Greeks and Romans for various purposes: among others it was employed for pipes to convey water, just as it is now. The lead-mines of this island were worked by the Romans, of which we have evidence in the pigs of lead preserved in the British Museum, and stamped with the names of the emperors Domitian and Hadrian. The early writers in this country, when speaking of the metals, are so confused, that it is by no means certain of which of them they are treating. This confusion is so great, that Sir George Harrison, when writing in exposition of the stannary laws of England, says, 'in a liberal construction, copper is tin.' The framers and early expounders of those laws fell into some strange mistakes regarding even the nature of particular metals. Camden derives the rights of the duke of Cornwall over tin from the circumstance of its containing silver, while lead is not considered a royal metal, because it contains no silver; the facts being the reverse, inasmuch as a considerable proportion of silver is frequently combined with lead, while it is very rare to find the smallest trace of it in tin.

The principal lead-mines in Great Britain are in Cornwall, Devonshire, Somersetshire, Derbyshire, Durham, Lancashire, Cumberland, Westmoreland, Shropshire, Flintshire, Denbighshire, Merionethshire, and Montgomeryshire; in Scotland at the Lead Hills on the borders of Dumfriesshire and Lanarkshire, in Ayrshire, and in Argyleshire. Lead is also found in Ireland, in the counties of Armagh, Wexford, Wicklow, Waterford, Clare, and Down. No certain account of the produce has ever been obtained, the proprietors or occupiers of the principal mines declining, from prudential motives, to give any statements to that effect. An estimate, which was made of the quantity raised and smelted in England and Wales in 1828, was generally believed to be near the truth, and this carried the produce to 45,500 tons: it is thought that the quantity has varied very little since that time. No estimate has been formed of the produce of the Irish mines, but it is not considerable.

The ore of lead, when extracted from the mine, is called *galena*, and is combined with various earthy matters. The first processes subsequent to its extraction are those of crushing or pounding and washing the ore, in order to separate as far as possible by mechanical means the impurities from the metal, which is then smelted, sometimes in a common smelting-furnace and sometimes in a reverberatory furnace, both of which are very similar in form and construction to the furnaces used for smelting and puddling iron. [IRON MANUFACTURE.] When the fusion has been continued long enough to cause the expulsion of the sulphur contained in the ore, and the separation of the earthy matter in the form of scoria, the latter, which from its smaller specific gravity floats on the melted metal, is removed from the furnace through an aperture provided for the purpose, and the lead is allowed to run into a large iron pan, from which it is ladled into cast-iron moulds. It then constitutes what is called pig-lead. The scoria still contains a portion of lead, and is subjected to the heat of another furnace, called a slag-hearth, for its separation, which occurs upon its fusion; the metal then falls into a cavity, whence it is run and also cast into pigs. In this state lead always contains more or less of silver. The proportion is sometimes exceedingly minute, being not more than 1 ounce or 1½ ounce per ton in the metal raised in Derbyshire and Shropshire, while in every ton of the lead from Devon and Cornwall there is found from 20 to 30 ounces of silver. The produce of other mines contains the more precious metal in various proportions between these two extremes. The extraction of the silver is always performed when it exists in a proportion sufficient to pay the expense of the process, which varies in different localities according to the cost of fuel. The process of extraction, which is called refining, depends upon the well-known circumstance, that lead, when heated to redness, absorbs a large portion of oxygen from the air, and is converted into an oxide, while silver does not undergo any such change, but retains its metallic form at almost any temperature. A *cupel*, which is a shallow dish of adequate dimension, is filled with a mixture of burnt bones and fern ashes pressed down, upon which the lead to be refined is placed in the furnace. As soon as the lead is melted, a blast of air, introduced by the usual means, is made to play forcibly upon the surface, and in a short time a crust of yellow oxide is formed, and this is driven away, as fast as it appears, to the opposite side of the furnace, until all or nearly all the lead has been thus converted to an oxide. The silver, which remains behind, is still combined with some portion of lead, and must be subjected to a second process similar to that here described, in order to obtain it in sufficient purity. The litharge, into which the lead has been thus converted, is easily restored to its metallic state by again heating it in a furnace in combination with carbonaceous matter, to which it gives up its oxygen. There is a considerable waste of material when thus treated, varying according to the quality of the lead. The oxide is very volatile at high temperatures, and so much of it escapes in a vapourous form during the process of refining, that the difference of weight before and after its completion is on the average about two-fifteenths. A new process for the extraction of silver from lead has been successfully used in the county of Durham, and was described by Mr. H. L. Pattinson, to the Mineralogical section of the British Association at its recent meeting (1838) in Newcastle. Having observed that in a mass of melted lead crystals were formed as the temperature was diminished below the point of fusion, Mr. Pattinson conceived that these crystals might be more homogeneous and would consequently be united with a smaller proportion of silver than the remaining uncrystallized mass. This idea, proving upon experiment to be correct, has been made practically useful by subjecting the lead to be refined to repeated processes of crystallization by means of a simple apparatus. This consists of a series of hemispherical iron pots, each capable of holding five tons of lead, ranged side by side, and furnished with separate fire-places. The mode of operation is as follows:—One of the pots is charged with lead, and when this is melted, the surface is skimmed in order to remove such impurities as are thrown up. The fire is then withdrawn, and the lead is suffered to cool gradually. When the process of crystallization begins, the crystals are withdrawn by means of ladles with perforations to allow the uncrystallized part to run through, and these crystals are transferred to the second pot, when they undergo a second melting and crystallization, and subsequently a third in another pot. The crystals collected at this third process are found to contain no more than from 10 to 15 dwts. of silver per ton, and are consequently melted and cast into pigs for sale as refined lead. The process here described is repeated with the remaining portion of the lead until it is so rich in silver as to contain from 200 to 300 ounces per ton, after which the silver is extracted by the old process of cupellation. As the proportion of the lead to which this wasteful process is applied does not exceed one-twentieth of the whole quantity of metal, the loss is diminished in a like proportion, and seldom exceeds one part in 120, by which means the expense of the extraction of silver is so far economised, that it will answer to apply the process to lead which originally contains any proportion greater than three ounces of silver to the ton. Independent of the great saving of lead, it is computed that the general adoption of the crystallizing process would occasion an annual gain to this country of 54,000 ounces of silver, through the larger quantity of metal which may be profitably subjected to the process of separation.

The most extensive use of lead is in the form of sheets, and pipes, or tubes, for the passage of liquids. To make sheet-lead the pigs are brought to a state of fusion in a large pot or cistern, near to which is placed the table on which the sheet is to be cast. This table, which is usually from 18 to 20 feet long and six feet wide, was formerly made of wood, and indeed wooden tables are still frequently used, but in many works cast-iron has of late been substituted. The wooden table has its surface protected by a layer of fine sand, which is wetted and spread evenly and firmly over it before the melted lead is poured on. To prevent the lead from running over the sides a ledge is provided, two or three inches thick, and two inches high, which forms the margin of the table. An instrument called a strike is also provided to regulate the thickness of the sheet, and to spread the melted metal evenly over the table. This strike, which is made wider than the table, rests by its two ends on the ledges, the size or diameter of the part within those ledges being adjusted according to the intended thickness of the sheet, which will be equal to the distance between the lower side of the strike and the layer of sand. In casting the sheet the fused metal is taken from the cistern with an iron ladle, and put into a triangular shaped iron shovel or peel, placed at the head of the table, which peel being raised so as to pour out the lead upon the table, the strike is brought into use to spread it evenly over the whole surface; the surplus, if any, falling into a vessel placed for its reception at the foot of the table. A sheet of lead weighs 9 cwt., so that its length and breadth will be greater in proportion to the diminution of its thickness. The thickness of sheets of lead is frequently reduced by means of heavy rollers worked by steam-power. Sheet-lead of different thicknesses is described by those who use it as being of so many pounds weight to the superficial square foot. The following table shows the thickness, in decimal parts of an inch, corresponding to certain weights per square foot —

Thickness.	Pounds per sq. foot.	Thickness.	Pounds per sq. foot.	Thickness.	Pounds per sq. foot.
·10	5·899	·14	8·258	·18	10·618
·11	6·489	·15	8·848	·19	11·207
·12	7·078	·16	9·438	·20	11·797
·13	7·668	·17	10·028	·21	12·387

It will be easy to compute from the foregoing figures the weight per superficial square foot of sheets of any other given thickness. The descriptions most commonly used for roofing, guttering, and the like purposes, are comprised within the limits above stated.

Lead pipes are sometimes made, when great exactness of shape is not required, by bending a length of sheet lead of the necessary width over a mandrel, and soldering the edges together, but the more usual method of manufacture is by casting and drawing. The casting-box employed is an iron cylinder made in two parts, and put together longitudinally with flanges; inside of this cylinder is placed an iron rod or core, which is so fixed as to be concentric to the cylinder, without touching it; a space is thus left into which the melted lead is poured. When this is set, the core is removed and the cylinder opened, so as to withdraw the pipe, which is much thicker than is needed, and must be lengthened, while its substance is reduced, by drawing it through a succession of holes in steel plates, diminishing gradually in diameter similarly to the method employed in drawing iron rods. [IRON MANUFACTURE.] The machinery employed for this process has at different times been much improved in its construction, so that it is now of rare occurrence to meet with an imperfect pipe.

Without entering into any description of the various machines and utensils made with this metal, whose qualities or uses depend not so much upon the material employed as upon their form and construction, it may be proper to give some explanation of the mode of manufacturing leaden shot by pouring the melted metal from a great height into water. This process was invented in 1782 by a workman named Watts, residing at Bristol, who is said to have conceived the idea in a dream, and to have proved its practicability by pouring some melted lead from the tower of the church of St. Mary Redcliffe at Bristol. Having secured the invention by a patent, he sold it to parties possessed of adequate capital, and the patent having long since expired, the process is now in common use. In order to give to the lead the quality of assuming a more perfectly globular form in cooling, the metal is previously alloyed with arsenic in the proportion of two lbs. to one hundred-weight, or with a small quantity of mercury, which latter is used in order to obviate an objection caused by the poisonous quality of arsenic. Shot formed by granulation are made in a high tower, in the top of which the melting-room is placed. Close to the furnace is placed a large colander, or perforated plate, into which a portion (determined by experiment) of the scoria produced in melting the metal is placed, when the metal is ladled into it. Being somewhat detained by the scoria, it is partially cooled and divided into separate portions, which pass through the colander in the form of globules, which follow in such rapid succession as to have the appearance, to a cursory observer, of a continued stream. These globules fall into a tub of water placed on the lower floor of the tower. The shot thus formed are of various sizes, and a small proportion are imperfect as regards sphericity. Having been perfectly dried by artificial heat, the shot are sorted according to their sizes by means of a series of sieves, the meshes of which have different degrees of fineness. A sieve having the smallest meshes is first used, that the smallest sized shot may pass through and be collected. What remain are transferred to the sieve next in fineness, to separate shot of the second size, and so on in succession. The process of separating the imperfect shot is very simple, and is thus performed:—A shallow wooden tray is suspended by cords from the ceiling of the room, and into this a certain quantity of shot is put: by raising one end of the tray, and giving it a motion from side to side, the shot will roll about, such as are perfectly spherical finding their way off the tray into a reservoir placed at its lowest side, while those which are of imperfect form run against and are detained by the sides of the tray, so that they can be collected in a separate vessel after the perfect shot have all run off. The shot thus sorted are then polished by putting about half a ton together into an iron barrel which that quantity will nearly fill. By means of a rotary movement given to the barrel, the shot are made to rub against each other, and thus acquire a black colour and a lustrous appearance.

The quantity of lead produced in this country is much beyond what is wanted for home use, and the surplus is necessarily exported. The trade in this metal with foreign countries and British dependencies, during each of the last ten years, has been as follows:—

	Foreign lead.		British lead and shot exported.	
	Imported. Tons.	Exported. Tons.	Weight. Tons.	Value.
1828	2,479	1,784	10,021	£177,983
1829	1,508	1,700	6,834	114,555
1830	662	859	7,442	106,789
1831	1,232	1,234	6,777	96,333
1832	1,090	957	12,181	144,653
1833	790	857	9,015	120,714
1834	969	865	8,672	142,513
1835	1,276	1,268	11,082	195,144
1836	1,893	913	9,769	224,981
1837	1,806	1,520	7,863	155,257

The above quantities are exclusive of litharge, red lead, white lead, and lead ore, which are every year exported in considerable quantities. The export of British lead, in all its forms, during each of the foregoing years, has been as follows:—

	Tons.		Tons.
1828	13,256	1833	11,145
1829	8,647	1834	10,411
1830	9,309	1835	13,372
1831	7,932	1836	11,418
1832	13,898	1837	9,560

The foreign lead imported is almost wholly supplied by Spain, the produce of exceedingly rich mines situated at Adra in Granada. The quantity furnished by these mines has fluctuated greatly; a circumstance, in all probability, owing to the unsettled state of the country. The greater or less produce of these Spanish mines has a great influence upon the price of lead in every market of the world; and at times has acted injuriously upon the mine-owners in this country, who have however, during the last few years, been realizing great profits. The market price of lead in London, during the spring of each of the last ten years, has been:—

	Per fodder of 19½ cwt.				Per fodder of 19½ cwt.		
1829	£17	10	0	1834	£17	15	0
1830	13	10	0	1835	18	15	0
1831	14	15	0	1836	27	15	0
1832	12	10	0	1837	23	5	0
1833	14	0	0	1838	21	15	0

The principal markets for English lead are Russia, France, Holland, the British possessions in India, Brazil, and the British colonies in America.

The produce of the Spanish lead-mines, and its distribution in each of the years 1836 and 1837, as stated by a very competent authority, was as follows:—

	1836. Tons.	1837. Tons.
Estimated produce of the mines	25,000	15,000
Exports to France	16,700	12,000
Italy, the Adriatic, and Sicily	1,700	2,000
Belgium and Holland	1,600	1,600
England	600	500
North of Europe	400	1,000
Portugal		400
Gibraltar and Spanish ports, mostly in transit for foreign markets	2,000	3,500
	23,000	21,000

Some lead-mines have been opened and worked upon a small scale in Missouri, one of the United States of North America. The total produce of this metal in the United States, in each of the ten years from 1826 to 1835, the latest as to which the accounts have been made public, was:—

	Tons.		Tons.
1826	1,042	1831	2,879
1827	2,720	1832	1,911
1828	5,496	1833	3,545
1829	6,451	1834	3,558
1830	3,719	1835	1,676

LEAD, MEDICAL PROPERTIES OF. In a purely metallic state, lead produces no action on the human system, except such as arises from its mechanical properties; but as soon as it has become oxidized, it can combine with the contents of the stomach, and produce different effects, according to the nature of the substances it meets with: hence even a leaden bullet, swallowed, has given rise to the symptoms characteristic of the presence of lead. 'In whatever form lead is habitually applied to the body, it is apt to bring on the train of peculiar symptoms: the inhalation of its fumes, the habitual contact of any of its compounds with the skin, the prolonged use of them internally as medicines, or externally as ointments and lotions, and the accidental introduction of them for a length of time, with the food, may, sooner or later, equally induce *colica pictonum*, or painters' colic. Of all exposures none is more rapid or certain than breathing the vapours or dust of the preparations of lead.' (Christison.) Thus the workmen at Lead Hills in Lanarkshire are stated never to have the lead-colic until they work at the smelting furnaces. The action of lead on the human frame differs greatly according to the kind of preparation of lead, the quantity employed, the length of time or frequency of exposure to it, and the channel of its introduction into the body. If injected into a vein, acetate of lead, even in small dose, will produce almost immediate effects; while if taken into the stomach it is much slower, and a considerable quantity is requisite to produce serious consequences. In the latter instance the effects are both local and remote: 'One class of symptoms indicates inflammation of the alimentary canal; another, spasm of its muscles; and a third, injury of the nervous system, sometimes apoplexy, more commonly palsy, and that almost always partial and incomplete. Each of these classes of symptoms may exist independently of the other two; but the last two are more commonly combined.' (Christison *On Poisons*, p. 511.) The rapidity of action is also determined by the solubility of the preparation or salt of lead; while the degree of effect is also closely connected with the solubility, the more insoluble salts being nearly powerless—a circumstance which supplies a convenient mode of disarming the others of their virulence by converting them from soluble to insoluble salts. Fatal cases from poisoning by large quantities of the salts of lead are not numerous, as there is in general time to administer antidotes; but death from the slow and insidious introduction of lead into the system is of frequent occurrence. The principal source of these is the use of water or other fluids containing lead in solution, the intermixture of lead, as adulterations or accidentally, with articles of food, or handling preparations of lead in the daily business of artisans, such as painters, plumbers, &c.

The danger of using water from leaden pipes or cisterns was known even to the Romans; nevertheless they are still extensively used, and the rarity of any fatal results shows that the risk has been much overrated. This is sufficiently explained by the protecting power of the insoluble salts of lead, formed by the action of the ingredients of the water on the lead, which hinders the subsequent supplies of water from coming in contract with the metal. Waters however which are remarkably pure, and particularly distilled waters, dissolve the lead, and becoming impregnated with it, cause serious accidents. But waters which abound with calcareous salts, or hard waters, speedily encrust the interior of the cistern, and remove the source of danger. The more impure the water, the more certainly will it form a protecting incrustation; hence the Thames water scarcely ever produces hurtful effects from standing in leaden cisterns previously to being used. No water should ever be drunk or employed for culinary purposes out of *new* cisterns; but water should be allowed to stand in them for some time without being renewed, for only after a crust has been formed does the water become safe; or to expedite this, a little phosphate of soda or iodide of potassium may be added, or a few drops of sulphuric acid may be used.

The lid or cover of cisterns should never be made of lead, as the vapour which condenses on it possesses all the solvent power of distilled water. It is also unsafe to use water which has flowed over leaden roofs, more particularly in towns, as the surface of the lead is almost invariably coated with some soluble salt.

It is however an error to attribute all the changes which lead used for roofs or cisterns undergoes solely to the corrosive power of water. (See case by Dr. Wall, quoted in Christison, p. 488, edit. 1836.) The holes with which the lead is often riddled are caused by the larva of an insect, the *Callidium bajulus*, in the stomach of which lead is often found. (Kirby and Spence's *Entomology*, i., p. 235.)

Perfumed distilled waters, such as orange-flower water, often contain lead in solution, derived from the solder cementing the copper vessels in which these are imported, whenever lead has been employed instead of tin solder.

No kind of adulteration or impregnation with lead, from accident or ignorance, is more common than that of wine or cyder. Even a single shot of lead left by accident in a bottle after cleaning has produced severe colic; and the more extensive use of the salts of lead to *fine* wines, as it is termed, that is, to remove their acid taste and make them sweet, has occasioned most serious consequences. In the cyder-presses, and in the worms of stills, lead was formerly employed, but it is now nearly banished from use. Lead is sometimes employed either ignorantly or fraudulently, to render tart and bad wines marketable. The lead, if present, may be detected by appropriate tests, among others by *Hahnemann's wine test*, made by putting into a small phial sixteen grains of sulphuret of lime, prepared in the dry way, and twenty grains of cream of tartar. The phial is to be filled with water, well corked, and occasionally shaken for the space of ten minutes. When the powder has subsided, the clear liquor is to be decanted off, and preserved in a well-stopped bottle. This liquor, when fresh prepared, discovers lead by causing a dark-coloured precipitate. Domestic and British wines, the nature of the fruit used in preparing them unavoidably causing them to be more acid than those prepared from the grape, are most likely to be impregnated with lead, particularly as in some cookery books it is ignorantly recommended to sweeten

Another important source of impregnation of articles of food with lead is connected with the use of earthenware glazed with lead. Anything containing vegetable acids, if kept in such vessels, will act on the lead, and may produce poisonous effects. Even milk cannot be kept with safety in leaden-glazed dishes. For all preserves, jellies, &c., Bristol ware, which is glazed with salt, should be employed. Nothing can be more dangerous than to keep vinegar in leaden bottles, or even in jars glazed with lead. The use of acetate or sugar of lead to clarify syrups or honey, or to render brandy pale, is to be avoided. Rum, hollands, and geneva are occasionally adulterated with lead, and cause extensive evil. Colouring cheese with red-lead is equally hazardous. them.

In small medicinal doses acetate of lead, which is almost the only salt administered internally, produces a direct action on the secretions of the stomach, combining with the albumen, and forming compounds which are for the most part insoluble in water and acids, but occasionally forming other compounds which are soluble by the addition of a small quantity of acetic, hydrochloric, or lactic acid. As these acids exist in variable quantities and under different circumstances, the degree and kind of action will be different, according as the lead is dissolved and conveyed to distant organs, or as it remains nearly undissolved and accumulated on the mucous membrane. In the greater number of cases it is very slowly introduced into the circulation. Even a considerable dose may display merely local effects, exciting irritation and inflammation; though these are sometimes followed by colic, convulsions, coma, or local palsy.

By a repetition of small doses the secretion of most mucous surfaces is diminished, and constipation occurs; the heart's action is reduced, and the calibre of the arteries is lessened and exhalation checked: if hæmorrhage should exist, that generally stops. Acetate of lead thus appears to be decidedly sedative and astringent. It manifests its sedative effect even when applied externally, and lessens discharges from ulcers, though its application to these is not always safe. Even white-lead (carbonate of lead) ointment applied to ulcers has proved fatal.

Acetate of lead should always be dissolved in distilled, not in common water. It is a most improper application to inflamed cornea whenever that is ulcerated, as it forms a white compound which is apt to get imbedded in the cornea.

The diseases in which it proves most useful are increased discharges either from mucous surfaces or in hæmorrhages. In diarrhœa, dysentery, but, above all, in cholera, when combined with opium, it is a most efficacious remedy (Dr. Graves, in *Medical Gazette*, Oct. 14, 1837); in fevers attended with diarrhœa it is also useful. Combined with opium on which boiling water has been poured, it forms a most grateful wash to erysipelatous and other inflamed surfaces. In all cases care must be observed in its use. In poisoning by acetate of lead or by litharge, the best antidotes are sulphate of soda (Glauber salts), sulphate of magnesia (Epsom salts), or alum, to decompose or form an insoluble compound, and afterwards the stomach-pump may be used, or emetics of sulphate of zinc may be given. [PAINTERS' COLIC.]

LEAD, BLACK. [PLUMBAGO.]

LEAF, THE, is an expansion of the bark of a plant, from whose axil a leaf-bud is developed. It is usually thin, and traversed with one or more veins, composed of woody and vascular tissue; sometimes it is fleshy, and occasionally cylindrical, or nearly so. Its veins form a double stratum, of which the upper is in connection with the alburnum, and the lower with the liber of the branch on which it grows. When leaves have been macerated long enough, it is easy to separate these two strata. The veins are held together by a green or coloured parenchyma, which is enclosed in an epidermis pierced by stomates or openings, supposed to be for the purpose of respiration. A leaf is either united to the stem by means of a petiole or stalk, or it is sessile, that is to say, seated on the branch without an intermediate stalk; through the petiole pass the veins before they can expand into the broad or green part forming the blade of the leaf. When the stem is angular, the leaf is not confined to the angles or the spaces between them, but grows from either indifferently, only uniformly in the same species.

The petiole is usually articulated with the stem, rarely with the blade of the leaf; the latter however sometimes happens, as in the orange. It usually loses itself in the parenchyma of the blade, but sometimes passes beyond it, and in compound leaves often forms a tendril or spine. Sometimes, as in the orange and in Nepenthes, and some other plants, it assumes the appearance of the leaf itself. Occasionally, as in New Holland Acacias, it is the only part of the leaf that the plant continues to bear after infancy, and, in the opinion of some botanists, it is what we call the leaf in the majority of Endogens; the latter however is an opinion but little held. It is not uncommon for the petiole to expand into a sheath (*vagina*) surrounding the stem, as in grasses, orchidaceous and many other plants. Some writers have believed this to be a special organ, because in certain instances leaves have both a flat sheathing base and a tapering body bearing the blade; but in such cases there is nothing more than a petiole dilated at the base and contracted at the apex.

Some leaves are furnished with an appendage, which in grasses is a thin membranous body arising from the base of the lamina, and in palms is a coarse net, formed, as is said, of tissue belonging to the veins of the leaves.

When leaves have but one blade, they are simple, as in the apple; but when there is more than one blade, each seated on a ramification of the petiole, a leaf is called compound. Of these and of the external form of the leaf there are endless modifications. Between 200 and 300 are enumerated by Bischoff. (Lindley's *Introduction to Botany*; Bischoff's *Handbuch der Botanischen Terminologie*.) Their normal figure is oval, produced by two arcs which intersect each other at each end. They are consequently quite symmetrical, the one side being exactly like the other; here and there however instances to the contrary are found, especially in Ulmaceæ and Begoniaceæ, where the two sides of the base, and in Orchidaceæ the two sides of the apex, are unequal; such leaves are called oblique.

The substance of the leaf consists of parenchyma, connecting the veins of woody and vascular tissue. It differs greatly in different plants, and appears to be so arranged as to meet the wants of the species in which it is found. Usually the cells of parenchyma belonging to the upper surface are planted perpendicularly upon the epidermis, while those of the under surface are parallel with it; but this varies very much, and it often happens that the arrangement of the parenchyma is alike on both sides of the leaf. All that appears uniform with respect to this substance is that it contains grains of chlorophyll in abundance, that it is traversed by air cavities in all directions, and that the latter are universally in communication with the stomates. The usual cause of the under side of leaves being paler than the upper is that the parenchyma is more cavernous on that side than the other.

In their position leaves are usually either alternate or opposite, in pairs upon the stem; in some however there are more than two leaves placed on the same plane, which are called verticillate. But when leaves are so closely arranged upon a stem that their bases touch, as in pine cones, the pine apple, the young shoots of asparagus, and in all leaf-buds, it universally is found that they indicate a spiral direction; and observation has shown that in fact this is the real plan of arrangement, however much it may be obscured by one cause or other. The subject of spiral arrangement in leaves has been treated as a mathematical question by Messrs. Schimper, Braun, Bravais, and others. (Link, *Elementa*, i. 448, ed. 2.)

Independently of their ordinary variations in form, leaves occasionally assume extraordinary appearances. Of this nature are those which, developing under water, form only their veins, without any connecting parenchyma, and consist of delicate thread-shaped segments. Another kind are the pitchers or hollow water-vessels found upon such plants as Nepenthes, Sarracennia, Dischidia, &c., in which some part of the leaf is rolled up so as to form a cavity capable of holding water. When such bodies have a lid, the latter is always the lamina, and the pitcher itself the modified petiole. In this country we have something of the kind in Utricularia, which forms under water little transparent bags, determined to be petioles by their analogy with the same parts in exotic species, in which a lamina also exists.

The most remarkable modifications of the leaf are however those common ones where it changes first into a bract, then successively into sepals, petals, stamens, and carpels. That those organs are really mere modifications of leaves is now so well known as to require no evidence to support the statement. (Lindley's *Introduction to Botany*, p. 524, ed. 2.)

By Linnæus certain kinds of leaves were called fronds, upon the supposition that they were a composition of both leaf and branch fused as it were together. He applied the idea to palms and ferns chiefly. No one now entertains such an idea of palms, whose foliaceous organs, although of very large size, sometimes as much as 30 or 40 feet in circumference in the Talipot Palm of Ceylon, differ from ordinary leaves in nothing else. The term is still applied to ferns, but upon no intelligible ground, as in those plants also any comparative anatomist can demonstrate that the so-called fronds are entirely analogous to the leaves of other plants. It is only in Lemna, Marchantia, Lichens, and such plants, that a frond, that is, a combination of leaf and stem into one body, is to be found.

The function of leaves is to elaborate the crude sap sent into them by the stem, to digest it, convert it into the secretions peculiar to each species, and to direct it afterwards into the bark. In order to enable them to perform these important duties, they have a very large surface exposed immediately to light and air; a still larger surface capable of respiration, if we consider their innumerable air-chambers; and there are passages through their epidermis to regulate their respiration and perspiration. The latter is brought on chiefly by the stimulus of solar light; to guard against the excessive action of which they are in all cases protected by a tough homogeneous cuticle lying on the outside of the epidermis, and by peculiar arrangements of the cells of the latter part, which are thin and thin-sided, or thick and thick-sided, in one stratum or in many strata, according to the circumstances under which a plant is intended naturally to grow. In submersed plants this provision is so slight that their leaves shrink up and wither as soon as they are exposed to the air: in plants destined to inhabit dry, hot, sunburnt situations, the provision is so abundant that they will live for many months without any supply of moisture.

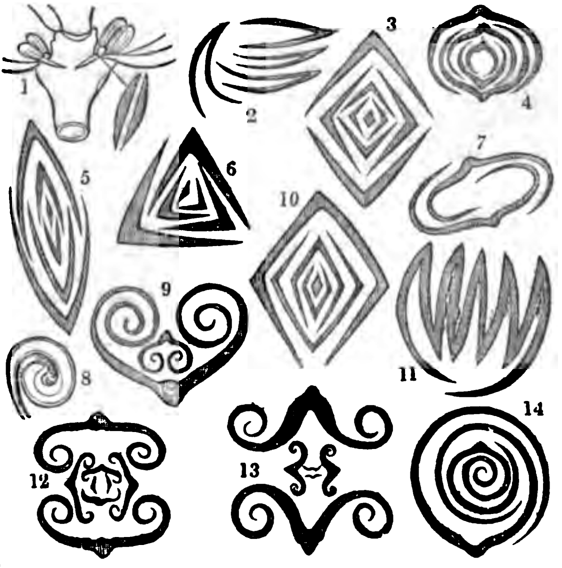
It is in consequence of these important offices which the leaf is intended to perform that in all plants it is so indispensable that they should be protected from injury of what ever kind.

LEAF-BUD, is an important organ of plants. It consists of leaves in a rudimentary state, resembling scales, arranged one over the other, and usually in a spiral manner, around a cellular conical centre, which has the power of growing upon the application of certain stimuli, namely, light and moisture combined with a variable degree of temperature. It is regarded by physiologists as a miniature plant, partaking in some measure of the nature of the embryo, and although in its natural condition only forming part of a complicated system of organization in connection with other leaf-buds, yet having an independent power of growth, which it is capable of exercising, if separated from the branch or system to which it belongs. This fact is obvious in the common gardening operation of propagation, for which purpose the buds of plants are cut off and made to form new individuals, as in the process called *budding*, in striking from *eyes* (*i.e.* leaf-buds), grafting, layering, propagation by cuttings, and the like. None of these operations can succeed except through the independent vitality of the leaf-bud. For this reason a plant must be considered a compound being, analogous to polypes and similar zoophytes.

As the leaf-bud is of this essential importance to a plant, nature takes the utmost care to guard its delicate internal tissue from accidents. For which purpose the external scales are filled and divided by air, and consequently form numerous non-conducting plates; or they are in addition clothed with a thick fur, with a soft resin, or with other similar secretions.

The leaf-bud is always produced in the axil of a leaf, and placed in immediate communication with the cellular horizontal system of a plant, of which system it is a peculiar development; and it is especially deserving of notice, that all leaves or modifications of leaves, be their external form or colour what they may, are capable of forming leaf-buds in their axils.

The manner in which the scales of a bud are packed varies very much; if we suppose them to be looked at when cut transversly, the sections will represent the following appearances, to which the names added at the foot of the wood cut are technically applied.



1. Applicative, or appressed	(Viscum album).
2. Conduplicate	(Cerasus communis).
3. Imbricate	(Syringa vulgaris).
4. Equitant-terete	(Vaccinium Myrtillus).
5. Equitant ancipital	(Iris germanica).
6. Equitant triquetrous	(Carex paludosa).
7. Obvolute, or semi-amplexal	(Saponaria officinalis).
8. Gyrate, or circinate	(Drosera anglica).
9. Involute	(Viola odorata)
10. Equitant tetraquetral	(Some Carexes).
11. Plicate	(Vitis vinifera).
12. Involute (a variation)	(Pyrus Malus).
13. Revolute	(Polygonum Persicaria).
14. Convolute, or supervolute	(Prunus Armeniaca).

LEAGUE, LEUCA, LEUGA, LEUVA, LEWEKE, &c. An itinerary measure, which in modern English always means the twentieth part of a degree of latitude, or three of what are called geographical miles, each of which is the sixtieth part of a degree. The variation of the degrees of latitude is not sufficient to make this measure sensibly incorrect for nautical purposes; and the league of our sailors may be described and easily remembered as 3·456 statute miles of 1760 yards each. The same marine league is used by the French and other nations: besides which the French have among their itinerary land measures two distinct leagues (or *lieues*, in some of the provinces *lègues*), the first of 2000 toises, or 2·42 English statute miles, which is the legal posting measure; the second of 25 to the degree, or 2·77 English miles. These are selected from among the French measures for their celebrity, and not as being the only ones: for before the Revolution there was no legal itinerary measure, and the length of the league varied from province to province. (Paucton.)

The *leuca* of the antient English law writers is necessary to be determined before the rights given by many charters can be defined; but unfortunately the length of this measure is enveloped in utter confusion. The modern lawyers, we believe, evade the question by setting it down as a mile; thus the legal minimum distance between two markets, which was certainly seven leucæ, is now called seven miles. We shall, in the present article, collect a few testimonies on the length of the leuca, and must leave the reader to form the best opinion which he can upon the varying presumptions which they afford.

By citations in Ducange, Paucton, &c., it appears that Hesychius distinctly describes the λεύγη,[*] and Jerome, Jornandes, &c., the leuca (stated by Camden to be derived from the Celtic *leach*, a stone) as a Gaulish measure; and the original Gallic league was set down by the Romans as a mile and a half of their own measure, which was in all probability a rough estimation, first used in the Itinerary of Antoninus. In that work the distances from place to place in Gaul are frequently given in leagues (always in whole numbers), which are in every instance reduced to Roman miles at the rate of a mile and a half to each league. (See also Amm. Marcell., xvi., c. 12.) Hence, taking the Roman foot at 11·62 English inches (which is a mean between the most trustworthy measures) and the pace of five feet at 58·1 inches, the Roman mile of 1000 paces is 1614 English yards, and the leuca was therefore 2421 yards, subject to the error of the Roman estimation; or 1·376 modern English miles, with the same reservation.

This leuca in all probability was brought by the Normans into England. It is true that the Saxon charters of Ingulphus describe distances in leucæ; but the genuineness of these charters is now considered more than questionable, and perhaps this very circumstance is a presumption against them. But the leuca soon began to vary in size. Ducange cites an old metrologist who speaks of two leucæ, the one legal, of 3000 paces, the other common, varying much in different countries. In the confusion incident to our subject, it will be worth while to remember that it was not uncommon, when a measure was found too short for convenience, to double it without altering its name: thus among the list of old coins (1540) given by John Dee, is found the *penny of two pence*. The registers of Battle Abbey (Sir H. Ellis) and the 'Monasticon Anglicanum' (Ducange) describe the leuca as containing 12 quarantenæ, or furlongs. Now the furlong (forty-long) is always 40 perches, and the perch, though varying much, yet was settled very early at 16½ feet. This gives a modern statute mile and a half to the leuca; so that a certain set of old authorities countenance the notion that the leuca was in their time very little more than that of the Gauls. It is not worth while to take into account any possible variations of the foot: since all the information we can obtain is too rough even to make the whole difference between the Roman and modern English foot of consequence.

The earlier statutes do not define the itinerary measures; confining themselves entirely to those by which land and goods were bought and sold. And the itinerary measures seem to have been on the increase, perhaps for the following reason:—The jurisdiction of towns, monasteries, &c., was usually defined as extending a leuca or a given number of leucæ in every direction from their precincts, so that it became the interest of these powerful bodies to make the leuca as long as possible. The old French term ban-lieue, banni-leuca, or league of the edict or regulation, refers to the space over which jurisdiction was granted. Ingulphus perhaps lets us a little into the secret when, speaking of his own monastery, he says, 'Prudentissimi metatores, contra malitiam emulorum nostrorum piissimé providentes, potius plus quam minus ponere voluerunt.' The same Ingulphus informs us that in his time the usual league was of 2000 paces, or 1·835 modern English miles, if the Roman pace be meant: but he adds that the English, adopting a Norman word to their own measure, frequently spoke of leucæ when they meant miles. But it may be questioned whether the mile and the leuca ever became interchangeable words in writings or charters, at least in England: in several continental countries the term mile never became vernacular, and miliare is therefore translated by league.

There is sufficient evidence to show, that whatever the mile of a later date may have been, the leuca was generally two miles; though instances occur in which it is still described as 1500 paces. The following are extracts with which we have been favoured from manuscripts in the British Museum. In the registers of the monastery of Canterbury (of the fourteenth century) we have the following: 'Mensura unius pollicis incipit ex transverso radicum unguinum pollicis. Tres pollices unam palmam faciunt: quatuor palmi faciunt unum pedem. Pes et dimidium faciunt cubitum parvum: Sex parvi cubiti faciunt cubitum magnum. Quinque pedes faciunt passum unum. Centum viginti quinque passus faciunt stadium unum. Octo stadia faciunt unum miliare. Duo miliaria faciunt unam leucam.' This gives a leuca of 10,000 feet. Again, in the same manuscript: 'Memorandum quod virga communis continet xvi. pedes et dimid. videlicet quinque ulnæ et dimid. secundum standardum Regis. Idem xl. virgat. continent i. quarantenam. Item vii. quarantenæ et dimid. iii. virgat. et ii. palm. continent unum miliar. Item duo miliar. continent i. leucam.' This gives a leuca of the same length. In a manuscript supposed to be of the time of Edward IV. we find 'v. fote make a pase, and ther go viii. forelongs to a mile in Yngland, and ii. ynglysch myle make a ffrenshe leweke.'

Bracton (Henry III.) and Fleta (Edward I.?) both assert (see the citations in Cowell, Comyns's 'Digest,' &c.) 6 leagues and half a league and the third part of a half (or 6⅔ leagues) as being the distance between two markets which do not injure each other: because 20 miles is a reasonable day's journey: now (both of them say) if the *dieta*, or day's work, be divided into three parts, the first is for going to the market, the second for business, and the third for returning. This appears to mean that no market should be established within a third of a day's journey of any one who is already within a third of a day's journey of the established market, so as to give him the option of going to either: that is, the two markets must be at least ⅔ of 20 miles apart, which being further described as 6⅔ leagues, shows that the leuca is two miles. This quotation is important, as establishing the meaning which the old law writers attached to the word.

It may then, we think, be confidently asserted, that the league, which began as a mile and a half (Roman), soon became lengthened, until it remained fixed at two of the miles of the day. It appears also that this length of two miles was a settled league at so early a period, that it is the measure of our oldest law writers, and of most of the oldest charters. It depends therefore upon the mile of the thirteenth and fourteenth centuries; and we must refer to the article MILE for the discussion of its absolute length. In order that matters of computation very nearly related may not be separated, we refer to that article some independent evidence on the length of the league, which makes no mention of the mile. We shall finish this article by stating our conviction that the length of the league or leuca was, in the time of the old law writers, very near, one way or the other, to two modern statute miles and nine-tenths of a mile; the old mile being to the modern statute mile in the proportion of 45 to 100.

LEAGUE. [GUISE, DUKES OF.]

LEAKE, ADMIRAL SIR JOHN, born at Rotherhithe in 1656, was bred to the sea, and from 1677, when he fought in Sir E. Spragge's action with Van Tromp, to the end of the century, served with high credit in various stations; more especially he distinguished himself in the battle of La Hogue. Being in command on the Spanish coast during the War of the Succession, he obtained much honour by the skill and gallantry which he displayed in relieving Gibraltar, first in October, 1704, secondly in

[*] The reading in Hesychius is, Λεύγη, μέτρον τι γάλακτος. We do not know who made the correction Γαλατικόν, but this word or Γαλάταις is probably the right reading.

March, 1705. In the same year he bore an active part in the reduction of Barcelona, which again he relieved in April, 1706, when besieged by the Spaniards and French, and in great extremity. In the same year he commanded the fleet at the capturing of Alicant, Carthagena, and the island of Majorca, and in 1708 of Sardinia and Minorca. After the death of Sir Cloudesley Shovel in 1707, Sir John Leake was made commander-in-chief of the fleet, and in 1709 Rear-Admiral of Great Britain, on which occasion the queen paid him the high compliment that 'she was put in mind of it by the voice of the people.' In the same year he became a lord of the Admiralty, and continued high in office until the death of Queen Anne. Being superseded on a pension on the accession of George I., he spent the rest of his life in retirement, and died August 1, 1720, leaving a high professional reputation for skill, courage, prudence, and success. His private character is represented in a very amiable light. (See the 'Life' by his grandson S. M. Leake, 1750, and a long article in the 'Biographical Dictionary,' 8vo.)

LEAMINGTON. [WARWICKSHIRE.]

LEAP YEAR, the name given to every fourth year of the Julian calendar, in which one additional day (a twenty-ninth day of February) is reckoned. This correction constitutes the distinction of the Julian calendar: the necessity for the Gregorian correction arises from the years being made a very little too long, one with another, by making them consist of 365¼ days each, as is done when a day is added to each fourth year. The Gregorian correction is made by omitting three leap years in four centuries, and it is settled that the common years, which would otherwise be leap years, shall be those which terminate centuries in which the first pair of figures is not divisible by four. Thus the years 1800 and 1900 are not leap years, but 2000 is leap year: 2100, 2200, 2300 are not leap years, but 2400 is leap year.

LEASE, *Dimissio*, or *Demissio* (from the French *laisser*, *permittere*), is a demise or letting of lands or tenements, right of common, rent, or any hereditament, unto another for term of years or life, for a rent reserved. (Cowel's *Law Dictionary*, art. 'Lease.') But it should be observed that the 'reservation of a rent' is no necessary part of the definition. The party letting is called the lessor, and the party to whom the property is let is called the lessee. A lease has also been defined to be a contract between a lessor and a lessee for the possession and profits of lands and tenements on the one side, and a recompense by rent or other consideration on the other. (Bac., *Ab.*, tit. 'Lease.') The lessor who thus grants a term of years to a lessee out of some larger estate has a reversion to which the rent is incident, and which gives him a right to distrain, by virtue of the relation thus created, provided a fixed rent be reserved: fealty also is due from the lessee to the lessor. [DISTRESS.]

The lessor contracts to give the lessee the possession of the lands and premises, and accordingly the lessee in possession may maintain an action of trespass against a person who enters even the subsoil of his premises; as for instance, if such trespasser enters by means of a level or passage from a mine in adjacent premises, and takes coal from under the lessee's land. (*Lewis* v. *Braithwaite*, 2 B. and Ad., 437.) The possession of the lessee comprises all that the lessor is entitled to, which in the case of land extends indefinitely below the surface [LAND]: this possession may exist without any property or ownership, as in the case just stated.

A lease for years does not require a deed or livery of seisin, and at the common law no writing was necessary, although the entry of the lessee was requisite to give it complete effect; but now, by the Statute of Frauds (29 Car. II., c. iii., s. 1), all leases, estates, interests of freehold or terms of years, created by livery and seisin only, or by parol, and not put in writing and signed by the parties so making or creating the same, or their agents thereunto lawfully authorised by writing, shall have the force and effect of leases or estates at will only, except leases not exceeding the term of three years from the making thereof, upon which the rent reserved to the landlord during such term shall amount to two-thirds at the least of the full improved value of the the thing demised. If the tenement is incorporeal or a reversion or remainder, a deed is necessary, and other leases are commonly made by deed, as covenants can be made by deed only. (See *Bird* v. *Higginson*, 2 A. and E., and the cases there cited.) In leases for life livery of seisin or some substitute for it is necessary.

When there is a parol agreement for a lease, which would be void by the statute, but the tenant has entered in consequence of such agreement, and done other acts in part performance of it, courts of equity will decree that the landlord shall execute a lease according to the terms of such agreement, if it can be satisfactorily proved by evidence.

It has been laid down that whatever words are sufficient to explain the intention of the parties, 'that the one shall divest himself of the possession, and the other come into it for such a determinate time, such words, whether they are in the form of a licence, covenant, or agreement, are of themselves sufficient, and will, in construction of law, amount to a lease for years, as effectually as if the most proper and pertinent words had been made use of for that purpose: and, on the contrary, if the most proper and authentic form of words whereby to describe and pass a present lease for years are made use of, yet if upon the whole deed there appears no such intent, but that they are only preparatory and relative to a future lease to be made, the law will rather do violence to the words than break through the intent of the parties; for a lease for years being no other than a contract for the possession and profits of land on the one side, and a recompense of rent or other income on the other, if the words made use of are sufficient to prove such a contract, in what form soever they are introduced, or however variously applicable, the law calls in the intent of the parties, and models and governs the words accordingly.' (Bac., *Ab.*, tit. 'Lease,' K.) However, the words 'grant,' 'demise,' and 'to farm let' (which are commonly all used together), are the most proper operative words to constitute a lease for years.

For the reasons stated in the passage just quoted, it is frequently found difficult to decide whether an informal written instrument shall have the operation of a lease, or shall be considered only as an agreement for a future lease. Much of the litigation on the subject of leases has arisen out of this difficulty. 'When a person agrees to let premises for a term, it is not unusual for the intended assignee to be let into possession on executing an agreement for a lease, either as a temporary arrangement until a lease can be executed, or with a view of avoiding the expense* of a lease altogether. But such a course is strongly to be deprecated, on account of the various questions which have arisen in regard to the ascertained time and execution of such agreements, and the unsatisfactory state in which it places the rights and remedies of the respective parties. The tenant has no security for his possession, since he is liable to eviction in an action at law (*Hamerton* v. *Stead*, 3 Barn. & Cress., 478); nor has the owner any summary means of enforcing payment of his rent; for it is settled that, under such an agreement, no distress can be levied, the landlord's only remedy for his rent being an action for use and occupation (*Hegan* v. *Jackson*, 2 Taunt., 148; *Dunk* v. *Hunter*, 5 Barn. & Ald., 322; and see 3 Barn. & 4 Cress., 480): unless indeed rent has actually been paid under the agreement; in which case, as the payment of rent creates an actual tenancy from year to year between the parties, the landlord may distrain. (4 Bythewood's *Conveyancing*, by Jarman, 331.)

The editor then enters into an examination of the two classes of cases, namely, those in which instruments of the nature of agreements for leases have been held to amount to actual leases, and those in which they have been decided to be agreements only. All that can be done here is to state briefly the general conclusion at which he arrives from this examination.

'A comparison,' he says, 'of these two classes of cases will serve to show the impossibility of reconciling all the decisions upon the subject. The sound and sensible rule seems to be, that where the paper is executory in its terms, and contains no words of present demise, particularly where an intention to execute a lease is expressed, it is to be construed as an agreement only; and to this rule the later judges have certainly inclined. Much of the discrepancy in the determinations is produced by the cases of *Poole* v. *Bentley* and *Doe* v. *Groves*, in which, it will be remembered, Lord Ellenborough and the rest of the Court of King's Bench held that an instrument by which one party agreed to let, and the other to take, premises on certain terms, and grant and accept a lease, operated as an actual lease, with an agreement to execute a future lease, by way of further assurance. The *professed* principle indeed of these cases is not at variance with the general current of authorities; for his lordship assumed that the instruments contained words of present demise; and if such had been the fact, the case of *Barry* v. *Nugent* would clearly have authorised his lordship's conclusion. But the assumption seems to be wholly unfounded; no operative words of demise can be collected from the instrument; therefore the cases may be considered as overruled by the later determinations, which seem to support the doctrine, as ably laid down by Sir James Mansfield in *Morgan* v. *Bissell*, except perhaps so far as the learned chief-justice asserted that words of present demise might be controlled by an agreement to grant a future lease; for it is difficult to carry the rule to this extent consistently with the principle in the authorities, particularly with the case of *Barry* v. *Nugent*.' (4 Bythewood, by Jarman, 341.)

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* Besides other differences between the two in regard to expense, there is a difference between the stamp duties chargeable on leases and agreements.

The following is part of the doctrine of Sir James Mansfield above referred to:—'It would be a very wise rule, that whenever one person is about to grant and another to take a lease, until the lease was actually executed, no interest at law should pass. As to the question, What are usual covenants? it is an endless source of litigation. I have known parties long hung up at an inquiry before a master of chancery—What are the usual covenants? and it is the extreme of folly either to give or to take possession under such an agreement till a lease is executed; but the convenience of parties sometimes requires it.' (*Morgan d. Dowding* v. *Bissell*, 3 Taunt., 65.)

Every lease must contain a sufficient degree of certainty as to its beginning, continuance, and ending. But it may be made to determine, before the time fixed, by a proviso or condition. In most modern leases there is a proviso, that if the rent is not paid within a certain time, and no sufficient distress is found on the premises, the lessor may re-enter. Where the lease is made to begin from an impossible date, as the 30th of February, it will take effect from its delivery.

A lease for years may be made to commence at a future time. If the lease is made at common law, of lands in possession, the lessor's interest is not completed till he takes possession, for without having taken possession he cannot avail himself of all the rights and privileges of a lessee. But before he takes possession he has an interest, technically called an *interesse termini*, which he may release, assign, or bequeath; but this interest is not capable of enlargement by release. If it is a lease of the reversion, and the lease is made by deed, such lease gives a vested interest and passes a portion of that reversion to the lessee, who thus stands in the relation of landlord to a prior lessee; but a reversionary lease, or a grant of a lease, to commence on a future day, or on some given event, is only an interesse termini.

When a lease is made by deed, there are certain covenants implied between the parties in the words usually employed. Thus the words 'grant or demise' imply a covenant by the lessor that he has a right to create the term, and that the lessee shall have quiet enjoyment of the property demised. And the words 'yielding and paying,' in the usual reservation of rent, imply a covenant on the part of the lessee that he will pay the rent in the manner mentioned in the reservation. But the implied covenants are restrained by the expressed covenants, of which many are commonly inserted in formal leases, and which vary in their character according to the intention of the parties and the nature of the property demised.

The doctrine of Estoppels applies to leases for years. If a person execute a lease of lands, for any term by *indenture*, in which he has no estate whatever, the want of which estate does not appear upon the instrument, the lease will operate upon any interest which he may afterwards acquire in the same lands during the continuance of the term. To produce this effect an indenture is necessary, that the deed, being the act of both parties, may render the estoppels reciprocal. (Burton *On Real Property*, 850; see note (*b*), *Bullen* v. *Mills*, 4 Nev. & Man., 29.)

The assurance by which the whole term created by a lease is transferred to another is called an assignment, and by this transfer the assignee becomes liable, until he assigns to some other person, to all those covenants in the lease which are said to run with the land, that is to say, those covenants which are not personal and extrinsic to the lease. But where the property is transferred for a part of the original term only, the transfer is called an under-lease, and the under-lessee is not liable to the original lessor. [ASSIGNMENT; ASSIGNEE.]

It is not necessary, in order to make the assignee liable to the covenants, that he should have taken possession of the lands or premises assigned: it is enough, for this purpose, that he has acquired all the interest in the term of years. It is now also settled that a mortgagee who takes a legal assignment of a term is bound by the covenants even if he has never taken possession of the land or premises, or received rent; and the rule has been extended so far as to make an equitable mortgagee by deposit of the title-deeds also liable in equity to the covenants. (*Williams* v. *Bosanquet*, 1 Brod. & Bing., 238; 7 Sim., 149.) The practical inference to be deduced from these rules is, that a man should not take an equitable mortgage of a term of years by deposit of title deeds, nor an assignment of the whole term, if he wishes to avoid the liability to the covenants; but he should take an under-lease.

A condition may be annexed to a term of years in its creation in two ways: either to operate only if enforced by the entry of the lessor or his representatives; or to make the lease determine at once on performance or breach of the condition itself, without any additional ceremony. 'Conditions annexed to a chattel are more favoured by the law than those which tend to defeat a freehold estate. A particular alienation may be prohibited on pain of forfeiture. But then the original limitation must not be to the lessee and his *assigns*, for this would be a contradiction. By the common law, covenants between the lessor and the lessee relating to the land would in general run with it on both sides; but the benefit of a condition was entirely lost by alienation of the reversion. This inconvenience was remedied by stat. 32 Henry VIII., c. 34, which attaches both the benefit and the obligation of conditions as well as covenants to the reversion in the hands of a grantee or assignee. But still the benefit of a condition or covenant which is already broken, and requires to be enforced by entry or action, cannot be assigned; nor can that of a forfeiture actually committed by the illegal alienation of the lessee.' (Burton's *Law of Real Property*, 851-857.)

LEASE and RELEASE. Of the various kinds of releases an account must be deferred to the article RELEASE. For the present purpose it will be sufficient to state that the release here spoken of is the relinquishment of some right or benefit to a person who has already some interest in a tenement, and such interest as qualifies him for receiving or availing himself of the right or benefit so relinquished. (Burton's *Law of Real Property*, 45.) Before the passing of the Statute of Uses 'it appears that a lease for two or three years was sometimes made, and perfected by entry of the lessee, for the single purpose of his afterwards receiving a release of the reversion. Thus arose a sort of compound conveyance, called a lease and release, which, if the grantor were seised in fee simple, had the same effect as a feoffment.' (*Ibid.*, 62.)

When it had been determined that the Statute of Uses operated so as to give an estate in land without entry, a lease for a year by bargain and sale was made by the vendor to the purchaser. A use was thus raised to the bargainee, without any enrolment, which in the case of freehold interests was required by the statute of enrolments; and the use thus raised or created for the bargainee was converted, by the Statute of Uses, into a legal estate. Thus the bargainee became immediately capable of accepting a release of the freehold and reversion: and a release was accordingly made to him, dated the day next after the day of the date of the bargain and sale. The release made to a purchaser who has an estate by virtue of the bargain and sale may either be a release at common law as referred to in the passage just quoted, or it may be a release under the Statute of Uses, which is now always meant when we speak of the conveyance called a lease and release.

This conveyance is said to have been first contrived by Sergeant Moore, at the request of Lord Norris, in order that some of his kindred should not know, by any search of public records, what settlement he should make of his estate. The validity of it was formerly doubted. But it was resolved (18 Jac. I.) by the chief-justices Montague and Howard, and chief-baron Tanfield, that upon a deed of bargain and sale for years of land, though the bargainee never entered, if afterwards the bargainor makes a grant of the reversion, reciting the lease, to divers uses, it was a good conveyance of the reversion. (*Lutwich* v. *Mitton*, Cro. Ja., 604.) And in a subsequent case, where there was a bargain and sale for years, followed by a release, judgment was given,—'that the lease being within the Statute of Uses, there was no need of an actual entry to make the lessee capable of the release; for, by virtue of the statute, he shall be adjudged to be in actual possession.' (*Barker* v. *Keate*, 2 Mod., 249.)

Lease and release is now the most common assurance for the transfer of freehold estates.

'In a lease and release, the lease is most properly made by the words "bargain and sell" only, that all possibility of question as to the mode of its operation may be excluded: but the release has commonly a multitude of words, such as "grant, bargain, sell, alien, release, and confirm;" the variation of which according to circumstances is for the most part more a matter of taste than of importance: and where the consideration is not pecuniary, the idle words "bargain and sell" are countenanced by the insertion of a nominal consideration, as of ten shillings, acknowledged to be paid.' (Burton *On Real Property*, 541, 542.)

When the conveyance by lease and release became a common assurance, only a nominal consideration was mentioned in the bargain and sale; and it was held that even a reservation of a pepper-corn rent was a sufficient consideration to raise a use by a bargain and sale on which to found a release.

'The recital of a lease for a year, in a deed of release, is good evidence of such lease against the releasor and all claiming under him (but not against strangers), without proving that there was such a deed, and that it was lost or destroyed. Not only estates in possession, but estates in remainder and reversion may be conveyed by lease and release. Estates in remainder and reversion expectant on estates for lives may be conveyed by lease and release; but in cases of this kind it is inaccurate to say that the releasee is in the actual possession of the premises; the proper expression being, that they are actually vested in him by virtue of the bargain and sale, and the operation of the Statute of Uses. Incorporeal hereditaments, such as advowsons, tithes, rents, &c., may be conveyed by lease and release, for they are expressly named in the Statute of Uses, or comprised under the general word hereditaments.' (4 Cru. *Dig.*, 114, 115.)

Lease and Release is one of those which are technically called the *innocent* conveyances, in contradistinction to those which are termed *tortious*. Thus,

'A conveyance by lease and release does not divest any estate, or create a discontinuance or forfeiture. Thus Littleton says,—"By force of a release nothing shall pass but the right which he may lawfully and rightfully release, without hurt or damage to other persons, who shall have right therein, after his decease." And in a subsequent section he says,—"If tenant-in-tail lets the land to another for term of years, by force whereof the lessee hath possession, and the tenant-in-tail release all his right in the same land, to hold to the lessee and his heirs for ever, this is no discontinuance: but after the decease of the tenant-in-tail, his issue may enter; for by such release nothing passed but for time of the life of the tenant-in-tail." This conveyance will not, for the same reason, destroy a contingent remainder: therefore if a person is tenant for life, with a contingent remainder depending on his estate, and he conveys in fee by lease and release, the contingent remainder will not be destroyed.' (4 Cru. *Dig.*, 116.)

The various modes in which property in land can be settled by means of lease and release belong more particularly to the subjects of POWERS and USES.

LEAST SQUARES, METHOD OF. This is a method, which, since its first introduction, has been shown to be the method of finding the most probable truth, when a number of discordant observations have been made upon a phenomenon. The earliest attempt at anything of the sort was made by Cotes, in a tract entitled 'Estimatio Errorum in mixta mathesi,' in which he very distinctly recommends a process which is identical with that of the method of least squares. It is remarkable that Cotes proposes his theorem not merely as a mode of finding a convenient mean (as was done by Legendre and Gauss), but as giving positively the most probable result. He even introduces the hypothesis of observations having different weights (though not with perfect correctness), and comes as near as possible to the assertion afterwards proved by Laplace. It will be worth while to quote the passage, as follows:—'Mihi vix quidquam ulterius desiderari videatur postquam ostensum fuerit quâ ratione Probabilitas maxima in his rebus haberi possit, ubi diversæ observationes, in eundem finem institutæ, paullulum diversas ab invicem conclusiones exhibent. Id autem fiet ad modum sequentis exempli. Sit p, locus objecti alicujus ex observatione primâ definitus, q, r, s, ejusdem objecti loca ex observationibus subsequentibus; sint insuper P, Q, R, S, pondera reciprocè proportionalia spatiis evagationum, per quæ se diffundere possint Errores ex observationibus singulis prodeuntes, quæque dantur ex datis errorum limitibus; et ad puncta p, q, r, s, intelligantur pondera P, Q, R, S, et inveniatur eorum gravitatis centrum Z: dico punctum Z fore locum objecti maximè probabilem qui pro vero ejus loco tutissimè haberi potest.'

Legendre, in his work on comets (1806), first distinctly proposed the application of the method to any case, and Gauss afterwards stated that he had been in the habit of using it since 1795. Finally, Laplace, in his 'Theory of Probabilities' (1814), and we believe in a previous paper published in the 'Memoirs of the Academy of Sciences,' showed that this method was in all cases the one which the principles of that theory pointed out as giving the result, which, from the observations, has the greatest weight of probability in its favour. The details and demonstration of this method may be found in the work of Laplace cited, in the Berlin 'Astronomisches Jahrbuch,' for 1834 and the two following years, and in the treatise on Probabilities in the 'Encyclopædia Metropolitana.'

The most simple case of this method has been in use as long as accurate observations have been made, under the name of taking an average or a mean. If three observations give 93, 94, and 98, then the mean of the three is 95, and if this be assumed as true, it is also assumed that the errors of the observations were 2, 1, and 3. The sum of the squares of these is $4 + 1 + 9$, or 14, and this is the least possible sum which can be thus obtained. If for example, we assume anything but 95, say 95·1, the assumed errors are then 2·1, 1·1 and 2·9, the squares of which are 4·41, 1·21, and 8·41, the sum of which is 14·03, more than 14.

But the more extended cases of the method of least squares are those in which the result is not simply observed, but is to be determined by operations upon the results of observation. In all cases the rule is the same; namely, that result has the greatest probability in its favour, the assumption of which makes the sum of the squares of the errors the least possible, provided that all the observations are equally worthy of confidence. Without entering into further explanation, we shall give the results of one case.

Suppose that A and a are to be determined by observation, the required result being $A \div a$ or the solution of the equation $a x = A$. Suppose also, which is essential to the simple form of the method which we now give, that all the observations, both of A and a, are made under equally favourable circumstances. Say that four observations are made of each; those for a being p, q, r, and s: those for A being P, Q, R, and S. If then all the observations were perfectly correct, each of the equations $p x = P$, $q x = Q$, $r x = R$, $s x = S$, would be identical with $a x = A$. Supposing however that the observations are discordant, take what value of x we may, the several quantities $p x - P$, $q x - Q$, $r x - R$, $s x - S$, will not be (as they should be) each equal to nothing. Whatever their value may be, the whole of each value will be error: and the sum of the squares of the errors, or

$$(p x - P)^2 + (q x - Q)^2 + (r x - R)^2 + (s x - S)^2$$

must be made the least possible. The value of x which satisfies this condition is

$$\frac{P p + Q q + R r + S s}{p^2 + q^2 + r^2 + s^2},$$

which is the most probable value.

The method of least squares is now universally used in astronomy, which is perhaps the only science in which so delicate a test is absolutely necessary.

LEATHER (*cuir*, French; *leder*, German; *leer*, Dutch; *læder*, Danish; *läder*, Swedish; *cuojo*, Italian; *cuero*, Spanish; *kusha*, Russian). This substance, which is universally employed throughout the civilized world, is prepared from the skins of animals, or it would perhaps be more correct to say, consists of that substance after it has been chemically changed by the process of tanning. This change is effected by means of a substance residing in several vegetable matters, to which the name of *tannin* has been given. When this tannin, which is soluble in water, is applied to the hides of animals from which the hair, epidermis, and any fleshy or fatty parts adhering to them are removed, and which hides then consist wholly of *gelatin*, also soluble in water, these two soluble substances so unite chemically as to form the wholly insoluble substance called leather. [TANNING.]

The leather manufacture is one of great importance in this kingdom, giving employment in all its various branches to a very great number of persons. It has been computed that taking into the account tanners, curriers, and dressers, shoemakers, glove-makers, harness-makers, sadlers, and other branches of the leather manufacture, there cannot be fewer than 250,000 persons supported by this branch of industry. We have not at present any means for ascertaining the quantity of leather made in the United Kingdom. The yearly average production in the three years ending with 1822 was 48,244,026 pounds; the average production in the next three years was 63,051,096 pounds, being an increase of 30 per cent. This increase is in great part attributable to the reduction of the duty from 3*d.* to 1½*d.* per pound, which took place in 1822. In 1830 the duty was wholly repealed, and we have thenceforward no means for ascertaining the quantity produced yearly. It is reasonable to suppose that the repeal of the duty, joined to the increase of the population, has since caused at least as great an increase in this branch of manufacture as followed the reduction of the duty in 1822. In this case the annual production at this time will be 82,000,000 pounds, and the value, taking one quality with another, at the moderate price of 1*s.* 4*d.* per pound, will amount to 5,466,000*l.* It has been assumed that the value of the leather forms only one-third of the cost of the articles made with that material, at which calculation the ultimate value of the manufacture in this country must be 16,400,000*l.* Some persons have calculated that the value of the leather—the raw material—forms only one-fourth part of the aggregate value of leather goods, and the manufacture must, according to their calculation, exceed 21 millions per annum. Nor will this amount appear excessive if we consider that there is only a very small proportion of the people, however poor they may be, who do not wear leather shoes or boots; that the use of leather gloves is general among all but the labouring class; and that the harness of horses used for pleasure, as well as those used for agricultural and other business operations, is made with this material, besides an endless variety of things in daily use, which will suggest themselves to every one's mind.

Nearly the whole of the leather made in this kingdom, and of the articles made with it, is used at home. The quantity and declared value of leather, wrought and unwrought, and the declared value of sadlery and harness exported (almost wholly to our colonies and dependencies), in each of the ten years from 1828 to 1837, were as follows:—

	Leather wrought and unwrought.		Sadlery and Harness.
	Number of Pounds.	Declared Value.	Declared Value.
1828	1,321,542	273,976	89,600
1829	1,338,987	268,380	83,303
1830	1,495,003	257,130	78,321
1831	1,314,931	246,410	61,312
1832	1,407,729	244,393	52,583
1833	1,652,579	279,524	60,013
1834	1,617,421	248,302	63,095
1835	2,104,318	285,934	74,462
1836	2,042,471	322,546	94,059
1837	1,647,000	255,818	87,938

The duty on leather, which was necessarily charged upon the weight produced, was impolitic, because of the regulations enforced by the revenue-officers for the prevention of fraud, but which also prevented the introduction of improved methods of manufacture; and it was also unequal in its pressure, falling most heavily upon those who were least able to bear it. The shoes of the labouring man were necessarily made thicker and heavier, and therefore paid a greater amount of duty than shoes worn by the easy classes, on which ground alone it was important to repeal it, but there is every reason for believing that the improvement in the quality of leather brought about since that repeal is of far greater benefit to all classes than the simple amount of the duty.

The revenue derived from this manufacture in the ten years preceding the repeal of the duty was—

1820	£608,158	1825	£443,000
1821	600,282	1826	378,975
1822	546,503*	1827	393,516
1823	393,657	1828	414,863
1824	434,481	1829	396,207

LEAVEN. [BREAD.]

LEBADÆA, LIVADIA. [BŒOTIA.]

LEBANON. [SYRIA.]

LE BLANC. [BLANC, LE.]

LEBRUN (or LE BRUN), CHARLES, an eminent French painter, was born at Paris in 1619. His father was an indifferent sculptor. The son, manifesting an early talent for drawing, was placed under the care of Simon Vouet. He however went to finish his studies at Rome, where he spent six years, during which time he diligently applied himself, under the guidance of Poussin, to acquire a thorough knowledge of the antique, and of the works of Raphael and other great masters. Lebrun had a very comprehensive genius, improved by profound study of history and of the manners of different nations. Few painters were better acquainted with the human mind and the influence of the passions on the countenance, as is shown in his 'Traité sur la Physionomie,' and 'Sur le Caractère des Passions.' In invention he has had few superiors. With a lively imagination he combined great facility of execution and sound judgment, and aimed at the greatest correctness, especially in the costume and details. His colouring, particularly in the flesh, is indifferent, retaining too much of the school of Vouet; his light and shade are often not happily distributed, and his foregrounds are generally deficient in force. His great merit obtained him the favor of Louis XIV., who appointed him his principal painter, president of the newly-erected Academy of Painting and Sculpture, and director of the Gobelin manufactory, conferred on him the order of St. Michael, and frequently visited his studio while he was engaged on the battles of Alexander, the best-known and most admired of all his works, even the engravings from which give a high idea of his great abilities, and of the elevated style of his composition and design. Lebrun died at Paris in 1690, at the age of seventy-one.

LECCE, a town in the kingdom of Naples, in the province of Terra di Otranto, which is often styled also 'provincia di Lecce,' because Lecce is the residence of the Intendente of the province and of the courts of justice. Lecce is a bishop's see, and one of the best built and liveliest towns in the kingdom, with wide streets, a handsome market-place, several fine churches, a royal college, and 15,000 inhabitants. Considerable trade is carried on here in agricultural products of the country, the principal of which are oil, tobacco, wool, cotton, and gum. There are also manufactories of lace.

The people of Lecce have a reputation for shrewdness and talent, and many of the natives have distinguished themselves in the learned professions. Lecce is situated about 200 miles east of Naples, and nine miles from the Adriatic coast, in a plain on the north-east side of the range of hills which cross the Messapian peninsula in its entire length. A good road, 25 miles long, leads from Lecce across the peninsula to Gallipoli on the southern coast, and another road, lately finished, leads to Taranto, from which Lecce lies 45 miles east. It is about 20 miles south-east of Brindisi, and nearly the same distance north-west of Otranto.

LECTOURE. [GERS.]

LECYTHIDA'CEÆ, an important but small natural order of plants with singular fruits, and very large fleshy flowers, inhabiting the woods of South America. They are regarded by De Candolle as a section of Myrtaceæ, from which they differ in their leaves being alternate, and not dotted, the stamens monadelphous, and extended on one side, in an unusual manner, into a broad lobe, which covers over the centre of the flower like a hood.

Among the plants belonging to this order are the following, which deserve particular notice.

1. *Lecythis ollaria*, a tree inhabiting the forests of Cumana and Brazil, with a hard woody fruit as large as a child's head, and opening by a lid like that of a jar or urn. It contains numerous large seeds.

2. *Lecythis Zapucajo*, a large Guiana tree, with alternate oval leaves twelve inches long, and racemes of large fleshy red and white flowers. The fruit is hard, woody, urn-shaped, and about four inches broad by six inches high; it

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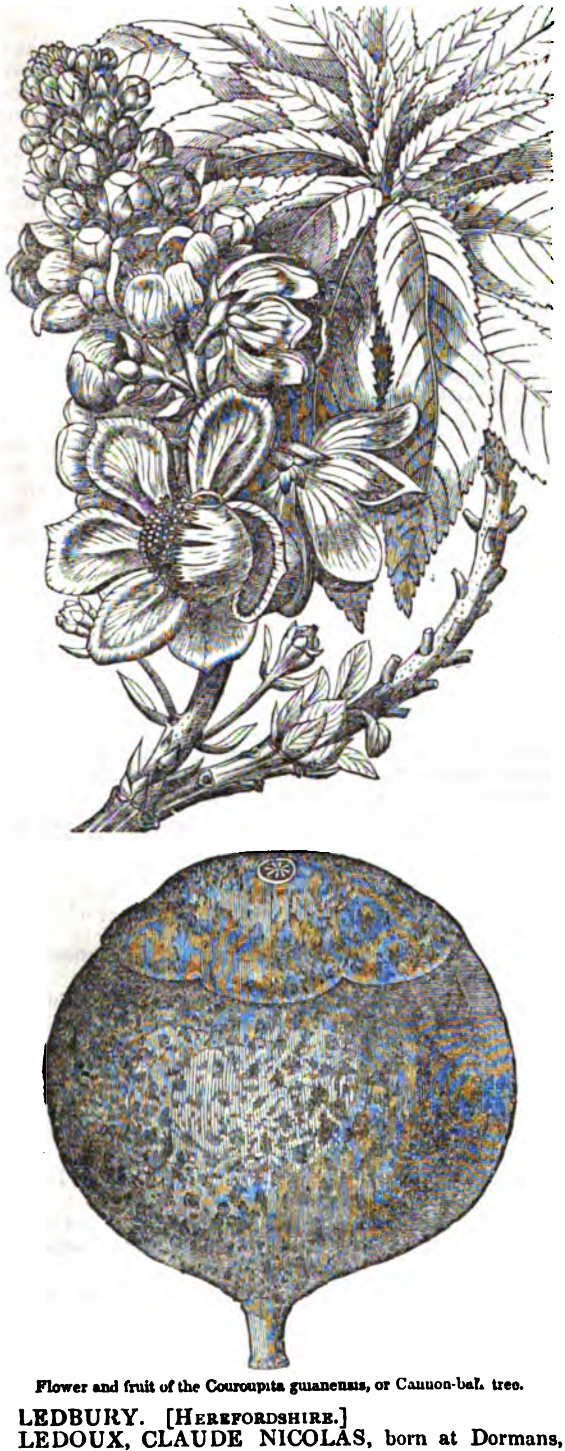
* Duty reduced from 3*d.* to 1½*d.* per lb. from 5th of July in this year.

contains numerous seeds as large as almonds, and quite as agreeable when fresh. They are sometimes seen in the fruiterers' shops in London, where they are called *Sapucaya nuts*.

3. *Bertholletia excelsa*, already described. [BERTHOLLETIA.]

4. *Couroupita guianensis*, or Cannon-ball tree. This plant takes its name from its large heavy woody fruit, which, according to Aublet, is about the size of a 36-pound shot, and although urn-shaped like the others, does not open by its lid, but is broken by its fall, or lies on the ground till it rots, before the seeds can extricate themselves. The flowers are very large and handsome, deep rose colour and white; the tree is of great size, with a trunk often more than two feet in diameter.



Flower and fruit of the Couroupita guianensis, or Cannon-ball tree.

LEDBURY. [HEREFORDSHIRE.]

LEDOUX, CLAUDE NICOLAS, born at Dormans, in the department of the Marne, in 1736, quitted the college of Beauvais at the age of fifteen, and went to Paris, where he at first gained his livelihood by engraving; but an irresistible inclination led him to the study of architecture, with the principles of which he made himself acquainted in Blondel's 'Cours.' His prepossessing person and engaging address availed him for some time more than his talents, or rather procured for him opportunities of displaying the latter; and he knew so well how to turn them to account, that Madame Dubarry appointed him her architect in 1771. It was for her that he erected the elegant pavilion De Louveciennes, and the Château de St. Vrin, near Arpajon. His high favour in that quarter not only established his celebrity with the public, but immediately procured for him numerous commissions, both in the capital and the provinces. In the former he built an hotel for Count d'Halleville; in the rue Michel le Comte, that of the Prince de Montmorency; and, besides several others, the Hôtel Thelusson, remarkable for the vast bridge-like gateway towards the street. In the latter he built the Château de Benonville, near Caen. But it was the 'Barrières' of Paris that afforded him an opportunity of abandoning himself to his fancy; and considering the period of their erection, they certainly display considerable originality, yet very much that is questionable; and have for the most part the appearance of being merely first ideas and sketches, carried at once into execution without having been revised and matured. The same remark applies to the large folio volume he published, consisting of a treatise on architecture, illustrated by designs, which, though they display much originality, are not a little chimerical and extravagant. He died of a paralytic attack, November 19th, 1806, at the age of seventy.

LEDYARD, JOHN, a remarkable person in the history of geographical discovery, was born at Groton in Connecticut, and educated at Dartmouth College, New Hampshire. Having lost his father, and being apparently friendless, he had not the means, if he had the wish, to follow up his studies. Some years he spent among the Indians, a good school of preparation for his future toils. He worked his passage from New York to London in 1771 as a common sailor; and in 1776 sailed with Capt. Cook, on his third voyage, in quality of corporal of marines. While thus engaged he conceived the bold scheme of traversing the unknown regions of America, from the neighbourhood of Nootka Sound to the eastern coast; and so earnest was he, that being frustrated in his design of reaching the western shore of America by sea, he set out from England towards the end of 1786, with ten guineas in his pocket, hoping to reach Kamtchatka, and thence effect a passage to America. According to Tucker's 'Life of Jefferson,' this scheme was suggested to Ledyard by Mr. Jefferson, then the American minister at Paris, who assisted him with money. He traversed Denmark and Sweden, passed round the head of the Gulf of Bothnia, after an unsuccessful attempt to cross it on the ice, and reached St. Petersburg in March, 1787, without money, shoes, or stockings, having gone this immense distance on foot in an Arctic winter. At St. Petersburg he obtained notice, money to the amount of twenty guineas, and permission to accompany a convoy of stores to Yakutsk in Siberia. But for some unexplained reason he was arrested there in January, 1788, by the order of the Empress Catherine, while waiting for the spring, and conveyed to the frontier of Poland, with a hint that he would be hanged if he re-entered Russia. He found his way back to England, after suffering great hardship. Still his adventurous spirit was unbroken; and, almost without resting, he eagerly closed with the proposal of the Association for promoting the discovery of the inland parts of Africa, to undertake a journey into that region. There is a characteristic story, that on being asked how soon he could be ready to set out, he replied, 'To-morrow morning.' He left London, June 30, 1788; and travelling by Marseille and Alexandria, reached Cairo, Aug. 19. The ardent, persevering, intelligent spirit of inquiry shown in his first and only despatches raised high expectation of the value of his labours; but these were cut short by his premature death, in that city, of a bilious disorder. His route was to have been from Sennaar westward, in the supposed direction of the Niger, so that he would have crossed that great continent in its widest part, traversing Bornou and the region lately explored by Denham and Clapperton, at right angles to their track from the Mediterranean. From his scanty education and mode of travelling, Ledyard probably would have contributed little to scientific knowledge; but his vigour and endurance, mental and bodily, and indifference to pain, hardship, and fatigue, fitted him admirably for a geographical pioneer; and his death, the first of many lives sacrificed to African discovery, excited a strong feeling of regret. 'I have known,' he said, shortly before leaving England for the last time, 'hunger and nakedness to the utmost extremity of human suffering. I have known what it is to have food given as charity to a madman; and I have at times been obliged to shelter myself under the miseries of that character, to avoid a heavier calamity. My distresses have been greater than I have ever owned, or ever will own, to any man. Such evils are terrible to bear, but they never yet had power to turn me from my purpose.'

LEE, NATHANIEL, was born in the latter part of the 17th century. He was educated at Westminster school, and afterwards went to Trinity College, Cambridge. A passion for the theatre led him to appear as an actor on the London stage, but he met with no success. He wrote however thirteen tragedies, of which two, 'Alexander the Great,' and 'Theodosius,' remained favourites for a long time, though the first alone is now remembered. A derangement of mind led to Lee's temporary confinement in Bedlam, and though he was released, he did not long enjoy his liberty. He died at the age of thirty-four, having, as Cibber supposes, been killed in a night ramble.

Lee has been treated with too much leniency by contemporary critics, who have admitted the bombast that pervades his works, but ascribe it to a wild and powerful imagination. Now it seems that these critics have mistaken his inflated words and thoughts for the fruits of imagination, when they are merely common-places dressed up in extravagant language. Shelley may be called a poet of wild imagination, because he is carried on by an irresistible impulse to creation of images, so rapid, that the theme of the poem is often lost. On the other hand, a poet of regulated imagination is one who, also with a creative power, has his creations at his own command, and uses them to illustrate his main subject. But extreme exaggeration may arise without much imagination; it requires no more imagination to describe a pillar 2000 than two feet above its proper height, or a multiplication table would be the imagination's highest creation. On looking over 'Alexander the Great,' it will be found that it is this sort of arithmetical exaggeration that is so freely used; thus, a character in sorrow will command 'all the world' to weep, and so on. The author has thus brought together a number of impossible characters, uttering no single word of true feeling, nor a phrase in good taste; and a discriminating reader will not only feel no interest, but find it difficult to repress a smile at the woes of the gaudy heroes and heroines. Much less would have been ascribed by the critics to the strength of imagination, had the connection between the words 'imagination' and 'image' been kept in mind; a connection which, in the German language, is preserved between 'bild' and 'einbildungskraft.'

LEECHES (Zoology), Hirudinidæ, a family of annulose animals, or red-blooded worms of Cuvier, which forms the fourth order of the Annelida in the work of MM. Andouin and Milne Edwards, the most recent publication on the classification of these animals. This order, called *Annelida suctoria* [ANNELIDA], is characterized by the body of the animals being destitute of bristles for locomotion, completely apodous, without soft appendages, and furnished with a prehensile cavity in the form of a sucker at each extremity. The head is not distinct, but generally provided with eyes and jaws. Cuvier, in the 'Règne Animal,' places the leeches in the third order of the Annelida, the '*Abranches*,' and in the second family, the '*Abranches sans soies*.' The classification of MM. Andouin and Milne Edwards does not differ materially from that of Cuvier, or from that in the 'Système des Annélides,' by Savigny, published in the great work on Egypt.

The family of the Hirudinidæ comprehends not only the leeches properly so called, which live by sucking the blood of various animals, but also includes many other worms which derive their nourishment in a totally different way, and present corresponding differences in organization. The affinities between the hirudines and some of the setiferous annelidans, as various species of nereis, lumbricus, planaria, &c., are so close that they hardly admit of being arranged in separate orders, and others of the leech tribe may even be confounded with some species of lernææ or epizoa.

The antients appear to have only known the most common species of leech: Aristotle makes no mention of them, and they do not appear to have been used in medicine in the time of Hippocrates. Pliny describes them very clearly under the name of Hirudines and Sanguisugæ, and distinguishes two species. The sea-leech is distinctly mentioned by Belon, Rondelet, and by all the writers on natural history since the revival of letters. More recently Linnæus increased our knowledge of the number of species, of which he describes eight in the 12th edition of the 'Systema Naturæ.' Müller afterwards discovered five or six others, so that Gmelin, in his edition of the 'Systema Naturæ,' enumerated fourteen species. Since then, Shaw, Leach, Dutrochet, Savigny, Milne Edwards, &c., have found many more, and the introduction of new zoological methods has caused a necessity for arranging these various species in different genera, of which we shall enumerate those which are best known.

The true leeches are all destitute of branchiæ or special organs of respiration, and this function has been supposed to be effected by means of the skin generally, but Dr. M. Edwards has recently stated (as was before observed by Cuvier) that 'there exists in these annelida a series of small membranous sacs, each of which communicates externally by a minute orifice situated on the ventral aspect of the body: these sacs derive from the numerous vessels which ramify upon their parietes a considerable quantity of blood; water penetrates into these organs, and seems to subserve a true respiratory purpose.' But though the species of the family Hirudinidæ are not provided with distinct branchiæ, these organs are found in a genus which is generally associated with the true leeches, and which we will place first in the following list of genera:—

1. Branchellion (*Savigny*), Branchiobdella (*de Blainville*), Polydora (*Oken*). These names have been given to a worm closely resembling a leech in external structure (it being furnished with two suckers), which is found parasitic on the Torpedo in the Mediterranean and other seas. The Hirudo branchiata (*Menzies*), a species observed on the tortoise which is found in the Pacific ocean, has also been placed in this genus, though Cuvier says that it ought not to be associated with it.

Hirudinidæ *proper*.

Section I.—Anterior sucker separated from the body by a distinct strangulation or neck.

2. Albione (*Sav.*), Pontobdella (*Leach* and *Blain.*), characterized by the body being bristled over with tubercles: species all marine; seven have been enumerated; two of them are very common in our seas:—1. Albione verrucosa, Hirudo muricata (*Linnæus*); 2. Pontobdella spinulosa (*Leach*): both of these worms attach themselves to fish, particularly skates; and the latter species is commonly known to fishermen by the name of the skate-sucker.

3. Hæmocharis (*Sav.*), Ichthyobdella (*Blain.*). In this genus there are eight eyes, the body is narrow, and the jaws scarcely visible. The only known species is the Hæmocharis piscium, Hirudo piscium (*Lin.*), which lives in fresh waters, where it attaches itself to fish, particularly Cyprini.

Section II.—Anterior sucker very slightly separated from the body.

4. Geobdella (*Blain.*), Trochetia (*Dutrochet*), is distinguished by having an enlargement round the orifices of the genital organs. We only know one small species of this genus, the Geobdella trochetii, which inhabits our waters, and which frequently comes on land to pursue the lumbrici or earth-worms.

5. Pseudobdella (*Blain.*) has the mouth merely provided with folds of skin, and is destitute of teeth. Only one species is well known, the Pseudobdella nigra, Hirudo nigra (*Lin.*), the common black leech.

6. Hæmopis (*Sav.*), Hypobdella (*Blain.*), has the mouth furnished with a few obtuse teeth. Three species are enumerated; the best known is the Hæmopis sanguisorba (*Sav.*), Hirudo sanguisuga (*Lin.*), the common horse-leech, which is much larger than the medicinal leech, and wholly of a greenish-black colour. The horse-leech has been reported to inflict dangerous wounds by some observers, while others say that it never attacks vertebrate animals. M. De Blainville thinks that this discrepancy has arisen from this species having been confounded with the foregoing, the black leech, which cannot penetrate the skin of vertebrate animals for want of teeth. Both these leeches greedily attack the common earth-worm.

7. Sanguisuga (*Sav.*), Jatrobdella (*Blain.*). The anterior

sucker has its upper lip divided into several segments. Its aperture is transverse, and it contains three jaws, each of which is armed on its edge with two ranges of very fine teeth, which enable these leeches to penetrate through the skin without making any dangerous wound. This genus contains the true medicinal leeches, eight species of which have been enumerated: the most common is the Sanguisuga medicinalis, Hirudo medicinalis (*Lin.*), which is a native of all our stagnant fresh waters.

8. Bdella (*Sav.*) has eight eyes and is destitute of teeth: one species is found in the Nile—the Bdella nilotica.

9. Nephelis (*Sav.*), Erpobdella (*Blain.*), has eight eyes, and the mouth is furnished internally with only three folds of skin. Several species of this genus are enumerated; the most common is the Nephelis tessilata (*Sav.*), Hirudo vulgaris (*Lin.*). This species has often been confounded with the medicinal and other leeches; it is commonly found in fresh waters, and, like all the other species of this genus, never leaves the water, and is injured by the contact of the air; so that if taken out of the water it quickly dies.

Section III.—Anterior sucker wanting.

10. Clepsina (*Sav.*), Glossopora (*Johnson*), Glossobdella (*Blain.*). This genus has a widened body and only a posterior sucker; the mouth is in the form of a proboscis. Cuvier thinks it doubtful whether the species of this genus should be arranged with the leech family; they consist of little worms which never leave the water, and live fixed to the stem of aquatic plants, from which they perhaps derive their nourishment: they never swim, but crawl along.

Besides the genera which we have enumerated, several parasitic worms, which live always fixed to the same part of some animal, have been enumerated among the Hirudinidæ, and have been arranged by Blainville in the genus Epibdella. He also places several other species, which are without distinct articulations, in the genus Malacobdella. There still remain several doubtful species of leech, and some have been confounded with true Planariæ, which differ from leeches in having no sucker at either end.

LEECHES, MEDICAL USE OF. Of the species described in the preceding article it is intended to treat here only of those of the genus Sanguisuga (Savigny), as they only can be employed for medical purposes. The same reason induces us to confine our attention to the species S. officinalis (Savigny) and S. medicinalis (Savigny).

Though the S. obscura and S. interrupta might be employed to withdraw blood, yet the S. officinalis and S. medicinalis are chiefly so used. The former is also termed the Hungarian or green leech (Hirudo provincialis of Carena; S. meridionalis of Risso), while the latter is termed the German or brown, or grey leech, also the true English or specked leech. The one species abounds in the south of Europe, while the other is a native of the north. The S. medicinalis is now rare in England, owing to the draining of so many of the ponds and bogs in which it formerly abounded. The same is nearly the case in France, which used to be supplied chiefly from the district of La Brenne, but now from the frontiers of Russia and Turkey. England derives the immense number required mostly from Sweden, Poland, and Hungary.

The genus Sanguisuga is characterized by having the body elongated, the back convex, the belly flat, and the oral and caudal extremities narrowed, before they spread out into disks or suckers. The body consists of from ninety to one hundred or more soft rings, which do not increase in number, but only in size, with the age of the animal, which requires about eight years to come to maturity; and if it escape being devoured by others which prey upon it, it may attain twenty years. The anterior or oral extremity is rather narrower than the caudal: it is provided with ten blackish points or eyes, and a triradiate (not triangular) mouth, furnished with three cartilaginous jaws, each armed with numerous cutting-teeth. The anus is very small, situate on the dorsal surface of the last ring.

The S. officinalis has a green body or light blackish-green, the back marked with six longitudinal bands of an iron colour, spotted with black spots at their middle portion and edge. The belly is of a yellowish-green *without spots*, but broadly bordered with black. The segments of the body are very smooth. It is large, often seven inches long. It lives in pools and rivers. There are three varieties.

S. medicinalis has the body of a deep green, its back marked with six longitudinal bands of an iron colour, pretty clear, spotted with black points, generally triangular. The belly is greenish, *spotted*, and broadly bordered with black, and the segments of the body rough from granular eminences. It inhabits ponds and small lakes.

Of the anatomy of the leech it is not necessary to say much. The skin consists of two layers, the external or epidermis, and the internal or corium. The first is transparent, resembling a serous membrane · this is thrown off from the body every four or five days. The corium consists of condensed cellular tissue. It displays the divisions into rings, and in it resides the colouring matter of the leech.

The alimentary system consists of the mouth, the stomach, salivary glands, liver, and anus. The mouth has a triradiate figure, formed of three equidistant lines, meeting in a centre, about the middle of the oral disk. Inside are three sublenticular jaws or piercers, white, and of a cartilaginous appearance. On the free, curved, sharp margin of each jaw there are about sixty small fine-pointed teeth The alimentary canal consists of an œsophagus, a long stomach, with cœcal sacs, and an intestine. The œsophagus is a muscular tube, and commences between the inner angle of the three jaws by a roundish opening: it dilates as it approaches the stomach, but at its termination it contracts into a circular aperture: the whole length does not exceed a quarter of an inch. The stomach occupies two-thirds of the length of the animal, and is formed of eleven compartments or cells. Each of these divisions, i.e. from the second to the eleventh, gives off on each side a sac, of which those of the last cell are much the largest. The intestine is about an inch in length; at the upper orifice is a valve, and at its lower a sphincter. These organs can contain nearly half an ounce of blood; so that there is nothing remarkable in the statement that leeches have been known to exist three years in water, without any other nourishment than they could obtain from it; for the blood is received into cells quite distinct, in the first eight of which it remains for months, without undergoing any change either in colour or fluidity: over these cells the animal has a perfect control, merely allowing so much nutriment to pass into the alimentary canal as is necessary to preserve its existence. This accounts for the reluctance of the animal, after being used to abstract blood, to repeat the operation; it not only being gorged at the time, but provided with nutriment sufficient to serve it during almost a sixth portion of its life. In its native abode the true medicinal leech does not seem to take any solid aliment, but subsists on the fluids of fish, frogs, &c.

Leeches are oviparous. The ova remain in the uterus for some time, where they become invested first with a serous membrane, and then with a glutinous fluid, which remains attached to them after their expulsion, and serves as a protecting covering after they are deposited in the clay and holes of the sides of the ponds. The leeches generally deposit the *cocoons* from May to the end of September. It would seem that these animals do not multiply in great abundance unless they have tasted blood, particularly that of cows. On this account the leech-dealers of Bretagne drive horses and cows into the ponds to such an extent that the cattle of the district are in general wretched-looking, and the leech-gatherers not much better.

About five years are required before the leach attains a state of maturity; while very young they are quite unfit for medical purposes. They are caught in various ways, by the hand, or by a person wading in the shallow waters during the spring of the year, when they adhere to his naked legs; but in summer, as they have retired to deeper waters, a raft is constructed of twigs and rushes, by which a few are entangled. Baits are deposited, generally pieces of decayed animal matter or liver, to which the leeches resort, and are then caught; but this last method is thought to injure the health of the animal. Many sicken and die on the journey, especially during warm weather. They are conveyed either in bags or small barrels with a canvas cover.

Leeches are subject to many diseases, several of which are epidemic, and spread in the troughs with great rapidity. On the first appearance of illness the sick should be immediately separated from the healthy. Care should be at all times taken that different speeches of leeches be not associated in the same trough, for they prey upon each other. The Hæmopsis vorax and also H. nigra devour greedily the S. medicinalis or S. vulgaris, though they cannot penetrate the skin of vertebrated animals.

A leech may be known to be in good health if it be active in the water and plump when taken out. In Prussia leeches are divided into three classes, according to their weight: the first not exceeding thirty grains; the second weighing between thirty and sixty grains; the third from sixty to ninety. Leeches above ninety grains are not to be used, unless specially ordered. In each prescription the physician is required to state what description of leech he intends should be used. In the case of children such regulations are highly proper, as an excess of blood abstracted may easily produce serious and often fatal consequences. Leeches vary in the quantity they can abstract, from one drachm to half an ounce: from one to two drachms is the average. The quantity is often doubled by the expedients resorted to after the leech has been removed, either dry or wet clothes being applied, or in many cases cupping-glasses, but cataplasms of linseed-meal are most beneficial where they can be applied.

One grey or German leech is deemed equivalent to two green or Hungarian leeches. The cases requiring or justifying the application of leeches are stated under the respective diseases, and need not be repeated here. It is of more importance to indicate the proper mode of applying them. The leech, though not so accurate an index of the weather as is commonly believed, is yet sensible of atmospheric changes, and in some (probably peculiarly electric) conditions of the atmosphere cannot be induced to bite. In such cases time ought not to be wasted, nor the patient exposed injuriously or kept in a fatiguing position, but some other mode of blood-letting should be had recourse to. Moreover, if the leech be sickly, it can rarely be made to bite. Certain states of the patient also hinder or indispose them to bite. Where the skin is very thick they cannot puncture it, or if the person has been using sulphur, the exhalation of the sulphuretted hydrogen is disagreeable to them; even the fumes of tobacco, vinegar, &c. will prevent them biting; also if grease, salt, or vinegar be on the spot to which they are applied, they refuse to attach themselves to it. The existence of hairs on the spot seems to hinder them from biting, and also from forming a vacuum to suck up the fluid, on which account they should be carefully shaved off. The leeches should be taken out of the water, and allowed to creep for some time over a dry warm cloth: in the meanwhile the part where it is intended to apply them should be washed with *plain* (not perfumed) soap and water, then with water alone, afterwards with milk or porter. It is difficult to make them fix themselves on the particular spot wished; but a leech-glass will generally effect this, and is preferable to holding the leech in the hand. When they still refuse to bite, slightly puncturing the part with any sharp instrument, so as to cause a little blood to ooze out, is a useful expedient: or if we pluck a feather from the wing of any bird, and cutting off the end, allow the liquid contained in it to be dropped on the spot, the leech will bite readily.

When the leech has dropped off, it should be seized by the tail or caudal end, and striped between the finger and thumb, so as to cause it to disgorge most of the blood. It is proper to allow it to retain a third of the blood. This is preferable to applying salt or vinegar to the mouth. It should then be placed in many successive fresh waters, and it may perhaps survive, and after many months be again fit for use.

When no expedient is had recourse to, in order to maintain the flow of blood, it generally stops spontaneously; but in some cases it continues much longer than is proper. Where the blood is either deficient in coagulating power, as happens in many weak persons, or when it is in a very alkalescent state, and the albumen in too dilute a condition, or owing to the very vascular state of the skin of children, the hæmorrhage is often troublesome, and in the case of children, who do not bear well the loss of a large quantity of blood, sometimes fatal. The object of any remedial means is to form a coagulum, or plug, at the mouth of the bleeding vessels. A weak solution of creosote applied to the part will generally effect this, or felt scraped from a hat, or gum in powder, or flour, or the dust of the puffball (lycoperdon or bovista), or the application of a compress and bandage, tying a ligature, or touching the wounds with lunar caustic. The patient should at the same time drink a saturated solution of alum, or take dilute sulphuric acid out of very cold water.

The increasing scarcity of leeches renders their preservation and propagation objects of primary importance. The death of a vast number of leeches is occasioned by errors in the method of keeping them. Though aquatic animals, it is not enough that they be supplied with water. They breathe by their entire surface, and are accustomed to change their skin every four or five days. Their body is covered, like that of all animals and plants which inhabit the water, by a slimy or mucilaginous fluid, which not only enables them to glide through the water, but keeps an aërial stratum in close contact with their respiring surface. When present in a limited degree, this mucous secretion is highly serviceable to them; in excess it is destructive. It is impossible for them to diminish it when it has accumulated, or to denude themselves entirely of their old skin, in water only. They must have some resisting body to creep over or through in order to accomplish this object. Some leech-dealers keep clay at the bottom of the troughs, and though this is useful as a material in which the leeches can burrow in warm weather (by which they are always more injured than by cold, if not intense; and it is their habit to retreat to the deeper waters of their native rivers or ponds in summer), it is inadequate to the end. The best method seems the following recommended by Fee:—

Into a marble or stone trough a layer of seven inches of a mixture of moss, turf, and charcoal of wood is to be put, and some small pebbles placed above it; at one extremity of the trough, and midway between the bottom and the top, place a thin plate of marble pierced with numerous small holes, upon which there should rest a stratum of moss or portions of the equisetum palustre, or horse-tail, firmly compressed by a stratum of pebbles. The trough to be replenished with water only so high that the moss and pebbles should be but slightly moistened. A cloth is to be kept over the mouth of the trough. This is imitating as near as possible their natural condition, and the charcoal not only aids in keeping the water sweet, but appears to prevent the leeches being attacked by parasitic animals, to which they are very liable. The water should be changed about once a week, and more frequently in warm weather.

Leeches have not been observed to propagate when kept in small bodies of water, but in large reservoirs, having a border of turf and rushes, and the sides well furnished with clay, in which to deposit the cocoons, Dr. Noble of Versailles has succeeded in procuring young ones. It has also been ascertained in France that leeches which have been used, if restored to their natural haunts, propagate abundantly, and also become capable of being again applied after eight or twelve months' stay in these congenial quarters.

The great extent to which the trade in leeches is carried on renders attention to this subject of paramount importance. Four only of the principal dealers in London import 7,200,000 annually, and in Paris 3,000,000 are used.

Leeches have sometimes been swallowed; and in Syria and other places a small leech is sometimes drank with the waters of the pools, and by adhering to the throat causes great suffering. Salt or vinegar is the best means of dislodging them.

(Johnson *On the Medicinal Leech;* Brandt and Ratzeburg, *Getreue Darstellung der Thiere;* and Mr. Pereira's Lectures in *Medical Gazette.*

LEEDS, the principal emporium of the woollen manufactures, is the most populous borough and market-town in Yorkshire; its parish is co-extensive with the borough. It is situated in the West Riding, in the liberty of the honour of Pontefract, and in the wapentakes of Skyrack and Morley. Under the Reform Act it sends two members to parliament. Its population in 1831 was 123,393, and the number of 10*l.* houses 6683. Under the Municipal Act, the borough has a commission of the peace, is divided into 12 wards, has 16 aldermen, and 48 councillors. It is 186 miles north-north-west of London; 40 miles north-east of Manchester, 33 miles north of Sheffield, and 24 miles south-west of York.

The township of Leeds comprises 3050 acres, and a population of 71,602 persons; the out-townships of the parish are Armley, Beeston, Bramley, Chapel-Allerton, Farnley, Headingley with Burley, Holbeck, Hunslet, Potternewton, and Wortley, which comprise 21,766 acres and a population of 51,791. The hamlets of Coldcotes, Osmondthorpe, Skelton, and Thornes, which lie at the west end of the borough, are comprehended in it; they are in the parish of Whitkirk, but from time immemorial they have been ecclesiastically included in the parish of Leeds.

History.—It is highly probable that Leeds was a Roman station; for Roman remains have been found in various parts of the town. The great road from Tadcaster (Calcaria) to Manchester (Mancunium) passed through this place. The district was successively under the dominion of the Saxons, and the sea-kings, or pirates, from Scandinavia and the Baltic. The North-men effected the subjugation of the district about the year 850; and it was again conquered by the Saxons previous to the Norman Conquest. The remains of a Danish fortification near Armley, and various other remains, both Danish and Saxon, sufficiently attest the above circumstances.

The appellation *Loidis* (Leeds) is Saxon; derived either from *Loid*, a people, or *Loidi*, the name of the first Saxon possessor. Nothing is known of the place in Saxon times, except that streets existed on the site of some of the present streets. It is mentioned in 'Domesday Book' (see p. 127, Bawdwen's translation), from which notice it appears rather to have been an agricultural than a manufacturing district. Soon after the Conquest Leeds passed, together with other valuable northern possessions, into the hands of the De Lacies. (BRADFORD; PONTEFRACT.] The castle of the Paganells, who held the place under the De Lacies, was besieged by Stephen. After the Paganells, the manor was held by several successive lords; it then reverted to the crown, and was afterwards purchased by a body of individuals, and has since passed into the hands of successive proprietors, who hold their court-leet, and are vested with the usual manorial privileges. We learn from Leland that in his time Leeds was considerably less than Wakefield, and Lord Clarendon (in 1642) speaking of Leeds, Halifax, and Bradford, calls them 'three very populous and rich towns depending wholly upon clothiers.' Perhaps no very definite time can be named as the commencement of manufactures at Leeds, but we may judge from the efforts made about the commencement of the sixteenth century for the various accommodations required by an increasing population, that such efforts were immediately subsequent to the commencement of its manufacturing activity. In 1638 Leeds had to furnish its proportion of ship-money; the town also participated in the conflict between Charles and the parliament,—it suffered under several severe visitations of the plague,—and in 1644-5 more than one-fifth of its population perished. At this time the place was almost deserted, the markets were removed to a distance from the town, and grass grew in the streets. The first charter was granted by Charles I.; the second, by Charles II., was granted on the petition of the merchants, cloth-workers, and other inhabitants, to protect them from the great abuses, defects, and deceits discovered and practised by fraudulent persons in the making, selling, and dyeing of woollen cloths. This charter also granted the usual municipal powers and privileges. The funds of the corporate body were never great. Of late years the town has continued to improve rapidly, and it possesses all the local establishments requisite for a large commercial community, as well as the institutions and societies necessary for supplying the wants and advancing the interests of its labouring population. In 1808 W. Hutton, the antiquary, passed through the town, and after witnessing its internal elements of wealth, and its natural advantages, he remarks of it, 'Leeds is rising, and will continue to rise except checked by a *just and necessary war*. The river, having been made navigable, gives an easy access to the markets. The number of elegant buildings recently erected shows what they have been able to accomplish; but the enterprising spirit of the inhabitants will perform future wonders. Good fortune stamps the place her own.'

Situation and Inland Communication.—Leeds is situated on the slope and partly on the summit of a hill which rises from the north bank of the Aire, and from the top declines to the east, west, and north. The northern and southern parts are connected by a freestone bridge, over which the traffic is very great. Two suspension bridges erected over the river, the first in 1827, and the second in 1832, form a connection between the town and its most populous suburbs. They are of a novel and simple construction. Instead of chains, the usual mode of suspension, two strong cast-iron arcs span over the whole space between the two abutments. The suspending arch is 152 feet wide, spanning over the river Aire and the towing-path; there is besides a small land arch of stone on each side. The total length of one of these bridges is 260 feet, and the span of the suspension arch 112 feet; the width of the bridge is 36 feet. The dimensions of the other bridge are rather less. The Victoria Bridge, from Sandford Street to the canal dock, is the property of a company of proprietors, with a capital of 20,000*l.* Its arch is 80 feet span, and 45 feet broad within the battlements: the first stone was laid in May, 1837. Leeds is admirably situated for trade, being placed in the heart of the inland navigation of the county. It communicates with the eastern seas by means of the Aire and Calder Navigation to the Humber, and westward by the Leeds and Liverpool Canal with the Mersey. The warehouses of the Aire and Calder Company are of great dimensions, and suited to the immense traffic to which they are auxiliary. A second communication to the east is formed by the Leeds and Selby Railway, which has now been in successful operation several years, and to which a line of continuation is in progress to Hull. A similar means of communication westward will soon exist in the line of railway now in the course of formation between Leeds and Manchester. Indeed it is evident that Leeds will shortly be the great northern centre of these rapid modes of transit; for the North Midland Railway will proceed from Leeds directly southward, and be connected with the main line to London; while the York and North Midland will proceed northwards and connect Leeds, York, Newcastle, and Edinburgh.

Manufactures.—The principal manufacture of Leeds is woollen cloth. There are a few worsted spinners and manufacturers, but the chief seats of the worsted trade are Halifax and Bradford. Twenty years ago there were in the clothing district extending westward from Leeds, and even to the confines of Lancashire, nearly 6000 master clothiers, who employed, besides their wives and children, 30,000 or 40,000 persons. But the number of these small domestic manufacturers has diminished exceedingly, in consequence of the introduction and extension of the factory system. Still there are immense numbers of clothing hamlets and villages where the first stages of the operations are carried on, as spinning, weaving, and fulling. The clothiers are generally men of small capital, who have a little farm or some other occupation independent of their manufacturing operations. The introduction of machinery during the present century has caused the erection of extensive factories, in which the whole process, from the breaking of the wool to the finishing of the cloth for the consumer, is carried forward. (MacCulloch's *Statistical Account of the British Empire*, vol. ii., p. 57.) Till within the last thirty years Yorkshire produced only the coarser kinds of cloth. The present improved qualities of its goods are the result of the skill and perseverance of Mr. William Hirst, himself an humble manufacturer, who introduced such improvements as enable Yorkshire to enter into competition with the superfine qualities of the West of England cloths. Though the spinning of worsted and the manufacture of worsted stuffs is not extensively followed at Leeds, vast quantities of these goods are brought there to be dyed and finished; these are chiefly purchased in the undyed state at Bradford and Halifax. [BRADFORD; HALIFAX.] The localities of the woollen and worsted manufactures in Yorkshire are —for woollen cloth, Leeds and Huddersfield; for worsted stuffs, Bradford and Halifax; and for blankets and carpets, Dewsbury and Heckmondwike. (MacCulloch's *Statistical Account of the British Empire*, vol. ii., pp. 50, 51.) The dye-houses and dressing-shops at Leeds are very extensive. In these establishments both the woollen and worsted goods are finished after being purchased in the rough, at the cloth-halls and piece-halls of the towns named. The mills at Leeds for the spinning of flax for canvas, linen, sacking, thread, &c., are very extensive; there are also large manufactories of glass and earthenware. These and the other operations of the district are facilitated by the abundant supply of coal, produced from the mines in the vicinity of the town. The number of steam-engines employed is at present estimated at 300, with an aggregate power of 5500 horses.

The Cloth-Halls.—The largest but at the same time the plainest buildings in Leeds are the cloth-halls. The Coloured-Cloth Hall was built in 1758; the White-Cloth Hall in 1775. Previous to 1711 the cloth-market was held in an open street; a hall was then built, which was used till 1755, but it was abandoned when the present buildings were erected. In the cloth-halls, the principal sales of woollen cloths in their rough state from the country manufacturers to the merchants are effected. The Coloured-Cloth Hall is a quadrangular building, 127½ yards long and 66 broad; divided into six departments, which are called streets. Each street contains two rows of stands, and each stand measures 22 inches in front, and is inscribed with the name of the clothier to whom it belongs. The original cost of each stand was 3*l.* 3*s.*; this price advanced to as much as 24*l.* at the beginning of the present century, but it has now fallen even below its original value; not owing to any decrease in the quantity of manufactured goods, but to the greater prevalence of the factory system over the domestic system of manufacturing. An additional story erected on the north side of the Coloured-Cloth Hall is used chiefly for the sale of ladies' cloths in their undyed state. The White-Cloth Hall is nearly as large as the Coloured-Cloth Hall, and is built on the same plan; the price of its stands has undergone similar fluctuations to those of the other, arising from the same cause. The markets for mixed and white cloths are held on Tuesdays and Saturdays, on which days only the merchants are permitted to buy in the halls. The time of sale is the forenoon, and commences by the ringing of a bell, when each manufacturer is at his stand, the merchants go in, and the sales commence. At the end of an hour the bell warns the buyers and sellers that the market is about to close, and in another quarter of an hour the bell rings a third time, and the business of the day is terminated. Fines are exacted from all who continue in the hall after this time. The White-Cloth Hall opens immediately after the other is closed, and the transactions are carried forward under similar regulations. The cloth is brought to the halls in the unfinished state, and it is dressed under the direction of the merchants.

Markets, Police, &c.—The Commercial Buildings may be considered as an Exchange for the merchants. The form is a parallelogram, with the south-western corner rounded. This portion is formed into a spacious portico, which has considerable architectural beauty. The entire edifice is of stone. Until 1823, the markets of Leeds were held chiefly in streets and thoroughfares, to the great annoyance of residents and passengers. At present the various markets are exceedingly commodious, and equal to the supply of all the wants of the dense population. The Free Market occupies an area of 9758 square yards; the Central Market is a spacious covered building, and is one of the principal ornaments of the town. It has a handsome elevation in the Grecian style. It was erected by a company of shareholders, and cost 35,000*l.* The area is divided into three walks, with stalls. The streets or alleys round the market are occupied chiefly by butchers. The South Market was also erected by a body of proprietors: it is chiefly used for the leather fairs, of which eight are held annually. The Corn Exchange is one of the ornaments of the town. The chief features of its elevation are two Ionic columns in antis, which support an entablature and pediment, and a small bell turret is raised above the whole. Between the columns is a niche with a statue of Queen Anne, which was restored at the expense of the corporation, and removed from the antient moot-hall to its present situation. The corn market is held every Tuesday, between the hours of eleven and one. The banks of Leeds are numerous, and have always offered those facilities so needful to the prosperity of a commercial town. The court-house, under which is the prison and police office, was completed in 1813. In it the quarter-sessions and the petty sessions for the borough are held. The Michaelmas sessions for the West Riding are also held here. The gaol affords no opportunity for the classification of prisoners, and has only a small airing-yard. A new borough gaol is however contemplated. The cavalry barracks are just within the northern boundary of the township. The buildings and the parade ground occupy more than eleven acres of land. This establishment was provided by the government, at a cost of about 28,000*l.*, granted in 1819 and 1820. The workhouse is a large and well-conducted establishment, now under the control of a board of twenty guardians. The present management is in no degree inferior, as regards the comforts of its inmates, to what it was towards the close of the last century, when it was visited by Howard, and called forth his commendations. The other establishments connected with the economical and general police of the town are the water-works, the gas-works, and the fire-engine establishments. Water-works have existed in the town since 1694. In 1754 further measures were taken to supply the increasing wants of the population. In 1790 efforts were again made, but all these have been inefficient, and at the present time the water is not only indifferent in quality, but in quantity is only equal to about one-fifth of the demand. An act was however obtained in 1837, and works are in progress which seem to promise a full supply. The town was badly and partially lighted with oil lamps to 1828, in which year it was lighted with gas. A new company was formed in 1834, and from the competition consequent on the existence of two gas companies, it is now very efficiently lighted. The town contains good public baths. The building has a neat elevation, adorned with Ionic columns and pilasters. There is also a capacious swimming-bath adjoining the Leeds and Liverpool Canal. The fire-engine establishments in various parts of the town are well kept up, and are in every respect creditable to the insurance companies. The savings' bank has a large number of depositors, and the provident institutions are numerous and well sustained; they take the usual forms of benefit societies, annuity societies, and widows' fund societies. The places of public amusement are the theatre (a plain building), which is not much encouraged, the assembly-rooms, and the music-hall, the latter of which is now used for various public purposes. An elegantly proportioned concert-room and a well appointed news-room are provided in the Commercial Buildings. The temperance societies in Leeds have accomplished a great moral change in the habits of many of the industrious classes. The late establishment of a day police has been attended with the effect of ridding the borough of disorderly persons.

Charitable Institutions, Trusts, &c.—The Leeds Infirmary was established in 1767, since which time great additions have been made to it, and it now possesses accommodations for more than 150 in-patients. This institution is secured from the too near proximity of other buildings by the purchase and presentation of 4000 square yards of building-ground, by R. Fountayne Wilson, Esq. To the same gentleman Leeds is indebted for other munificent acts. The subscriptions and collections in support of the Infirmary amount to about 2500*l.* annually; the rest of the income is derived from legacies and benefactions, from the dividends of 3000*l.* stock, and from certain shares. The number of in-patients who participated in the benefits of the infirmary in 1835 was 1608, and of out-patients 2904. The House of Recovery, for the reception of persons attacked by infectious fevers, may be considered as an appendage to the Infirmary, and it is supported by similar means. Out of 179 patients who entered it in 1834, 137 were cured. The Dispensary relieves about 3000 patients per annum, at an expense of about 600*l.* The other medical charities in Leeds are the Eye and Ear Infirmary and the Lying-in Hospital.

Respecting the trusts in the hands of 'the Committee of Pious Uses,' nothing very satisfactory or definite is known, except to those who act as trustees. It is a subject of complaint that no correct list of the trustees is accessible to the public; neither is the nature of the property, its value, or its application thoroughly known. The Charity Commissioners obtained an inventory of the property about ten years ago, but it has altered much, both in amount and description, since that time. One of these trusts for the repair of highways in and near Leeds is of considerable amount, but the stock varies according to the assistance rendered by the committee to the different townships. There is also a trust for the poor, which is laid out in clothing, and distributed at Christmas. The estates of the free grammar-school are vested in the committee, and the property of several other charities. Harrison's hospital was endowed in 1653, and its funds have since been augmented by various bequests. Jenkinson's almshouses, founded with money bequeathed in 1643, provide a residence for eight poor and aged persons. Certain rents are also distributed by the will of the founder among the aged poor of Leeds. Several augmentations have been made to the funds of this charity by later bequests. Potter's hospital, endowed in 1729, provides for the reception of 'ten antient, virtuous, poor, necessitous widows;' the income of this charity has also been increased by later endowments. The sources of posthumous charity are considered to amount to more than 5,000*l.* a year: in addition to this amount, upwards of 6000*l.* a year are distributed in the town and immediate neighbourhood for the support of local charities; and besides this large subscription for local institutions, the inhabitants of Leeds are among the most munificent contributors to the various county charities and institutions for the support or education of those who labour under physical infirmities. The smaller charities of Leeds are the Benevolent Society, and the clothing, visiting, soup, and other charities. In every large town assistance of this nature is called for, either under circumstances of periodical and foreseen presence and difficulty, or for extraordinary and unlooked-for calamities.

Places of Worship.—The parish church, dedicated to St. Peter, is now (1839) being rebuilt upon its antient site. The late building is supposed to have been erected in the time of Edward III., and enlarged during the reigns of Henry VII. and VIII. The old vicarage-house was pulled down in 1823 to make room for the Free Market, when a large and handsome mansion was purchased in a very salubrious part of the town. The vicarage is worth upwards of 1300*l.* per annum. In consequence of the disorderly proceedings at a contested election for the office of vicar in 1748, the patronage was vested in twenty-five trustees. The vicarial tithes were commuted in 1823 for 500*l.* a year, arising from 14,000*l.*, one half of which was the gift of R. F. Wilson, Esq., and the other half was raised by subscription. St. John's church was erected and endowed at the sole cost of John Harrison, Esq. This benefice is a perpetual curacy, and is now worth 375*l.* per annum. Trinity church was built by subscription, and endowed by the Rev. Henry Robinson, the nephew of the above-named John Harrison, and whose charities were also very numerous. The other Episcopal places of worship in the town are St. Paul's, St. James's, Christchurch, St. Mary's, St. Mark's (the three latter built under the Million Act), and St. George's church; the last was erected in 1837, and the entire cost of the building and endowment was defrayed by subscriptions, amounting to more than 11,000*l.* The townships of Hunslet, Holbeck, Beeston, Armley, Wortley, Farnley, Headingley, Kirkstall, Bramley, and Chapel Allerton have also episcopal chapels, and most of them several dissenting places of worship. The Catholics have two chapels in Leeds, and have lately erected a most splendid structure, to which the name of 'St. Ann's Catholic Church' has been given. 'The interior of this church consists of a nave and side aisles; its inside dimensions are 100 feet 6 inches long by 58 feet 6 inches wide, and the outside extreme extent, including the tower, is 124 feet 6 inches. The tower and spire rise to the height of 150 feet. It is built in the style of architecture which prevailed during the fifteenth century. The accommodations in the body of the church are for 600 persons, with sufficient room for 200 other sittings to be fixed at a future period; and in the gallery, which is a front one, and very spacious, 200 sittings are provided.' (*Leeds Mercury, Oct.* 27, 1838.)

There are 32 dissenting chapels in Leeds. The Wesleyans have six chapels, two of which are the largest and handsomest chapels in the kingdom, and each contains 3000 sittings. The Warrenites, a sect who have separated from the Wesleyans, have four chapels. The New Connexion Methodists have three chapels; the Primitive Methodists have two; the Female Revivalists have two. The Independents, a very numerous and influential body, have seven chapels, two of which are very costly in their accommodations. The Unitarians have two chapels, in one of which Dr. Priestley officiated during the earlier period of his ministry. The Baptists have two chapels. The Inghamites, a sect which originated at Leeds, and which approach in their faith to the moderate Calvinists, have one chapel. The Friends, the Swedenborgians, and the Southcottians have also each a place of worship.

In 1835 'the Leeds Cemetery' for the use of persons of all religious denominations was opened. It is situated near Woodhouse Moor, and occupies ten acres of land. The ground is laid out in walks and grassy lawns, and shaded with ornamental trees and shrubs. The same person is registrar and chaplain, and he and the sexton reside in houses adjoining to and forming part of the principal entrance. In the centre of the cemetery is an elegant chapel. The grounds afford space for 14,000 graves in addition to the vaults under the chapel, and an intended arcade to consist of a range of 48 spacious vaults, which may be subdivided to suit purchasers.

Schools and Scientific Institutions.—The free grammar-school of Leeds was first endowed by the Rev. Sir William Sheafield, in 1552, but it has received many subsequent endowments from various individuals. In 1624 John Harrison gave the present site, and the former edifice was erected at his expense. A dwelling-house for the head-master was built in 1780, and the school was rebuilt in 1823, on an enlarged plan. In 1815 the trustees adopted a resolution by which the pupils receive the benefit of instruction in the elementary branches of the mathematics. In 1820 they further determined that the sons of all residents in Leeds should be freely taught, and that the masters should receive no presents. This school enjoys one of Lady Elizabeth Hastings's scholarships, and it has also a claim, in its turn, to a fellowship and two scholarships at Emanuel College, Cambridge, in case they are not filled up from the free-school at Normanton. There are also three scholarships of 20*l.* per annum each, at Magdalen College, Cambridge, for scholars from Leeds, Halifax, and Heversham schools. The Charity Commissioners reported of this school that it was ably and satisfactorily conducted. The number of scholars is upwards of one hundred. The annual income of the school is more than 1600*l.*, and it possesses about 3000*l.* stock. Fines on copyhold estates form an occasional source of income. The masters are liberally remunerated.

St. John's charity-school, for the education and clothing of 80 girls, was established in 1705; it was originally intended for 40, and included their maintenance. In 1815 its object was again partially changed, and it was converted into an institution for bringing up girls of twelve years of age and upwards as household servants. The property of this charity produces about 400*l.* per annum, and arises from 5900*l.* 3 per Cents., and various small investments. It is managed by subscribers who contribute one guinea a year.

The Lancasterian school for 500 boys was commenced in 1811. We ascertain from the last Report that 8776 pupils have been received since its commencement; that 350 were received in 1837; and 323 left in that year; 477 were in the school at the date of the last Report (1838). A library is formed for the use of the elder boys, and the elements of mathematical drawing are taught. The committee consider that a carefully conducted common education is given at an annual cost of six shillings each pupil. The school owes much of its present efficiency to the untiring labours of its constant visitor Mr. B. Goodman. There are several other Lancasterian schools in the town, and the Wesleyan Methodists have four large day-schools on a system in many respects similar. In the central school of the National Society there are 267 boys and 166 girls. The whole number of Church Sunday-schools, including this, contain 2038 boys and 2012 girls. The Sunday-schools in connexion with the Sunday-school Union contain 4619 pupils, who are taught by 749 teachers. There are also several other Sunday-schools, which are not included in either of the above bodies. The Leeds infants' school was established in 1826; the building at present occupied was erected in 1836; the school is intended as a model-school, and for the instruction of teachers.

The chief institutions at Leeds for supplementary education are the Leeds Philosophical and Literary Society, established in 1820, which has about 300 proprietary and ordinary members and annual subscribers; the Leeds Literary Institution, which has 500 members, and the Leeds Mechanics' Institute, which has 260 members. The Philosophical Society has an extensive museum, a laboratory, and a library, and it has published a highly interesting volume of Transactions. The Literary Institution has a large reading-room, an extensive library, frequent lectures, and a collection of philosophical apparatus. Connected with the Mechanics' Institute a peculiar feature requires notice. In 1837 thirteen of the Mechanics' Institutions of the West Riding were formed into a union, to embrace the following important objects:—1st, The interchange of opinion and advice on the local management of Mechanics' Institutes, and the consequent rapid diffusion of improved methods; and, 2nd, The procuring of first-rate lectures on scientific subjects, systematically arranged, and subordinated to each other, so as to present a connected and comprehensive view of each, at a much lower pecuniary cost than can be done by isolated engagements.' This plan of the union of several institutions was strongly recommended in the 'First Publication of the Central Society of Education;' it was brought forward at Leeds by Mr. Edward Baines; it has been found to answer as far as could be looked for during the first year of trial, and there can be no doubt but, with the modifications which time and experience will suggest, it will work well for all populous districts. There is a School of Medicine at Leeds, and a Society for the Encouragement of the Fine Arts which has periodical exhibitions. The Leeds library, founded in 1768, on the recommendation of Dr. Priestley, is one of the most extensive in the north of England. There are also the New Subscription Library, the Eclectic Library, the Parochial Library, and the Young Men's Library.

A society has been formed during the last year for the establishment of Botanical and Zoological Gardens; they occupy about 20 acres of land, and are now rudely laid out, ponds have been dug and shrubs planted; the greenhouses and conservatories will be immediately erected.

Eminent Persons.—Ralph Thoresby, the author of 'Ducatus Leodensis;' Dr. John Berkenhout, William Hey, Esq., F.R.S., a surgeon of great celebrity, Dr. Bentley, John Smeaton, Sir Thomas Dennison, Bishop Wilson, the Rev. Joseph Milner and his brother Dr. Isaac Milner, Dr. Priestley, David Hartley, and Edward Fairfax, the translator of Tasso, were all born at Leeds, or in the immediate vicinity. John Harrison, the philanthropist, was also a native and a resident of Leeds, where his name will be always venerated, not only for his active charities, but for the purity of his life.

(Thoresby's *Ducatus Leodensis*; Whitaker's *Loidis and Elmeti*; Parsons's *History of Leeds, &c.*; Baines's *Directory of Yorkshire*; and *Communications from Leeds.*)

LEEK. [STAFFORDSHIRE.]

LEER (sometimes called Lier), a circle of the province of East Friesland in the kingdom of Hanover, with a population of 18,000 inhabitants. Leer, the capital, is a market town, situated in 53° 13′ N. lat. and 7° 25′ E. long., on the river Leda, which falls into the Ems about three-quarters of a mile below the town. It is an unfortified well built place; it has one Lutheran, one Calvinist, and one Roman Catholic church, a Moravian chapel, a synagogue, a grammar school, an orphan asylum, two hospitals, &c., and 6500 inhabitants, who carry on manufactures of linen, woollen, leather, thread, stockings, &c. There are 26 extensive brandy distilleries, 16 breweries, and some soap manufactories. Leer has a considerable trade in butter, cheese, and other articles: ships of 150 tons burden come up to the town by the Ems, and the number of vessels arriving and departing is from 250 to 300 in a year.

LEET is the precinct or district within the cognizance or subject to the jurisdiction of a court-leet. Sometimes the term is used to denote the court itself, the full style of which is 'court leet and view of frank-pledge.' Each of these titles is frequently used alone; but the omission does not affect the character or the jurisdiction of the court. The court-leet is also called a law-day, as being the ordinary tribunal.

I.—*Origin of the Court-leet.*

One of the least improbable derivations of the word 'leet' seems to be that which deduces lath and leet from the Anglo-Saxon 'lathian,' or 'gelathian,' to assemble, both lath and leet indicating, under different modifications, a district within which the free male resiants (residents) or indwellers assembled at stated times, as well for preparation for military defence as for purposes of police and criminal jurisdiction. Of the first of these objects scarcely any trace exists in the modern leet. The title of the court as a 'view of frank-pledge' points to its former importance under the extensive system of police introduced or perfected by King Alfred, which required that all freemen above twelve years of age should be received into a decenna, dizein, decennary, or tithing, sometimes called a visne, or neighbourhood, and in Yorkshire and other parts of the North, ten-men-tale (a number, tale, or *tally* of ten men), and forming a society of not less than ten friborgs or freeborrows, freemen, each of whom was to be *borhoe*, that is, pledge or security for the good conduct of the others. So the German 'bürge,' pledge or surety (fidejussor), appears to be derived from the verb 'borgen,' to give or take on credit. In this sense, in the 'Franklin's Tale,' Chaucer has 'Have here my faith to borw ' And in the 'Squire's Tale,'—'St. John to borwe.'

In the ballad of 'The Rising in the North,' preserved in Percy's 'Reliques of Antient Poetry,' Lady Northumberland, proposing to her husband to place herself in the hands of Queen Elizabeth, as a surety or hostage for his submission, says, 'Thy faithful borrow I will be.'

When a party was accused of a crime, his tithing was to produce him within 31 days, or pay the legal mulct for the offence, unless they proved on oath that no others of the tithing were implicated in the crime, and engaged to produce him as soon as he could be found. For great crimes the offender was expelled from the tithing, upon which he became an outlaw.

The duty of inspecting a decennary or tithing was called a view of frank-pledge, the freeborrows having received from their Norman conquerors the designation well known in Normandy of frank-pledges. The principal or eldest of these freeborrows, and as such the person first sworn, who was denominated sometimes the tithing-man or tithing-head, sometimes the headborough or chief-pledge, sometimes the borsholder or borsalder (borhes-alder, or senior or ruler of the pledges), and sometimes the reeve, was in an especial manner responsible for the good conduct of each of his co-pledges, and appears to have had an authority analogous to that still exercised by the constable, an officer elected by the resiants for the preservation of the peace within the district constituting the leet, tithing, or constablewick. This officer is in many places called the headborough, which designation, as well as those of borsholder and tithing-man, is frequently used by the legislature as synonymous with that of constable. It is probable that all the frank-pledges were numbered according to rank or seniority, as in places where more than two constables are required, the third officer is called the thirdborough. Blackstone, misled by the sound, supposes headborough to be the chief person or head of a town or borough. This derivation will remind the readers of 'Hudibras' of the 'wooden bastile' (stocks), which

> 'None are able to break thorough,
> Until they're freed by *head of borough*.'

The Holkham MS. of the Anglo-Saxon customary law says:—'A tithing (there called decimatio) contains, according to local usage, ten, seventy, or eighty men, who are all bound (debent) to be pledges (fidejussores) for each other. So that if any of them be accused (calumpniam patitur), the rest must produce him in court, and if he deny the offence, he is to have lawful purgation by the tithing (*i.e.* by their swearing to their belief of his innocence). A tithing is in some places called a *ward*, as forming one society, subject to observation or inspection within a town or hundred. In some places it is called "borch," that is, pledges for the reasons above stated. In others it is called tithing (in the original, decimatio), because it ought to contain ten persons at the least.'

The assizes of Clarendon directed 'that all the customs of frank-pledge should be observed; that a person receiving men into his house or land, or within his jurisdiction (soke), who were not in frank-pledge, should be answerable for their appearance, and that no franchise or liberty [LIBERTY] should exclude the sheriff from entering for the purpose of seeing that views of frank-pledge were duly held.'

Leets are either public or private. The public leet is an assembly held in each of the larger divisions of a county, called a hundred, at which all freemen who are resiants within the hundred are bound to attend in person or by their representatives. These representatives were the reeves or chiefs of their respective tithings, whether designated by that or by any of the other appellations, each of whom was accompanied by four good and lawful men of, and elected by, the tithing which deputed them. This public court-leet was held formerly by the royal governor of the county, the ealdorman of the Saxons, the earl of the Danes, the comes or count of the Normans. This great functionary was accompanied by the shire-reeve, an officer elected by the county to collect the king's rents and the other branches of the royal revenue, who, in the absence of the ealdorman, presided in the court, and governed the county as his deputy, whence he is called by the Normans a vice-comes or vicount, though in English he retained the name of shire-reeve or sheriff, the designation connected with his original and more humble duties. This public court, which was originally called the folkmote, being held successively in each hundred in the course of a circuit performed by the sheriff, acquired the name of the sheriff's *tourn*, by which name, though itself a court-leet, it is now distinguished from inferior private leets. The latter courts appear to have been created at a very early period by grants from the crown obtained by the owners of extensive domains (which afterwards became manors) [MANOR], and most frequently by religious houses, for the purpose of relieving their tenants and those who resided upon their lands from the obligation of attending the tourn or leet of the hundred, by providing a domestic tribunal, before which the resiants might take the oath of allegiance and the frank-pledges might be inspected, without the trouble of attending the tourn, and to which as an apparently necessary consequence, the criminal jurisdiction of the precinct or district was immediately transferred. In these private leets the grantee, called the lord of the leet, performed the duties which, in the public leet or tourn, after the ealdorman or earl had permanently absented himself, fell upon the sheriff. Their duties he might perform either personally or by his steward, though some writers, overlooking the authorities, have doubted whether the lord can sit in person. As a compensation for this, and his trouble in obtaining the franchise, it appears to have been the practice for the great land-owner who by his money and his influence had procured the grant of a private leet to claim from resiants a certain small annual payment by the name of certum letæ. The tenants within the precincts of a private leet, whether in boroughs, towns, or manors, formed a body politic wholly independent of the tourn or leet of the hundred; whilst such upland, or unprivileged, towns as had not been formed into or included within any private leet, still appeared, each by its tithing-man or reeve and four men of the tithing, and formed part of the body politic of the hundred. Each of these communities appears to have exercised most of those rights which it has of late years been supposed could not exist without a royal incorporation. In many cities and boroughs the antient authority of the court-leet was in later times superseded by charter of incorporation, in some of which the important right of popular election of magistrates was preserved entire; whilst in the great majority of cases the right, though continued in name, was fettered, if not rendered altogether nugatory, by restrictions of various characters and degrees, which are still to be seen in incorporated boroughs not regulated by the Municipal Corporation Act. In other respects the course prescribed by these charters was adapted to the changes which had taken place in the habits of the people since the institution of the court-leet. Many of the functions of the magistrates in the new incorporations were borrowed from the then comparatively recent institution of justices of the peace.

II.—*Constitution of the Court-leet.*

This court is a court of record, having jurisdiction of such crimes as subject the offenders to punishment at common law. The exclusive exercise of criminal jurisdiction being inherent in the kingly office, all criminal matters are denominated pleas of the crown, and the courts in which such pleas are held are the king's courts, although granted to a subject; for such grant operates merely as an authority to the grantee to preside judicially by himself or his steward, and to take the profits of the court to his own use. The authority so exercised under the king's grant is called a lordship, and the grantee is said to be the lord of the leet. It may be claimed either by a modern grant or by prescription, *i.e.* long established user, from which an antient grant is presumed. The grantee, whether claiming under a grant still extant or by prescription, is commonly the lord of a manor, and the leet is usually coextensive either with the actual limits of the manor, or with its boundary at some former period. There may however be several leets in one manor, and a leet may be appendant to a town, or to a single house. It is not necessary that the lord of the leet should have a manor, or indeed that he should have any interest in the land or houses over which the leet jurisdiction extends. It is competent to the crown to grant to A a leet over the lands of B, and the grantee of a leet in his own land may convey the land and retain the leet. As the leet was originally granted for the more convenient administration of justice, the lord may be required by writ of mandamus to hold the court. Upon non-user of a leet, the grant is liable to be seised into the hands of the crown, either absolutely as for a forfeiture, or *quousque*, that is until the defect be amended; the same consequence ensues upon neglect to appoint an able steward and other necessary officers, or to provide instruments of punishment.

Private leets are commonly held, as public leets *must* be, twice in the year, within a month after Easter, and within a month after Michaelmas, and even the former cannot, unless warranted by antient usage, be held at any other time except by adjournment. The court appears to have been formerly held in the open air. It should be held at its accustomed place, though, if sufficient notice be given, it may be held anywhere within the precinct. All persons above the age of twelve years and under sixty (except peers and clergymen, who are exempted by statute, and women and aliens), resiant within the precinct for a year and a day, whether masters or servants, owe suit to (*i.e.* personal attendance at) this court, and here they ought to take the oath of allegiance. The suit to the court-leet is said to be real (*i.e.* regal or due to the king), because every one bound to do suit to such court as a resiant, is also bound to take the oath of allegiance unless he has taken it before. But where a non-resiant is bound by tenure to join with the resiants in making presentments at the court-leet, the duty is not suit-real, for he shall not be sworn to his allegiance, &c., at this leet. It is merely suit-service, *i.e.* a suit forming one of the services due from the tenant to his lord in respect of the tenure. For the non-performance of such suit the remedy is by distress, as in case of other suits-service or rents-service. A man who has a house and family in two leets, so as in law to be conversant or commorant in both, must do his suit to the leet where his person is commorant, viz. where his bed lies, but if he occasionally reside in both, he is bound to do suit to each.

III.—*Jurisdiction of the Court-leet.*

The Anglo-Saxon Hundred Court appears to have had jurisdiction in all causes, civil, criminal, and ecclesiastical; and also to have had the cognizance and oversight of all the communities of frank-pledges within the hundred, the members of these communities being bound for that purpose to attend at the Hundred Court by themselves or their elected representatives. The jurisdiction of the Hundred Court in ecclesiastical matters was taken away by an ordinance of William the Conqueror, forbidding the attendance of the bishop.

It was the province of the court-leet, as well the public leet of the hundred, as the private leet, to repress all offences against the public peace, and to enforce the removal of all nuisances affecting the public convenience.

The leet jury possess a legislative authority in establishing by-laws. By laws made in a court-leet and embodied in the presentments of the jury in respect of matters properly cognizable in the leet are binding upon resiants, but not upon strangers. [BY-LAW.] A by-law imposing a penalty of 5*l.* per month for taking or placing an inmate without giving security to the overseers against any charge upon the parish was said by Lord Hale to be usual and valid. The leet jury elect their own chief magistrates, the reeve or constable, &c., of the private leet, and, as it would seem, the high constable (sometimes called the alderman) of the hundred.

Before the Norman conquest, and probably for some time after, this court of the leet was, if not the sole, at least the ordinary tribunal for the administration of criminal justice in the kingdom. Until the reign of Henry I., when, with respect to certain heinous offences, the punishment of death was substituted for pecuniary compositions, no crime appears to have been punished by death except that called in the laws of that prince 'Openthifte,' a theft where the offender was taken with the *mainour*, that is, with the thing stolen upon him. [ROBBERY.] Of this crime, as requiring no trial or presentment, the leet had no cognizance. Other offences, of however serious a nature, subjected the party to a mulct, or pecuniary fine, the amount of which was in many cases determinate and fixed.

Offences to be merely inquired of in leets are arson, burglary, escape, larceny, manslaughter, murder, rape, rescue, sacrilege, and treason, and every offence which was felony at common law. These offences being presented by the leet jury as indictors, and the indictment being certified to the justices of gaol delivery, the indictees may be arraigned; but they cannot be arraigned upon the mere production of the court-roll containing the presentments. Formerly all offences inquirable in leets were also punishable there by amercement; but the power of adjudicating finally upon crimes in courts leet, whether public or private, is now limited to such minor offences as are still left under the old system of pecuniary compensation. No matters are cognizable in the leet unless they have arisen or have had continuance since the last preceding court.

An amercement is a pecuniary punishment which follows of course upon every presentment of a default or of any offence committed out of court by private persons. Amercements are to be mitigated in open court by affeerers (afferatores, from afferrare or afforare, *afferer*, to tax, or fix a price, hence the term afferage, used in the old French law to denote the judicial fixing of a price upon property to be sold). The affeerers by their oaths affirm the reasonableness of the sum at which they have assessed the amercement. This course is sanctioned and confirmed by Magna Charta, which directs that amercements shall be assessed by the peers of the offender, *i.e.* the pares curiæ, or suitors of the same court. [JURY.] The amercements, being affeered, are estreated (extracted) from the court-roll by the steward, and levied by the bailiff under a special warrant from the lord or steward for that purpose, by distress and sale of the goods of the party, which may be taken at any place within the precinct, even in the street; or the lord may maintain an action of debt for such amercement. For a nuisance, the jury may amerce the offender, and at the same time order that he be distrained to amend it.

The steward of a leet is a judge of record, and may take recognizances of the peace; and he may impose a fine for a contempt or other offence committed in court, as where a party obstructs the jury in the execution of their duties, or by public officers in the discharge of their duties out of court. The amount of the fine is at once fixed by the steward, and therefore, though sometimes loosely called an amercement, it is not to be affeered. When a suitor present in court refuses to be sworn, it is a contempt for which a reasonable fine may be imposed; so if the jury, or any of them, refuse to make a presentment, or depart without making it, or make it before all are agreed. But the fine must be set upon each person individually. For the fine so imposed the lord may distrain or bring an action of debt. In all matters within the cognizance of a court-leet the lord or steward has the same power as the judges in the superior courts. He has indeed no power to award imprisonment as a punishment for offences presented in the leet, such offences being the subject of amercement only; but he may imprison persons indicted or accused of felony before him, and persons guilty of a contempt in face of the court.

If a nuisance within the jurisdiction of a leet be not presented at the court-leet, the sheriff cannot inquire of it in his tourn, for that which is within the precinct of the leet is exempt from the jurisdiction of the tourn; which has merely the same jurisdiction as private leets in such parts of the hundred as are not included within any private leet.

A private trespass cannot be presented at the court-leet, even though committed against the lord; and a custom to present and amerce for such trespasses is void.

Of common right the constable is to be chosen by the jury in the leet; and if the party chosen be present, he ought to take the oath in the leet; if absent, before justices of the peace. If he refuse to accept the office, or to be sworn, the steward may fine him. If the party chosen be absent and refuses, the jury may present his refusal at the next court, and then he is amerced. But a person chosen constable in his absence ought to have notice of his election. A mandamus lies to the steward of a leet to swear in a constable chosen by the jury. By 13 & 14 Car. II., cap. 12, when a constable dies or goes out of the parish, any two justices may make and swear a new one until the lord shall hold a court-leet; and if any officer continue above a year in his office, the justices in their quarter-sessions may discharge him, and put another in his place until the lord shall hold a court. But the justices at sessions cannot discharge a constable appointed at the leet; and though they can appoint constables until the lord shall hold a court, they cannot appoint for a year, or till others be chosen. A person chosen constable who is deficient in honesty, knowledge, or ability, may be discharged by the leet or by the Court of King's Bench as unfit. The steward may set a reasonable fine on a constable or tithing-man refusing to make presentments.

Though the leet has long ceased to be the principal and ordinary court of criminal jurisdiction, its power and authority have been enlarged by several statutes, which give it cognizances over offences newly created, and it does not appear to have been at any time directly abridged by legislative interference. The business of the court has chiefly been affected by the creation of concurrent jurisdictions, particularly that of justices of the peace [JUSTICES OF THE PEACE], who have cognizance of the same matters, as well as of many others over which the court-leet has no jurisdiction. Justices of the peace are always accessible, whereas the court-leet is open only at distant intervals, and for a short period, unless it be continued by adjournment, which can only take place for the despatch of existing business. Another cause of the declension of these tribunals is that except in a very few cases the jurisdiction of the leet is confined to offences punishable at common law. In statutes providing for the repression of new offences, the leet is commonly passed over in favour of justices of the peace. Blackstone reckons 'the almost entire disuse and contempt of the court-leet and sheriff's tourn, the king's antient courts of common law formerly much revered and respected, among the mischievous effects of the change in the administration of justice by summary proceedings before justices of the peace.' It was not however left to the learned commentator to make this discovery. In the course of the very reign which witnessed the introduction of the modern system of justices of the peace, we find the Commons remonstrating against the violation of the Saxon principle of self-government and domestic administration of justice, resulting from the encroachments made upon the antient jurisdiction of the leet by giving to the new tribunal of the justices of the peace a concurrent jurisdiction in matters usually brought before the court leet, and an exclusive jurisdiction in other important matters. In the last year of Edward III. (1377), the Commons, by their petition in parliament, prayed the king that no justice of the peace should inquire of anything cognizable in the courts of lords who had view of frankpledge, or of anything cognizable in any city or borough within their district, and should attend only to the keeping of the peace and the enforcing of the statute of labourers. To this petition the king returned the following unsatisfactory answer:—'The statutes heretofore made cannot be kept if the petition be granted.' At this time, and until the passing of 27 H. VIII., c. 24, offences in leets were alleged to be against the lord's peace, not the king's.

IV. *Manner of holding the Court-leet.*

The common notice of holding the court is said to be three or four days; but it is now usual to give fifteen days' notice. An amercement at a court of which sufficient notice has not been given is void. But even where there is a clear prescriptive usage to give a certain number of days' notice, the resiants cannot disturb the holding of the court on the ground that such notice has not been given.

The functions of the steward of a court-leet are mostly, if not wholly, judicial. Ministerial acts are to be performed by an inferior officer called the bedel or bailiff, who of common right is appointed by the lord or steward, though by custom he may be chosen by the jury, and sworn with the other officers chosen at the leet; and where, in a leet appendant to a borough, the bailiff so chosen has a discretionary power in impannelling the jury, this important function is a sufficient ground for issuing a quo warranto to inquire into the title of the party exercising it. The steward, at the customary or at a reasonable time before the holding of the court, issues a precept under his seal, addressed to the bailiff of the leet, commanding him to warn the resiants to appear at the time and place appointed for holding the court, and to summon a jury. The notice may be given in the church or market, according to the usage of the particular place; but it is said that if it be not an antient leet, personal notice is necessary. According to the course most usually pursued, the steward opens the court by directing the court to be proclaimed; and this being the king's court, it is necessary that three proclamations should be made. This is done by the bailiffs crying 'Oyes' (hear) three times, and then saying once, 'All manner of persons who are resiant or deciners and do owe suit royal to this leet, come in and do your suit and answer to your names upon pain and peril which shall ensue.' The bailiff then delivers to the steward a list of persons summoned as jurymen, together with the suit or resiant roll. The suit-roll is then called over, and those resiants who are absent are marked to be amerced. The bailiff then makes three other proclamations, by crying 'Oyes' three times, and then saying 'If any man will be essoigned, come in, and you shall be heard.' The steward having called for the essoigns, enters them. The essoigns should regularly be adjourned to the next court for examination in the court roll or book.

Suit-real must be done in person; it cannot be done by attorney; nor can it, as it would seem, be released by the lord. But the suitor may be essoigned or excused *pro* *hâc vice*, which is done generally upon the payment of an essoign penny.

The constables are next examined as to their compliance with the orders received by them at the previous court. After this the leet jury is formed. This jury is chosen from the body of the suitors, and consists of not less than twelve, nor more than twenty-three. In some leets the jury continues in office for a whole year; in others the jurors are elected and discharged in the course of the day. A custom for the steward to nominate to the bailiff the persons to be summoned on the jury is valid. If a sufficient number of resiants to form a jury cannot be found, the steward has power to compel a stranger to serve, even though he be merely travelling through the district, and is actually riding on his journey at the time his services are required; but a woman, though a resiant, cannot be sworn.

After the jury is chosen a foreman is named, who is sworn as follows:—'You shall well and truly inquire, and true presentment make, of all such articles, matters, and things as shall be given you in charge; the king's counsel, your companions', and your own, you shall keep secret and undisclosed. You shall present no man for envy, hatred, or malice; nor spare any man for fear, favour, or affection, or any hope of reward; but according to the best of your knowledge, and the information you shall receive, you shall present the truth and nothing but the truth.' As soon as the foreman is sworn, three or four of the jury, taking the book together, are sworn to observe and keep, on their parts, the same oath which the foreman has taken on his part. The jury then receive a charge from the steward, pointing out the nature of their duties, and of the matters which ought to be presented. The jury make their presentments to the steward, who, in cases of treason or felony, must return the presentments (in these cases called indictments) to the justices of gaol delivery if the offenders be in custody; if they be at large, the indictments must be removed into the King's Bench by certiorari, in order that process may issue thereon. In all other cases the steward of the leet has power, upon the complaint of any party grieved by the presentment, or, on the other hand, upon any suspicion entertained as to the concealment of any offence, by non-presentment, to cause an immediate inquiry into the truth of the matter by another jury, though in the former case the more usual course now is by certiorari or traverse.

A court-leet may be adjourned if the business of the particular court require it. This should be done by three proclamations. A court held on the 28th April, and adjourned, after the jury had been sworn, till the 15th December, which day was given them to make their presentments, has been held not to be necessarily unreasonable.

It is not necessary that notice should be given of an order made by the leet for abating a nuisance; the party being within the jurisdiction, must take notice of it at his peril. For the same reason he is also bound to take notice of a by-law.

V. *Profits of Court.*

The ordinary profits of a court-leet are the fines, amercements, and essoign pence, and belong, in the case of a public leet or tourn, to the king; in the case of a private leet, to the grantee or lord of the leet. It would rather seem however that the lord is bound to account at the Exchequer for these profits, though he may discharge himself by showing his title. In a private leet also, the lord, as above mentioned, is entitled to a further payment, in the nature of a poll-tax, capitagium, or chevage, by the name of certum letæ, sometimes called cert-silver, certainty-money, cert-money, and head-silver. When this payment is to be made on the day of the leet the defaulters may be presented and amerced. For such amercement the lord may distrain; but he cannot distrain for the cert-money itself, without a prescription to warrant such distress. In the absence of both amercement and prescription, the lord's remedy is by action of debt.

LEEUWARDEN, situated in 53° 12′ N. lat. and 5° 43′ E. long., is the chief town of the province of Friesland, in the kingdom of the Netherlands. It is surrounded with an earthen rampart and a wide moat; the broad straight streets are intersected by canals, the banks of which, as well as the ramparts, are planted with trees, and afford very pleasant promenades. The town, which is well built, has manufactures of linen and paper, and has a considerable trade, which is much facilitated by canals communicating with the sea, and with Dokkum, Franeker, and Haarlingen. The principal buildings are the town-hall, the prinzenhof, or palace of the princes of Orange, as hereditary governor of the province, a synagogue, and twelve churches, the largest and handsomest of which contains several monuments of the princes of the house of Orange. The population is 21,000.

LEGACY (Legâtum), a bequest or gift of goods and chattels by will or testament. The person to whom it is given is termed the legatee (legatârius); and every person is capable of being a legatee, unless particularly disabled by the common law or by some statute.

The bequest in no case confers more than an incohate property on the legatee, which does not become complete until the assent of the executor or administrator with the will annexed, as the case may be, has been given. [EXECUTOR.] But, before such assent, the bequest is transmissible to the personal representatives of the legatee, and will pass by his will.

Legacies are of two kinds, general and specific. A legacy is general when it is so given as not to amount to a bequest of a particular thing, or a particular fund of the testator; a specific legacy is a bequest of a specified thing, or a specific part of the testator's estate. The whole of the estate of a person deceased being liable for the payment of his debts, legacies of both kinds are of course subject to debts: but in case of a deficiency of the estate for the payment of the legacies, the general legatees can only be paid in equal proportion; and they must, as it is technically termed, *abate*. But a specific legatee is not compelled to abate or allow any thing by way of abatement, though his legacy may be taken for the payment of debts, in case the general legacies have all been applied to pay them and there is still a deficiency to meet the demands on the estate of the deceased. Specific legatees may however be compelled to abate as against one another. If the part of the testator's estate which is specifically given has been disposed of by the testator in his lifetime, or at the time of his death has ceased to exist in such form as described in his will, the general rule is, that the specific legatee loses his legacy, and is not entitled to any satisfaction out of the general estate: in such case the legacy is said to be adeemed, a term which has been derived from the Roman law, though the word 'adimere' is not there used exactly in this sense (*Dig.* 34, 4.) There is also a third description of legacy, partaking somewhat of the nature of both kinds already mentioned, as a gift of so much money, with reference to a particular fund for payment. This is called a *demonstrative* legacy, but so far differs from one properly specific, that if the fund pointed out fails on any account, the legatee will be paid out of the general assets; yet it is so far specific that it is not liable to abate in case of a deficiency of the general assets.

Legacies may be given either absolutely (purè) or upon condition (sub-conditione), or upon the happening of any contingency; provided it must happen, if at all, within the duration of a life or lives in being at the time of the decease of the testator and 21 years afterwards, allowing in addition the period of gestation where the contingency depends upon the birth of a child. Legacies may also be given in such a way that though no condition is expressed in distinct terms, it may be clearly inferred that the testator did not intend his gifts to take effect till a definite time had arrived or a definite event had taken place. When a legatee has obtained such an interest in the legacy as to be fully entitled to the property in it, the legacy is said to be *vested*, and this property may be acquired long before the right to the possession of the legacy accrues. A vested legacy partakes of the incidents of property so far as to be transmissible to the personal representatives of the party entitled to it, or to pass by his will; a legacy which is contingent or not vested is no property at all with respect to the legatee. This distinction of legacies, vested and not vested, seems derived from the Roman law, which expresses the fact of vesting by the words 'dies legati cedit.'

Formerly, in all cases when a legatee died before the testator, the legacy lapsed, or failed, and went to the person appointed residuary legatee by the testator, or if there was none such, to the next of kin; and lapse might also take place (as already observed with respect to a legacy given to a legatee at a particular time, or upon condition, or the happening of a contingency) if the legatee died before the appointed time arrived, or if the condition was not performed, or the contingency did not happen. The recent statute, 1 Vict., c. 26, sect. 33, has modified the old rule, and directs that when legacies are bequeathed to a child or other issue of the testator who shall die in his lifetime, leaving issue, and such issue shall be living at the testator's death, the legacies shall not lapse unless a contrary intention appears upon the face of the will, but shall take effect as if the legatee had died immediately after the testator.

The rules by which gifts of legacies are construed are derived from the civil law, or rather are a part of that law, which prevails in the ecclesiastical courts; for although the court of chancery has concurrent jurisdiction over legacies with the ecclesiastical courts, yet to prevent confusion it follows the same general rules. If however a legacy be charged upon or made payable out of real estate, then, as the ecclesiastical court has no concurrent jurisdiction, courts of equity are not bound to follow the same rules as to the construction of such gifts as in the case of personal estate.

The questions involved in the law relating to legacies are so numerous that it is quite impossible even to notice them in an article of this description, and as they are chiefly of a technical nature, the reader is referred to the various treatises on that branch of the law.

Generally speaking an executor cannot be compelled to pay legacies until after the expiration of twelve months from the decease of the testator, and not even then unless the assets should be realized and the debts paid or provided for; but as the rule is only for the general convenience of executors, if it should appear that all the debts of the testator are paid, the executor may be compelled to pay the legacy before the twelve months have expired. It may be stated however as a general rule, that legacies are payable twelve months after the death of a testator, and with interest from that time at 4 per cent., unless the testator has made some special provision as to time of payment and interest. The rule as to the twelve months is taken from the Roman law. It has already been stated in this work [EXECUTOR], that an action at law does not lie for a legacy, until after the executor has admitted that he has assets in his hands sufficient to make the payment, or in the case of a specific legacy, has assented to it. But the law may perhaps be more correctly stated thus: Where a specific legacy consists of some determinate chattel, whether real, as a lease for years, or personal, as a particular horse, the legatee, after assent by the executor to the legacy, may take possession of it, or sue for it by action at law; but where the specific legacy consists of money, &c., and in all cases of general and of demonstrative legacies, no action at law lies unless the executor has, for some new consideration beneficial to himself, expressly promised payment. As a general rule therefore it may be stated that the remedies by legatees against executors are afforded by the courts of equity. (Roper *On Legacies;* Williams *On Executors.*)

On the subject of legacies (legata) under the Roman law, Gaius (ii., 192-255) and the *Digest*, lib. xxx., xxxi., xxxii., 'De Legatis et Fidei commissis,' are the authorities. This is one of the subjects on which the Roman jurisconsults have most successfully exercised their sagacity and diligence.

LEGATE (from the Latin Legátus). This word had various significations among the Romans. The legates were the chief assistants of the proconsuls and propraetors in the administration of the provinces. The number of legates differed according to the quality of the governor whom they accompanied; their duties consisted in hearing inferior causes and managing all the smaller affairs of the government. They appear to have been chosen and appointed by the governor, though at the first institution of the office it would seem they were selected by the senate, as advisers to the governor, from the wisest and most prudent of their own body. The word legatus also signified a military officer who was next in rank to the general or commander-in-chief in any expedition or undertaking, and in his absence had the chief command. (Cæsar, *De Bell. Civ.*, ii., 17.) The word legatus is also often used to denote a person sent by the Roman state to some other state or sovereign power on matters that concerned the public interest: in this sense the word corresponds pretty nearly to our ambassador or envoy, except that the motives for sending a legatus, or legate, seem to have been occasional only, and the legates do not appear ever to have been permanent resident functionaries in a foreign community. Under the emperors those who were sent by them to administer the provinces of which the government was reserved to the emperors, were called legates.

Under the republic the senators who had occasion to visit the provinces on their own business used to obtain what was called a 'legatio libera,' that is, the title and consideration of a legatus, or public functionary, with the sole object of thereby furthering their private interests. These legationes are said to have been called liberæ, or free, because those who held them had full liberty to enter or leave the city, whereas all other public functionaries whose duties were exercised beyond the limits of the city could not enter Rome till they had laid aside their functions; or because a senator could not go beyond a certain distance from Rome unless he obtained permission in the form of a legatio. Cicero, who on one occasion inveighs vehemently against the legatio libera, could defend it when it suited his purpose, and in a letter to Atticus (i. 1.) he expresses his intention to visit Cisalpine Gaul in this capacity for the purpose of furthering his election as consul.

At the present day a legate signifies an ambassador, or nuncio, of the pope. They are of the highest class of ambassadors. [AMBASSADOR; NUNCIO.]

There are several kinds of papal legates, *legatus a latere*, *legatus natus*, &c. Legates a latere are sent on the highest missions to the principal foreign courts, and as governors of provinces of the Roman dominion, thence called legations. Legatus natus is a person who holds the office of legate as incident and annexed to some other office, and is, as we should say, a legate *ex officio*. As this office or title exempted the holder from the authority of the legates a latere, it was earnestly sought after by the bishops. The archbishop of Canterbury was formerly a legatus natus, and there are now three or four German bishoprics permanently invested with the privileges of the office. Legates of a lower rank than cardinals are called nuncii apostolici.

LEGEND (from the Latin word *legendum*, a thing to be read) is used commonly in the sense of fabulous or doubtful narratives, such as the exploits of heroes of the middle times, between history and fiction, tales of superstition, or other subjects, in which credulity and imposture find free room for exercise. Thus legends have come to signify that which is usually rather matter of tradition than of written evidence. In our old authors the word occurs in its simple meaning.

Legend is also used technically to denote the words encircling a coin; to writing on tablets the word *inscription* is applied, which is also used instead of legend where a sentence, instead of encircling, occupies the place of a device on the coin.

LEGENDRE, ADRIEN MARIE, an analyst, whose name must follow those of Lagrange and Laplace in the enumeration of the powerful school which existed in France at the time of the Revolution, was born at Paris in 1751, and died there January 10, 1833. No authentic account of his personal life has yet been published: so that we can only now say that it was passed in strenuous and successful exertions for the advancement of mathematical science and of its applications. He never filled any political post, or took any marked part in public matters: he was, we believe, no favourite of any government, and his scientific fame did not procure him more than a very moderate competency. The writings of M. Legendre consist of various papers in the Memoirs of the Academy of Sciences, and several separate writings of which we shall give a slight account.

The first appearance of Legendre as a mathematician was (A.D. 1782) as the writer of two papers, one on the motion of resisted projectiles, the other on the attraction of spheroids, which gained prizes from the academies of Berlin and Paris, and a place in the former as the successor of D'Alembert. In a memoir on double integrals, published in the volume for 1788 (though presented at the end of 1799), he digested a method of transforming an integral with two variables to one depending upon other variables, which he applied to the question of the attraction of spheroids. He was the first who extended the solution of this question by the aid of modern analysis: it being not a little remakable, that this problem in the year 1773 required the power of Legrange to show that even as much could be done with it by the modern analysis as had been effected with the antient methods by Newton and Maclaurin. Various other memoirs by Legendre refer either to points of the integral calculus, or to his geodetical operations. In 1787 he was appointed one of the commissioners for connecting the observatories of Greenwich and Paris by a chain of triangles. Cassini de Thury had memorialized the British government on the expediency of this step: the execution of which was committed to General Roy on the English side, and to Legendre, Cassini, and Méchain on the French. Much of the work was completed in 1787, and a memoir of Legendre, published in the volume for that year, upon some theoretical points, contains one of those simple and beautiful theorems which carry the name of their inventors with them for ever. It is the celebrated proposition relative to the *spherical excess* [Trigonometry] of a small spherical triangle. An account of the actual triangles constructed in his survey is contained in the volume for 1788. When the grand French arc of the meridian was completed, Laplace and Legendre were employed to deduce the form of the spheroid which agreed most nearly with all the observations. In the construction of the large trigonometrical tables (which still remain unpublished) he contributed some simplifying theorems. In 1806 he published his 'Nouvelles Méthodes pour la Détermination des Orbites des Comètes,' in which he gives a method the peculiarity of which then was that it allowed of the correction of the original observations at any part of the process. It may be doubtful whether the method itself was an improvement upon those which were then in use; and if it were, it is still superseded by others posterior to it. But this tract is further remarkable by its containing the first proposal to employ the method of least squares. [Least Squares, Method of.] Whether Legendre had seen the hint of Cotes or not, he made a proposal of great ingenuity, and introduced, as a matter of practical convenience, a method which was afterwards shown by Laplace to be entitled to confidence on the strictest grounds of principle.

Legendre applied himself at an early period of his life to the development of those integrals on which the determination of the arcs of an ellipse and hyperbola depend. In the Memoirs of the Academy for 1786 are two papers on the subject written by him. His 'Exercices du Calcul Integral,' published in 1811, contain, among other matters of high curiosity, an extended view of the same subject. He continued to devote himself assiduously to the cultivation of this new branch of science, and in 1825 and 1826 he produced the two volumes of his 'Traité des Fonctions Elliptiques et des Integrales Euleriennes,' containing a digested system, with extensive tables for the computation of the integrals. The work was hardly published when the discoveries of MM. Abel and Jacobi appeared. These mathematicians, both then very young, had begun by looking at the subject in another point of view, and had produced results which would have materially simplified a large part of the work of Legendre, if he had had the good fortune to find them. With a spirit which will always be one of the brightest parts of his reputation, Legendre immediately set about to add the new discoveries to his own work; and in 1828 and subsequent years appeared three supplements, in which they are presented in a manner symmetrical with the preceding part of the work, and with the fullest acknowledgment of their value and of the merit of their authors.

To Legendre is also due the collection of the results obtained upon the theory of numbers [Numbers, Theory of], a subject to which he made very remarkable additions. The second edition of his 'Théorie des Nombres' was published in 1808, and the third in 1830.

The best known of Legendre's works is, as might be supposed, his Elements of Geometry, of which Sir David Brewster gave an English translation in 1824, from the eleventh edition: Legendre published his twelfth edition in 1823. Of the finished elegance and power of this very remarkable work it is not easy to speak in adequate terms: and next to the Elements of Euclid, it ought to hold the highest place among writings of the kind. But it would not be difficult to show that much of the rigor of Euclid has been sacrificed, and though those who determine to abandon the latter cannot do better than substitute Legendre's work, we hope that in this country the old Greek will maintain his ground at least until a substitute can be found who shall give equal rigor of demonstration, as well as greater elegance of form.

LEGER *Lines and Spaces* (*Léger*, Fr., *light*), the lines and spaces added to the staff when the notes exceed the ordinary compass. The word is often most improperly written *Ledger*.

LEGHORN. [Livorno.]

LEGION. In a Roman consular army each grand division, corresponding nearly to a modern brigade, was so denominated; and the word indicates a selection of the individuals composing such division. The name is still occasionally given to a body of troops consisting of several regiments or battalions, when raised at a particular place or for a particular service.

The strength of a Roman legion varied at different periods. When Romulus divided the citizens of his newly-formed state into three portions or tribes, he also divided the men who were able to bear arms into bodies of 3000 men, and each of these constituted a legion, which was commanded by one or three præfects or tribunes. (Plutarch, in *Rom.*) Servius Tullius, who, by the enlargement of the city, formed a fourth tribe, is supposed to have raised the strength of the legion to 4000 men. About 150 years afterwards, when Camillus marched against Satricum, he had four legions, each of which consisted of that number of men (Liv., i. 22); but, twenty years later, the strength of the legion is stated to have been 5000 foot and 300 horse. (Liv., viii. 8.) This probably continued to be the general establishment of that body of troops, though particular circumstances might cause it to be occasionally increased. Scipio landed in Africa (Liv., xxix. 24) with two legions, each consisting of 6200 men (though the best commentators suppose that 5200 is meant); and while the Roman army was acting against Perseus in Macedon, each legion contained 6000 foot and 200 horse. (Liv., xliii. 12.) Vegetius, who lived in the fourth century, describes the legion (lib. ii., cap. 6) as a body consisting of 6100 foot soldiers, besides 720 horsemen; but he designates this the antient legion, and his account is probably applicable only to the state of that body in the age of Hadrian and the Antonines. The legion declined under the later emperors, and in the time of Constantine it appears to have consisted of only 1500 men.

During the reign of Augustus twenty-five legions were placed permanently on the frontiers of the empire; and in the time of Hadrian the number of legions composing the Roman army was 30, exclusive of the auxiliaries. Their disposition in Italy and the provinces may be seen in Gibbon, vol. i., ch. 1. The legions were denoted by numbers, and they were further designated by the name of the emperor who raised them, or by the name of the place where they were raised, or where they had distinguished themselves.

The manner in which the soldiers were elected to serve in the legions is fully described by Polybius (book vi., ch. 1), who lived in the age of Fabius and Scipio; and it may be presumed that this was in accordance with the prescribed regulations, which however were only followed when the necessities of the state did not compel the magistrates to dispense with them. When an army consisting of four legions was to be raised, the citizens of the proper ages being assembled on an appointed day in the Capitol, the military tribunes drew out the tribes by lot, and from that which was first called they selected four men of nearly equal age and stature: of these the tribunes who were appointed to the first legion chose one; those who were appointed to the second legion chose another; and so on. Afterwards the whole body of the tribunes chose four other men, and of these the tribunes of the second legion first chose one; those of the third legion then chose another; and so on, the tribunes of the first legion taking the last man of the four. In like order the election proceeded, till the required number of men was obtained. Polybius states that, in his time, the horsemen were enrolled before the foot soldiers, but that antiently the former were chosen last.

Immediately after the enrolment, the recruits for the legions being made to advance one by one, each was sworn to be obedient to his commanders, and to execute all the orders which he should receive from them to the utmost of his power.

When soldiers were to be raised from the allied cities of Italy, notice appears to have been sent by the consuls to the magistrates of those cities, who then enrolled men in a manner similar to that which was practised at Rome; and, having caused them to be disciplined, sent them to join the army.

On the institution of regular bodies of troops by Romulus, he is said to have divided them (probably each legion) into companies of 100 men, and these were called *Manipuli*, from the bundles of grass which served as standards for the people who accompanied him when he attacked the palace of Amulius. (Aur. Victor, *Origo Gen. Rom.*, c. 22.) The first mention of a cohort occurs shortly after the expulsion of the kings (Liv., ii. 11); and in the time of Polybius the legion was divided into ten cohorts, each of these into three manipuli (Polyb., b. xi.), and each of the latter into two centuriæ. [Cohort.] A manipulus must have then consisted of 200 men; and at a later period it designated a body of less than the original number. Under Hadrian and the emperors immediately following him the cohorts appear to have been of unequal strength. Vegetius states that the first, which was called *cohors milliaria*, and which carried the eagle, consisted of 1500 foot and 132 horsemen; the second, called *cohors quingenaria*, of 555 foot and 70 horsemen; and that the remaining cohorts were nearly of the same strength as the second.

Servius Tullius is said to have divided the military force into five different classes of troops (Liv., i. 43), which were distinguished by their armour; but from the commencement of the republic, or nearly so, the order of battle consisted of three lines of troops, the *Hastati*, the *Principes*, and the *Triarii*. (Liv., viii. 8.) The *Velites* (light troops or skirmishers) had no particular station, and, except the latter, all the troops, according to Polybius, were armed nearly in the same manner.

The youngest men were selected to act as velites: they were armed with bows or slings, and some of them carried a light javelin. After the time of Marius these ceased to be enrolled as legionary troops, and were chiefly foreigners. Vegetius designates them *Ferentarii*. They wore short swords, and were provided with bucklers of a circular form, about three feet in diameter. The staff of their javelin was two cubits long, and as thick only as a finger; the iron head tapered gradually to a fine point, in order that, being bent at the first discharge, it might be rendered useless to the enemy.

The hastati of all the cohorts were stationed in the first line; the principes formed the second, those of each cohort supporting their own hastati; and the triarii were similarly disposed in the third line to support the principes. All the three classes were completely armed with cuirass, helmet, and greaves; their buckler was 4 feet long and 2½ feet broad, and five arrows were placed in its concavity, to be thrown when necessary. Each man was provided with a long and a short sword, the blade of the former being strong, and made either to cut or thrust; and he carried, besides, two javelins, or *pila*. (Polyb., b. vi.) The only difference in the arms of the three classes seems to have consisted in the size of the *pilum*, those used by the triarii, or veteran soldiers, in the time of Varro being longer and heavier than those of the men in the other lines.

It is supposed that originally the principes were stationed in the first line, and that they were men of the superior classes; from which circumstance, or because they came first into action, they may have acquired their designation.

The front of the legion, when in order of battle, was formed by ten corps of the hastati, each corps being arranged with 16 men in front, and 10 in depth. The second line, or that of the principes, was of the same strength, and was drawn up in the same manner. The line of triarii consisted also of ten corps; but these had only 10 men in front and 6 in depth. Every legionary soldier was allowed five feet in front, and as much in depth, in order that he might be enabled to make free use of his arms.

The cavalry of a Roman legion was divided into ten *turmæ*, of about 30 horsemen each, who, in order of battle, were drawn up with 8 in front, and 4 in depth. Each legion of the allies had however 600 horsemen; so that the cavalry of a consular army (consisting of two Roman legions and two legions of allies) amounted to 1800 men, who were disposed on the wings of the legion, in one line or two, according to circumstances. The legionary cavalry were furnished with cuirasses and helmets, and they were accompanied by light-armed horsemen, who served as archers.

LEGISLATION. In treating of legislation, we will explain,—1st, the meaning and etymology of the word; 2nd, the distinction between the legislative and executive powers of government; and 3rd, the difference between jurisprudential and legislative science—under which head we will make some remarks respecting the most convenient form for the composition of laws.

1. *Meaning and etymology of the word Legislation.*—A magistrate who proposed a law in Rome for the adoption of the assembly of citizens was said *legem ferre* (as we say, to *bring* a bill into parliament); and the law, if carried, was said to be *perlata*, or simply *lata*. Hence the term *legum lator*, or *legislator*, was used, as synonymous with the Greek νομοθέτης, in the sense of a lawgiver. From *legislator* have been formed *legislation*, *legislative*, and *legislature* (the latter word signifying a person or body of persons exercising legislative power).

Legislation means the making of positive law. Positive law, as explained in the article Law, is made by the person or persons exercising the sovereign power in a community. The end of positive law, as explained in the same article, is the temporal happiness of the community.

2. *Distinction between the legislative and executive powers of government.*—A general command, or law, issued by a sovereign government would be nugatory, if it was not applied in practice to the cases falling within its scope, and if the pains denounced for the violation of it were not inflicted on transgressors. The execution of the general commands, or laws, of a sovereign government is therefore an essential part of the business of a government. Accordingly the ordinary functions of a government may be divided into the two classes of *legislative* and *executive*.

An *executive* command, or act, of a sovereign government, is a special command issued, or act done, in the execution of a law previously established by the government. Executive commands or acts are of two sorts, viz. *administrative* and *judicial*. The distinction between these two sorts of executive commands or acts may (in conformity with modern phraseology) be stated as follows. A judicial proceeding is a declaration, by a competent authority, that a person has (or has not) brought himself within the terms of a certain penal provision, or that he has (or has not) a certain legal right or obligation which another disputes with him. An administrative proceeding is for the sake of carrying a rule of law into effect, where there is no question about the legal culpability, or dispute about a legal right or obligation of a person. In an administrative proceeding the government functionary acts, or may act, spontaneously; in a judicial proceeding he does not act until he is acted upon by others. A judge cannot act until his court is (to use the French phrase) *seized*, or *saisi*, with the question; or (to use the language of our ecclesiastical courts) it is necessary 'to promote (or set in motion) the office of judge.' (Dégerando, *Institutes du Droit administratif Français*, Paris, 1829.)

It should be observed, that the division of the functions of government into legislative and executive is not exhaustive; inasmuch as neither class comprehends acts or special commands not founded on a previous general command or law, in other words, *privilegia*, concerning which see the article Law.

The distinction between the making of laws and their execution is too obvious to have been overlooked by the ancient writers on government. The latter subject was treated by them under the head of *magistrates*. (See, for example, Aristot., *Pol.*, vi. 8.) The distinction has however attracted peculiar attention from both speculative and practical politicians since the beginning of the last century, in consequence of the great importance attributed by Montesquieu to the separation of the legislative, administrative, and judicial powers of government; *i.e.* the exercise of the administrative and judicial functions by officers distinct from the supreme legislative body, and from each other. (*Esprit des Lois*, xi. 6.) The importance of the separation in question has however been overrated by Montesquieu; and it has never existed, and indeed can scarcely exist, to the extent which he supposes. The legislative functions of a government can be distinguished, logically, from its executive fuctions; but these functions cannot, in every case, be severally vested in different persons. In every free government (or government of more than one) the legislative bodies exercise some executive functions: thus, in England, the House of Lords is an appellate court in civil cases, and the House of Commons decides in cases of contested elections of its own members. In every form of government the public functionaries, whose primary business is the execution of the laws, exercise a considerable portion of (delegated) legislative power. It is scarcely possible to conceive a body of law so complete as not to require subsidiary laws for carrying the principal laws into execution, and a power of making these subsidiary laws must, to a greater or less extent, be vested in the executive functionaries. In the article LAW we have distinguished laws made by supreme from laws made by subordinate legislatures. The latter class of laws usually emanate from executive functionaries, especially judges. (Austin's *Province of Jurisprudence*, p. 244-9.)

3. *Difference between jurisprudential and legislative science.*—Positive law may be viewed from the two following aspects. First, it may be considered as an organic system, consisting of coherent rules, expressed in a technical vocabulary. Secondly, its rules may be considered singly, with reference to their tendency to promote the happiness of the community; in other words, their expediency or utility. Law viewed from the former aspect is properly the subject of the science of jurisprudence. [JURISPRUDENCE.] Law viewed from the latter aspect is the subject of a department of political science which is generally termed *legislative science.* (Legislation, in strictness, is concerned about the technical form, as well as the utility, of a law; but the term legislative science, as just defined, is sufficiently accurate for our present purpose.)

It is important to bear in mind the distinction, just pointed out, between the scientific or technical excellency of a system of law, and the expediency or utility of the rules of which it is composed. The distinction, however manifest, has been frequently overlooked, even by lawyers. Thus Sir W. Blackstone, in describing the struggle made by the clergy to substitute the Roman law for the common law of England, gives the preference to the latter system on the ground of the imperial government of Rome being despotic. The excellence of a system of law, considered in a scientific point of view, has no connexion with the form of the government by which the laws were established. Law may be, and has been, cultivated as a science with admirable success under very bad governments. The scientific cultivation of law in Rome scarcely began until the Empire; and the great legal writers of France lived in times of political anarchy or despotism. A system of law of which the practical tendency may be most pernicious may have the highest scientific or technical excellence. A code of laws establishing slavery, and defining the respective rights and duties of master and slave, might be constructed with the utmost juristical skill; but might, on that very account, be the more mischievous as a work of legislation. On the other hand, a system of law may be composed of rules having a generally beneficial tendency, but may want the coherency and precision which constitute technical excellence. The English system of law affords an example of the latter case. Owing to the popular character of the legislature by which its rules were enacted or sanctioned, it has a generally beneficial tendency; but considered in a scientific point of view, it deserves little commendation. The writings of Mr. Bentham, in like manner, are far more valuable contributions to legislative than to jurisprudential science. The remains of the writings of the Roman lawyers, on the other hand, are of little assistance to the modern legislator, but they abound with instruction to the jurist.

The distinction between the technical excellence of a law and its expediency, or (in other words) between its form and its substance, is also important with reference to the question of *codification*, i.e. the making of a code of laws.

The making of a code of laws may involve any one of the three following processes:—1. The formation of a new system or body of laws. 2. The digestion of written laws, issued at various times, and without regard to system. 3. The digestion of unwritten law, contained in judicial decisions and authoritative legal treatises. The antient codes of law were, for the most part, works of new legislation; such were, for example, the codes of Solon and Draco, the Twelve Tables, the code of Diocles of Syracuse, and others. The *codices* of Theodosian and Justinian afford examples of the digestion of written laws. [CONSTITUTIONS, ROMAN.] The Digests or Pandects of Justinian afford an example of the digestion of unwritten law. The French codes were not digests of the existing law of France, either written or unwritten; but they were in great measure founded on the existing law. The same may be said of the Prussian Landrecht. The statutes for consolidating various branches of the criminal law, the bankruptcy laws, the customs laws, the distillery laws, &c., are instances of the digestion of the written law of England. The Criminal Law Commissioners have furnished a specimen of a digest of the English common (or unwritten) law relating to theft. (*First Report*, 1835.) The digestion of existing law, whether written or unwritten, requires merely juristical ability; the making of new laws requires, in addition to the knowledge and skill of the jurist, that ability which we have termed legislative. In other words, the making of new laws requires both attention to their utility or expediency, and technical skill in the composition or drawing of them. Popular forms of government secure a tolerably careful examination of laws, with reference to their expediency; but they do not secure attention to the technical or scientific department of legislation. Indeed nearly all the principal codes of laws have emanated from despotic governments, viz. the Roman, Prussian, Austrian, and French codes. The difficulty of passing an extensive measure through a popular legislature has, in free governments, discouraged attempts at systematic digestion of the law. The digest of the law of real property in the state of New York however affords an example of such digest passed by a popular legislature.

The most convenient form for the composition of laws is a subject which has exercised many minds, but on which we cannot, consistently with the plan of this Cyclopædia, make more than a few remarks.

The inconveniences arising from too great prolixity or too great conciseness in the phraseology of laws are stated by Lord Bacon, in the 66th and 67th aphorisms of his eighth book *De Augmentis*. If an attempt be made, by an enumeration of species, to avoid the obscurity which arises from the use of large generic terms, doubts are created as to the comprehensiveness of the law; for, as Lord Bacon well observes, 'Ut exceptio firmat vim legis in casibus non exceptis, ita enumeratio infirmat eam in casibus non enumeratis.' (*Ib.*, aph. 17.) On the other hand, vague and extensive terms, if unexplained, are obscure and frequently ambiguous. The best mode of producing a law which shall at once be comprehensive, perspicuous, and precise, probably is, to draw the text of the law in abstract and concise language, and to illustrate the text with a commentary, in which the scope, grounds, and meaning of the several parts of the law are explained. A commentary such as we now speak of was suggested by Mr. Bentham (*Traités de Legislation*, tom. iii., p. 284; *De la Codification*, s. 4), and the penal code recently prepared for India has been drawn according to this plan. Doubts will arise in practice respecting the interpretation of the most skilfully drawn laws; and the best guide to the interpretation of a law is an authentic declaration, made or sanctioned by the legislature which enacted it, of its scope or purpose. The want of such a commentary frequently causes the scope of a law to be unknown; and hence the tribunals often hesitate about enforcing laws which may be beneficial. (*Dig.*, lib. i., t. 3, fr. 21, 22.)

It seems scarcely necessary to say that laws ought, where it is possible, to be composed in the language most intelligible to the persons whose conduct they are to regulate. In countries where the great majority of the people speak the same language (as in England or France), no doubt about the choice of the language for the composition of the laws can exist. In countries however where the people speak different languages, or where the language of the governing body differs from that of the people, or where the bulk of the people speak a language which has never received any literary cultivation, a difficulty arises as to the language in which the laws shall be written. Where the people speak different languages, authentic translations of the original text of the laws should be published. Where the language of the governing body differs from that of the people (which is generally the case in newly-conquered countries), the laws ought to be issued in the language of the people. It is comparatively easy for a small number of educated persons to learn a foreign language; whereas it is impossible for the people at large speedily to unlearn their own, or to learn a new tongue. Thus the Austrian government in Lombardy uses the Italian language in all public documents. Where the language of the bulk of the community has not received a literary cultivation, the language used by educated persons for literary purposes must be employed for the composition of the laws. Thus in Wales, the

Highlands of Scotland, and the west of Ireland, the language of the laws and the government is not Celtic, but English; and in Malta, where the bulk of the people speak a dialect of Arabic, the laws are published and administered in Italian, which is the literary language of the island.

LEGNA'GO. [VERONA.]

LEGRAND, JACQUES GUILLAUME, a French architect and a writer on subjects of architecture, was born at Paris, May 9th, 1753. When studying in the Ecole des Ponts et Chaussées he attracted the notice of Perronet, and was, while yet very young, entrusted with the execution of the bridge at Tours. His taste however disposed him far more to architecture than to engineering; and he accordingly placed himself under Blondel, and, after his death, pursued his studies under Clerisseau, who, esteeming his character no less than his talents, bestowed his daughter upon him in marriage. With Molinos, his friend and his professional associate in most of his works, he made a tour through Italy, and was preparing to investigate the remains of art in Magna Græcia, when he was recalled home by the government. From that period he was employed during nearly twenty years in restoring several public edifices and erecting others. One of his most noted works, which he executed in conjunction with Molinos, was the timber cupola of the Halle aux Bleds. The Théatre Feydeau, the restoration of the Fontaine des Innocens, of the Halle aux Draps, and of the interior of the Hôtel Marbœuf, besides a number of designs for private individuals, were executed by him. He had been appointed to conduct the repairs of the abbey of St. Denis, and had removed to that place for the purpose of giving his undivided attention to the works, just before his death, which happened November 10th, 1806. Among his writings are the text to the 'Edifices de Paris' and the 'Galerie Antique,' and to many of the architectural subjects in the 'Annales du Musée;' also the architectural portion of Cassas's 'Voyage Pittoresque d'Istrie,' and that of 'Phenicie;' and an octavo volume to accompany Durand's 'Parallèle d'Edifices.' This last was merely the sketch of a more complete and detailed history of architecture, which, had he lived to execute it as he had proposed, would have extended to thirty volumes.

LEGU'MIN, a peculiar vegetable product obtained by Braconnot from peas, and which he considers as a vegetable alkali. To obtain this substance, ripe dried peas are to be digested in warm water, to be reduced to a pulp in a mortar, and water being added, the liquor is to be strained; this is milky, and when allowed to deposit those substances which are merely suspended in it, is still turbid, and appears to contain legumin in combination with some vegetable acid. During evaporation a translucent substance separates at the surface of the liquor, which appears to be legumin combined with some vegetable acid; it is of a greenish-grey colour, does not redden litmus, but restores its blue colour when reddened by an acid; it is insoluble in alcohol, but this dissolves the chlorophylle; after being long boiled in the alcohol it resembles starch, and becomes transparent and white by drying. It dissolves in very dilute vegetable acids, such as the oxalic and tartaric, but the mineral acids precipitate it from solution in them. It is readily dissolved by the alkalis and their carbonates in solution, even when very dilute.

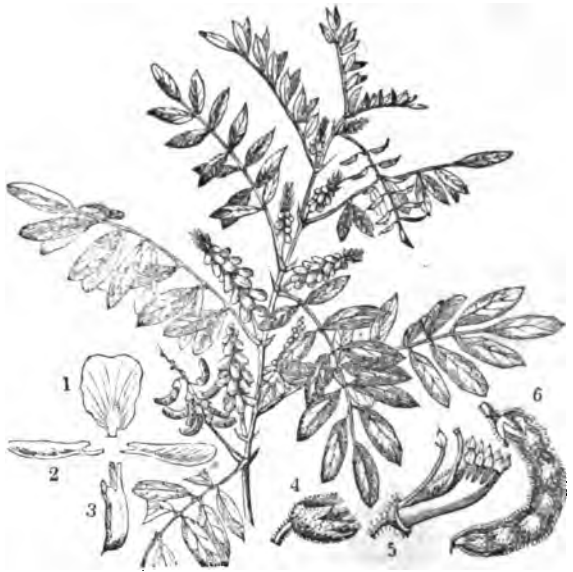
Legumin appears to be a substance intermediate as to gluten and vegetable albumen; it differs from the first in being insoluble in alcohol, and from the last in readily dissolving in the alkaline carbonates; it contains some sulphur, and also azote, but less than animal albumen; it is precipitated from solutions which are not acid by bichloride of mercury, and also by infusion of galls. It exists in peas and beans to the amount of about 18 per cent. It has not been completely analyzed.

LEGUMINO'SÆ, or **FABA'CEÆ**, a very extensive natural order of plants inhabiting the coldest and hottest, the dryest and dampest parts of the world, assuming the greatest varieties of form and size, some being among the smallest of flowering plants, others forming the largest trees in tropical forests, and varying in an extraordinary degree in their sensible qualities, some being eatable, as peas, beans, and other pulse; others poisonous, as Piscidia, Tephrosia, and Cytisus; some secreting a fragrant volatile oil, others destitute of all trace of such a substance

So many modifications of structure are found among these plants, that although they may be generally defined as being polypetalous exogens with definite perigynous stamens, and a superior simple carpel, changing to a legume, yet each of these characters disappears in certain species, so that none are free from exceptions. For instance, Ceratonia has no petals, the stamens are indefinite and hypogynous in Mimosas, and the fruit is not a legume in Dipterix and many others. Nevertheless, as one or other of the above characters is always present, although the others may be absent or deviated from, there is but little practical difficulty in determining if a plant belongs to this order.

The species amount to some thousands, and are conveniently divided into three suborders, *Papilionaceæ*, *Cæsalpinieæ*, and *Mimoseæ*.

Papilionaceæ have what are called papilionaceous flowers, that is, of the five petals one is large, broad, spread open, and called the *standard;* two others are parallel, convex, or slightly spreading, and called *wings;* and the two remaining ones are also parallel, but united by their anterior edge so as to form a body not unlike the *keel* of a boat, after which it is named. In all these plants the stamens are definite in number, and inserted with tolerable distinctness into the calyx; but while many are diadelphous, others are monadelphous or decandrous; the fruit is either a legume, a lomentum, or a drupe, or some form intermediate between the first and last. It is here that the great mass of the order occurs, especially in the colder parts of the world. Peas, beans, clover, saintfoin, lucerne, liquorice, indigo, medicks, and trefoils, lupines, and numerous other common European genera, belong to Papilionaceæ.



Indigofera Anil.

1, Standard; 2, wings; 3, keel of the flower; 4, calyx; 5, diadelphous stamens; 6, legume.

Cæsalpinieæ have the petals spread out, and nearly equal sized, with distinct unequal stamens; they may be considered the regular form of the order, while Papilionaceæ are the irregular form. Their fruit is usually a legume, but not always. The Cassia, which furnishes the senna-leaves of the shops, is the most interesting among them; to this suborder also belong the Tamarind and Algaroba fruits, the trees yielding logwood, Brazil-wood, Sappan-wood, &c., and Hymenæa, from which gum animi is procured.

Mimoseæ have small regular flowers collected into heads, numerous often indefinite stamens, usually hypogynous, and a legume. They are unknown in cold countries in a wild state, but in the hotter parts of the world they form a strikingly beautiful portion of the vegetation. From the much greater length of their stamens, their petals, and the clustered compact arrangement of their flowers, the latter often resemble tassels of silk, of the most vivid colours, intermingled among the leaves. Their bark is usually astringent, with a frequent intermixture of gum. The gums Arabic, Senegal, Sassa, and others, are produced by different species; catechu is the extract of the astringent bark of Acacia Catechu, and rose-wood is said to be the timber of some Mimosa inhabiting the interior of Brazil. One of the most striking phenomena among the plants of this order is the excessive irritability observable in the leaves of certain species of Mimosa, such as M. pudica, sensitiva, &c., which

Cassia elongata.

are hence called sensitive plants. It is however a special peculiarity, and not one of general occurrence; unless the folding up at night of the leaves of the whole suborder be regarded as an instance of the same irritable quality in a low degree.

Mimosa pudica.

1, A flower, much magnified; 2, a legume.

LEIBNITZ, GOTTFRIED WILHELM, was born July 3, 1646, at Leipzig, where his father (Friedrich) was professor of jurisprudence. Having lost his father at the age of six years, he was placed at the school of St. Nicholas, in his native city, from which he was removed in his fifteenth year to the university of the same place. Although law was his principal study, he combined the legal lessons of the elder Thomasius with those of Kuhn in mathematics, and applied at the same time with great diligence to philology, history, and, in short, to every branch of knowledge. Of antient writers, Plato, Aristotle, and the Pythagoreans seem to have exercised the greatest influence on his mental character, and his profound knowledge of their writings has furnished many an element in his own philosophy, while it suggested a wish, as bold as it was impracticable, of reconciling their several systems and combining them into one consistent whole. After further prosecuting his mathematical studies at Jena under Erhard Weigel, Leibnitz returned to Leipzig, where he passed successively to the degrees of bachelor and master in philosophy. On the latter occasion (A.D. 1664) he read his treatise 'De Principio Individuationis,' in which he took the side of the nominalists against the realists. His pursuits at this time were chiefly of a mathematical and juristical character. In 1664 appeared the treatise 'Quæstiones Philosophicæ ex Jure collectæ,' which was followed in the next year by the 'Doctrina Conditionum.' The treatise 'De Arte Combinatoria' was published in 1666. This important and remarkable work contained a new method of combining numbers and ideas, and was intended to exhibit the scientific advantages of a more extensive design, of which it was only a particular application. This general design, which is sketched in the 'Historia et Commendatio Linguæ Characteristicæ Universalis' (*Posthumous Works*, by Raspé, p. 535), was the invention of an alphabet of ideas, to consist of the most simple elements or characters of thought, by which every possible combination of ideas might be expressed; so that by analysis or synthesis the proof or discovery of all truth might be possible. Notwithstanding such early proofs of his genius and talents, Leibnitz was refused a dispensation of age which he had asked for at Leipzig in order to take the degree of Doctor of Laws, which however he obtained at Altorf. His exercise on this occasion was published under the title 'De Casibus in Jure Perplexis,' which was everywhere received with approbation. Declining a professorship here offered to him, in all probability from a distaste for a scholastic life, he proceeded to Nürnberg, where he joined a society of adepts in the pursuit of the philosopher's stone, and, being appointed secretary, was selected to compile their most famous works on Alchemy. For such an occupation he is said to have proved his fitness by composing a letter, requesting the honour of admission, so completely after the style of the Alchemists, that it was unintelligible even to himself. From these pursuits he was removed by the Baron Von Boineburg, chancellor to the elector of Mainz, who invited him to proceed to Frankfort in the capacity of councillor of state and assessor of the chamber of justice. He here composed the valuable and important essay 'Nova Methodus docendi discendique Juris, cum subjecto catalogo desideratorum.' At this time Leibnitz began to prosecute the study of philosophy with greater energy, and to extend his fame to foreign countries by the republication of the work of Nizolius, 'De veris Principiis et vera Ratione Philosophandi,' to which he contributed many philosophical notes and treatises. To this date belong two original compositions which are remarkable for their boldness of views, and as containing the germ of his later philosophical system. Of these two works, the 'Theoria Motus Concreti' was communicated to the Royal Society of London, and the 'Theoria Motus Abstracti' to the Academy of Sciences of Paris. The latter city he first visited in 1672, in company with the son of his patron, and there formed the acquaintance of the most learned and distinguished men of the age; among others, of Malebranche, Cassini, and Huyghens, whose work on the oscillation of the pendulum attracted Leibnitz to the pursuit of the higher mathematics. Leibnitz next proceeded to London, where he became personally acquainted with Newton, Oldenburg, Wallis, Boyle, and others, with many of whom he had previously maintained an active correspondence. Upon the death of the elector of Mainz, he received from the duke of Brunswick Lüneburg the appointment of hofrath and royal librarian, with permission however to travel at pleasure. He accordingly visited London a second time, in order to make known his mathematical studies and to exhibit his arithmetical machine. This machine, either an improvement of that of Pascal, or an original invention, is described in the first volume of the 'Miscellanea Berolinensia,' and is still preserved in the museum at Göttingen. From London Leibnitz returned to Hanover, where he was engaged in arranging the library and in the discovery and development of the method of infinitesimals, which was so similar to the method of fluxions of Newton as to lead to a bitter dispute between the admirers of these great men, and ultimately between themselves, as to the priority of discovery. To decide this dispute the Royal Society of London, at the request of Leibnitz, nominated a commission, which decided in favor of Newton. [FLUXIONS; COMMERCIUM EPISTOLICUM.] There is little doubt however that the two methods were equally independent and original; but if the two claims are irreconcilable, the priority of publication gives the presumption in favor of Leibnitz. To this period belong also the important works of a mixed historical and political nature, 'Scriptores Rerum Brunsvicensium,' and the 'Codex Juris Gentium Diplomaticus,' the materials of which he had collected during his travels through France, Suabia, Bavaria, and Austria, which he undertook at the instance of Duke Ernest Augustus of Brunswick. In 1683 he joined Otto Mencke in publishing the 'Acta Eruditorum' of Leipzig, and from 1691 he was also a constant contributor to the 'Journal des Savans,' in which many of his most important essays on philosophy first appeared. To this period belong the composition of the 'Monadologie' and the 'Harmonie Préétablie.' In 1702 Leibnitz was appointed president of the Academy of Sciences at Berlin, which the elector of Brandenburg, afterwards Frederick I. of Prussia, had established at the instance of his queen, a princess of the house of Brunswick, and by the advice of Leibnitz himself. In 1710 the 'Theodicée' was published, with a view to oppose the tendency of the writings of Bayle; and two years afterwards the 'Nouveaux Essais sur l'Entendement Humain,' in answer to the essay of Locke. In the previous year Leibnitz formed the personal acquaintance of Peter the Great, who, at Torgau, consulted him on the best means to be adopted for the civilization of Russia, and rewarded his valuable suggestions by the title and dignity of councillor of state and a pension of 1000 rubles. Shortly afterwards, at the instance of Prince Ulrich of Brunswick, the emperor, Charles VI., elected him aulic councillor and baron of the empire; and, in consequence, he visited Vienna, where he became acquainted with the Prince Eugene of Savoy and the chancellor Count Sinzendorf. Upon the elevation of the elector of Hanover to the throne of England, Leibnitz returned to Hanover, where, after the publication of a few political and philosophical works, he expired on the 14th November, 1714. He was buried on the esplanade at Leipzig, where a monument, in the form of a temple, indicates, by the simple inscription 'Ossa Leibnitii,' the place of his burial. 'The best *éloge* of Leibnitz,' to use the words of Dugald Stewart, 'is furnished by the literary history of the eighteenth century, a history which, whoever takes pains to compare with his works and with his epistolary correspondence, will find reason to doubt whether, at the singular æra when he appeared, he could have more accelerated the advancement of knowledge by the concentration of his studies than he has actually done by the universality of his aims.'

The first object of the philosophical labours of Leibnitz was to give to philosophy the rigour and stability of mathematical science. The latter derives this character both from its formal portion, or demonstration, and also from the nature of its object-matter. With a view to the former, Leibnitz assumed the existence of certain universal and necessary truths which are not derived from science, but grounded in the very nature of the thinking soul. (*Principia Philosophiæ*, s. 30-7.) As the object-matter of mathematics may be supposed to be constructed of points or units, Leibnitz was led to the assumption of certain primary constituents of all matter. These are his famous monads, which form the basis of his system. These monads are simple substances without parts, out of which all bodies are compounded by aggregation. They are real, because without real simple principles the composite would not possess reality; and consequently, if there were no monads, nothing of any kind could exist really. These monads must not be confounded with the atoms of Democritus or Epicurus. They are real units, the grounds of all activity, or forces, and the prime absolute principles of all composite things, which may ultimately be resolved into them. Leibnitz called them metaphysical points and substantial forms. Being without parts, they are necessarily unextended, indivisible, and without figure. As such they are incapable of dissolution, and without natural decay or production, which is only possible in composite bodies. The monads therefore were created at once and momentarily, and in the same manner they must be destroyed or last for ever. Internally they admit not of change, since neither substance nor accident can penetrate what is wholly without parts. Nevertheless they must possess certain determinations or qualities, since otherwise they could not be things. Further, every monad is distinct from all others; for there cannot be two things absolutely identical and without internal difference. This proposition forms one of Leibnitz's necessary and fundamental principles, which he called the 'principle of identity of indiscernibles' (principium identitatis indiscernibilium). According to this principle all things must differ more or less, since otherwise they would be indistinguishable, for identical things are indiscernible. All created things are subject to change; consequently the monads also are constantly changing. This change however is only external, and does not operate internally; on the contrary, the outward change results from an internal principle; and this internal principle of change constitutes the essence of all force: the monads consequently are forces. Besides this principle of change every monad possesses also a certain schema of that which is changed, which, so to say, while it expresses the differences and multiplicity of the monad, yet comprises the multiplicity in unity. All natural changes proceed in gradation; consequently, while one part is changing, another remains unchanged, and the monads consequently possess a plurality of affections and relations. This transitory state, which experiences and exhibits the multiplicity of changes in the unity of the monad, is perception, which however is unconscious (sine conscientiâ). The active force, by which the change or passage from perception to perception is accomplished, is an appetite (appetitus). By its action the monads are ever attaining to new perceptions, in which their whole activity consists, and besides which nought else is in them; consequently they may be termed entelechies, as possessing a certain perfection (*τὸ ἐντελες*) and a certain self-sufficiency (*αὐταρκεία*), by which they are the sources of their own activity. In lifeless things perception is uncombined with consciousness; in animated, it is combined with it and becomes *apperception*. The monads endued with apperception may be called souls, and, in combination with the unconscious monads, constitute all animals; the only difference between man and the rest of animals, as between God and man, consisting in a higher degree of perfection. The unconscious perception is also found in the monads endued with apperception, when they are in a state of sleep or are stunned, for in sleep the soul is without apperception, and like the other monads. All perceptions however are closely dependent on each other; and when consequently the soul passes from sleep, the unconscious perceptions which it had during that state form the link which connects its present thoughts with the past. This fact affords an explanation of memory, and that anticipation of like results from like causes which guides the conduct of all animals. Man however is distinguished from the rest by his cognition of eternal and necessary truths; by these he rises to a knowledge both of his own and the Divine nature; and these constitute what is called reason or mind. By these necessary truths man becomes capable of the reflex art of distinguishing the subject (ego) and the object (res), and furnishes him with the fundamental principles of all reasoning, namely, the principle of contradiction and the law of sufficient reason. According to the former, whatever involves a contradiction is false, and its opposite true: the latter teaches that nothing can be true or exist, unless some reason exist why it should be as it is, and not otherwise. This sufficient reason of all necessary truths may be discovered by analysis, which arrives ultimately at the primary notions which assume the form of identical propositions, and are incapable of proof, but legitimate themselves. In the same manner all contingent truths must have an ultimate cause, since otherwise an infinite series of contingencies must be assumed in which reason would be lost. This last cause of all things and of their mutual dependence in the universe is God, who is absolute infinite perfection, from whom all things derive their perfection, while they owe their imperfection to their own nature, which, as finite, is incapable of receiving into itself infinite perfection. The Divine intellect is also the source of all eternal truths and ideas, and without God nothing could possibly be actual, and nothing could exist necessarily. God alone, as possessing infinite perfection, exists of necessity; for as nothing obstructs his potentiality, he is without negation or contradiction, and is unlimited. But although the eternal truths have their reason in the nature of God, they are not therefore arbitrary or determined by the will of God. This is the case only with contingent truths. God, as the prime monad by whom all created monads were produced, is omnipotent; as the source of the ideas after which all things were created and from which they receive their nature, he is intelligent, and he also possesses a will which creates those finite things which his intelligence recognises as the best possible. These same properties of intelligence and will constitute the subject, or ego, in man, by which he is capable of perceiving or desiring. While however these attributes are in the highest degree of perfection in the Deity, in finite things they are variously limited, according to the respective degrees of perfection.

As imperfect, the activity of the created monads tends without themselves; consequently they possess activity so far as they possess clear perceptions (apperception), and are sive so far as they perceive obscurely. Of two composite substances, that is the more perfect which possesses the ground of the contingent changes of the latter: but simple substances cannot exert any influence on each other, unless by the intervention of the Deity, who, at the creation, arranged them in due co-ordination with each other. This adjustment of the monads was in accordance with certain sufficient reasons in each monad, by which the Divine will was moved to place the passivity of one and the activity of one in an harmonial relation; this sufficient reason was their comparative perfection: hence the famous principle of Leibnitz, which has been designated by the term Optimism—that of all possible worlds, God has chosen and produced the best.

As every monad stands in harmonious relation to all others, it expresses the relations of all, and is, as it were, a mirror of the universe which is represented in a peculiar manner by each. Hence the greatest possible variety is combined with the greatest possible harmony. God alone can embrace all these relations, while finite minds have only a very obscure perception of them. All in the world is full, and bound together into one continuous and coherent whole. The motion of each single monad, whether simple or in aggregation, affects all according to distance; and God therefore sees all future things, as well as present and past. But the soul is only cognizant of what is present to it; and although indeed it represents the whole universe, yet the infinity of objects surpasses its capacity, and its clearest representations are of those which immediately affect the body with which it is united. The soul pursues its own laws, and the body likewise its own; both however, by reason of the harmony established at the creation among all monads, as representatives of the universe, act in unison. The soul strives after means and ends, and works by the laws of final causes; the body, by those of efficient causes. Both species of causes are in harmony with each other. Such is the system of pre-established harmony, according to which the body and soul act independently of each other, and each as if the other did not exist, and yet nevertheless both as if they had an influence on each other. This harmonious relation of the body and soul Leibnitz illustrates by the supposition of two clocks, one of which points, while the other strikes the hour; both harmonise in their movements, but nevertheless are independent of each other.

The power and goodness of God are displayed in the whole universe, but it is in the moral world that they are chiefly visible. Between the natural and the moral worlds, or between God as creator of the mundane machine and as ruler of spirits, the strictest harmony subsists. God as architect of the world is consistent with himself as lawgiver; and agreeably to the mechanical regulation of the course of nature, every transgression is followed by punishment, as every good act is by rewards, since all is so disposed as to contribute to the good and happiness of the whole. This is the grand principle of the 'Theodicée.' In this work Leibnitz shows that God, as all-powerful, all-wise, and all-good, has chosen and created the best of all possible worlds, notwithstanding the seeming objections which may be drawn from the existence of evil. If a better constitution of things had been possible, God would have chosen it in preference; and even if another equally good had been possible, there would not have been any sufficient reason for the existence of the present world. The existence of evil is both metaphysical and physical. As to the former the antecedent will of God designed infinite good; but this was not possible, since the multiplicity of things necessarily limit each other, and this limitation is evil. But evil may also be considered as physical and moral. Physical evil is a necessary consequence of the limitation of finite things. Moral evil however was not necessary, but became a consequence of metaphysical and physical. But the less evil must be admitted for the sake of greater good; and evil is inseparable from the best world, as the sum of finite beings to whom defect and imperfection necessarily cling by nature. God therefore permitted its existence: for as the world contains a good incomparably greater than its attendant evil, it would have been inconsistent with the Divine goodness and wisdom not to have realised the best possible world, in consequence of the comparatively little evil which would come into existence with it.

A more immediate source of evil is the freedom of the human will, which however exists for the sake of a greater good, namely, the possible meritoriousness of man and his consequent adaptation to a state of felicity to be attained by his spontaneous acts. This freedom of man is intermediate between a stringent necessity and a lawless caprice. That man is free who, of several courses which in certain circumstances are physically possible, chooses that which appears the most desirable. This choice however cannot be without a motive or sufficient reason, which however is of such a nature as to incline only, and not to compel. Every event in the universe takes place according to necessity; but the necessity of human actions is of a peculiar kind; it is simply moral, and is not destructive of its contrary, and consists merely in the choice of the best. Even the Divine omniscience is not destructive of human liberty. God unquestionably knows all future events, and among these consequently the acts of all individuals in all time who act and sin freely. This prescience however does not make the contingency of human actions a necessity.

Such was the philosophical system by which Leibnitz sought to correct the erroneous opinions of his age, which had been drawn from the theory and established on the authority of Des Cartes. The broad and marked distinction which the latter had drawn between matter and mind had led to an inexplicable difficulty as to the reciprocal action of the body and soul, to get rid of which Spinosa had advanced his theory of substance, and denied or got rid of the difference. Leibnitz attempted to solve this difficulty by resolving all things into spirit, and assuming nothing but mental powers or forces. Nevertheless he has only presented the dualism of the Cartesian theory under another form; and the equal difficulty of explaining the community of action between the conscious and unconscious forces so as to account for the reciprocal influence of body and mind forced him to have recourse to the gratuitous assumption of the pre-established harmony. As to the charge of fatalism, which Dugald Stewart has objected to, his objection seems to have arisen from that antagonism of error which takes refuge from a blind necessity in irrational chance. The theory of optimism has been the subject of the satire of Voltaire; but it is not more misrepresented in 'Candide' than in the 'Essay on Man.' Pope and Leibnitz agree in the position that of all possible systems infinite wisdom must form the best; but by the coherency of all, the former understood the coexistence of all grades of perfection, from nothing up to Deity; the latter, that mutual dependence of all in the world by which each single entity is a reason of all others. By the fullness of creation Leibnitz denied the existence of any gap in the causal order of co-existent things; Pope asserted by it the unbroken series of all degrees of perfection. The Divine permission of evil Pope referred to the indisposition of the Deity to disturb general by occasional laws. There is consequently evil in the world which the Deity might have got rid of, if he were willing in certain cases to interrupt his general providence. Consequently he admits evil in the world which does not contribute to the perfection of the whole. Leibnitz however denies that God could remove the existing evil from the world without prejudice to its goodness. He moreover does not admit of the opposition of general and particular providence, but makes the general law of the universe to be nothing else than the totality of all special laws. (On this subject consult Mendelsohn, 'Kl. ph. Schriften,' p. 538.)

Leibnitz has been more principally spoken of as a metaphysician, but it should be remembered that his mathematical fame is as high among mathematicians as his metaphysical reputation is among metaphysicians, and perhaps higher.

Of the works of Leibnitz several editions and collections have appeared. The two principal are the following: 'G. W. Leibnitii, Opp. omnia nunc primum coll. stud.' Dutens, Genevæ, 6 vols.; and 'Œuvres Phil., Lat., et Franc., de feu M. Leibnitz, pub. par. M. Raspé,' Amstelod., 1765, 4to. The 'Commercium Philosophicum et Mathematicum,' two volumes, quarto, containing the correspondence of Leibnitz with John Bernoulli, was published at Lausanne and Geneva in 1745.

LEICESTER. [LEICESTERSHIRE.]

LEICESTER, ROBERT DUDLEY, EARL OF, one of Queen Elizabeth's principal favourites, was born about the year 1531, of an antient and noble family, an account of which may be seen in the 'Biographia Britannica.' Edmund Dudley, the rapacious minister of Henry VII., was his grandfather. His father was John Dudley, duke of Northumberland, who, after attaining considerable celebrity during the reigns of Henry VIII. and Edward VI., was executed in August, 1553, for his adherence to the claims of Lady Jane Grey, who was his daughter-in-law. Robert Dudley was knighted by Edward VI.; was imprisoned at the same time and for the same offence as his father; was liberated in 1554; and was afterwards appointed master of the ordnance to Queen Mary. He had all those exterior qualities which were likely to ingratiate him with a queen; a youthful and handsome person, a polite address, and a courteous insinuating behaviour: and Elizabeth was no sooner on the throne than she bestowed upon him a profusion of grants and titles. He received from her lordships, manors, and castles: he was made master of the horse, a privy-counsellor, a knight of the garter, high-steward of the University of Cambridge, baron of Denbigh, and earl of Leicester; to which other dignities were subsequently added. Leicester was continually in attendance at court, and the queen delighted in his society. At an early age he had married Amy, the daughter of Sir John Robsart. In 1560 this lady died suddenly at Cumnor under suspicious circumstances, murdered, as many supposed, at the instigation of her husband, who, seeing no bounds to the queen's friendship for him, found his wife an obstacle to his ambition. The queen admired him, trusted him, and allowed him great influence; she also projected a marriage for him, but it was not with herself. She proposed him as a husband for Mary, Queen of Scots. We doubt however whether the offer was sincerely made, and whether, if other parties had been willing, she would have given her consent. It is scarcely necessary to say that the union did not take place; and that Leicester, continuing to reside at court, played his part with the queen with consummate dexterity and cunning. During this residence he engaged in an intrigue, or, as some writers say, a marriage with the widow of Lord Sheffield, who bore him a son, to whom he bequeathed the bulk of his property in a will which designated him his *base* son. Lady Sheffield afterwards narrowly escaped death from some poison that was administered to her, and being menaced by the earl of Leicester, consented to marry Sir Edward Stafford. Whether Leicester caused the poison to be given cannot be ascertained, but it is certain that his anxiety to destroy all connexion with himself was the cause of his promoting her marriage. It would have been most dangerous to his ambition that the queen should hear of his intrigue, and he was successful in concealing it. His favour continued, and the queen was prevailed upon to visit his castle at Kenilworth, in Warwickshire, where he entertained her for many days with pageants and feasting, prepared in a style of magnificence unequalled even in those days. (Strype's *Annals*.)

It is not surprising that Leicester, on account of the undue eminence to which he had risen, should have been odious to Cecil, Essex, and many of the principal English nobility; neither can it be wondered at that the foreign ambassadors who came to treat for the hand of the queen should have felt hostility towards a courtier who, aspiring to be her suitor himself, was known to be adverse to her making a foreign alliance. To undermine his power was the interest of many persons; and it was with this view that Simier, the ambassador of the duke of Anjou, acquainted Elizabeth with a fact which had been hitherto concealed from her, namely Leicester's marriage with Lady Essex. The queen was violently angry when first the disclosure was made, and threatened to commit him to the Tower; she relented however, and again received him at court with undiminished esteem. There were other persons to whom, for other reasons, Leicester's marriage was likewise a source of anger. There were suspicions that foul means had been resorted to for its accomplishment. These suspicions, as in the previous cases, could not be proved; for such inquiries as were not suppressed through fear were foiled by artifice; but considering Leicester's character, they were warranted by the facts. He had become enamoured of Lady Essex during her husband's life-time. Lord Essex died suddenly of a peculiar sickness which could not be accounted for, and two days after his death Leicester was married to his widow. Accusations for this and other offences were not only made in private, but attacks against him were published in a book entitled 'Leicester's Commonwealth,' which the queen caused her council to contradict upon her own personal knowledge and authority.

In 1585 Leicester took charge of some forces sent to the Low Countries, and was invested with great powers for the settlement of some differences that had arisen there: he sailed in December, and was received at Flushing with great pomp. He was unfit however for a military commander, and so fully manifested his incapacity while opposing the troops of his experienced adversary the Prince of Parma, that on his return to the Hague the States expressed their dissatisfaction at his tactics, and suspicions of his fidelity. He returned to England in November, 1586. [BARNEVELDT.]

It was at the time of his arrival that Elizabeth was anxious to determine what course to pursue with her prisoner Mary, Queen of Scots. When Leicester was consulted, it was his advice that she should be privately put to death, a recommendation which somewhat strengthens the suspicions of him which had been previously entertained. In 1587 he returned to the Low Countries with a considerable force, both horse and foot, and was received with honours; but before long fresh quarrels arose between him and the States; he was again accused of mismanagement, and the queen recalled him after an absence of five months.

In 1588 he was appointed lieutenant-general of the infantry mustered at Tilbury Fort for defence against the Spaniards. This was the last trust conferred upon him. He was seized with illness at his house at Cornbury, in Oxfordshire, which he had visited on his road to Kenilworth, and died on the 4th of September, 1588. His body was removed to Warwick for interment.

'Leicester,' says Mr. Hume, 'was proud, insolent, interested, ambitious; without honour, without generosity, without humanity. Neither his abilities nor his courage were worthy of the trust that was reposed in them. His dexterity as a courtier was remarkable; and he is a rare instance of a favourite maintaining a long and uninterrupted ascendency until the end of his life.'

After the fashion of the age, he gave lands for charitable endowments, and the hospital of Robert, earl of Leicester, at Warwick, still remains as a monument of his liberality, or perhaps only of his vanity and conformity to the practice of his times. (*Biog. Brit.*; Aikin's *Elizabeth*; Hume's *Hist.*, &c.)

LEICESTERSHIRE, an English county, bounded on the north by Nottinghamshire, on the north-east by Lincolnshire, on the east by Rutlandshire, on the south-east by Northamptonshire, on the south-west by Warwickshire, and on the north-west by Derbyshire. It is included between 52° 24′ and 52° 59′ N. lat., and between 0° 39′ and 1° 37′ W. long. The greatest length is, from north by east to south by west, from the junction of the three counties of Nottingham, Leicester, and Lincoln, to the neighbourhood of Lutterworth, 44 miles; its greatest breadth, at right angles to the length, is, from the neighbourhood of Ashby-de-la-Zouch to that of Rockingham, 40 miles. The area is estimated at 806 square miles. The population, by the census of 1821, was 174,571; in 1831 it was 197,003; showing an increase in ten years of 22,432, or about 12·5 per cent., and giving 244 inhabitants to a square mile. In size it is the twenty-eighth of the English counties, ranking between Nottinghamshire and Westmoreland; in population the twenty-sixth, ranking between Worcestershire and Northamptonshire; in density of population it is the twelfth, ranking between Somersetshire and Yorkshire. Leicester, the county-town, is on the river Soar, about 90 miles in a direct line north-north-west of London, or 98 miles by the road through St. Alban's, Dunstable, Stony Stratford, Northampton, and Market Harborough. A detached portion of Derbyshire near Ashby-de-la-Zouch is surrounded on three sides by Leicestershire, and on the fourth side by Warwickshire and Staffordshire.

Surface and Geological Character.—The surface of Leicestershire consists almost entirely of gently rising hills. The north-eastern part is occupied by the southern extremity of the Kesteven Cliffe Row, which extends through a considerable part of Lincolnshire, and skirts the basin of the Trent and of the Upper Witham. These hills overlook the vale of Belvoir, which is partly in Leicestershire and partly in Nottinghamshire. The south-eastern portion of the county, from Owston, not far from Melton Mowbray, to Lutterworth, is occupied by the hills which separate the basin of the Soar from that of the Welland. The north-western portion, between Mount Sorrel, Loughborough, Ashby-de-la-Zouch, Market Bosworth, and Leicester, constitutes the district which, though now bare of wood, retains its antient designation of Charnwood Forest. This district is occupied by a group of hills of inconsiderable elevation, but of a rugged character, with distinct, sharp prominences. Bardon Hill, between Leicester and Ashby, is the most elevated point of the group, and commands probably a greater extent of landscape than any other point in the island. In one direction Lincoln Cathedral, distant sixty miles, forms a prominent object in the horizon; in another direction, with a good glass, the Dunstable Hills, distant nearly eighty miles, may be seen. The Malvern Hills in Worcestershire, the Wrekin in Shropshire, and even some eminences in North and South Wales, are distinguishable. The Derbyshire Hills, to the highest point of the Peak, are also visible. Right lines described from the extremities of the view would include nearly one-fourth part of England and Wales. The height of Bardon Hill is 853 feet above the level of the sea.

Some portions of the east side of Leicestershire are occupied by the formations which constitute the third or lowest system of oolites. The great oolite extends over the summit of the sandy hills which overhang the vale of Belvoir. From beneath the great oolite the beds which intervene between it and the lias crop out: they skirt the vale of Belvoir, and occupy the border of the county toward Rutlandshire. The lias occupies the rest of the eastern side of the county, skirting the valley of the Soar at the distance of two to three miles eastward from that river. The rest of the county, with the exception of Charnwood Forest, the coal-fields near Ashby-de-la-Zouch, and some isolated hills of mountain limestone to the north-west of Charnwood Forest, is occupied by the newer red or saliferous sandstone. The Ashby coal-fields lie one to the north-east, the other to the south-west of the town, and extend into Derbyshire. The south-western field is of an oblong figure, extending north-west and south-east about eleven miles. The strata dip in different directions. More than twenty coal-works have been opened in this field, the deepest of which is sunk 738 feet. One of the coal-beds has a thickness of 17 to 21 feet. The other coal-field is also oblong, and extends in the same direction as that just mentioned: its length is about six or seven miles. The isolated beds of mountain limestone are quarried at the village of Osgathorpe near Ashby, at a spot near the road from Ashby to Loughborough, and in other places. Charnwood Forest district is occupied by rocks of the transition series, sienite, greenstone, and slate. Some of these rocks are quarried under the name of granite. This district yields coarse slate for roofing and other common purposes. Gypsum is quarried near Leicester; and limestone, which makes excellent cement for works under water, at Barrow-upon-Soar. Freestone for building and clay for bricks are procured in several parts of the county.

Hydrography and Communications.—The county is chiefly included in the basin of the Trent, which just touches the county, and for a few miles divides it from Derbyshire. The principal tributary of the Trent belonging to this county is the Soar, which is formed by the junction of several small streams that rise near the south-western border of the county between Hinckley and Lutterworth. It forms a crescent, the line joining the extremities of which runs north and south, from the heads of the river to its junction with the Trent below Kegworth. In the lower part of its course the Soar forms the boundary between Nottinghamshire and Leicestershire: the upper part belongs wholly to Leicestershire. It was antiently called Leire, from which the town and county of Leicester derive their name. This river has a gentle current: it is navigable for about seven miles from its junction with the Trent to the neighbourhood of Loughborough; a canal continues the navigation up to that town. The length of the Soar is nearly forty miles.

The Wreak is a tributary of the Soar. It is reputed to rise at Ab Kettleby, near Melton Mowbray; but the true head is near Oakham in Rutlandshire, from whence it flows in a winding channel to Melton, below which it receives the short stream from Ab Kettleby: before this junction it is called Eye, or Eie. It then flows into the Soar near Mount Sorrel, after a course of about twenty-five miles. Its channel, so far as it is navigable, forms part of the Leicester and Melton Mowbray Navigation.

The Anker skirts the border of the county for two or three miles near Atherstone in Warwickshire: it joins the Tame, a feeder of the Trent, at Tamworth.

The Sence rises in Charnwood Forest, and flows south-west fourteen miles into the Anker near Atherstone.

The Mease, a feeder of the Trent, which rises just within the border of Derbyshire, has a small part of its course in this county; it flows by Ashby, and in two places separates Leicestershire from the detached part of Derbyshire.

The Deven, which joins the Trent at Newark, has its source in Croxton Park in this county: the Smyte, or Smite, which waters the vale of Belvoir, rises just within the county, near Nether Broughton. These are all the streams belonging to the system of the Trent which claim notice.

The Avon, a tributary of the Severn, forms the boundary of the county for seven or eight miles on the southern side, separating it from Northamptonshire. The Swift, a small stream which flows by Lutterworth, falls into it.

The Welland, which rises just within Northamptonshire, forms, for sixteen or eighteen miles, the boundary between that county and Leicestershire. A small feeder of the Welland divides, for about seven miles, the counties of Leicester and Rutland.

Leicestershire has several canals. The Leicester Navigation consists partly of a canal, and partly of the river Soar made navigable. It extends from Loughborough (where it is connected with the canal already mentioned from the navigable part of the Soar to that town) to the town of Leicester. Its length is about eleven miles: the rise in that distance is forty-five feet. It affords a conveyance for the limestone and granite (so called) of the neighbourhood.

The Leicester and Melton Mowbray Navigation commences at the junction of the river Wreak with the Leicester Navigation, and is carried along the channel of the Wreak and Eye, which are thus made navigable, to Melton. The length of this navigation is about eleven miles.

The Leicestershire and Northamptonshire Union Canal extends from the Leicester Navigation at Leicester, to Foxton near Market Harborough, with a cut from Foxton to Harborough. It is carried for the first two or three miles along the bed of the Soar. Its whole length is about seventeen miles: or, including the branch to Harborough, twenty-one miles. At Saddington there is a tunnel half a mile long, through which the canal passes. The rise in the canal is about one hundred and twenty feet from Leicester to the tunnel at Saddington.

The Grand Union Canal forms a communication between the Grand Junction Canal, at Long Buckby in Northamptonshire, and the Leicestershire and Northamptonshire Union Canal at Foxton. Its whole length is nearly forty-five miles, of which about eight are in Leicestershire. In the Leicestershire part there are a tunnel and a short branch canal to Welford in Northamptonshire.

The Oakham Canal runs from Oakham in Rutlandshire to Melton Mowbray, where it unites with the Leicester and Melton Mowbray Navigation. Its whole length is about fifteen miles, of which more than half is in Leicestershire.

The Ashby-de-la-Zouch Canal commences in the Coventry Canal, about three miles from Nuneaton in Warwickshire, and runs to the coal-field south-west of Ashby. Its whole length is above twenty-six miles, of which twenty-one are in Leicestershire or in the detached portion of Derbyshire. It is on one level throughout. It is principally used for the conveyance of the coal and lime procured in the neighbourhood of Ashby. There are three railways connected with this canal at the Ashby end; one from the Ticknall lime-works, eight miles and a half long, carried in one place through a tunnel; a second branching off from this to the Cloudhill lime-works, four miles and a quarter long, with two short branches; and a third from a colliery near Moira, to the canal, half a mile long.

There is a railway fifteen miles and three-quarters long from Leicester to Swannington near Ashby, formed for the purpose of conveying coal and lime from the works in that neighbourhood for the supply of Leicester. The quantity of coal conveyed on it in 1835 was 135,000 tons. A railroad called 'the Midland Counties Railway,' for which an act was obtained in 1836, is now in progress. It branches off from the London and Birmingham railroad at Rugby in Warwickshire, about eighty miles from London, and proceeds nearly due north to Leicester, a distance of twenty miles, leaving Lutterworth to the right or eastward of the line; from Leicester it continues along the valley of the Soar by Loughborough into Nottinghamshire, in which county it crosses the Trent near its confluence with the Soar, and then by two arms runs to Nottingham and Derby. The length from Rugby to Nottingham is forty-seven miles and a quarter; from Rugby to Derby above forty-nine miles; from Nottingham to Derby the distance is fifteen miles and a quarter.

The principal coach roads through the county are as follows:—The Chester and Liverpool mail-road enters the county from Northamptonshire, near the village of north Kilworth, and runs through Lutterworth and Hinckley to the neighbourhood of Atherstone, where it enters Warwickshire. The Leeds mail-road enters the county from Rutlandshire, and runs through Melton Mowbray into Nottinghamshire. The Halifax mail-road enters the county from Northamptonshire, and passes by Market Harborough, Leicester, and Loughborough, into Nottinghamshire. The Portpatrick, Carlisle, and Manchester mail-road coincides with the Halifax road as far as Loughborough, from which town it runs by Kegworth to Derby. Roads lead from Leicester by Melton Mowbray to Grantham; by Bingham in Nottinghamshire to Newark; by Ashby-de-la-Zouch to Burton-on-Trent; to Hinckley; to Lutterworth; and to Uppingham in the adjoining county of Rutland.

Agriculture.—The climate of Leicestershire is mild and genial, without being so moist as in those counties which lie nearer the Atlantic. There are few high hills to intercept the clouds. The soil is loamy, without the extremes of stiff clay, loose sand, or chalk. It varies in fertility according to its texture, depth, and freedom from superfluous moisture. The most fertile soils are almost invariably kept in pasture, for which this county is pre-eminent; the poorer and thinner soils only, which are not so well adapted for grass land, being kept in arable cultivation. Out of above 500,000 acres of surface, fully one half is in permanent grass. The quantity of woods or wastes is very small.

There are many large landed proprietors who have family seats in this county, and they have in general some portion of their domains in hand. By employing intelligent bailiffs they greatly contribute to the improvement of husbandry. Grazing and breeding cattle and sheep is the chief object of the Leicestershire farmers, and they have succeeded admirably both with oxen and sheep. The success of Mr. Bakewell, of Dishley farm, and some others, has contributed greatly to excite a spirit of emulation in the breeders, and to make them attentive to keep up the good qualities of the breeds, and to prevent their degenerating by injudicious crosses. The arable land has however not been neglected; and the quantity of stock kept, for which artificial food must be provided in winter, has not only supplied abundant manure to recruit the land, but also made the cultivation of turnips, potatoes, cabbages, and green crops more general and extensive than in many other counties, which cannot fail to improve the crops of corn sown after these, and to keep the land in a productive state.

The plough in common use has two wheels fixed to the end of the beam, which is like that of a common swing plough, the horses drawing the plough by the beam. This is better than the arrangement of carriage of a common wheel plough, where the beam only rests upon it without being fixed. This plough, which is generally used in the midland counties, and is known by the name of the Rutland plough, when properly set requires no one to hold the stilts after it is once entered into the furrow, but will keep its depth and direction, provided the horses keep their proper course. Most of the improved modern instruments, such as scarifiers, spiked rollers, and drills, have been introduced, and are used in the larger farms, which are chiefly in the hands of the proprietors. In many parts of the county the occupations are small, not exceeding 100 acres, where the farmer holds the plough himself, and his family do most of the work of the farm. The course of crops of the grazier, breeder, or principal farmer is very commonly as follows:—On good friable loams, 1, a green crop to clean the land, turnips, rape, or cabbages; 2, barley, with clover and grass seeds; 3 and 4, clover mown and pastured; 5, oats or wheat. This is a very good rotation, if the clover be only sown every second course, or be mixed with a considerable proportion of rye grass, trefoil, and other grasses; for the clover will fail if it recur too often. On a good heavy loam the following has been observed: 1, beans drilled; 2, wheat; 3, green crops; 4, barley and seeds; 5 and 6, grass. This is an excellent rotation, the manure being put on for the beans and green crops.

The natural meadows along the banks of the rivers are considerable, and most of them of excellent quality. On the banks of the Soar, near Leicester, is a considerable tract of excellent meadow land, apparently formed by the deposition of the sediment of that river, which still inundates it occasionally, and keeps up the fertility. The upland meadows are very good also, but require to be manured occasionally. The produce in hay is from one and a half to two tons per acre.

There are considerable dairies in Leicestershire, especially on the borders of Derbyshire; and very good cheese is made there. The cheese known by the name of Stilton is chiefly made in Leicestershire, and has obtained its name from having been first noticed at an inn in Stilton. It is a very rich cheese, in which a great portion of cream is added to the milk in the making. It requires great nicety in the management, to bring it to a proper state of maturity, and keep a rich mild flavour in it. Every dairy-woman has her own secrets, which she does not readily communicate; and hence attempts to imitate Stilton cheese are seldom successful. That it can be made elsewhere is proved by that which goes by the name of Windsor Forest cheese, which is superior to most of the cheese which is sold as Stilton, and is eagerly purchased at two shillings the pound. [CHEESE.] In a good dairy, a cow is reckoned to make, on an average, 4 cwt. of cheese in the year, and to require for her keep summer and winter 3 acres of land. Four cows will fatten a pig of 40 lbs. to 12 score, which is an increase of 50 lbs. for each cow, besides the cheese and the calf. This will altogether afford a rent of 30*s.* to 40*s.* per acre. An acre of good sheep pasture will keep, during the summer, two ewes and their lambs and two wethers, and, with a quarter of an acre of green crops, during the winter also. Thus 80 sheep may be bred and fatted upon 50 acres of land. This will likewise afford a rent of about 30*s.* per acre.

A great portion of the low pastures has been much improved by draining; some were drained by Elkington himself, and at considerable expense; but the increased value of the land amply repaid the outlay. In consequence of the demand for streams to turn mills, wherever there is any fall, the irrigation of meadows is not carried on to the extent it might be. Mr. Bakewell and several other enterprising farmers have however irrigated extensively, and with great advantage.

The principal breed of cattle in Leicestershire is the improved long-horn, which owes its high character to the intelligence, activity, and perseverance of Mr. Bakewell of Dishley farm near Loughborough. [CATTLE.]

The sheep, for which this county is also renowned, equally owe their superiority to the same individual. They are large, with very long wool, and fatten very readily at an early age. All these qualities render them valuable in good pastures, which they require. [SHEEP.]

In a county where the amusement of fox-hunting is followed with great eagerness, it may be expected that many good horses are bred, and the rich pasture favours the rearing of this useful and noble animal. Many well-bred horses are annually sold by the breeders, and realise great prices; but the risk in breeding high-bred horses is very great, and unless carried on extensively, is seldom very profitable. Good useful cart-horses are a safer speculation; they are easily reared, come soon to market, and are less liable to accidents and diseases.

Hogs have been improved in Leicestershire, as well as other animals. This has been done chiefly by crossing with foreign breeds, such as the black Neapolitan and the Chinese. The Dishley swine are small boned, compact, and get extremely fat. There are larger breeds, but the middle-sized are, on the whole, the most profitable.

The following are the principal fairs in Leicestershire:—Ashby-de-la-Zouch, Easter Monday, (a show for stallions); Tuesday for horses; Whitsun-Tuesday, horses, cows, and sheep; Belton, Monday after Trinity week; Castle Donnington, March 18, Whit-Thursday, September 29; Hallaton, Holy Thursday; Hinckley, third Monday after January 6, Easter Monday, Monday before Whit-Monday, Monday after August 26, October 28; Husband-Bosworth, October 15; Leicester Old Fairs, March 2, May 12, July 5, October 10, December 8; New Fairs, January 4, June 1, August 1, September 13, November 2; Loughborough, February 14, March 24, 28, April 25, Holy Thursday, August 12, September 30, November 13; Lutterworth, February 16, Holy Thursday, April 2, September 16; Market Bosworth, May 8, July 10; Market Harborough, January 6, February 16, April 29, July 31, October 19; Melton Mowbray, Monday and Tuesday after January 17, March 13, May 3, Whit-Tuesday, August 21, September 12; Waltham-on-the-Would, September 19.

Divisions, Towns, &c.—Leicestershire is divided into six hundreds, as follows:—

Name.	Situation.	Area. Acres.	Pop. in 1831.
West Goscote	N.W. and Central	90,520	86,216
East Goscote	Central	79,830	18,770
Framland	N.E.	87,540	17,197
Gartree	S.E.	80,740	17,059
Guthlaxton	S.	63,980	22,591
Sparkenhoe	W.	108,730	35,170
		511,340	197,003

It contains the borough, market, and county town of Leicester; and the market-towns of Ashby-de-la-Zouch, Market Bosworth, Market Harborough, Hinckley, Loughborough, Lutterworth, Melton Mowbray, and Mount Sorrel. Of Ashby and Bosworth an account is given elsewhere; of the others an account is subjoined. [ASHBY-DE-LA-ZOUCH; BOSWORTH, MARKET.]

Leicester is on the right bank of the Soar. It was known to the Romans by the name Ratæ, and was then a place of importance. Its name Leicester (supposed to have been Caer Leirion in the time of the Britons, and altered by the Saxons to Lege-Cestria and Legeocester) is derived from the river Leire, now Soar. Geoffrey of Monmouth ascribes its name and foundation to the fabulous Leir, the son of Bladud, the Lear of Shakspeare. It was a place of importance under the Saxons, but its history is uncertain. It appears to have been the seat of a bishop's see transferred hither from Sidnaceaster. It was taken and many of the inhabitants massacred by Ethelfrith, king of Northumberland. It was also taken by the Danes, and was one of the five Danish burghs, or commonwealths, which filled up with their dependent territories that part of the Danelagh, or Danish portion of the island, which intervened between Northumbria and East Anglia. Being recovered, it was repaired and fortified anew and enlarged by Ethelfleda, daughter of Alfred the Great in the time of Edward I. (the elder). After the Conquest, it was added to the royal demesne, and a castle was erected, or rather an older fortress was enlarged and strengthened, to keep the townsmen in check. On the Conqueror's death this castle was seized by the Grentemaisnells, and held by them for Duke Robert of Normandie; it was therefore attacked and reduced to a heap of ruins by William Rufus. In the following reign the castle was repaired; and in the civil wars of Henry II. was, as well as the town, taken by the king's forces from the adherents of his rebellious sons. Both town and castle were nearly destroyed. The castle, having been granted to the earls of Lancaster, rose from its ruins; and during the reigns of the Lancastrian princes was frequently a royal residence, and parliaments were held in it. On the overthrow of that dynasty it went to decay. In Charles I.'s time the materials were sold, and there are now few remains of it, except the mound or earthwork of the keep, in the neighbourhood of which are some old buildings called 'the Newark,' or new works, probably to distinguish them from the castle or old works.

Leicester had a mint, in which were produced a succession of coins from the time of the Saxon Athelstan to Henry II. There were several religious houses or hospitals, among which the most important was the abbey of St. Mary Pré or De Pratis, founded for Black or Augustinian canons, by Robert Bossu, earl of Leicester, A.D. 1143. Its revenue at the dissolution was 1062*l.* 0*s.* 4*d.* gross, or 951*l.* 14*s.* 5*d.* clear. Of this great and wealthy establishment, to which, from its being the scene of Cardinal Wolsey's death, considerable interest attaches, little more than a mass of shapeless ruins remains. During the civil wars of Charles I., Leicester, which was occupied by the Parliamentarians, was taken by storm by the king, May 31, 1645, but was recovered on the 18th June, in the same year, by the Parliamentarians under Fairfax.

The borough of Leicester and its liberties comprehend an area of 3960 acres, with a population, in 1831, of 38,904. The liberties, in which the borough and county magistrates previously exercised conjoint jurisdiction, have been by the Boundary and Municipal Reform Acts incorporated with the borough both for parliamentary and municipal purposes. The borough, thus enlarged, has been divided into seven wards, and has a corporation of fourteen aldermen and forty-two councillors.

The town is irregularly laid out; the principal line of street extends from north to south nearly a mile in length. The houses are for the most part of red brick. There are several churches, of which the most antient is St. Nicholas, which is partly built of the bricks from an adjacent Roman wall, of which a fragment, called the Jewry wall, remains; and from the resemblance of some arches of the church to those of the wall, it has been supposed that some portions of the same edifice to which the Jewry wall belonged, or of an edifice of about the same date, have been built into the church. The church, which consists of a nave, chancel, and south aisle, has a square western tower between the nave and chancel, and is chiefly of Norman architecture. St. Mary's church is a large building, partly of Norman, partly of Early English architecture, with some inserted portions of later date: it has a western tower surmounted with a lofty and elegant spire rebuilt in the last century. The various styles in which this church is built are admirably executed; some of the arrangements are very singular. There are, close to the church, a gateway in the Perpendicular style, leading into an area called the castle yard; and a large room, formerly serving as a court-hall and banqueting-room to the earls of Leicester and the dukes of Lancaster, and now used for the assizes and county business. The church of St. Martin is an antient cross church, partly of Early English and partly of Perpendicular architecture: a tower, the lower part of which is Norman, rises from the centre, surmounted by a crocketted spire, which, as well as the upper part of the tower, is of later date. This church is the largest in Leicester; it was converted into a barrack by the Parliamentarian soldiers during the civil war, and has since been frequently occupied by public meetings. All Saints is a small church; the chancel is of modern erection, but the rest is antient, and chiefly in the Early English style, with some later insertions. St. Margaret's is a handsome church, partly Early English, with a chancel and a lofty tower of Perpendicular character. There are some portions of good work in the Decorated style. There is a district church in St. Margaret's parish, dedicated to St. George, lately erected in the Perpendicular style.

There are four bridges over the Soar.

The guildhall is a commodious building; the borough gaol and house of correction are new buildings, erected on or near the site of the former county gaol, but are insufficient for the proper classification of the prisoners. A new county gaol and house of correction have been built on the south side of the town. Wigston's hospital or almshouse is an antient building, with some good Perpendicular work both in stone and wood. There are a theatre, and a range of assembly rooms, which were originally built for an hotel, and have their ceiling and walls richly painted. The New Walk is a promenade on the south-east side of the town, planted with trees and commanding some pleasant prospects.

The staple manufacture of the town is stockings, which probably employs 3000 persons. Lace-making is carried on to some extent, and probably employs 500 persons. Wool-combing employs nearly 150; dyeing above 200; and several hands are employed in the manufacture of the frames or other machinery required by the stocking-weavers. The market is on Saturday, and is well supplied. In the market-place, which is too small for the business done, is a building called the Exchange, where the town magistrates hold a weekly meeting and transact business.

There are races held yearly; and of late years a triennial musical festival has been established.

There are in Leicester six parishes, besides some extra-parochial districts; but the parish of St. Leonard's is united for ecclesiastical purposes with St. Margaret's. The vicarage is held by 'a sequestrator,' and is of the clear yearly value of 40*l.* The other parishes are vicarages, the clear yearly values of which are as follows:—All Saints, 148*l.*; St. Margaret, 440*l.*; St. Martin, 140*l.*; St. Mary, 221*l.*; and St. Nicholas, 85*l.* The perpetual curacy of the district church of St. George is of the clear yearly value of 100*l.* Only All Saints and St. Margaret have glebe-houses. The churches have been noticed already. There are several dissenting meeting-houses, and one chapel for Catholics.

There were in the borough and liberties, in 1833, three infant schools with 477 children, six dame schools with 156 children, two Lancasterian schools with 570 children, a national school with 245 children, two parochial or other free schools with 220 children, an endowed grammar-school with 18 or 20 children, two day and Sunday schools with 382 children, nine day-schools with 318 children, a boarding and day school with 30 to 40 children, and twenty-four Sunday-schools with 3577 children. Besides these institutions there was 'the Female Asylum,' in Newark liberty, where from 10 to 16 girls between the ages of thirteen and sixteen were received for three years, clothed, maintained, and instructed. Two proprietary grammar-schools, or 'colleges,' have been since established. There are several hospitals or almshouses, especially Trinity hospital containing ninety inmates, and Wigston's hospital for twenty-six. There are also an infirmary or county hospital, and a lunatic asylum.

The assizes and quarter-sessions for the county are held here; it is also the place of election and one of the polling-stations for the southern division of the county. Leicester has returned two members to parliament since the time of Edward I. The magistrates of the borough hold quarter-sessions, and have a court of record for the recovery of debts.

Market Harborough appears by the remains of an encampment and by various antiquities that have been dug up to have been occupied by the Romans. It is in Gartree hundred, on the Carlisle mail-road, 83½ miles from London, and 14½ from Leicester. The town is in the parish of Bowden Magna, which has an area of 3120 acres, with a population in 1831 of 3346, of which the chapelry of Market Harborough contained 2272. The town however extends beyond the chapelry into the parishes of Bowden Magna and Bowden Parva (the latter in Northamptonshire). It stands on the north bank of the Welland, and consists of one principal street and several smaller ones. In the principal street is a town-hall, built by a former earl of Harborough; the under part is occupied as shops, the upper is used by the county magistrates for their official business. The chapel is large and one of the finest ecclesiastical buildings in the county. It consists of a nave, two aisles, and chancel, with a fine tower and a lofty octangular spire, crocketted. There are two or three dissenting meeting-houses. The only manufacture carried on is that of carpets. There is a weekly market on Tuesday. The chapelry is of the clear yearly value of 144*l.*, with a glebe-house. There were in the chapelry in 1833 eleven dame-schools with 201 children; a day-school, partly supported by endowment, with 50 children; six other day-schools with 148 children, and four Sunday-schools with 388 children. There is a branch from the Leicestershire and Northamptonshire Union Canal from Foxton to Harborough. Harborough is one of the polling-places for the southern division of the county.

Hinckley is in the hundred of Sparkenhoe, on the Chester and Liverpool mail-road, 99½ miles from London and 12½ from Leicester. The town was antiently incorporated. The parish extends into Knightlow hundred, Warwickshire, and comprehends 6200 acres, with a population in 1831 of 7180. The township of Hinckley Bond, in which the town stands, contains 3190 acres, and had, in 1831, 6491 inhabitants, including the hamlet of Wykin. The church is large and antient; the roof is of beautiful old oak. There are several dissenting meeting-houses. The staple manufacture of the town is that of stockings, chiefly of coarser quality. The quantity of stockings manufactured is probably greater than in any town of the same size in the kingdom. This branch of industry employs 700 hands in the town, and many more in the adjacent villages. The market is on Monday. The living is a vicarage of the clear yearly value of 338*l.* with a glebe-house. The chapelries of Stoke Golding and Dadlington in the parish are annexed to the vicarage. There is a chapel only at Dadlington. There were in 1833, in the whole parish, one infant school with 173 children; one day-school, partly supported by subscription, with 25 children; one endowed grammar-school in Stoke Golding chapelry with 13 children, and twelve other day-schools with 385 children; two boarding and day schools with 35 children; one national school, supported by an endowment, with 130 children, and ten Sunday-schools with 1131 children. There was also a Catholic college with several students. Hinckley is one of the polling-places for the southern division of the county.

Loughborough, the second town in the county in population and importance, is 11 miles from Leicester and 109 from London on the Carlisle and Halifax mail-road. It is in West Goscote hundred. The parish comprehends an area of 5460 acres, and had in 1831 a population of 10,969: of these 4370 acres and a population of 10,800 were in the township of Loughborough. This town was of importance in the time of Leland, who says, 'The town of Lughborow is yn largeness and good building next to Leyrcester, of all the markette tounes yn the shire, and hath in it a 4 faire strates, or mo, well paved.' The prosperity of the town has much increased of late years: in 1801 the population of the parish was 4603; in 1811, 5556; and in 1821, 7494. The houses are generally built of brick. The market-place is now open, the old market-house having been lately removed. The church is a handsome building in the Perpendicular style; it has a fine tower which was built about the end of the sixteenth century. There are several dissenting meeting-houses. The chief manufactures of the town are hosiery (especially what is termed fleecy-hosiery), which employs about 900 to 1000 persons in the town and neighbourhood; bobbin-net lace, cotton goods, and shoes. The Leicester Navigation and the Loughborough Canal, communicating with the Soar, tend much to the prosperity of the town. The market is on Thursday. The living is a rectory of the clear yearly value of 1848*l.* with a glebe-house. There were in 1833 in the township of Loughborough one dame-school with 25 children; four endowed day-schools, viz. three for boys, containing respectively 250, 80, and 8 scholars, and one for girls with 108 scholars; six other day-schools with 163 children; and seven Sunday-schools with 2096 children. The endowed schools have ample funds and the course of education might be much extended. Loughborough is the principal place of election for the northern division of the county, and a polling-station.

Lutterworth is in the hundred of Guthlaxton, 13 miles from Leicester, and 89½ from London on the Chester and Liverpool mail-road. The parish comprehends an area of 1890 acres, with a population, in 1831, of 2262. The town consists of one main street and several smaller ones. The church is a large handsome building: the chancel is separated from the nave by a beautiful screen. From the pulpit, which is of fine carved oak, Wickliffe, who held the living of Lutterworth, is said to have addressed his flock. The chief manufacture of Lutterworth is of coarse hosiery, but it is not extensive. The market is on Thursday. The living is a rectory, of the clear yearly value of 585*l.*, with a glebe-house. There were in the parish, in 1833, one endowed school, with 100 boys; two other schools, partly supported by endowments and by subscription, with 10 boys and 32 girls respectively; another school, partly supported by subscription, with 26 boys; eleven other day-schools, with 171 children; and four Sunday-schools, with 486 children.

Melton Mowbray is in the hundred of Framland, 15 miles from Leicester, and 105 from London on the Leeds mail-road. The parish contains an area of 3570 acres, with a population, in 1831, of 3356, beside the chapelry of Freeby and the township of Welby, which are in the parish, and contain 2040 acres, with a population of 164. Melton owes its prosperity to its being the seat of the well-known Melton Hunt, which causes a large influx of sportsmen during the season. The town is in a valley, on the river Eye, or Wreak, and is well built. It is watched, lighted, and paved; and the three bridges in or about the town (over the Eye, or, its feeder, the Scalford) are kept in repair from property left in trust, and called 'the Town Estate.' The church is large, and has a fine tower, partly in the Early English style. There are one or two dissenting meeting-houses. The chief manufacture is that of bobbin-net lace. The market is on Tuesday; and at every alternate market there is usually a great show of cattle. The living is a vicarage, united with the chapelries of Freeby and Welby (both in the parish), also with the chapelries of Burton Lazars and Sysonby: its clear yearly value is 580*l.*, with a glebe-house. There were, in 1833, in the parish, exclusive of Freeby and Welby, fifteen dame-schools, with 250 children; two free day-schools, supported from 'the Town Estate;' the upper school having 45 boys, and the lower school 330 children of both sexes; eight other day-schools, with 145 children; and three Sunday-schools, with 537 children.

Mount Sorrel is in the hundred of West Goscote, 7½ miles from Leicester on the road to Loughborough. The chapelry of Mount Sorrel, which is chiefly in the parish of Barrow-upon-Soar, comprehends an area of 680 acres, with a population, in 1831, of 1602. The town is in a very romantic situation, on the left bank of the Soar, as its name (Mount-Soar-Hill) imports. The extremity of a range of hills extending from Charnwood Forest overhangs the town, presenting a steep slope: it is called Castle Hill, from a fortress which antiently crowned it. This castle was occupied by the insurgent barons in the close of John's reign, and the garrison committed great depredations in the neighbourhood, until repressed by a Royalist detachment from Nottingham: the castle however was not subdued until the next reign, when it came into the hands of the king, and was razed to the ground. The town consists chiefly of one street: it is paved with 'red granite,' as it is termed, from the adjacent rocks of the Charnwood Forest group. Many houses are built of the same stone. There are a chapel and several dissenting places of worship. There is a small market-house, on the site of which formerly stood an antient cross, removed, on the erection of the market-house, to the park of Sir John Danvers. The principal manufacture is of stockings: some bobbin-net lace is also made. The market is on Monday, but is very small. The living is a perpetual curacy, of the clear yearly value of 157*l.*, in the gift of the vicar of Barrow. There were, in 1833, two day-schools with 37 children, and two Sunday-schools with 248 children.

Beside these towns there are one or two other places entitled to a brief notice. Billesdon, the market of which, held on Friday, has been discontinued within the present century, is in the hundred of Gartree, about 9 miles from Leicester, on the road to Uppingham. The parish comprehends an area of 4430 acres, with a population, in 1831, of 908. There are in the parish two chapelries, Goadby and Rolleston, included in the foregoing numbers. The church consists of a nave, chancel, and two aisles: it has a stone tower and a neat spire. There is a school, with a small endowment. There are chapels at Goadby and Rolleston: the former is antient; in the grave-yard of the latter are the remains of a neat cross. The living of Billesdon is a vicarage, with the chapelries annexed, of the clear yearly value of 279*l.*, with a glebe-house. There were in the whole parish, in 1833, three dame-schools, with 54 children; one boarding-school, with 26 children; three day-schools, with 82 scholars; and three Sunday-schools, with 166 scholars. Barrow-upon-Soar is about two miles from Mount Sorrel, on the opposite bank of the Soar, lower down the stream. The parish, which contains nearly 8000 acres, with a population, in 1831, of about 6000, includes the chapelries of Mount Sorrel, Quorndon, and Woodhouse. The village of Barrow contains an hospital, or almshouse, for six poor men, and an endowed school of 30 or 40 boys. There are two or three dissenting places of worship. Quorndon chapelry, in Barrow parish, comprehends 1990 acres, with a population, in 1831, of 1752: the stocking and bobbin-net lace manufactures are carried on to a considerable extent. The village is on the road between Mount Sorrel and Loughborough. Kegworth is on the road from Loughborough to Derby, in the hundred of West Goscote. The parish comprehends an area of 1850 acres, with a population, in 1831, of 1749, exclusive of the chapelry of Isley Walton. There was a market here, which has been discontinued within the present century. There are some dissenting places of worship. The church is a handsome light building, in the form of a cross. The tower is surmounted by a spire. Bottesford is on the river Deven, in the vale of Belvoir, in Framland hundred. The parish comprehends 5010 acres, with a population, in 1831, of 1320. The village is on the road from Grantham to Nottingham. The church is a cross church, with a tower and lofty ornamented spire, and contains a number of handsome monuments of the earls of Rutland of the Manners family. Four dukes of Rutland are buried here, but have no monuments. Belvoir Castle, the seat of the dukes of Rutland, is about four miles from Bottesford, upon the border of Leicestershire and Lincolnshire. This noble building occupies nearly the summit of a hill, on the southern slope of which are terraces and shrubberies. It surrounds a quadrangular court, and has undergone many alterations during the present century: in its situation and general appearance it bears some resemblance to Windsor Castle. It contains a very fine collection of paintings. Seleby is on the right bank of the Soar, near Mount Sorrel. It has a fine church with a handsome tower, an endowed school, and several dissenting places of worship. Syston is on the road from Leicester to Melton; it has a large church with a square tower. Both these villages are in the hundred of East Goscote, and had a population, in 1831, of 1491 and 1349 respectively. The stocking manufacture is carried on in them to a considerable extent. Wimeswould is in East Goscote hundred, near the border of the county, on the road from Leicester to Newark. The population, in 1831, was 1276; the chief manufacture is that of lace. Woodhouse is in West Goscote hundred, near Mount Sorrel; the population in 1831 was 1262; the inhabitants are engaged in the stocking manufacture. Castle Donnington, in the same hundred, is on the border of the county, on the road from Ashby-de-la-Zouch to Nottingham. The population of the parish in 1831 was 3182: about 100 of the inhabitants were engaged in manufactures. There are the remains of an old castle, from which the parish gets its name, and a noble park and mansion, the residence of the marquis of Hastings. The house is modern, built of stone round a court-yard; the architecture is Gothic. It contains a valuable collection of paintings. Sheepshead, between Ashby and Loughborough, had, in 1831, a population of 3714. The stocking manufacture gives employment to 500 hands. In the middle of the village is a stone cross, consisting of a single shaft, standing on steps. There are several dissenting meeting-houses. At Whitwick, near Ashby, in West Goscote hundred; at Great Wigston, Oadby, Blaby, Cosby, Countessthorpe, and Whetstone, near Leicester, and in Guthlaxton hundred; at Southfield in the same hundred, near Lutterworth; at Earl Shelton, Burbage, Barwell, and Sapcote, all near Hinckley, in Sparkenhoe hundred; at Thurmaston in East Goscote, and Austey in West Goscote, and at Enderby and Narborough in Sparkenhoe hundred, all near Leicester, from one hundred to three hundred stocking-weavers are employed. This constitutes, in fact, the staple manufacture of the county, and gives employment in all to upwards of ten thousand workmen, more than half of whom are at Leicester or Loughborough, or at other places in West Goscote hundred.

Divisions for Ecclesiastical and Legal Purposes.—This county is in the diocese of Lincoln and in the ecclesiastical province of Canterbury. It constitutes an archdeaconry, that of Leicester; and is divided into the six rural deaneries of Akely, Framland, Gartree, Goscote, Guthlaxton, and Sparkenhoe. It comprehended, when Burton published his 'Description of Leicestershire,' in the early part of the seventeenth century, 115 rectories, 81 vicarages, and 105 chapels, of which 33 were in ruins. At present, as near as we can collect, there are 211 benefices, viz. 115 rectories, 79 vicarages, 13 chapelries or perpetual curacies, and 4 donatives.

Leicestershire is in the Midland Circuit; the assizes and quarter-sessions are held at Leicester.

Before the Reform Act, Leicestershire returned four members to parliament, viz. two for the county, and two for the borough of Leicester. By that Act the county was divided and the number of members increased, each division of the county returning two. The northern division comprehends the hundreds of West Goscote (except the borough and liberties of Leicester), East Goscote, and Framland, and two detached portions of that of Gartree. Loughborough is the place of election, and the polling-stations are Loughborough, Melton Mowbray, and Ashby-de-la-Zouch. The southern division comprises the hundreds of Gartree, Guthlaxton, and Sparkenhoe, with the borough and liberties of Leicester. Leicester is the chief place of election; and the polling-stations are Leicester, Market Harborough, and Hinckley.

History, Antiquities, &c.—Leicestershire was antiently comprehended in the territory of the Coritani: and when the Romans had subjugated Britain and divided it into provinces, it was included in the province of Flavia Cæsariensis, which comprehended the midland and eastern parts of the island. The Romans established several stations within or near upon the limits of the county: Ratæ (Leicester); Vernometum, near Willoughby (on the road from Leicester to Newark); Manduessedum (Manceter, near Atherstone); Benonæ, or Venonæ (High Cross, between Lutterworth and Hinckley); and Tripontium, which some fix on the Avon, near Catthorpe, a village in Northamptonshire, south of Lutterworth. Of these stations however only Ratæ strictly belongs to this county. Venonæ and Tripontium are just on the border: the others lie beyond it. Ratæ, as it is termed in the Itineraries of Antoninus, otherwise Ῥάγε, or Ἐράται, according to Ptolemy, and Ragæ and Ratiscorion, according to Richard of Cirencester, was on the site of the modern Leicester. Many tessellated pavements, coins, urns, and domestic and military utensils have been discovered at different times. The pavements do not display much taste or skill; most of them were found from four to six feet under the surface of the present streets. A Roman mile-stone was discovered A.D. 1771, about two miles from the town northward, on the side of the Foss-road: it is cylindrical like the shaft of a column, with a roughly carved inscription, showing it to have been set up in the time of the emperor Hadrian. It was subsequently removed into the town. The portion of Roman wall called the Jewry wall at Leicester is built of alternate courses of ragstone and brick; the masonry is very rough: there are several arches in the wall, turned entirely of tiles. To what building it belonged cannot now be satisfactorily ascertained. South of Leicester town are two remarkable parallel embankments, called the 'Raw Dykes,' extending about three furlongs in length, and about sixteen yards apart. They have been commonly regarded as the limits of a race-course, and as of British origin; but neither of these points is ascertained. There do not appear to be any remains of Venonæ, which probably stood at the intersection of Watling-Street and the Foss-Way; but Camden reports that great foundations of square stones had been discovered under ground, and, since his time, coins have been found here. There are some traces of Tripontium near Catthorpe. There are remains or traces of encampments, probably Roman, near Market Harborough; at Medbourne near Harborough; at Burrow near the Rutlandshire border, south of Melton Mowbray; and at Sexhill, or Segs-hill, north-west of the Melton Mowbray. Tessellated pavements have been found at Rothley and Wanlip, between Leicester and Loughborough. At Wanlip were found also coins and broken urns.

The Roman road Watling-Street forms the boundary between this county and Warwickshire from Tripontium, or Catthorpe, to the neighbourhood of Manduessedum (Manceter, near Atherstone). The Foss-Way, another antient road, which intersects Watling-Street at Venonæ (High Cross), runs in a direct line north-east to Ratæ (Leicester); and from thence north-north-east to Vernometum, near Willoughby, just within the border of Nottinghamshire. The Via Devana enters the county on the south-east, crossing the Welland near Medbourne, and runs north-west by Ratæ (Leicester) and Ashby into Derbyshire. Some remains of the Foss-Way and Via Devana may be traced. Another antient road, the Salt-Way, is represented in some maps as branching from the Foss-Way near Sexhill, and running toward Grantham.

During the Heptarchy, Leicestershire was included in the kingdom of Mercia. In the year 680, or according to others 737, Leicester was made the seat of a bishopric transferred thither from Sidnaceaster. The diocese of Leicester, we may presume, was nearly coincident with the present county and archdeaconry of Leicester. About the year 970, according to some, the diocese was united to Lincoln; but others consider that it did not exist above a century from its establishment, being transferred to Dorchester on the bank of the Thames, in Oxfordshire; or rather united to the previously existing see of Dorchester.

By the treaty between Alfred and Guthrun the Dane, (A.D. 878 or 880) Leicestershire was included in the Danelagh, or Danish territory; and Leicester became one of the great Danish burghs. It was recovered by Ethelfleda, governess of Mercia, during the reign of Edward the Elder.

According to Throsby and others, Leicester had been the seat of an earldom under the kings of Mercia, A.D. 716; but Mr. Allen, in the Appendix to Sir F. Palgrave's 'Rise and Progress of the English Commonwealth,' gives to the nobles whom Throsby enumerates as earls of Leicester, the title of earls of Chester and Coventry. At a later period, A.D. 1018-1057, Leicestershire may have been included in the earldom of Mercia.

Upon the Norman Conquest, Leicestershire was divided between the followers and relatives of the Conqueror. Several of these or their descendants, to secure the territory thus acquired, erected castles or repaired older ones at Leicester, Mount Sorrel, Shilton, Whitwick, Groby, Hinckley, Donnington, Melton Mowbray, Ravenston, Thorpe, Sauvey, and Belvoir. Of these castles, except that at Ashby [ASHBY-DE-LA-ZOUCH], there are few remains. The present Belvoir Castle is a more modern edifice, erected or restored by the first earl of Rutland, in the end of the fifteenth or beginning of the sixteenth century, after the older edifice had been dismantled and ruined by Lord Hastings in the time of the war of the Roses. Leicester, Mount Sorrel, and Hinckley have been mentioned elsewhere. Of Groby (near Leicester) the earthworks and a few fragments of the masonry remain. There were several monastic establishments in the county, but there are no remains of any of these deserving notice. Leicester Abbey has been already mentioned.

The population of the county at the time of the Domesday Survey has been calculated by Nichols at 34,000.

Upon the accession of William Rufus, A.D. 1187, Leicestershire was ravaged by Hugh Grentemaisnell, who supported the cause of Robert, duke of Normandie. It was on this occasion that Leicester Castle was taken by William Rufus. The county was again the scene of contest in the civil troubles of the reigns of John and Henry III. The civil war of the Roses was closed by the defeat and death of Richard III. at Bosworth-field in this county, A.D. 1485. [BOSWORTH.]

In the civil war of Charles I. the men of Leicestershire seem generally to have taken the side of the parliament. The royalists, who had occupied Belvoir Castle, defeated a body of parliamentary forces, November 27, 1643, at Melton Mowbray, but in December of the same year the parliamentarians, under Lord Grey and Colonel Temple, gained an advantage over the royalists under Colonel Lucas at Belvoir. The royalists seem to have been in considerable strength in the neighbourhood of Melton, where in February, 1644, there was another skirmish. In March, 1644, Colonel Hastings, a royalist, took possession of Hinckley, where he collected some prisoners and booty, but these were rescued, and the royalists defeated, by a parliamentary detachment from Leicester. About the same time the royalists were defeated in a skirmish at Loughborough. Ashby and Belvoir appear to have been their strongholds: while the parliamentarians occupied Leicester, where their directing committee sat; they established several posts, one at Cole Orton, to watch the royalists at Ashby. In February, 1645, two skirmishes were fought, one between Harborough and Leicester, the other near Melton. In the first the royalists had the advantage and occupied Leicester for a night; the second was drawn. In these actions each party lost 300 to 400 men killed and wounded. On the 31st May, the king took Leicester by storm; the garrison consisted of about 450 soldiers and 500 to 600 townsmen; the resistance was obstinate, but unavailing: some of the women are said to have assisted in the defence of the breach. The besieging army was estimated at 4000. The triumph of the king was short· the battle of Naseby in Northamptonshire, near Market Harborough, was won by the parliament, a fortnight after the capture of Leicester: this victory was decisive. Leicester was retaken four days after by the parliamentarians. In his subsequent marches the king came once or twice to Belvoir and Ashby. Belvoir was taken by storm in November, the same year, and the garrison at Ashby surrendered in the Februrary following.

(Nichols's *History of Leicestershire; Beauties of England and Wales;* Conybeare and Phillips's *Outlines of the Geology of England;* Priestley's *History of Navigable Rivers; Parliamentary Papers.*)

STATISTICS.

Population.—Leicestershire is partly an agricultural and partly a manufacturing county. It ranks the 29th on the list of agricultural counties, and in this respect retains nearly the same position as it did in 1811 and 1821, when it was the 30th on the list. Of 49,812 males, of the age of 20 and upwards, living in this county in 1831, there were 15,343 engaged in agricultural pursuits, 10,542 of whom were labourers; 12,240 employed in manufactures, or in making manufacturing machinery; and 3701 employed as labourers in labour not agricultural. Of those engaged in manufactures 10,000 were employed in the manufacture of stockings. The town of Leicester contained 3400 manufacturers, of whom probably 3000 were stocking-makers. Loughborough contained 900, Hinckley 700, Sheepshead 500, stocking-makers; Great Wigston and Earl Shilton about 280 each; Fileby 200; Southfield, Burbage, Thurmastown, Kegworth, Barwell, Anstey, Whitwick, Blaby, Mount Sorrel, Oadby, contain from 180 to 130 each. After these in order may be reckoned Countessthorpe, Cosby, Whitstone, Enderby, Narborough, Sapcote, Long Stratton, Syston, as containing above 100 each. Less than 100, but more than 50, in each of the towns of Desford, Belgrave, Woodhouse, Gilmorton, Thungston, Great Glenn, Quorndon, Stoke-Golding, Lutterworth, Wykin, Smeeton, and Westerby. About 750 men are employed in lace-making, most of them probably at Leicester, several at Melton Mowbray and Quorndon. Frame-smiths and makers of machinery are of course frequent in all these places. In the county are mentioned about 40 weavers of linen and 40 carpet-makers.

The following Table is a Summary of the Population, &c., of every Hundred, &c., as taken in 1831.

HUNDREDS AND TOWNS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Framland . . Hundred	3,300	3,556	10	66	1,917	984	655	8,538	8,659	17,197	4,300
Gartree	3,634	3,803	10	151	1,605	1,318	880	8,331	8,728	17,059	4,436
Goscote, East . . .	3,830	4,033	11	142	1,783	1,629	621	9,343	9,427	18,770	4,763
Goscote, West . . .	9,442	9,727	58	393	2,474	5,542	1,711	23,572	23,740	47,312	11,756
Guthlaxton	4,734	4,867	9	205	1,524	2,720	623	11,251	11,340	22,591	5,692
Sparkenhoe	7,066	7,461	21	284	2,770	3,840	851	17,563	17,607	35,170	8,835
Leicester, Borough .	8,348	8,695	55	600	279	6,951	1,465	18,958	19,946	38,904	10,030
Totals .	40,354	42,142	174	1,841	12,352	22,984	6,806	97,556	99,447	197,003	49,812

The population of Leicestershire at each of the following periods was as under:—

	Males.	Females.	Total.	Increase per cent.
1801	63,943	66,138	130,081	. .
1811	73,366	77,053	150,419	15·63
1821	86,390	88,181	174,571	16·05
1831	97,556	99,447	197,003	12·84

showing an increase between the first and last periods of 66,922, or nearly 51½ per cent., which is 5½ per cent. below the whole rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

		£.		s.	d.	
1801	were	79,911,	being	12	3	for each inhabitant.
1811	. .	110,560	„	14	8	„
1821	. .	124,244	„	14	2	„
1831	. .	113,951	„	11	6	„

The expenditure for the same purpose in the year ending March, 1837, was 55,019*l.* Assuming the population to have increased since 1831 in the same proportion as in the ten preceding years, the above sum gives an average of about 5*s.* 3*d.* for each inhabitant. All these averages, except the last, are above those for the whole of England and Wales, which for 1837 was 5*s.* 5*d.* for each inhabitant.

The sums raised in Leicestershire for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1833, was 139,303*l.* 6*s.*, and was levied upon the various descriptions of property as follows:—

On land . . .	£108,330	3*s.*
Dwelling-houses .	29,551	7
Mills, factories, &c. .	783	2
Manorial profits, navigation, &c.	638	14
	139,303	6

The amount expended was—

For the relief of the poor . .	£114,881	16
In suits of law, removal of paupers, &c.	4,912	6
For other purposes . .	22,842	12
	142,636	14

In the returns made up for the subsequent years the descriptions of property assessed are not specified. In the four years ending March, 1837, the total money levied was in 1834, 133,812*l.*; 1835, 116,083*l.*; 1836, 97,019*l.*; 1837, 63,767*l.*; and the expenditure for each year was as follows:—

	1834.		1835.		1836.		1837.
	£.	s.	£.	s.	£.	s	£.
For the relief of the poor .	100,857	0	83,986	0	70,077	0	55,019
In suits of law, removals, &c.	5,472	0	3,808	0	3,771	0	2,338
Payments towards the county-rate . .	28,502	0	16,884	0	15 761	0	. .
For all other purposes			12,091	0	10,514	0	6,410
Total money expended	£134,831	0	116,769	0	100,123	0	63,767

The saving effected in the whole sum expended in 1837, as compared with that expended in 1834, was therefore about 52¾ per cent.; and the saving effected, comparing the same periods of time, in the expenditure of the poor, was nearly 45½ per cent.

The number of turnpike trusts in Leicestershire, as ascertained in 1835, is 24; the number of miles of road under their charge is 445. The annual income and expenditure in 1835 were as follows:—

	£.	s.	d.
Revenue received from tolls .	£23,876	6	0
Parish composition in lieu of statute duty . . .	2,133	2	0
Estimated value of statute duty performed . . .	2,627	3	0
Revenue from fines . .		12	0
Revenue from incidental receipts	134	19	0
Amount of money borrowed on the security of the tolls . .	400	0	0
Total income	29,172	2	0
	£.	s.	d.
Manual labour . .	7,608	18	0
Team labour and carriage of materials	1,095	6	0
Materials for surface repairs .	5,792	8	0
Land purchased . .	239	12	0
Damages done in obtaining materials	270	18	0
Tradesmen's bills . .	1,929	15	0
Salary of treasurer . .	54	0	0
„ of clerk . .	329	0	0
„ of surveyor . .	1,087	15	0
Law charges . . .	874	14	0
Interest of debt . .	4,158	5	0
Improvements . . .	4,757	0	0
Debts paid off . . .	283	6	0
Incidental expenses . .	821	10	0
Estimated value of statute duty performed . . .	2,627	3	0
Total expenditure	31,838	10	0

The county expenditure in 1834, exclusive of that for the relief of the poor, was 15,181*l.* 9*s.* 11*d.*, disbursed as follows:—

	£	*s.*	*d.*
Bridges, building and repairs, &c.	351	14	2
Gaols, houses of correction, and maintaining prisoners, &c.	3,502	11	8
Shire-halls and courts of justice, building, repairing, &c.	66	10	8
Prosecutions	2,312	0	6
Clerk of the peace	253	10	8
Conveyance of prisoners before trial	335	19	8
Conveyance of transports	134	7	0
Vagrants, apprehending and conveying	35	19	7
Constables, high and special	568	3	9
Coroner	157	0	9
Debt, payment of, principal and interest	5,441	5	0
Miscellaneous	2,022	6	6

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 944, 1273, and 1667 respectively; making an average of 135 annually in the first period, of 182 in the second period, and of 238 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect of whom any costs were paid out of the county-rate, was 65, 93, and 93 respectively.

Among the persons so charged with offences there were committed for

	1831.	1832.	1833.
Felonies	73	84	89
Misdemeanors	21	11	10

The total number of committals in each of the same years was 97, 110, and 108 respectively.

	1831.	1832.	1833.
Convicted	65	83	77
Acquitted	19	17	22
Discharged by proclamation	12	22	13

At the assizes and sessions in 1837 there were 432 persons charged with criminal offences in this county. Of these 31 were charged with offences against the person, 20 of which were for common assaults; 29 persons were charged with offences against property committed with violence, 314 with offences against property committed without violence; 7 for malicious offences against property; 4 for uttering counterfeit coin; 5 for poaching; 6 for taking and destroying fish in enclosed waters; and 36 for riot, &c. Of the whole number committed, 328 were convicted, 71 were acquitted, and against 33 there was no bill found, or there was no prosecution. Of the whole number of persons convicted, 17 were sentenced to death, but none were executed; their sentences being commuted to transportation for various periods; 10 were sentenced to transportation for life, and 44 for various periods; 11 were sentenced to imprisonment for 2 years, or not less than 1 year; 24 for 1 year or not less than six months, and 198 for 6 months or under; 24 were whipped, fined, or discharged upon sureties. Of the whole number of offenders, 375 were males and 57 were females; 113 could neither read nor write; 211 could read and write imperfectly; 105 could read and write well; and the degree of instruction of the remaining 3 could not be ascertained.

The number of persons qualified to vote for the county members of Leicestershire is 8879, being about 1 in 22 of the whole population, and about 1 in 5 of the male population twenty years of age and upwards, as taken in 1831. The expenses of the last election of county members to parliament were, to the inhabitants of the county, 229*l.* 5*s.* 4*d.*, and were paid out of the general county rate.

This county contains 5 savings' banks; the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.	1836.	1837.
Number of Depositors	2,714	3,321	3,232	3,356	3,778	3,878
Amount of Deposits	£79,210	£94,968	£93,761	£99,116	£108,092	£111,165

The various sums placed in the savings' banks in 1835, 1836, and 1837, were distributed as under:—

		1835.		1836.		1837.	
		Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding	£20	1,813	£14,835	2,021	£15,958	2,095	£16,798
"	50	962	29,326	1,134	34,071	1,137	34,157
"	100	393	26,964	421	29,014	432	29,569
"	150	115	13,835	125	14,590	145	17,240
"	200	54	9,218	60	10,047	54	9,251
Above	200	19	4,868	17	4,412	15	4,120

Education.—The following summary is taken from the Parliamentary Returns on Education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	116		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		749	
Females		689	
Sex not specified		1,296	
			2,734
Daily schools	557		
Number of children at such schools; ages from 4 to 14 years:—			
Males		8,417	
Females		5,539	
Sex not specified		2,577	
			16,533
Schools	673		
Total of children under daily instruction			19,267
Sunday schools	399		
Number of children at such schools; ages from 4 to 15 years:—			
Males		13,389	
Females		13,586	
Sex not specified		4,225	
			31,200

If we assume that the population between the ages of 2 and 15 has increased since 1831 in the same proportion as the whole population has increased during the ten years preceding that period, we find that the number of children between the ages of two and fifteen residing in Leicestershire in 1834 was 50,467. Twenty-nine Sunday-schools are returned from various places where no other school exists, and the children, 1269 in number, who are instructed therein cannot be supposed to attend any other school. At all other places Sunday-school children have an opportunity of resorting to other schools also; but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Thirty-one schools, containing 1805 children, which are both daily and Sunday schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. Allowing for this duplicate entry it may perhaps approximate to the truth to state that not more than two-thirds of the population between the ages of two and fifteen were receiving instruction in this county at the period this return was made.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	5	219	105	1,805	6	710
Daily Schools	76	3,041	46	2,408	410	9,603	25	1,491
Sunday Schools	13	620	373	29,658	..	..	13	922
Total....	89	3,661	424	32,285	515	11,408	44	3,113

The schools established by Dissenters, included in the above statement, are—

	Schools.	Scholars.
Infant schools	—	—
Daily schools	5	283
Sunday-schools	149	14,926

The schools established since 1818 are—

		Scholars.
Infant and other daily schools	347, containing	10,834
Sunday-schools	217	21,100

Eighteen boarding-schools are included in the number of daily schools given above. No school in the county of

Leicester appears to be confined to the children of parents of the Established church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

There are lending libraries of books attached to 33 schools in this county.

LEIGHLIN, a bishop's see in the archiepiscopal province of Dublin, in Ireland. This diocese comprehends the county of Carlow, and extends into the counties of Wicklow, Wexford, Queen's County, and Kilkenny. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, and four prebendaries. In 1792 it was divided into 89 parishes, constituting 39 benefices, and having 30 churches. In 1834 the numbers were—parishes 82, benefices 56, churches of the Establishment 49, places of Roman Catholic worship 64. In the latter year the gross population of the diocese was 190,852, of whom there were 20,391 members of the Established Church, 169,982 Roman Catholics, 191 Presbyterians, and 288 other Protestant Dissenters; being in the proportion of somewhat more than eight Roman Catholics to one Protestant. In the same year there were in the diocese 279 daily-schools educating 20,755 young persons, being in the proportion of 10·87 per cent. of the entire population under daily instruction, in which respect Leighlin ranks first among the 32 dioceses of Ireland. Of the above schools, in 1834, 61 were in connection with the National Board of Education.

The founder of this diocese was St. Laserian, who supported the Roman mode of celebrating Easter at the Synod of Whitefield, or Leighlin, A.D. 630. Prior to that time the church of Leighlin had been ruled by an abbot. It is said, that during Laserian's time he had 1500 monks under his government in this abbey. The names of his successors down to the period of the arrival of the English are not known. The first Protestant bishop was Robert Travers, advanced to the see A.D. 1550, and deprived, on the accession of Queen Mary, soon after. He was succeeded by Thomas Field, a Franciscan friar, who in 1567 was succeeded by Daniel Cavanagh, the second bishop of the Reformed faith. The bishoprics of Leighlin and Ferns became united A.D. 1600, in the person of Dr. Robert Grave, which union still subsists. The lands of the see comprise 12,924 statute acres, producing an annual average income of 2667*l.* 7*s.* 6¾*d.* The cathedral is the parish church of Leighlin-Bridge. According to the provisions of the 3rd and 4th William IV., c. 37, the see of Ossory, on its falling vacant, becomes united with the united sees of Ferns and Leighlin.

(Beaufort's *Memoir of a Map of Ireland;* Harris's *Ware's Bishops of Ireland; Parliamentary Returns,* &c.)

LEIGHTON, ROBERT, D.D., archbishop of Glasgow; a divine whose sermons and other tracts are held by many persons in great esteem, but who has secured for himself a reputation by having acted in a manner the most opposite to that by which reputation is most commonly secured. In times of excitement he was the steady advocate of peace and forbearance. One story of him so completely illustrates his character, that, though it has been often told, we must repeat it. A question not unfrequently put to the Scottish clergy at their assemblies was, 'Whether they preached to the times?' When Leighton's turn came, his reply was, 'When all my brethren preach to the times, suffer me to preach about eternity.'

The times spoken of are those of the Commonwealth, or a little before, when he had a church near Edinburgh; but he found that moderation would not be tolerated in a minister, so that he retired into privacy, from whence however he was called to preside over the university of Edinburgh. When Charles II. resolved to make the attempt at introducing Episcopacy into Scotland, Dr. Leighton was nominated to the bishopric of Dumblane. His conduct was the reverse of that of Dr. Sharpe, who was ostentatious in the display of an ecclesiastical rank which was displeasing to a large portion of the Scotch nation. Leighton on the contrary conducted himself with that moderation which he had before manifested, so that he won the affections of even the most rigid Presbyterians. The bishops generally took a different course, and this induced Leighton to offer to resign his bishopric: but the views of the Court changing in respect of the attempt to bring the Scotch nation to accept an Episcopalian church, and it being intended to proceed more in the way of persuasiveness and gentleness, he was induced to accept the archbishopric of Glasgow. Still he found it an affair of contention little suited to his habits or turn of mind, and accordingly he resigned his archbishopric, and retired to the county of Sussex in England, where he ended his days in 1684. The best edition of his works, with an account of his life, was published in 1808, 6 vols. 8vo.

LEIGHTON BUZZARD, a parish and market-town in the hundred of Manshead and county of Bedford, is seated on the right bank of the Ouse, 17 miles west-south-west from Bedford, and 38 north-west from London, near the line of the London and Birmingham Railway. The streets are ill-paved and not lighted with gas, and the inhabitants derive their chief supply of water from wells. The trade consists in corn and timber; the market-day is Thursday, and the fairs are held in February, April, July, October, and December. The living, in the diocese of Lincoln, is a vicarage in the patronage of the prebendary of that see. Its net annual value is 193*l.* The burgh and parish, including the four chapelries of Billington, Egginton, Heath-and-Reach, and Standbridge, contained, in 1831, a population of 5149 persons, that of the burgh alone being 3330. Besides a Lancasterian school for the education of children of both sexes, and supported by voluntary contributions, there are several benevolent institutions and charitable foundations, a particular account of which is given in the Twelfth Report of the Commissioners on Charities. The principal of these are the almshouses, originally founded by Edward Wilkes in 1630, which, together with certain revenues bequeathed by him and his successors, are appropriated to the use, maintenance, and clothing of poor widows of the town of Leighton Buzzard, and the Pulford and Leigh charities for affording gratuitous instruction to poor children resident in the same town. (*Parliamentary Papers,* &c.)

LEININGEN, formerly a county situated between the Lower Palatinate and the bishoprics of Spires and Worms, gives its name to one of the wealthiest of the mediatised German houses. The antient line of princes becoming extinct in 1220, Frederick of Hardenberg, son of Simon, count of Saarbrück, and of Luccarde, daughter of the last count of Leiningen, succeeded to the territory by inheritance, and assumed the title of count of Leiningen. The family was subsequently divided into several branches. The principal line obtained, in 1779, the dignity of princes of the empire: in 1803 it lost its possessions on the left bank of the Rhine, which had an area of 250 square miles, with 36,000 inhabitants, and produced a revenue of 168,000 florins, and obtained instead Amorbach, Miltenberg, and several other bailliwicks, the area of which is 520 square miles, with 86,000 inhabitants, in 15 towns, 9 market villages, and 171 other villages, producing a revenue of 568,000 florins, which form together the present principality of Leiningen. The principality was mediatised (as it was called) by the act of the Rhenish Confederation in 1806; and, according to the territorial arrangements made in 1810, 410 square miles are under Baden, 100 under Bavaria, and 10 under Hesse-Darmstadt. The population of the principality is now about 107,000. The present Prince Charles, born at Amorbach in 1804, succeeded his father in 1814, under the guardianship of his mother, Maria Louisa Victoria, a princess of Saxe-Coburg, sister to Leopold, king of the Belgians; she is the widow of the late duke of Kent, and mother of Victoria, queen of the United Kingdom. The prince's residence is at Amorbach, in the Odenwalde, which has a population of about 3000 inhabitants. It has some manufactures, a new palace, with fine gardens, and a very handsome church with four towers and a remarkable organ. The religion is Protestant. There are four other branches of the house of Leiningen, two Protestant and two Roman Catholic; but all of them have much smaller possessions than the above principal branch.

LEINSTER, a province of Ireland, supposed to be derived from the Irish *laighen,* signifying a spear. It extends from 52° 6′ to 54° 7′ N. lat., and from 6° to 8° 3′ W. long., including the eastern half of the central and south-eastern parts of Ireland. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge it comprises 4,356,868 statute acres, or 6807½ square statute miles.

Of the four provinces of Ireland, Leinster possesses the greatest advantages in point of soil and surface, being little encumbered with mountains, and having consequently superior facilities for internal communication. The navigable Shannon forms part of its western boundary, and the navigable Barrow intersects its central and southern counties. The Boyne also, the basin of which lies within its north-eastern limits, is partly navigable, and two canals traverse it from east to west. The coast is inferior in point of natural harbours to that of the remainder of the island, but it is more sheltered from the prevalent winds.

Upon the coming of the English in 1170 the present province was divided into the two petty kingdoms of Meath and Leinster, and embraced also a part of the then kingdom of Ulster, in the present county of Louth. The first counties erected were those of Dublin, including the present county of Wicklow; Meath, including the present West Meath and Longford; Louth; Kildare, including the present King's and Queen's Counties; Carlow, Kilkenny, and Wexford. Meath was divided into Meath and West Meath in the reign of Henry VIII.; King's and Queen's Counties were separated from Kildare and erected into separate counties in that of Mary; Longford was made shire-ground in the time of Elizabeth; and Wicklow was finally separated from Dublin and made a county in the reign of James I.

The antient kingdom of Leinster, including all the counties south of Meath, with the exception of Dublin, was inherited by the descendants of Eva, daughter of Dermod MacMurrogh, and wife of Earl Strongbow. Meath was bestowed on Hugh de Lacey, and descended to the families of De Verdon and Geneville. Almost all the inheritors having ultimately become absentees, the native Irish of Carlow, King's and Queen's Counties, and West Meath seized on their estates, and obliterated all traces of the English law from the western and some of the midland parts of the province; nor was it till the reign of Elizabeth that the whole was brought again under a regular government. The counties of Louth, Meath, Dublin, Kildare, and Wexford have not shaken off the English law or abjured English manners at any time since the Conquest.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort . . .	181,948	..	..	..	..	..	..	..
1821	Under Act 55 Geo. III. c. 20 . .	278,398	352,320	..	..	..	859,798	897,699	1,757,492
1831	Under Act 1 William IV. c. 19 . .	292,729	344,314	186,177	75,040	83,097	927,877	981,836	1,909,713

The population of Leinster in the last year gives 373 inhabitants to the square mile, being a more dense population than in the other provinces.

LEIOCE'PHALUS. [Iguanidæ.]

LEIOLÆMUS. [Iguanidæ.]

LEIO'LEPIS. [Agama, vol. i., p. 192; Iguanidæ.]

LEIOSAURUS. [Iguanidæ.]

LEI'OTHRIX, a genus of birds established by Mr. Swainson, with the following

Generic Character.—Bill much compressed; *Culmen* gradually curved; *Nostrils* large, membranaceous; *Tail* moderate, deeply forked.

Example.—Leiothrix furcatus, 'Pl. Col.,' 287, f. 1: India. The genus belongs to Mr. Swainson's subfamily *Leiotrichanæ* (Silky Chatterers?), being the first of his family *Ampelidæ*. Fruit-eaters or Chatterers. [Leiotrichanæ.]

LEIOTRICHA'NÆ, Sw. The subfamily alluded to under the title *Leiothrix*, and thus defined by Mr. Swainson:—

Legs large, robust, syndactyle. Hind-toe longer than the outer. Wings short and rounded. Bill strong; the gonys ascending.

The only other genus besides *Leiothrix* placed in this subfamily by Mr. Swainson is *Pteruthius*, Sw., to which that author gives the following

Generic Character.—Bill short, compressed, thick; the tip shrike-like, hooked; *culmen* arched; *gonys* ascending. *Nostrils* basal; the aperture round; *gape* wide; *rictus* slightly bristled. *Wings* very short, rounded. *Tail* short, broad, rounded; the tips obtuse. *Tarsi* smooth, pale. Example, *Pteruthius erythropterus*, Gould's 'Century of Himalaya Birds,' pl. 11, (*Lanius erythropterus*): India.

LEIPZIG, or LEIPSIC, one of the four circles of the kingdom of Saxony, is bounded on the west and north by Prussia, on the east by the circle of Meissen, and on the south by that of the Erzgebirge, and the principality of Saxe-Altenburg. Its area is 1326 square miles, and the population (according to the census of 1834) 361,251. The country is level, except in the south and south-east, where there are some offsets of the Erzgebirge. The soil is fertile and well cultivated; but the country is deficient in wood, which is procured from the Erzgebirge and the circle of Voigtland. There are no metals; but there are potters' clay, limestone, marble, porphyry, and jasper. There is a very good generally-improved breed of sheep, of which the circle is estimated to possess about 300,000.

This is not one of the manufacturing circles of Saxony: there are however flourishing manufactures of woollens, cotton, and linen in all the thirty-eight towns; but in the villages, which are above 1000 in number, all hands, generally speaking, are required for agriculture. The climate is temperate and healthy.

LEIPZIG, the capital of the circle, and the second city in the kingdom, is in 51° 20′ 16″ N. lat. and in 12° 21′ 45″ E. long., in an extensive plain watered by the Pleisse, into which the White Elster, in several arms, the Parde, and the Luppe flow. The swamps that formerly existed in this plain having been filled and drained, it is now extremely fertile and healthy, and covered with flourishing villages. The town, including the four suburbs, is nearly a mile in length from north to south, parallel to the course of the Pleisse, and three-quarters of a mile in breadth. It contains about 1540 houses, of which 877 are within the walls, and 47,514 inhabitants (1837). It was formerly well fortified, but the ramparts have been converted into public walks, and partly laid out as gardens. The only remaining part of the fortifications is the castle, called the Pleissenburg, upon which the observatory now stands.

Leipzig is by no means regularly built, and the streets are generally narrow, though well paved and lighted, but it contains many very handsome parts, numerous elegant public buildings, private houses resembling palaces, and many seats, with fine gardens, in the suburbs. The most remarkable edifices are, St. Thomas's Church; St. Nicholas, a venerable and magnificent building, adorned with paintings by Oeser; St. Paul's, or the University Church; St. John's, in which is the marble monument of Gellert; the theatre, the town-hall, built in 1599, the cloth-hall, the Pleissenburg, with the observatory, which is furnished with excellent instruments, and is in 51° 20′ 19″ N. lat. and 30° 1′ 52′ E. long. of Ferro, and 10° 1′ 45″ E. of Paris. The great building called Auerbach's House is in the time of the fairs a kind of bazaar, where the finest and most costly articles are exposed for sale. There are numerous excellent schools and academies, and many literary and learned societies, such as Prince Jablonowsky's Society for the cultivation of science, the Societies of Natural History and Mineralogy, that for the National Language and Antiquities, a deaf and dumb institution, an academy of design, painting, and architecture, many museums, several considerable private collections, especially of paintings, the library of the Senate, now consisting of 60,000 volumes and 2000 MSS., with a cabinet of 6000 coins and medals, and admirable establishments for the poor, which are considered to be some of the best in Germany. There are also flourishing manufactories of various kinds. Leipzig, though comparatively small, has become one of the most important cities in Europe, owing to its university, its fairs, and its book-trade.

The university was founded in 1409, in consequence of the immigration of a great number of students from Prague with their professors, on which occasion the Elector Frederick and his brother William took the universities of Prague and Paris as models. The 4th December, 1409, is considered as the date of the foundation, and the bull of Pope Alexander VI. confirming it is of the same year. The salaries of the professors were paid partly in money, and partly by the assignment of the rents of certain houses and lands. The revenues were increased by various additions in process of time; and lastly, the late king Frederick Augustus allotted to the purpose of paying the salaries of the professors, &c., the interest of 100,000 dollars and some other revenues. During its whole existence of more than four centuries, the university of Leipzig has enjoyed the reputation of being one of the most eminent in Germany. The number of students is between 1100 and 1200, and that of the professors ordinary and extraordinary, lecturers, private teachers, &c., 120. The organization of the university has been frequently modified, and especially since 1830, when the four nations of which it was composed were abolished, and the general administration of the university placed under the department of ecclesiastical affairs: the property of the university, with the immediate superintendence of the management, was confirmed to it. For the promotion of the studies in the university there are admirably organized institutions, some of them founded by bequests and donations, partly designed for the cultivation of learning in general, and partly for particular branches of science. Among them are the philological seminary, an excellent clinical institution, a school of midwifery, a botanic garden, a chemical laboratory, an ophthalmic institution, a deaf and dumb asylum, a museum of natural history, &c. The library, after having been for a long time rather neglected, has now an additional head librarian under the minister for ecclesiastical affairs: it was formed out of the libraries of suppressed monasteries and the gifts of professors, and now consists of 100,000 volumes and above 4000 MSS., and is particularly rich in philology, medicine, and old divinity. A great ornament of the university is the Augusteum, erected by a grant of the Assembly of the Estates in 1831, in memory of King Frederick Augustus, and finished in 1835. It is a very fine building, after a design of Schinkel, 300 feet in length and three stories in height, and contains a great hall, lecture-rooms, and apartments for the library, the cabinet of philosophical apparatus, and the collections of natural history. The university still retains its reputation for sound learning, and the students, notwithstanding the excitement of recent times, deserve the praise of diligence and good conduct. (Gretschel, *Die Universität Leipzig*, Dresden, 1830.)

The origin of Leipzig was the Slavonian village in the angle where the Parde falls into the Pleisse, which is said to have received its name from the lime-trees growing about it, which are called in Slavonian Lip, Lipa, or Lipsk. After King Henry I. had founded the castle of Meissen in 928, he seems to have laid the foundations of a castle in the plain of Leipzig; but it is not spoken of as a fortified town, surrounded with walls and a moat, till the twelfth century, under Margrave Otho the Rich, who granted it a licence to hold two fairs, at Easter and Michaelmas. At that time the number of the inhabitants was between 5000 and 6000. Otho's son Dietrich designed to curb the mutinous spirit of the citizens by erecting in 1218 three castles, of which only the Pleissenburg still exists, but in a very different form. As Jews are already mentioned at that time among the inhabitants, it may be inferred that there was considerable trade. The first fair at New Year was proclaimed in 1458, and the three fairs were confirmed by the emperor in 1507. These fairs have laid the foundation of the prosperity and wealth of Leipzig. The concourse of merchants from various countries is very great, and the value of the goods sold was estimated a few years ago at upwards of three millions sterling, not including the value of the books. The business done at the fairs is not so great as it has been, which is owing in a great measure to the very rigorous prohibitory system of Russia, which, being extended to the kingdom of Poland and the provinces of Persia and Asiatic Turkey now incorporated with the Russian empire, prevents the merchants of those countries from making extensive purchases at Leipzig. What effect the formation of the German Commercial League may have on the trade of Leipzig cannot yet be fully ascertained; but it seems to be now believed that it will be rather favourable than otherwise.

The singular concentration of the German book-trade in Leipzig has been a main cause of the celebrity and wealth of that city. The first two booksellers, who were also printers, that settled in Leipzig were Steiger and Boskopf, in 1545. The books were sent to Frankfort fair for sale; but subsequently the book fair at Leipzig was instituted, and in 1667 it was attended by nineteen booksellers from other places. The first catalogue appeared in the sixteenth century. The systematic arrangement of the catalogue was changed in process of time for the alphabetical, and in 1795 the size was altered from quarto to octavo. The number of new works announced has gradually increased. It was not till 1816 that above 3000 new works appeared in Germany; in 1828 there were above 5600; and this year, 1838, about 6000. The German booksellers are either publishers (Verlagshändler) who sell only their own publications, or booksellers who publish nothing themselves (Sortiments händler), but sell only what they purchase of the publishers. Now however these latter are in general publishers also, by which means they are able to make exchanges with other publishers. It is now become the general custom for the publishers to let the retail booksellers have their publications on sale and return for a certain time, at the expiration of which payment is made for what has been sold, and the remainder may be returned. The peculiar feature in the German book-trade is that every publisher has his commissioner at Leipzig, to whom he sends prospectuses and specimens of his new publications, which the commissioner distributes and makes known. A bookseller out of Leipzig, A, sends his orders, not to the publisher, B, but to his own commissioner, C, at Leipzig, who delivers them to the commissioner of the publisher, D, and the latter gives the books to C, and keeps the order to send to B.

At the Easter fair booksellers from all Germany, Sweden, Denmark, the Russian Baltic provinces (where the German language is spoken), from the Netherlands, and even France and England, to the number of above 300, meet at Leipzig to settle their accounts, &c.; and this meeting has acquired additional importance by the establishment of a Booksellers' Exchange, a handsome building which has been but just completed. The number of booksellers and music-sellers in Leipzig itself is 119. Besides the advantages arising from this centralization of the book-trade, the 23 printing-offices, of which that of Brockhaus, in which the 'Conversations Lexicon' is printed, employs 40 ordinary presses, and three machines which are worked by a steam-engine, and the five type-founderies, employ a capital of some millions of dollars. Above 40 millions of sheets are annually printed at Leipzig, and the bales of books brought thither every year amount on an average to 30,000 cwt., the value of which however is probably not more than from 200,000*l.* to 250,000*l.* sterling.

Much as Leipzig has suffered at different periods by the miseries of war, the active spirit of the citizens has always enabled them to recover in a much shorter time than might have been expected. The Thirty Years' War seemed to have wholly ruined it. In September, 1631, the great victory obtained by Gustavus Adolphus over Tilly was fought on its plain; and in 1642 it was besieged by the Swedish General Torstenson, after defeating the Imperial army under the Archduke Leopold William and Piccolomini, who came to its relief. The fearful conflict on the 16th, 17th, and 18th of October, 1813, in which Napoleon was totally defeated by the allied armies under Prince Schwarzenberg, is still fresh in our recollection. The damage done in the environs only of Leipzig was estimated at 2,580,949 dollars (400,000*l.*), and yet in a few years all trace of the mischief had disappeared. The pursuit and the acquisition of wealth have not obscured the good qualities which Pope Alexander VI. recognised in the inhabitants when he declared them to be polished and well-conducted persons. They have given every encouragement to education and the cultivation of knowledge. Men of eminence, such as Gesner, Ernesti, Fischer, Reiske, have been rectors of the schools; and Leibnitz, Thomasius, Fabricius, and Teller were natives of this city. They are great friends to the fine arts, and are especially fond of music and the drama, and the best actors of Germany have been formed on their stage. They are also extremely charitable, and are ready to relieve by liberal contributions cases of distress, either among themselves or in other parts of Germany.

(Leonhardi's *Geschichte und Beschreibung der Kreisstadt Leipzig*, Leipzig, 1799; Dolz's *Versuch einer Geschichte von Leipzig*, Leipzig, 1818; and Gretschel, *Leipzig und seine Umgebungen*, Leipzig, 1828.)

LEITH, a seaport town and contributory parliamentary borough, situated on the banks of the river Leith, at its confluence with the Frith of Forth, is about two miles north-east from the city of Edinburgh, with which it is connected by a broad street called Leith Walk. It is irregularly built and ill-paved, but contains many handsome houses of recent erection. There are several churches and other public buildings, of which it is sufficient to mention the custom-house, mariners' hospital, assembly-rooms, and the elegant bathing establishment at Seafield. A gaol was erected in 1822, at the expense of the corporation of Edinburgh; but in consequence of disputes between that body and the community of Leith, no use is at present made of the building, although the common lock-up house is said, from dampness and other defects, to endanger the lives of the prisoners. The municipal government of the town is conformable to the act 3 and 4 William IV., c. 66 and 77, according to which the governing body consists of a provost, four baillies, a treasurer, and ten common-councillors. The principal incorporated trades are the 'Ship-masters,' usually termed the 'Trinity House;' the 'Traffickers,' or 'Merchants' Company;' the 'Maltmen,' and the 'Trades,' the last of which possesses certain exclusive privileges. The police of the town is under the regulations of a local act of 7 and 8 Geo. IV., cap. 112, entitled 'An act to provide for the municipal government of the town and suburbs of Leith, for the further administration of justice, and for the regulation of the police therein;' and the expense of the establishment, together with the expense of lighting and cleansing, is defrayed by an assessment of 1*s.* 6*d.* in the pound upon the rent of all lands and houses whose yearly rent is not less than 3*l.*

In consequence of the close connection which has been established from a remote period between Edinburgh and Leith by means of the charters granted by different monarchs to the former town, the revenues of Leith, including the port dues, and likewise the imposts levied within the burgh, have hitherto (1836) formed part of the revenue of Edinburgh; and the debts, with some trifling exceptions, are placed in the same position. Among the debts for which the corporation of Edinburgh are responsible, the most important are those contracted with the government for the purpose of constructing the Leith Docks, and which, in the year 1835, amounted to 245,992*l.* The capital, belonging exclusively to the corporation of Leith, consists of public buildings and debts due from the trustees of the new markets, and was estimated, in 1833, at 5824*l.*, from which had to be deducted engagements amounting to 3818*l.* The annual income of the corporation at the same period was 196*l.*, and its expenditure 35*l.*

There are two commodious dry docks for the repairing and building of ships, and two wet docks (one opened in 1806, the other in 1817), each of which is 300 feet wide and between 700 and 800 feet long, and of sufficient depth to admit vessels of from 200 to 250 tons burthen. They are surrounded by well-constructed quays, upon which are erected appropriate warehouses for the reception of merchandise. The depth of water in the harbour during neap-tides is about 10 feet, and during spring-tides about 16 feet. A steam-vessel belonging to the London Shipping Company leaves St. Katharine's wharf, London, for Leith, every Wednesday and Saturday evening. Great complaints have been made against the corporation of Edinburgh for 'unjustifiably' increasing the rate and number of the port charges, which is said to have been productive of considerable injury to the mercantile community of Leith, many branches of commerce which formerly flourished having been transferred in consequence to other ports. The net proceeds of the harbour and dock dues for the year ending Whit-Sunday, 1833, were 12,217*l.*, out of which the corporation of Edinburgh paid to government 10,350*l.* on account of interest and sinking fund.

The borough, in union with Portobello and Musselburgh, returns one member to parliament. It comprises the parishes of North and South Leith, whose population, in 1831, was 25,855 and 18,439 respectively. The population of the latter parish had decreased during the preceding ten years, in consequence of many of the inhabitants having removed from want of employment.

At the time of the foundation of the High School of Leith (the date of which does not appear) the endowments are stated to have been considerable; but in 1831 the funds were insufficient to liquidate the salaries of the teachers. In that year however the late Dr. Andrew Bell, by deed, appointed the magistrates and heads of the corporation trustees for certain sums (4894*l.* 3 per cent. consols, and 4895*l.* bank annuities), to be appropriated in the foundation of schools on the Madras system; and since then, although no new school has been established, two teachers, upon the above system, have been appointed to the High School by the corporation, by whom also they continue to be paid. The administration of the Bell trust funds is described as having been in several respects improvident and censurable. The management of the other affairs of the High School is confided to the Kirk Session and to the commissioners under the local act before cited. During the ten years preceding 1836 the number of pupils varied from 160 to 250. There are six classes, namely, two for the classics, one for the mathematics, one for writing and arithmetic, and two for English. The fees for the first two are 15*s.* per quarter, and for the other four 7*s.* 6*d.* per quarter. For more particular information as to the High School, the state of the harbour, and the connection between the city of Edinburgh and burgh of Leith, see the Commissioners' Reports on the city of Edinburgh (1835) and on the burgh of Leith (1836), from which this article is principally taken.

LEITMERITZ, one of the sixteen circles of the kingdom of Bohemia. It is bounded on the east by the circle of Buntzlau, on the south by that of Rakonitz, on the west by Meissen, and on the north by Lausitz. The area is 1434 square miles, and the population 345,000, who are mostly Germans. It contains 30 large towns and 967 villages. The greater part of this circle is high mountain land. On the north-west is the Erzgebirge, on the north and north-east the ridge of the Sudetes, and in the middle, between the Eger and Bela, a part of the Bohemian central chain. Some parts are mountainous and sterile, while others are romantically beautiful, with extensive valleys, which are among the most fertile parts of Bohemia, whence this circle is called the Bohemian Paradise, and the granary of Saxony. It produces in abundance corn, flax, hops, fruits, lime, tin, precious stones, especially garnets, coals, in the higher parts timber, and contains many stone-quarries. It possesses a good breed of cattle; and there are manufactures of woollen, cotton, and linen. The Elbe, flowing northwards, traverses the whole length of the circle. The other chief rivers are the Eger, the Bela, and the Potzen. The town of Töplitz, with its celebrated mineral springs, is in this circle. [TÖPLITZ.]

LEITMERITZ, the capital of the above circle, is situated in 50° 30′ N. lat. and 14° 5′ E. long., on the Elbe, which is there navigable, and over which there is a bridge 843 feet in length. It is surrounded with walls and a moat. It has a very fine cathedral, dedicated to St. Stephen, and eleven churches, the principal of which is All Saints, an episcopal palace, a handsome townhall, a gymnasium, a theological seminary, &c. The inhabitants, 4800 in number, have a few inconsiderable manufactures, and chiefly subsist by a profitable fishery of sturgeon, shad, and salmon, and the cultivation of their corn-fields, orchards, and vineyards.

(Hassel, *Geography*; Blumenbach, *Oesterreichische Monarchie*; *Oesterreichische National Encyclopëdie.*)

LEITRIM, a maritime county of the province of Connaught in Ireland, bounded on the north by the bay of Donegal and by Donegal county, on the north-east by the county of Fermanagh, on the east by the county of Cavan, on the south-east and south by the county of Longford, and on the south-west and west by the counties of Roscommon and Sligo, from the former of which it is separated by the river Shannon. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge it lies between 53° 47′ and 54° 27′ N. lat., and between 7° 35′ and 8° 25′ W. long.; and according to the Ordnance Survey of Ireland, extends from north-north-west to south-south-east 51¼ statute miles, varying in breadth from 5½ to 21. In the latter map the area is given as follows:—

	Stat. Acres.	R.	P.
Land . . .	368,614	3	25
Water . . .	23,747	3	37
Total .	392,362	3	22

or 613 square statute miles. In 1831 the population was 141,524.

The outline of Leitrim is very irregular, being contracted in the centre to little more than the breadth of Loch Allen, north and south of which lake the county expands into its two principal divisions. The district lying south and east of Loch Allen is an irregular parallelogram of about 18 miles by 20, the western and south-western sides of which are formed by Loch Allen and the line of the Shannon, and the north-eastern and south-eastern sides by the boundaries of the counties of Cavan and Longford respectively. The southern portion of this district, abutting on the counties of Longford and Roscommon, is to a considerable extent encumbered with narrow and steep ridges of low elevation, running in a direction about 10° west of north and east of south, which is consequently the general direction of all the streams and roads by which the intermediate valleys are traversed. The numerous small lakes also abounding in this part of Leitrim are of conformable outline. Of these the principal is Rinn loch, about two miles in length by half a mile in breadth, formed by an expansion of the Rinn river, which runs southward out of Leitrim through the north-western extremity of Longford to the Shannon. The Eslin, which brings down the waters of several small lakes situated between the Rinn and the Shannon, joins the latter river at the southern extremity of Loch Boffin. The rough country above mentioned lies eastward from the Eslin towards the Longford boundary, along which it extends for a distance of ten miles, covering in all a tract of about 30 square miles. Northward from this tract extends an open undulating plain, interspersed with numerous lakes and streams as far as the southern extremity of Loch Allen. This district forms part of the great limestone plain of Ireland, and contains some patches of excellent arable land, but is in general more adapted for grazing. The surface is more irregular than is generally the case in other divisions of the limestone country, in consequence of the great number of clay and gravel ridges scattered over it. The general direction of these ridges conforms to that of the heights farther south, but they are not disposed with so much regularity. The principal heights in this part of the county are Sheemore and Sheebeg, two hills of moderate elevation rising from the eastern bank of the Shannon. The main drainage of the limestone district is southward and westward to the Shannon, but several considerable streams in the north-eastern division of it run eastward to the lakes on the border of Cavan. Of the latter the principal is the river Dale, which runs into Garadice lake, and thence to Loch Erne. A cluster of lakes, of which the largest are called Lough Scur and St. John's Lough, occupies a tract of about six miles in length on the north of this level district, and there are upwards of fifty other lakes, varying in size from a quarter of a mile to a mile in length, scattered throughout the same portion of the county. The principal towns and villages are situated on the borders of the plain, the interior being comparatively thinly inhabited. They are, on the western side, Drumshanbo, at the southern extremity of Loch Allen; Leitrim, a village, four miles farther down the Shannon; Carrick-on-Shannon, the county town, three miles south of Leitrim, situated at the point where the Shannon changes its southern for a south-eastern course; Jamestown, three miles south-east of Carrick-on-Shannon, and Drumsna, two miles farther down the river. Along the southern margin of the plain the towns are Mohill, north of Loch Rinn, Cloone, and Carrigallen, near the Cavan boundary. On the east is the village of Newton Gorie, and in the north the small town of Ballinamore, and the villages of Castlefore and Cashcarrigan, the two latter situated between Loch Scur and St. John's lough.

That part of the basin of Loch Allen which is included within this county is formed by the group of Slieve-an-ierin on the east, by the Lackagh range lying south of Manor Hamilton on the north, and by a part of the Munterkenny and Braulieve ranges on the west. The group of Slieve-an-ierin extends from above Drumshanbo into the west part of Cavan, a distance of about twelve miles. Its highest point is at its southern extremity, where it has an altitude of 1922 feet. The summits of Bencroy and Lugnacuillagh, which are the most prominent points within this county in the group farther north, rise to 1707 and 1494 feet respectively. Between the two latter mountains the Yellow river descends by a broad and precipitous channel to Loch Garadice, and the Shannon, which has its source in Cavan, enters the northern extremity of Loch Allen through the valley intervening between Lugnacuillagh and the eastern declivities of the Lackagh groups upon the north. The highest summit of the Lackagh range is 1448 feet, and between it and the Munterkenny group, which rise along the western shore of Loch Allen, a wide valley intervenes watered by the Diffagher. The Diffagher has its chief source in Belhavel lake, a sheet of water about two miles in length, which occupies the summit level between Loch Allen and the valley of the Bonnet; the waters to the north of this point finding their way to the Atlantic either by Sligo or the bay of Donegal, and those to the south descending to Loch Allen and the Shannon. The heights of Munterkenny, the highest point of which is 1377 feet, bound Loch Allen on the west, forming the northern side of the valley of the Arigna, which river for some distance constitutes the boundary between Leitrim and Roscommon [ROSCOMMON], and runs into the south-western extremity of Loch Allen through a portion of the latter county. Besides the rivers enumerated, Loch Allen receives the waters of numerous minor streams and winter torrents, particularly from the western side of Slieve-an-ierin, which is deeply furrowed with their channels. The lake is eight miles in length, and from one to three in breadth, and lies nearly north and south. The Shannon issues in a noble stream from its southern extremity, at which point the scenery is highly picturesque, as well as at the opposite end of the lake, where several islands and peninsulas diversify the outline. The general aspect of the lake however is gloomy, and from its situation it is exposed to violent squalls, which render navigation dangerous. Its summer level is 159 and its winter level 163 feet above the level of the sea at low water. The Shannon, in its passage from Loch Allen to the extremity of the county, has a fall of thirty feet, which is principally distributed over the first seven miles of its course, where the difficulty of navigation has been obviated by the construction of a canal, extending from Drumshanbo to Battlebridge. Another canal, about a mile long, avoids the rapids between Jamestown and Drumsna. [SHANNON.]

Beyond the range of Lackagh and the table-land occupied by the lake of Belhavel rise four detached mountain groups, including, with the heights of Lackagh, five distinct valleys, which unite in a pleasantly situated plain occupying nearly the centre of the northern division of the county. The town of Manor Hamilton and the village of Lurganboy are situated close to one another in the common terminus of these valleys, and through these towns the entire inland communication between Leitrim and Sligo and the northern counties is carried on. Of these valleys the best defined are those of the Upper and Lower Bonnet. The Bonnet, taking its rise from Glenade Loch, near the north-western extremity of the county, runs south-east between the heights of Dartry on the north, and a prolongation of the range of Benbulben in Sligo on the south, to within a mile of Manor Hamilton, where it is joined by the Owenmore descending from a valley between the eastern flank of the Dartry mountains and the western declivity of Dooey. After its junction with the Owenmore, the Bonnet changes its direction to south-west, and runs with a winding course by Dromahair into the eastern end of Loch Gill, the waters of which are alternately discharged into the Bay of Sligo. The valley between Dromahair and Manor Hamilton is formed by the brow of Lackagh on the eastern side, and on the west by the mountain of Benbo and its subordinate range. Benbo, though not exceeding 1400 feet in height, from its shape and position has a striking appearance. The slopes on each side of the valley are well wooded, and the whole scene is one of considerable beauty. North of the group of Benbo lies the valley of Glencar watered by the Differen, which however runs westward by Glencar lake and a wooded defile through the northern part of Sligo to the sea. Glanfarn is another valley terminating in the open country round Manor Hamilton. It lies nearly due east and west in an opposite direction from Glencar, and is watered by a considerable river running eastward into Loch Macnean. The valley is bounded by the northern brow of Lackagh on the south, and by the heights of Dooey on the north, the mountains rising on each side to a height of 1400 to 1500 feet. Steep sides and flat extended summits are the characteristics of all the mountains in this district of Leitrim, and, although of no remarkable altitude, they severally cover very large areas, so that there is probably not more than one-fourth of the northern district unencumbered. Lochs Macnean and Melvin stretch along the north-eastern boundary of the county, separating it from Fermanagh, in which they partly lie. They are respectively 3½ and 7½ statute miles in length, and are pleasingly diversified with wooded islands. The Kilcoo river connects them, and their waters are discharged into the Bay of Donegal by the Drowes, from which latter the bathing village of Bundrowes, at its embouchure, takes its name. At the western extremity of Loch Melvin is the village of Kinloch, in an open tract expanding towards the sea, and contracted on the inland side, between the heights of Dartry and the prolongation of the Benbulben group, forming a continuation of the valley of the Upper Bonnet. The river Duff, which separates Leitrim from Sligo, runs into the Bay of Donegal, at the eastern extremity of the coast-line.

The shore is for the most part a rocky bluff, with a rough stony beach along the foot of it, and is exposed to the whole swell of the Atlantic. A few yawls are kept at Bundrowes; but there is no shelter on any part of the coast for larger craft. Bundrowes has the requisites for constructing a harbour, but the cost would be greater than any contemplated advantage would repay. There are salmon fisheries at the mouths of the Drowes and Duff rivers.

A new road has been lately completed from the sea at Bundrowes, through Glenade to Manor Hamilton, and thence by the west side of Loch Allen to Carrick-on-Shannon and Drumsna. The other principal roads in the northern district of the county pursue the lines of the several villages radiating from Manor Hamilton. The chief roads in the southern district run east and west, connecting the towns and villages which occupy the northern and southern margins of the open limestone country. A line of railroad has been projected from Dublin to Sligo, which would pass through the southern extremity of Leitrim, but it has not been recommended by the Railway Commissioners for Ireland. The Shannon is crossed by seven bridges within the limits of the county.

Climate.—The climate is raw and damp, particularly in the northern parts of the county, owing to the great extent of moory ground and the vicinity of the Atlantic. In the sheltered valleys however, particularly in the vicinities of Dromahair and Manor Hamilton, where there is a kindly soil, vegetation is as luxuriant as in most parts of other counties in the same latitude. The surface of Leitrim was till a comparatively late period well stocked with timber. It is now barer of wood than most of the neighbouring counties; the only traces of the former forests consisting of some copses in Glencar, and a small quantity of old timber preserved in private demesnes.

Geology.—The varieties of surface in Leitrim indicate the internal structure with peculiar precision. The flat-topped mountain groups showing steep escarpments and natural terraces belong to the millstone-grit or Loch Allen coal formation. The undulating open country has the floetz-limestone for its substratum, and the rough coarse land, when not belonging to the Loch Allen basin, generally consists of sandstone, conglomerate, and wacke. The rocks of the Loch Allen coal-district are more analogous to the millstone-grit of the north of England than to coal tracts in general. The series reposes on the splintery limestone which forms the upper member of the carboniferous or floetz-limestone field. First in ascending order occur thick beds of yellowish-white quartzy sandstone with interposed beds of black shale. The edges of these strata present the appearance of terraces. Then succeeds a massive bed of shale which in some parts of the series attains a thickness of 700 feet. The lower beds of this member consist of thin alternations of black shale with impure dark bluish grey argillaceous limestone, containing many of the fossils of the carboniferous limestone formation. The calcareous beds gradually grow thinner as they ascend, and at length disappear, their places being supplied by layers, and frequently by large flattened spheroids, of argillaceous ironstone. The shale associated with the ironstone contains frequent casts of marine organic remains. The beds of ironstone also grow thinner as they ascend, and at length disappear, leaving the upper portion of the shale of a uniform structure. The next member of the series after the massive shale is a stratum of yellow sandstone, in some parts of the district 250 feet thick, associated with beds of true millstone-grit. Alternations of shale and sandstone containing beds of coal succeed wherever the mountains are of sufficient altitude; for it would appear that such a formation had originally extended over the entire district, and that the absence of those members from the lower mountains has been owing to their removal by some abrading and denuding force. At present they remain only on the summits of Sliev-an-ieran, Lugnaculleagh, Lackagh, and on the highest part of the Munterkenny range; and the occurrence of coal in lumps throughout the sandstone, gravel, and blue-clay hills of the south and south-eastern parts of the county confirms the supposition that a portion of the coal formation has been removed, and points at the north-west as the direction from which the denuding agent must have proceeded. The chief workable beds of the district are situated on the summit of the Braulieve Mountains, on the southern side of the valley of the Arigna, where the coal-measures are worked for the purpose of smelting the ironstone with which they are associated.

Where the millstone-grit formation terminates, the floetz-limestone reappears, and occupies the greater portion of the district watered by the Bonnet and its tributaries. The grit and sandstone occur however in the detached formation of Dartry, and a stripe of yellow sandstone and conglomerate, similar to that of the extreme south, intervenes between the external limit of the limestone and the sea. The only primary rock within the county occurs along the western boundary of the valley of the Lower Bonnet, where the granitic and trap formation of the Ox mountains of Sligo is prolonged by the southern and eastern shore of Loch Gill, along the valley of the Bonnet, to within a few miles of Manor Hamilton. Benbo, which rises about the middle of this range, is a mass of gneiss passing into mica slate.

It is surprising that in a country so rich in minerals there should not at present be any mine in operation. The smelting of iron was carried on in several places round Loch Allen while the wood of the native forests lasted, but as no care was taken by coppicing or planting to preserve the supply, there is no longer any fuel of that kind to be had. Lead-ore has been raised near Lurganboy, and copper-ore from the north side of Benbo. Manganese is found in considerable quantities in the neighbourhood of the latter place. Fullers' earth, potters' clay, steatites, and marls are also obtained in the district between Dromahair and Lurganboy. Chalybeate springs are numerous on the borders of the Loch Allen district.

Soil, Cultivation, &c.—The soil is far from kindly even in the open limestone country, being for the most part stiff, cold, and very retentive of wet. The best tracts are along the Shannon, Rinn, and Bonnet rivers, in the vicinity of Drumsna, Mohill, Dromahair, and Manor Hamilton. The principal crops are potatoes, oats, and flax. Wheat is not grown to any considerable extent. The *loy*, or narrow-bladed spade, is still used in the more remote districts, and the potatoe crop is not unfrequently dibbled in with a pointed stick called a 'steveen.' Improved implements of husbandry are scarcely in use among any but the gentlemen farmers. Leitrim is more a grazing than an agricultural county. Large quantities of young stock, chiefly horned cattle, are raised on the pasturable plains of the southern district. The following table exhibits the sales of agricultural produce in the chief market-towns in the years 1826 and 1835.

	Barrels of Wheat.		Barrels of Oats.		Barrels of Rye.	
	1826.	1835.	1826.	1835.	1826.	1835.
Carrick-on-Shannon . .	270	246	2,320	2,160	209	118
Drumsna . .	average[*]	463	average	8,937		
Drumshanbo .	„	„	15,600	23,400		
Jamestown .	average	1,449				
Mohill . .	„	„	average	5,200		
Dromod . .	„	„	average	500		
Ballinamore .	„	„	average	3,565		
Fenagh . .	average	2,228				
Carrigallen .	„	„	average	160		
Dromahair .	included in sales for Sligo		. . .			
Drumkeerin .						
Manor Hamilton						

There are no great demesnes of the resident nobility in Leitrim, and the mansions of the resident gentry are not so numerous as in any of the adjoining counties. The neighbourhoods of Carrigallen, Drumsna, Dromahair, and Manor Hamilton are the best situated with respect to the residence of the higher classes; and there are several handsome demesnes on the shores of lochs Melvin and Macnean. The peasantry, who generally speak the English language, are decent in appearance, and have the character of industry and peaceable habits. Their mode of living is however

[*] On each of the ten years preceding 1835.

very poor, and, generally speaking, they are inferior in physical advantage to the peasantry of the midland counties. The wages of agricultural labourers vary from 6*d*. to 10*d*. per day for 140 working days in the year. Wages are higher in the northern district than in that south of Loch Allen. Turf fuel is everywhere abundant.

Leitrim is divided into the baronies of Rossclogher on the north, containing part of the town of Manor Hamilton (population, in 1831, 1348) and the village of Lurganboy (pop. 134); Dromahair, occupying the remainder of the northern division, containing the villages of Dromahair (pop. 336) and Drumkeerin (pop. 284); Carrigallen on the south-east, containing the towns of Carrigallen (pop. 492), Ballinamore (pop. 312), and the village of Newtowngore (pop. 207); Leitrim on the south-west, containing part of the town of Carrick-on-Shannon (total pop. 1870), the towns of Drumshanbo (pop. 479), Drumsna (pop. 427), Jamestown (pop. 311), and the villages of Leitrim (pop. 274) and Cashcarrigan (pop. 94); and Mohill on the south, containing the town of Mohill (pop. 1606) and the village of Dromod (pop. 162).

Carrick-on-Shannon, formerly Carrick Drumrusk, is incorporated by charter of the 11th James I., but since the year 1826 the corporation have not exercised any functions. It is well situated for trade, having a good bridge over the Shannon, and water communication to Limerick, Dublin, and Loch Allen. It formerly returned two members to the Irish parliament, but was disfranchised at the time of the Union. The town is badly paved and is not lighted. Jamestown, also incorporated by charter of the 19th James I., formerly returned two members to the Irish parliament: it is now disfranchised, and its corporation is extinct. Mohill, Manor Hamilton, and Drumsna are neatly built towns; the other places are inconsiderable.

Leitrim lies partly in the diocese of Ardagh, but chiefly in that of Kilmore. Prior to the Union it returned six members to the Irish parliament. The representation is now limited to two county members. In January, 1836, the constituency consisted of 1491 voters. The assizes for the county are held at Carrick-on-Shannon, where the county gaol and court-house are situated. General quarter-sessions are held at Carrick-on-Shannon, Ballinamore, and Manor Hamilton, at which latter places are sessions, court-houses, and bridewells. The district lunatic asylum is at Ballinasloe, in the county of Galway. The county infirmary is at Carrick-on-Shannon, and there are dispensaries in all the towns and villages. The constabulary force in 1836 consisted of 5 chief constables, 21 constables, 86 sub-constables, and 5 horse, the total cost of maintaining which force amounted to 4633*l*. 12*s*. 8*d*., defrayed in nearly equal proportions by government and the county. In 1836 the total number of criminal offenders committed to the county gaol was 327, of whom 282 were males and 45 females. Of these 89 males could read and write at the time of their committal, 25 males and 2 females could read only, 144 males and 30 females could neither read nor write, and of 24 males and 13 females the instruction could not be ascertained. The only barrack for troops in Leitrim is at Carrick-on-Shannon.

The spinning and weaving of linens is the only branch of manufacture carried on with activity. There are 4 bleach-greens in the county, which annually finish about 32,000 pieces of cloth, chiefly for the English market. The number of weavers in 1831 was 437, of flax-dressers 33, of reed-makers 2, of millers 54, of tanners 10, and of tobacconists 1. A coarse pottery ware is made near Dromahair, and there is throughout the county a considerable manufacture, for home consumption, of friezes, flannels, and woollen stuffs. The trade of the county, exclusive of the linen business, consists almost wholly in the sale of grain, butter, and live-stock.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	10,026	..	..	..	..	..	..	50,000
1813	Under Act of 1812 . . .	17,899	..	..	..	..	..	..	94,095
1821	Under Act 55 Geo. III. c. 120	21,762	23,001	..	..	..	61,361	63,424	124,785
1831	Under Act 1 Will. IV. c. 19 .	24,200	25,481	20,937	2,085	2,459	69,451	72,073	141,524

Before the coming of the English, Leitrim formed portion of the territory of Breifne, of which O'Rourk was petty king, and was called Breifne, or Brenny O'Rourk, to distinguish it from Brenny O'Reily, the present county of Cavan. It was by carrying off Devorgil, the wife of Tiernan O'Rourk, king of Breifne, that Dermod MacMurrogh provoked the hostility which forced him to seek the aid of Henry II. The whole of Brenny O'Rourk is said to have been bestowed by King John on De Lacey; the O'Rourks nevertheless continued to maintain their independence until the reign of Elizabeth, when Leitrim was first reduced to shire ground as a separate county by the Lord Deputy Sussex in 1563, or, according to others, by Sir Henry Sidney in 1565. During the earlier period of Anglo-Irish history it is said to have formed portion of the county of Roscommon. Brian O'Rourk, the principal man among the native Irish of the county, resented the introduction of the English laws; and after many bickerings with Sir Richard Bingham, president of Connaught, broke out into open rebellion in 1588. He was assisted by MacSwiny, and had a body of Munster troops in his pay, with whom he held the castle of Dromahair until compelled to retreat towards Donegal by Sir Richard Bingham and the earl of Clanrickard. Disputes having occurred between him and the leader of the Munster auxiliaries, he was soon after driven to take shelter with MacSwiny in Donegal. From thence he fled to Scotland, where he was delivered to the English authorities by James VI., and was finally carried to London, and there tried for treason and executed. It is related of him by Lord Bacon that he petitioned to be hanged with a withy, after his own country fashion. On the breaking out of O'Donnell's rebellion, in 1596, Tieg O'Rourk, the son of Brian, joined the insurgents, but submitted 14th February, 1597. In June of the same year however he resumed arms, and with Maguire defeated Sir Conyers Clifford in a pass of the Curlew mountains, with considerable loss to the English. He finally submitted in 1603, and took out a patent of the residue of his estate, which had been allotted to him on an English tenure. By an inquisition, taken in 1615, the king's title to the greater part of Leitrim was affirmed, and numerous patents were granted to undertakers by a commission appointed for the purpose of disposing of the estates of the crown in Leitrim, Longford, and King's County. On the breaking out of the rebellion of 1641, the native Irish, headed by Sir Owen O'Rourk, seized all the places of strength in the county, with the exception of the castles of Carrickdrumrusk and Manor Hamilton, the latter of which had been built a short time before by Sir Frederic Hamilton, one of the grantees under the commission. Jamestown, a castle of Sir Charles Coote's, also held out until 1645, when it was taken by Lord Taaffe. The Roman Catholic prelates and clergy assembled here in 1650; and having nominated agents to treat with foreign powers on their behalf, concluded their synod, August 12th, by fulminating a decree of excommunication against the marquis of Ormond and all his adherents. The confiscations which followed on the termination of these wars included almost all the lands that had been allowed to remain to the native proprietors under former attainders, and may be said to have extinguished the family of O'Rourk. The forfeitures consequent on the war of the revolution of 1688 do not appear to have extended to Leitrim, which, from its remote situation, was little affected by the military operations of that æra. In 1798 the county was traversed from north to south by the French under Humbert, who, after taking Castlebar [MAYO] marched northward through the county of Sligo to Dromahair, and thence across the southern district of Leitrim to Ballinamuck, on the borders of Longford, where, after a short resistance, he surrendered to Earl Cornwallis.

The remains of antiquity in Leitrim are not very interesting. There are some ruins of the abbey of Fenagh, founded by St. Caillin in the fifth century, and celebrated during the early period of Irish church history as a school of divinity. The abbey of Creevlea, near Dromahair, founded by the wife of Owen O'Rourk in 1508, was an extensive pile, of which the principal walls are still standing: it contains some curious tombs and monuments. The remains of the other religious houses are insignificant. O'Rourk's Hall at Dromahair, Castle Longfield, Cloncarrick Castle, Castle Car, and several others now in ruins, belonged to the O'Rourks. Jamestown and Castlefore castles were built by Sir Charles Coote in the early part of the seventeenth century. Dromahair Castle, of which the gables are still standing, was erected in 1628 by Sir William Villiers. The strongest and handsomest fortalice however in the county is the castle of Manor Hamilton, built about the same period by Sir Frederic Hamilton. It is quoined and corniced with cut stone, and is surrounded by a regular rampart with four bastions.

The county expenses are levied by grand jury assessments. The amount assessed in 1835 was 15,638*l.* 12*s.* 10*d.*, of which 2107*l.* 0*s.* 10*d.* was for roads and bridges charged to the county at large; 2794*l.* 7*s.* 4½*d.* was for those of the baronies; 5291*l.* 8*s.* 11*d.* for public buildings, salaries, &c.; 2338*l.* 3*s.* 7½*d.* for police; and 3107*l.* 12*s.* 1*d.* for repayment of loans from government.

(*Statistical Survey of Leitrim*, Dublin, 1802; Griffith's *Account of the Connaught Coal Tract; Report of Railway Commissioners for Ireland;* Cox's *History of Ireland; Parliamentary Reports and Papers.*)

LELAND, or LAYLONDE, JOHN, an eminent English antiquary, was born in London in the beginning of the sixteenth century, and educated at St. Paul's school under the celebrated William Lily. He first entered at Christ's College, Cambridge, where he is said to have been a Fellow, but afterwards removed to Oxford, and passed several years in All Souls College, where he prosecuted his studies not only in Latin and Greek, but in Saxon and Welsh. From thence he went to Paris and learned French, Italian, and Spanish. On his return home he entered into orders, and being esteemed an accomplished scholar, King Henry VIII. made him one of his chaplains; gave him the rectory of Popeling in the marches of Calais in 1530; appointed him his library-keeper; and by a commission dated in 1533 dignified him with the title of his Antiquary. By this commission he was ordered to make search after England's antiquities, and peruse the libraries of all cathedrals, abbeys, colleges, and other places where 'records and the secrets of antiquity were deposited:' a stipend was allotted to him: and he received a dispensation for non-residence upon his living. He spent six or seven years in travelling through England and Wales, collecting materials for the history and antiquities of the nation; and noticed in his journey not only the more important manuscripts which he met with, but all the localities and local antiquities of the country of whatever description, the rivers, forests, chases, woods, cities, castles, manor-houses, monasteries, colleges, and everything that seemed memorable. In 1542 Henry VIII. presented him to the rectory of Hasely in Oxfordshire, and the year following to a canonry of King's College, now Christ Church, Oxford. In 1545, upon the surrender of that college to the king, he lost his canonry, but seems to have been compensated for it in the prebend of East and West Knowle in the cathedral of Sarum. In that same year, having digested into four books that part of his collections which contains an account of the illustrious writers in the realm, with their lives and monuments of literature, he presented it to his Majesty, under the title of 'A Newe Year's Gift,' with a scheme of what he intended to do further for the general history and topography of England and Wales. For the purpose of digesting his collections he retired to a house of his own in the parish of St. Michael-le-Querne in London.

In 1547 Leland's royal patron died, and the attention of the Court, according to Bale, became slackened toward his labours. Whether this was really the cause of the disorder by which he became afflicted is matter of doubt, but within a year or two he became insane: and his distemper being made known to King Edward VI., his Majesty by letters patent, dated March 5th, 1550, granted the custody of him, by the name of John Layland the Younger, to John Layland the Elder, 'with all his lands, tenements, rents, &c., in as large and ample manner as the said John the Younger, being in his right mind, had the same.' In this state he continued, without recovery for two years, when he died, April 18th, 1552. He was interred in the church of St. Michael-le-Querne, which then stood at the west-end of Cheapside, between the conduit and Paternoster-row.

Leland's papers, upon his death, were committed by King Edward VI. to the custody of Sir John Cheke; but subsequently became dispersed. Sir John Cheke, being obliged to go abroad, left four volumes of Leland's Collections in the hands of Humphry Purefoy, Esq., from whom they descended to Burton, the historian of Leicestershire, who, having obtained possession of eight other volumes of Leland's manuscripts containing his 'Itinerary,' deposited the whole, in 1632, in the Bodleian Library at Oxford.

Part of a volume of Leland's Collections, in his own handwriting, will be found in the Cottonian MS. Julius C. VI., in the British Museum; and it is probable that other libraries contain fragments of his productions. He and Nicholas Udall, between them, prepared the verses in English and Latin which were spoken in the Pageant as Anne Boleyn went to her coronation.

The publications by which Leland is most known are his 'Commentarii de Scriptoribus Britannicis,' not very faithfully edited by Anthony Hall, 2 vols. 8vo., Oxon, 1709; his 'Itinerary,' published by Thomas Hearne, 9 vols. 8vo., Oxford, 1710-12; reprinted as the third edition in 1770; and 'De Rebus Britannicis Collectanea,' edit. Thoma. Hearne, 6 tom. 8vo., Oxon, 1715; reprinted at London in 1770.

(*Lives of Leland, Hearne, and Wood*, 2 vols. 8vo., 1772; Chalmers's *Biogr. Dict.*, vol. xx.; Bliss's edit. of Wood's *Athenæ Oxonienses.*)

LELAND, JOHN, D.D., born 1691, died 1766, was of a Presbyterian family in Lancashire, but his father removed while he was very young to Dublin. He was designed for the ministry, and early in life he became pastor of a congregation of Presbyterian Dissenters in Dublin, and in that situation he spent the remainder of his life. He received his degree of Doctor of Divinity from the university of Aberdeen.

Dr. Leland's name would not however have found its way into these columns had he pursued the course of a useful and pious minister only. His claim to notice rests on various works of which he was the author, in the great controversy of the age in which he lived, on the truth and divine origin of Christianity. His first work, published in 1733, was an answer to Tindal's 'Christianity as old as the Creation.' In 1737 he encountered Dr. Thomas Morgan's work, entitled 'The Moral Philosopher;' and in 1742 he published an answer to a tract entitled 'Christianity not founded on Argument.' In 1753 he published 'Reflections' on such parts of Lord Bolingbroke's 'Letters on History' as relate to Christianity and the Scriptures.

All these works are esteemed valuable defences of Christianity; but his principal work is entitled 'A View of the principal Deistical Writers that have appeared in England in the last and present Century; with Observations upon them.' This work first appeared in its original form in 1754.

LELAND, THOMAS, born 1722, died 1785, a divine, scholar, and historical writer, was a native of Dublin, but not, we have reason to believe, at all connected with the Presbyterian minister just mentioned. He was educated at Trinity College, Dublin, and became early in life a Fellow of that Society, which placed him in a state of independence, and enabled him to devote himself to the pursuit of knowledge and truth, for which he was remarkable through the whole course of his life.

His principal works are, 'A Translation of Demosthenes,' 1756-1770; 'A History of the Life and Reign of Philip of Macedon,' 1758; 'A Dissertation on the Principle of Human Eloquence,' 1764, one of the many works that arose out of the publication, by Bishop Warburton, of his 'Divine Legation of Moses;' 'A History of Ireland,' 1773.

Dr. Leland was an admired preacher, and after his death a collection of his sermons, in three volumes, was published.

LE'LEGES. The history of this people is involved in great obscurity, in consequence of the various and almost contradictory traditions which exist concerning them; according to which, they are on the one hand represented as among the earliest inhabitants of Greece, while on the other they are said to be the same people as the Carians. According to Herodotus, the Carians, who originally inhabited the islands of the Ægean Sea, were known by the name of Leleges before they emigrated to Asia Minor (i. 171); and according to Pausanias, the Leleges formed only a part of the Carian nation (vii. 2, § 4). The Leleges appear, from numerous traditions, to have inhabited the islands of the Ægean Sea and the western coasts of Asia Minor from a very early period. In Homer they are represented as the allies of the Trojans; and their king Altes is said to be the father-in-law of Priam. (*Il.*, xx. 96; xxi. 86.) They are said to have founded the temple of Hera in Samos (Athen. xv., p. 672, Casaubon); and Strabo informs us that they once inhabited, together with the Carians, the whole of Ionia (vii., p. 331).

On the other hand, in the numerous traditions respecting them in the north of Greece we find no connection between them and the Carians. According to Aristotle (quoted by Strabo, vii., p. 322), they inhabited parts of Acarnania, Ætolia, Opuntian Locris, Leucas, and Bœotia. In the south of Greece we again meet with the same confusion in the traditions of Megara respecting the Leleges and Carians. Car is said to have been one of the most antient kings of Megara, and to have been succeeded in the royal power, after the lapse of twelve generations, by Lelex, a foreigner from Egypt. (Paus., i. 39, § 4, 5.) Pylus, the grandson of this Lelex, is said to have led a colony of Megarian Leleges into Messenia, where he founded the city of Pylus. (Paus., iv. 36, § 1.) The Lacedæmonian traditions, on the contrary, represent the Leleges as the original inhabitants of Laconica. (Paus., iii. 1 § 1.)

It can scarcely be doubted, from the numerous traditions on the subject, that the Leleges were in some manner closely connected with the Carians; though it seems improbable that they were, according to Herodotus, the same people. The Carians are universally represented as a people of Asiatic origin; while the principal and apparently earliest settlements of the Leleges were on the continent of Greece. With the single exception of the Megarian tradition mentioned above, the Leleges are nowhere represented as foreign settlers. If we might venture to form an opinion upon such a doubtful subject, we should be disposed to regard the Leleges as a people of Pelasgian race, a portion of whom emigrated, at a very early period, from the continent of Greece to the islands of the Ægean Sea, where they became connected with the Carians, and subsequently joined them in their descent upon Asia Minor.

(Kruse's *Hellas*; Wachsmuth's *Historical Antiquities of the Greeks*; Thirlwall's *History of Greece*; *Philological Museum*, No. 1, art. 'Ancœus.')

LELY, SIR PETER (or Peter Vander Faes), was born in 1617, at Soest in Westphalia. He was placed, at what age does not appear, under Peter Grebber at Haarlem, an artist of considerable merit, whose school was in high esteem. Lely continued two years with him. He acquired great reputation by his portraits, and was appointed state painter to King Charles II., who probably became acquainted with him when he was in Holland. He is especially eminent for his talent in giving a pleasing representation of female beauty. His pencil was light and delicate, his colouring very beautiful, the tone warm, clear, and full, and his execution often spirited. The airs of his heads and his figures are pleasing and graceful, and the attitudes easy and unaffected. The hands of his figures are painted with remarkable care and delicacy. His draperies are arranged, with an appearance of negligence, in broad folds. He sometimes gave his pictures a landscape background in a style peculiarly calculated to give relief to his figures. He occasionally painted historical pictures, one of the best of which is a representation of Susannah and the Elders, at Burleigh House. His most celebrated performance is the series of portraits of the beauties of the Court of King Charles II., preserved at Hampton Court. Lely equally excelled as a crayon painter, and his portraits in that style are esteemed equal, and by some are preferred, to his paintings in oil. He died in England in 1680, at the age of 63.

LEMAN LAKE, *Lemānus Lacus*, *Lake of Geneva*, *Genfersee* (German), one of the largest lakes in Europe, extends in the form of a crescent from east to west between Switzerland and Savoy. Its northern or convex bank, which forms an arc of about 53 miles in length, not reckoning the sinuosities, belongs to the Swiss canton of Vaud, and the southern or concave side, forming an arc of 46 miles, belongs for the greater part to Savoy, the canton of Geneva possessing about eight miles of it at the south-western, and the canton of Valais four miles of it at the south-eastern extremity. Its breadth varies greatly, being between eight and nine miles in the middle, four miles towards the eastern extremity between Vevay and St. Gingouph, three miles in its western part opposite Nyon, after which it becomes narrower and narrower, being reduced to one mile just before reaching Geneva. This narrow part, which is about 14 miles in length from Nyon to Geneva, is called the Little Lake, and more especially the Lake of Geneva. The greatest depth of the Leman, below the cliffs of Meillerie on the coast of Savoy, is nearly 1000 feet; it is 500 feet deep near the castle of Chillon, on the opposite coast, and from 600 to 300 feet in other places. The lake seldom, if ever, freezes; the temperature of its water below 150 feet depth is 41° of Fahrenheit. Its surface is 1150 feet above the sea, but in summer it rises sometimes from six to eight feet higher, owing to the melting of the snows in the Alps. The water reflects a bright azure tinge like that of the Mediterranean sea. The Rhone, coming from the Valais, enters the lake at its south-east extremity, where the waters of the river are muddy coloured; and it issues out of it again at Geneva at the south-west extremity, where its waters assume a deep blue tinge. The other rivers that enter the lake are, 1, the Dranse on the Savoy side, coming from the Alps of Faucigny; 2, the Venoge, on the northern or Swiss side, which rises in the Jura and enters the lake between Morge and Lausanne; 3, the Vevayse, a mountain-torrent, which rises in the canton of Freyburg, and enters the lake near Vevay. Though the Leman lake does not abound so much with fish as most of the other Swiss lakes, still it affords some very fine and large sorts, especially trouts, pike, carp, perch, and a species called 'omble chevalier,' which is much esteemed. The east and north-east winds are the most violent on this lake, and when they blow fresh for some time the waves rise to a considerable height, and the surface of the lake resembles an agitated sea. The most dangerous wind is the Bornand, or south wind, which blows in sudden gusts from the mountains of Savoy. The traffic-boats are few and clumsily built, and cannot stay out in bad weather. A regular communication has been established for some years all along the northern coast from Villeneuve to Geneva by means of two steam-boats, the Leman and the Winkelried, which ply every day in opposite directions. The scenery around this lake has been always a subject of admiration to travellers. The mountains of the Chablais, being a lower offset of the Alps, rise dark and abrupt along the southern shore, some of their summits being 5000 feet above the lake, and beyond them, through their openings, the spectator from several points of the Swiss coast sees the higher Alps of Faucigny and Mont Blanc itself covered with perpetual snow. The eastern extremity of the lake presents the wild and imposing scenery of the narrow deep entrance into the Valais between the lofty groups of the Dent de Morcle and Dent du Midi, between 8000 and 9000 feet high above the lake, while the northern or Swiss coast displays a milder and more cheering landscape of hills rising, in the form of an amphitheatre, covered with vineyards and gardens, and studded with numerous towns and villages having all the appearance of comfort and industry.

(Leresche, *Dictionnaire Géographique de la Suisse.*) [LAKES.]

LEMBERG, one of the nineteen circles of the Austrian kingdom of Galicia, is situated nearly in the centre of the country. The area is variously stated by different authors; 975 square miles is probably near the truth. The population, by the census of 1826, was 166,118; and as it appears from the census that the increase had been 10,000 in four years, it may be presumed that the population would now (1838) probably approach 200,000, but for the ravages of the cholera in 1831. The face of the country is undulating, but without any high mountains. To the west of the city of Lemberg there is a range of low hills, and woods are common. The soil is sandy, stony, and in parts swampy and unproductive.

LEMBERG, the capital both of the circle and of the whole kingdom of Galicia, lies in 49° 52′ N. lat. and 24° E. long. It is situated in a narrow valley, which winds round an alluvial sand-hill, and there gradually expands into a plain. The situation is pleasant, but not suited to a great city, there being no river, and only a small stream, the Peltew, which is dry in summer. The city is 868 feet above the level of the sea. When Lemberg belonged to Poland it was a very ill-built place, consisting chiefly of wooden houses; but it has been extremely improved since it came into the possession of Austria. There are now many handsome buildings, broad straight streets, and lofty houses built of freestone, which, with the cupolas and steeples of the cathedrals and churches, give the city, especially when viewed at a distance, an air of grandeur. The city was formerly strongly fortified, and made a successful defence in 1666 against the Russians, and in 1672 against the Turks (to whom it however paid 80,000 dollars to raise the siege). In 1704 Charles XII. of Sweden took it by storm; after which the fortifications were not kept in a state of defence, and under Joseph II. they were pulled down, and low ramparts erected instead, which are planted with trees and laid out in public walks. The compass of the city is small, and the largest houses are in the four suburbs. There are in Lemberg a handsome cathedral and thirteen other Roman Catholic churches, an Armenian and a Greek cathedral, a Lutheran chapel, 2 synagogues, and 9 (formerly 33) convents, namely, of Catholics, 4 of monks and 3 of nuns, one Armenian nunnery, and 1 convent of Greek monks. Besides being the residence of the Roman Catholic, Armenian, and Greek archbishops, of the Lutheran superintendent, and a chief Rabbi, of the Governor-General (the Archduke Ferdinand of Este), and all the chief military and civil authorities of the kingdom, Lemberg has a university, two gymnasia, a Roman Catholic and a Greek Catholic theological seminary, and numerous schools of various kinds, with many hospitals, infirmaries, and other charitable institutions. The manufactures have become much more extensive and important within these few years than they formerly were. Lemberg is the most important trading town in Galicia after Brody. The commission trade is very extensive, and an immense amount of business is done at the annual fair, commencing on the 6th January, and in the six weeks beginning on the 14th January, which is called the 'contract time,' when the nobility of Galicia and a vast concourse of strangers, Christians and Jews, resort to this place. The population, without the military and the strangers, was, in 1836, 52,202 according to Mr. Rohrer (*Statistik des Oesterreichischen Kaiserthums*), and he thinks that, with the military, the foreign students, and the numerous strangers, it may be estimated at 60,000, of whom above 20,000 are Jews.

LEMGO. [Lippe-Detmold.]

LEMMA (λῆμμα, literally 'a thing taken or assumed'), a preparatory proposition borrowed from another subject, or from another part of the same subject, and introduced at the point at which it becomes indispensable. Thus, if in a treatise on mechanics it become necessary to prove certain propositions of geometry, those propositions are lemmas. Many writers use the term as if it applied to any necessary preliminary proposition: thus the seventh of the first book of Euclid is with them a lemma to the eighth. But this destroys the peculiar and antient signification of the term, which it is desirable to retain, or else to avoid the word altogether.

LEMMING. [Muridæ.]

LEMNIAN EARTH. Occurs in the Isle of Lemnos, whence its name. It is found massive. Fracture earthy. Dull. Has a meagre feel. Soft. Opaque. Colour greyish or yellowish white. Falls to pieces when put into water. It was formerly used in medicine under the name of *Terra Sigillata*.

According to Klaproth it consists of—

Silica	66·0
Alumina	14·5
Oxide of iron . . .	6·0
Soda	3·5
Water	8·5
Traces of lime, magnesia, and loss .	1·5
	——100·0

LEMNISCA'TA, a curve (first noticed by James Bernoulli) having the form of an 8, but with the upper and lower parts perfectly symmetrical. It is the locus of the point in which a tangent to an equilateral hyperbola meets the perpendicular on it drawn from the centre. If the equation of the hyperbola be $x^2-y^2=a^2$, that of the lemniscata referred to the same axes is $(x^2+y^2)^2=a^2(x^2-y^2)$, and its polar equation is $r^2=a^2\cos.2\theta$. If the hyperbola be not equilateral, and its major and minor semi-axes be a and b, the locus above described is still a curve of the same form; and if

$$\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$$

be the equation of the hyperbola, that of the new lemniscata is

$$(x^2+y^2)^2=a^2x^2-b^2y^2.$$

A great many different curves might be assigned, having the same form: an instance is $y^2=mx^2(a^2-x^2)$.

(Peacock's *Examples, &c.*; Legendre, *Exercices du Calcul Integral.*)

LEMNOS, one of the northern islands of the Ægean Sea, situated nearly half-way between Mount Athos and the entrance of the Dardanelles, and about 22 miles south-west of Imbros. Its area is about 147 square miles, and its population 8000, all Greeks, with the exception of the Turkish garrison and governor, who resides in the castle above the head town or village of the island. The modern Greeks call both the island and the town Stalimene. The surface is hilly, but the hills are not very high; the western part of the island, which is more fertile than the eastern, produces wine and corn, hemp and flax, and fruits, but it is deficient in timber trees and in wood for fuel. The principal harbour, called Sant Antonio, in the south-west part of the island, is large and safe, and might be a useful station for a squadron in those seas. The Russian fleet, in 1770, after burning the Turkish fleet at Tschesmé, sailed to Lemnos, and landed troops on the island to besiege the castle, when Hassan Bey, afterwards known as Capudan Pacha, conceived the bold scheme of driving them out of the island. He embarked at Tenedos, with about 3000 volunteers, in boats, landed on the island of Lemnos unperceived by the Russians, surprised their camp, and drove them in confusion to their ships, which immediately weighed anchor and sailed, leaving Hassan and his raw volunteers masters of the field.

Lemnos is known, in antient mythology, as the spot on which Vulcan fell after being hurled down from heaven, and where he established his forges. A volcano which once was burning on the island may have afforded ground for the fable. A story is also recorded by Herodotus and other antient writers, of the women of Lemnos having murdered all the men, except their king Thoas, who was concealed by his daughter Hypsipyle. The Pelasgi, being driven out of Attica, are said to have taken possession of Lemnos; and it is also said that, having stolen some Athenian women, and carried them to the island, the children of these women despised their half-brethren, born of Pelasgian women; in consequence of which, the Pelasgians took the resolution of murdering both the Athenian women and their children. In consequence of these atrocities, Lemnos had a bad name among the antient Greeks. The Athenians, led by Miltiades, took Lemnos after their conquest of the Chersonesus. (Herod., vi. 140.) A labyrinth is mentioned by Pliny (*Hist. Nat.*, xxxvi. 19) as having existed on the island, like those of Egypt and Crete, adorned with 150 columns, and with gates so well poised that a child could throw them open. Pliny says that it was constructed by three native architects, whose names he mentions, and that remains of it existed in his time. Lemnos had two towns, Hephæstiæa and Myrina; the present castle is supposed to be on the site of the latter.

The 'terra sigillata' of Lemnos [Lemnian Earth] is a kind of earthy substance, which was once, and is still supposed by Greeks and Turks to have wonderful medicinal properties. It is dug out of a hill in the island, with great ceremony, and at particular times, in presence of the Turkish Sandjak, or governor, and the Greek clergy, and is shaped into little balls, stamped with the governor's seal. The governor makes a traffic of it, and sends it to Constantinople and other places. It is also used for tanning leather. (Herod., vi. 137, &c.; Choiseul Gouffier, *Voyages en Grèce*; Dapper, *Description des Isles de l'Archipel.*)

LEMON. [Citrus.]

LEMONS, ACID OF. [Citric Acid.]

LEMONS, SALT OF. [Oxalic Acid.]

LEMU'RIDÆ. Linnæus, in his 'Characteres Mammalium,' defines *Lemur*, the third genus of his *Primates*, thus: 'Dentes primores inferiores 6.' In the body of the work

(*Syst. Nat.*) he characterizes the genus as follows:—Upper incisors (primores) 4; the intermediate ones remote; lower incisors 6, longer, prominent (porrecti), compressed, parallel, and approximate. Canines (laniarii) solitary, approximate. Molars numerous (plures), sublobate, the anterior ones longer and more acute. The genus consists of the *Lemures tardigradus*, *Mongoz*, *Macaco*, *Catta*, and *volans*. To these species Gmelin added *Indri*, *Potto*, *Catta*, *murinus*, *bicolor*, and *laniger*.

Cuvier remarks that the *Makis* (*Lemur*, Linn.) comprehend, according to Linnæus, all the *quadrumana* which have, in the one or the other jaw, incisors which differ in number from four, or are at least otherwise directed than in the Monkeys (*Singes*). This negative character, Cuvier observes, could not fail of embracing considerably different beings, and did not even collect all those which ought to be together. He goes on to notice that M. Geoffroy has established in this genus many divisions much better characterized. These animals have all the four thumbs well developed and opposable, and the first hind finger or toe armed with a pointed and raised nail or claw, whilst all the other nails are flat. Their fur is woolly; their teeth begin to exhibit pointed tubercles fitting into each other (engrenant les uns dans les autres), as in the *Insectivora*. The following groups are adopted by Cuvier:—

1. The Makis, or Macaucos, properly so called, *Lemur*.
2. The Indris, *Lichanotus*, Illiger.
3. The Loris group (Slow Lemurs, *Stenops*, Illiger).
4. The Galagos, *Otolicnus*, Illiger.
5. The Tarsiers, *Tarsius*.

Mr. Gray arranges the *Lemuridæ* as the third family (*Quadrupedoid*) of the order *Primates*, Linn., and he thus characterizes the family:—

Grinders 6—6 above, 5—5 below: nostrils terminal; extremities free; first finger of the hind feet armed with recurved claws.

† Head long; grinders blunt.

1. *Lemurina:* genus *Lemur*, Linn. 2. *Lichanotina:* genera *Indris*, Lacép., *Lichanotis* (*Lichanotus*), Ill.

†† Head round.

3. *Loridina:* genera *Loris*, Geoff., *Nyaticebus* (Nycticebus), Geoff. 4. *Galagonina:* genera *Otolienus* (Otolicnus), Illig., *Galago*, Adams, *Cheirogallus* (Cheirogaleus), Geoff. 5. *Tarsina:* genus *Tarsius*. 6. *Cheiromina:* genus *Cheiromys*, Cuv.

Mr. Swainson makes the *Lemuridæ* his third family of *Quadrumana*, with the following characters:—

Form approaching that of quadrupeds; cutting teeth $\frac{4}{4}$ or $\frac{4}{6}$; canine $\frac{1-1}{1-1}$; grinders $\frac{5-5}{5-5}$ or $\frac{5-5}{4-4}$, obtusely tubercular; head long, triangular; nostrils terminal; ears generally concealed, very small.

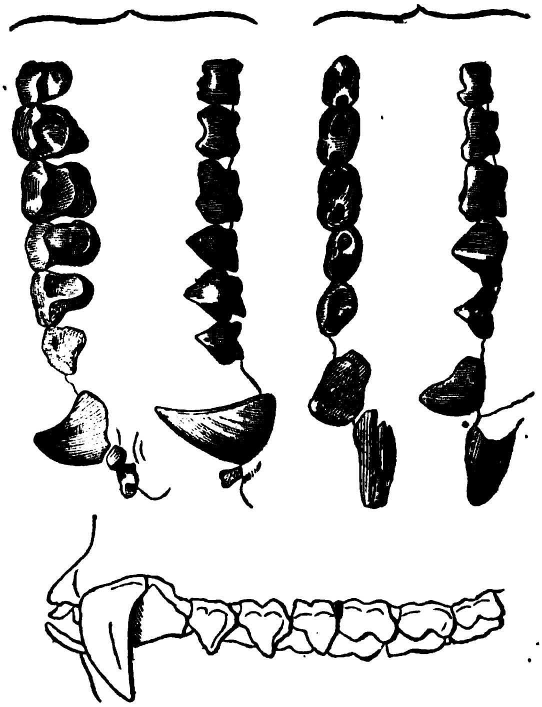
The following genera are comprised by the author last mentioned under this family: *Lemur*, Linn., *Indris*, Lacép., *Lichanotus*, Ill., *Scartes*, Sw., *Stenops*, Ill., *Otolicnus*, Geoff., *Cephalopachus* (Tarsius Bancanus, Horsf.), *Tarsius*, Storr., *Aötes*, Humb., *Galeopithecus*, Pallas, *Cheirogaleus*, Geoff.

The author of 'The Natural History of Monkeys, Lemurs, and Opossums,'* divides the Mammals with opposable thumbs into three sections, like Storr; and the author's arrangement is almost the same, differing only in the removal of the *Simiadæ* or *Prosimia*, as Storr calls them, from the second to the third section in consequence of observations made since Storr's time. The author observes that the coincidence is the more remarkable, inasmuch as the arrangement of Storr was unknown to him till long after the publication of his own views. [CHEIROPEDS, vol. vii.] The author makes his second section of *Cheiropeds* consist of the *Quadrumana*, or those which have opposable thumbs on both fore and hind hands; and he divides the section into two subdivisions, the first consisting of the *Simiæ* (with anthropoïd teeth), and the second of the *Lemuridæ* (with abnormal teeth). The genera arranged by him under this last subdivision are *Lichanotus*, *Propithecus*, *Lemur*, *Otolicnus*, *Cheirogaleus*, *Stenops*, *Tarsius*, *Cheiromys*, and *Galeopithecus*.

Mr. Gray's subfamily *Lemurina* contains the true Lemurs or Macaucos.

The genus *Lemur* properly so called is thus characterized:—Dental formula:—Incisors $\frac{4}{6}$; canines $\frac{1-1}{1-1}$; molars $\frac{5-5}{4-4}=32$.

M. Geoffroy maintains that the number of incisors in both jaws is equal, coinciding with the number in the Monkeys, the two outermost of the six, which are larger than the rest, being, according to him, the true canines; while the teeth commonly called canines are, in his opinion, only the first series of molars. 'This conjecture,' says Mr. Bennett, 'unquestionably derives considerable strength from the fact that when the animal closes its mouth the supposed canines of the lower jaw pass behind those of the upper, a position directly contrary to that which they uniformly assume in every other animal that is furnished with that kind of teeth.'



Teeth of Lemur, more than one-third larger than nature. (F. Cuvier.)

The muzzle is very pointed, the tail very long, the fur woolly and soft, and there are two pectoral *mammæ*. The structure of the hands and nails is mentioned above. (Cuvier's description of the Makis.)

Geographical Distribution and Habits.—'The whole of the genus thus characterized,' writes Mr. Bennett, in his 'Tower Menagerie,' 'are natives of Madagascar, and of two or three of the smaller islands in its immediate vicinity. They appear to occupy in that remarkable and very imperfectly known country the place of the Monkeys, none of which have yet been detected within its precincts. They are said to live in numerous troops upon the trees, and to feed upon fruits and insects; but their habits in a state of nature have not yet been observed with sufficient accuracy to enable us to form any clear idea of their mode of existence. In captivity they are particularly tame and good-tempered, fond of being noticed, delighting in motion, and leaping with surprising agility. They are however in some degree nocturnal, and when undisturbed pass a considerable portion of the day in sleep. If alone, they roll themselves up in the form of a ball, and wind their long tail in a very curious manner round their body, apparently for the purpose of keeping themselves warm, for they are naturally chilly, and delight in basking in the rays of the sun, or in creeping as close as possible to the fire. When two of them are confined together, they interlace their limbs and tails after a singular fashion, and, placing their heads in such a position as that each may, if disturbed, see what is going on behind the other's back, fall comfortably asleep.'

There are several species, and all that we have seen, some of them very beautiful, and exhibited in the Zoological Society's Collection at the Regent's Park, have been very mild.

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* 'Library of Entertaining Knowledge,' vol. xlii., part 1, Dec. 1838.

We select as an example the *White-Fronted Lemur*, *Lemur albifrons*.

Description.—Fur ruddy or bronzed-grey above, whitish below; *male* with the front white; *female* with the same part of a deep grey and a black longitudinal line on the top of the head. M. Lesson remarks that the female is the *Maki d'Anjouan* of M. Geoffroy St. Hilaire, and the *Maki aux pieds fauves* of Brisson.*

The bounding elasticity of this species, when familiar and quite at its ease, is wonderful. It pitches, after a leap of many yards, so lightly as hardly to attract the notice of the ear when it alights. If it take a leap from a table to the back of a distant chair, or even to the upper angle of an open door, it never misses its hold. Under the points of the fingers are elastic cushions, which no doubt assist it in performing these feats. It is a very affectionate animal and a most amusing companion. Our limits will not permit us to indulge in an account of one which we kept, and which was suffered to go at large. When tired with playing about in the evening, its favourite perch was on the instep of the uppermost leg of his master, as he sat cross-legged before the fire. Having obtained leave, he used to take his seat, wrap his boa-like tail round his shoulders and back, and enjoy his nap.

Lemur albifrons.

Mr. Bennett characterized generically, at a meeting of the Zoological Society of London (*Zool. Proc.*, 1830-31), a Lemuridous species, which he states to be probably the animal noticed and imperfectly represented by Bosman under the name of *Potto*. Mr. Bennett names the animal *Perodictus Geoffroyi*, and gives as synonyms *Potto*, Bosman; *Lemur Potto*, Gmel.; *Nycticebus Potto*, Geoff.; and *Galago Guinneensis*, Desm. [Perodictus.] The same zoologist (*Zool. Proc.*, 1833) called the attention of the Society to a *Black Lemur* (*Lemur niger*, Geoff.) in the Society's menagerie, expressing his belief that it was the first individual of the species which had fallen under the observation of zoologists since the days of Edwards, the original describer, who saw and figured one which was living in 1765 in London, and whose description and figure were up to 1833 the only proofs of the existence of such an animal. Mr. Bennett added that the *Black Lemur* is the type of the *Lemur Macaco*, Linn.; and that the *Vari*, to which the name of *Lemur Macaco* has been applied by modern authors, is given by Linnæus as Var. d. of that species. Custom having however transferred the specific name to the variety, Mr. Bennett deemed it better to acquiesce in the use which has obtained, leaving to the *Vari* the name of *Lemur Macaco*, and to the *Black Lemur* that of *Lemur niger*. Mr. Bennett also (*Ibid.*, p. 106) characterized a new species as *Lemur rufifrons*.

Those subfamilies and genera which belong to the group in its most extensive sense will be noticed under their proper titles, as far as our limits will permit. The genera *Galago* and *Nycticebus* will be treated of under the titles of Otolicnus and Stenops.

Of *Cheirogaleus* but little is known, and of its dentition, at present, nothing. M. Geoffroy characterized the genus from the drawings and MS. of Commerson.

Generic Character.—Head round; nose and muzzle short; whiskers long; eyes large and prominent; ears short and oval; *tail* long, full (touffue), cylindrical, and curled (enroulée); nails of the thumbs flat, and all the other nails subulate; fur short.

This genus is considered by many to be doubtful, though three species are recorded, which we shall presently mention. M. Desmarest only admits them into his 'Mammalogie' in a note.

The three species mentioned in Commerson's manuscript notes are *Cheirogaleus major*, *Cheirogaleus medius*, and *Cheirogaleus minor*, all from Madagascar. M. Geoffroy thinks that the species last named is *Galago Madagascariensis*.

LENA, River. [Siberia.]

L'ENCLOS, NINON DE, was born in 1616, of a noble though not very rich family of Touraine. Her mother wished to make her a nun, but her father, who was a man of pleasure, directed his daughter's ideas in a very different course, giving her very loose notions of morality, and preparing her to be, what she became in reality, a devotee to sensual gratification. She lost both her parents at an early age, and finding herself her own mistress, with a moderate independence, she fixed her residence at Paris. Being remarkably handsome and graceful, she was courted by most of the noblemen and wits about court, was very indulgent to all whom she liked, and had a numerous and often renewed succession of favourites. She is said to have been perfectly disinterested in her amours, being herself above want, and having neither ambition nor a passion for hoarding money. Such was the tone of morality in France, in that age, that modest women courted her society, which was considered a model of elegance and fashion; among others, Madame de la Fayette, Madame de Sully, and Madame Scarron, afterwards Madame de Maintenon, often visited her. Christina of Sweden, during her residence in France, was much pleased with her company, and wished to attach her to her little court; but Mademoiselle de l'Enclos preferred her independence. She is said to have retained her attractions to a very advanced age, and to have been the object of a violent attachment at seventy. She was good-tempered and liberal, witty and accomplished. Some of her letters to St. Evremond, which are found in the works of that author, and have been published separately in the 'Lettres de Femmes Célèbres,' edited by L. Collin, 1805, are the only authentic memorials of her pen; other works have been attributed to her, which are apocryphal. She died in Paris, in 1706, at ninety years of age.

LENNEP, JOHN DANIEL VAN, was born at Leeuwarden, in the province of Friesland in Holland, in November, 1724, and was educated at the university of Franeker. In 1747 he edited a Greek poem by Coluthus, which was favourably received by his learned contemporaries. He was elected in 1752 professor of Latin and Greek at Groningen, and after remaining there fifteen years, was appointed to a similar professorship at Franeker. He died the 6th of February, 1771, at Aix-la-Chapelle, whither he had gone for the benefit of his health.

Lennep is principally known by his 'Etymologicum Linguæ Græcæ,' which was published after his death, by his pupil Scheide, 2 vols. 8vo., Utrecht, 1790; it was reprinted in one volume in 1808, under the superintendence of Nagel. This work used to be considered by many scholars a standard book on Greek etymology; but since the study of etymology has been pursued on sound principles, it has been justly regarded as a useless book, full of errors and absurdities. The views of Lennep on etymology in general, and especially on that of the Greek language, are given in a treatise of his entitled 'De Analogia Linguæ Græcæ,' published by Scheide, in the 'Prælectiones Academicæ' of Lennep and Valckenaer, 8vo., Utrecht, 1790.

Lennep was engaged at the time of his death in editing the Epistles of Phalaris, and translating into Latin Bent-

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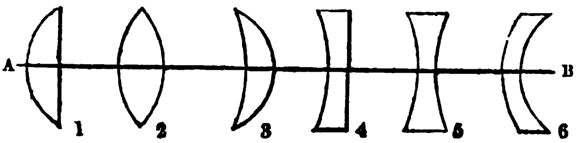
[*] M. F. Cuvier regards as a conclusive proof of the identity of these supposed different species that a male *Lemur albifrons* and a female of the so-called *Maki d'Anjouan*, confined in the Paris menagerie, produced young. Mr. Mac Leay some time since exhibited at a meeting of the Linnean Society a Lemur, with all the external characters of colour supposed by M. F. Cuvier to be peculiar to the male, which was regarded as a female. But, as Mr Bennett observes ('Gardens and Menagerie of the Zoological Society'), there is a possibility that some error may have occurred in the determination of the sex; and he states that he himself had witnessed such a mistake.

ley's celebrated Dissertations on those Epistles. This work, together with the translation of Bentley, was published in 1777, under the superintendence of Valckenaer, who has given in the preface a brief account of the life and writings of Lennep.

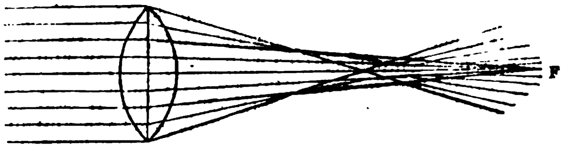
LENS (Latin for 'a small bean'), a name given to a glass, or other transparent medium, ground with two spherical surfaces in such manner as to be generated by the revolution of one or other of the following figures about the axis AB.

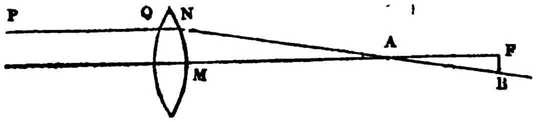


(1) is plano-convex; (2) is double-convex; when the radii are equal it is called equi-convex, and when one radius is 6 times the other it is called a crossed lens; (3) is a meniscus; in every such lens the concave side has the larger radius; (4) is plano-concave; (5) is double concave; (6) is concavo-convex.

We shall not here enter upon the laws of optics, but presuming them known, shall collect the principal facts and formulæ connected with the passage of a direct pencil of light, that is, of a pencil whose rays are either parallel to the axis, or converge from or diverge to a point in the axis. We shall follow the notation (for the most part) and formulæ of Mr. Coddington, in his 'Treatise on the Reflexion and Refraction of Light,' Cambridge, 1829, which contains the most complete investigation of the subject which we know of; referring to the work itself for demonstration and extension.

The following figure represents the passage of a pencil of light with parallel rays through a double-convex lens. The rays are not all refracted to a point, but are tangents to a Caustic, which has a cusp at a certain point F, and may be considered with sufficient accuracy as a small portion of a semicubical parabola. If however the aperture of the lens be no considerable portion of a sphere, which is always the case in practice, the rays which pass near the axis are thrown so thick about the point F, that the effect is an image of the extremely distant point from which the rays come, formed at F. This (for parallel rays) is called the focus of the glass, and its distance from the nearest side of the lens is called the focal distance. The longitudinal aberration of a ray is the distance from the focus at which it passes through the axis, and the latitudinal aberration is the perpendicular distance from the axis at which it passes through a perpendicular drawn through the focus. Thus, in the following figure, FA is the longitudinal, and FB the latitudinal aberration of the ray PQ.





We shall first state the method of finding the focal length of a given lens. Let μ be the index of refraction, or $\mu : 1$ the constant proportion which the sine of the angle of incidence bears to that of refraction (which for plate-glass varies from 1·500 to 1·540; for crown glass, from 1·525 to 1·563; and for flint glass from 1·576 to 1·642); and let R and S be the radii of the two sides of the lens *with their signs*, while r and s are the numerical values of these radii independently of their signs. Also let every convex surface be considered as having a positive radius, and every concave surface a negative one. Let F be the focal distance with its sign, and f the numerical value of the same, it being agreed that the focal distance shall be positive when parallel rays are made to converge, and negative when they are made to diverge, that is, to proceed as if they came from a point on the same side of the glass as that on which they entered. One formula, upon these suppositions, will embrace all the cases; and that formula is

$$\frac{1}{F} = (\mu-1)\left(\frac{1}{R}+\frac{1}{S}\right)$$

on the supposition that the central thickness of the lens is inconsiderable. But if it be necessary to take this thickness into account, let it be called t, and let R be the radius of the side at which the light enters: then either find F from

$$\frac{1}{F} = (\mu-1)\left(\frac{1}{R}+\frac{1}{S}\right) + \frac{(\mu-1)^2}{\mu} \cdot \frac{t}{R^2};$$

or correct F, as found from the preceding formula, by subtracting from its *algebraical* value

$$\frac{(\mu-1)^2}{\mu} \quad \frac{F^2 t}{R^2}$$

F being found from the preceding: the result is sufficiently correct.

The focal distance, as determined from the first formula, is the same whether the light enter on one side or the other, but the correction for the thickness depends, as we see, upon the side at which it enters.

The application of these formula to the several cases is as follows:—We write the distinctive adjective of the lens so that the first part of the word shall denote the part at which light first enters; for instance, plano-convex, or convexo-plane, according as the light first meets the plane or convex surface.

(1). *Plano-convex:* R is infinite, $S = s$:

$$\frac{1}{F} = \frac{\mu-1}{S}, \text{ or } f = \frac{s}{\mu-1}.$$

(1). *Convexo-plane:* $R = r$, and S is infinite:

$$\frac{1}{F} = \frac{\mu-1}{R} + \frac{(\mu-1)^2 t}{\mu R^2} : f = \frac{r}{\mu-1} - \frac{t}{\mu}.^*$$

(2). *Double-convex:* $R = r$, $S = s$:

$$\frac{1}{f} = (\mu-1)\left(\frac{1}{r}+\frac{1}{s}\right) + \frac{(\mu-1)^2}{\mu}\frac{t}{r^2}.$$

(3). *Convexo-concave meniscus:* $R = r$, $S = -s$, $r < s$:

$$\frac{1}{F} = (\mu-1)\left(\frac{1}{r}-\frac{1}{s}\right) + \frac{(\mu-1)^2}{\mu}\frac{t}{r^2} = \frac{1}{f}.$$

(3). *Concavo-convex meniscus:* $R = -r$, $S = s$, $r > s$:

$$\frac{1}{F} = (\mu-1)\left(\frac{1}{s}-\frac{1}{r}\right) + \frac{(\mu-1)^2}{\mu} \quad \frac{t}{r^2} = \frac{1}{f}.$$

In all the preceding cases F is positive; or all sharp-edged lenses make parallel rays converge: but in those which follow it will be noted that F is negative, or all flat-edged lenses make parallel rays diverge.

(4). *Plano-concave:* R is infinite, $S = -s$:

$$\frac{1}{F} = -\frac{\mu-1}{s}, \text{ or } f = \frac{s}{\mu-1}$$

(4). *Concavo-plane:* $R = -r$, S is infinite:

$$\frac{1}{F} = -\frac{\mu-1}{r} + \frac{(\mu-1)^2}{\mu}\frac{t}{r^2}; \; f = \frac{r}{\mu-1} + \frac{t}{\mu}.^*$$

(5). *Double-concave:* $R = -r$, $S = -s$:

$$\frac{1}{F} = -(\mu-1)\left(\frac{1}{r}+\frac{1}{s}\right) + \frac{(\mu-1)^2}{\mu} \quad \frac{t}{r^2};$$

$$\frac{1}{f} = (\mu-1)\left(\frac{1}{r}+\frac{1}{s}\right) - \frac{(\mu-1)^2}{\mu} \quad \frac{t}{r^2}.$$

(6). *Convexo-concave:* $R = r$, $S = -s$, $r > s$:

$$\frac{1}{F} = (\mu-1)\left(\frac{1}{r}-\frac{1}{s}\right) + \frac{(\mu-1)^2}{\mu} \quad \frac{t}{r^2};$$

$$\frac{1}{f} = (\mu-1)\left(\frac{1}{s}-\frac{1}{r}\right) - \frac{(\mu-1)^2}{\mu} \quad \frac{t}{r^2}.$$

(6). *Concavo-convex:* $R = -r$, $S = s$, $r < s$:

$$\frac{1}{F} = (\mu-1)\left(\frac{1}{s}-\frac{1}{r}\right) + \frac{(\mu-1)^2}{\mu} \quad \frac{t}{r^2};$$

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* These results are only nearly true.

$$\frac{1}{f}=(\mu-1)\left(\frac{1}{r}-\frac{1}{s}\right)-\frac{(\mu-1)^2}{\mu}\ \frac{t}{r^2}.$$

If, in any of the preceding, the term involving t be left out, we have the common approximate mode of determining the focus. We now come to the formulæ for determining the aberration in the case of a direct pencil of parallel rays.

Let MN, in the third figure (the perpendicular distance from N to the axis will do equally well) be $=y$; then AF is determined by the following formula:—

$$K=-\frac{\mu-1}{2\mu^2}\left\{\frac{1}{R^2}+\left(\frac{1}{S}+\frac{\mu+1}{F}\right)\left(\frac{1}{S}+\frac{1}{F}\right)^2\right\}F^2y^2$$

where R is the radius of the surface which the light first meets. The algebraical value of MA in the figure is F + K, where F is supposed corrected for the thickness. If we assume

$$X=\frac{S-R}{S+R}\text{; then }K=-\frac{Ay^2}{8F};$$

where A stands for

$$\frac{1}{\mu(\mu-1)}\left\{\begin{array}{l}\frac{\mu+2}{\mu-1}X^2-4(\mu+1)X\\ +(3\mu+2)(\mu-1)+\frac{\mu^2}{\mu-1}\end{array}\right\}$$

The following are the results, assuming $\mu=\frac{3}{2}$, which is near enough (if the material be glass) for determining this correction. This supposition gives (x being the numerical value of X, independently of sign)

$$K=-\frac{7X^2-10X+10}{6}\cdot\frac{y^2}{F}.$$

(1). *Plano-convex:* $X=-1$ $\quad K=-\frac{9}{2}\frac{y^2}{F}.$

(1). *Convexo-plane*· $X=1$ $\quad K=-\frac{7}{6}\frac{y^2}{F}.$

(2). *Double-convex:* light entering at the more convex side.

$$x=\frac{s-r}{s+r},\ K=-\frac{7x^2-10x+10}{6}\ \frac{y^2}{F}.$$

(2). *Double-convex:* light entering at the less convex side:

$$x=\frac{r-s}{r+s},\ K=-\frac{7x^2+10x+10}{6}\ \frac{y^2}{F}.$$

(3). *Convexo-concave meniscus:*

$$x=\frac{s+r}{s-r},\ K=-\frac{7x^2-10x+10}{6}\ \frac{y^2}{F}.$$

(3). *Concavo-convex meniscus:*

$$x=\frac{r+s}{r-s},\ K=-\frac{7x^2+10x+10}{6}\ \frac{y^2}{F}.$$

(4). *Plano-concave:* same * as plano-convex.

(4). *Concavo-plane:* same as convexo-plane.

(5). *Double concave,* light entering at the more concave side: same as double convex, light entering at the more convex side.

(5). *Double concave,* light entering at the less concave side: same as double convex, light entering at the less convex side.

(6). *Convexo-concave:* same as concavo-convex meniscus.

(6). *Concavo-convex:* same as convexo concave meniscus.

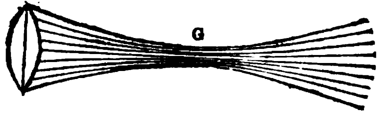
Throughout these formulæ the sign of K is opposite to that of F, since $7x^2 \pm 10x + 10$ must always be positive. Hence the point A always lies between the points M and F (third figure). If the point N be placed as high as possible that is, if y be what is called the *semi-aperture* of the lens, then K is the aberration of the extreme ray. It appears also that the longitudinal aberration varies directly as the square of the semi-aperture, and inversely as the focal distance.

The aberration is least for a given aperture and focal length, when $x=\frac{5}{7}$, which gives $S=6R$, requiring a double-convex or double-concave lens, in which the radius of the side on which light enters is one-sixth of the other. The convex lens of this kind is what opticians call the crossed lens. The co-efficient of $y^2 \div F$ is $-\frac{15}{14}$.

The latitudinal aberration at the focus (as determined with the correction for the thickness) is $yK \div F$, or (neglecting the sign)

$$\frac{1}{8}A\frac{y^3}{F^2}\text{; for glass }\frac{7X^2-10X+10}{6}\ \frac{y^3}{F^2}.$$

But if we observe the rays in the second figure (and the same may be clearly seen in a beam of sun-light thrown into an otherwise dark room through a convex lens) we shall see that the luminous space is bounded by a surface of revolution which narrows and afterwards spreads again, as in



this diagram. The smallest circle (at G) is called the circle of least aberration, and is determined as follows:—Its centre is nearer to the glass than the focus (corrected for the thickness) by three-fourths of the longitudinal aberration of the extreme ray; and its diameter is one half of the lateral aberration of the extreme ray. If then we measure from the corrected focus, we find for the distance of the circle of least aberration (neglecting its sign) from this focus,

$$\frac{3Ay^2}{32F}\text{; for glass }\frac{7X^2-10X+10}{8}\cdot\ \frac{y^2}{F};$$

and for the diameter of this circle,

$$\frac{Ay^3}{16F^2}\text{, for glass }\frac{7X^2-10X+10}{12}\ \frac{y^3}{F^2}$$

The correction for the thickness, to be subtracted from F as determined by the first equation of all, is

$$-\frac{1}{4\mu}(X+1)^2.\ t\text{; for glass }-\frac{1}{6}(X+1)^2.\ t;$$

which is always algebraically subtractive, whatever the sign of F may be. The following table exhibits this correction, the distance of the circle of least aberration, and its diameter, for the cases above noted. The description of the lens is in the first column, and I stands for plane (or plano), C for concave, and inverted C for convex. The sign of the surface which the light first meets is placed first. Where a great and small letter meet, the small letter shows the side which has the less curvature, or the larger radius.

$$\alpha = 7x^2 - 10x + 10$$
$$\beta = 7x^2 + 10x + 10$$

Lens.	X or x.	Correction for thickness.	Distance of Circle.	Diameter of Circle.
IƆ and IC	$X=-1$	0	$\frac{27}{8}\ \frac{y^2}{F}$	$\frac{9}{4}\ \frac{y^3}{F^2}$
CI and ƆI	$x=1$	$\frac{2}{3}t$	$\frac{7}{8}\ \frac{y^2}{F}$	$\frac{7}{12}\ \frac{y^3}{F^2}$
Cɔ and Ɔc	$x=\frac{s-r}{s+r}$	$(x+1)^2\frac{t}{6}$	$\frac{\alpha}{8}\ \frac{y^2}{F}$	$\frac{\alpha}{12}\ \frac{y^3}{F^2}$
cƆ and ɔC	$x=\frac{r-s}{r+s}$	$(x-1)^2\ \frac{t}{6}$	$\frac{\beta}{8}\ \frac{y^2}{F}$	$\frac{\beta}{12}\ \frac{y^3}{F^2}$
Cc and Ɔɔ	$x=\frac{s+r}{s-r}$	$(x+1)^2\ \frac{t}{6}$	$\frac{\alpha}{8}\ \frac{y^2}{F}$	$\frac{\alpha}{12}\ \frac{y^3}{F^2}$
ɔƆ and cC	$x=\frac{r+s}{r-s}$	$(x-1)^2\frac{t}{6}$	$\frac{\beta}{8}\ \frac{y^2}{F}$	$\frac{\beta}{12}\ \frac{y^3}{F^2}$

We have judged it more useful to collect what we may call the *critical* formulæ, by which the fitness of a lens for any given purpose may be estimated, than to enter upon explanations of optical principles in an isolated article. We shall now give the formulæ only, omitting the detail of cases, when the pencil of rays is not parallel, but proceeds from a point in the axis.

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* That is, the aberration has the same formula: but it must be noted that F has different signs in the two lenses.

Let U be the distance of the entering pencil from the surface whose radius is R, and V the distance of the focus of the rays on the other side from the surface whose radius is S; U being negative when the entering pencil is divergent, and V negative when the emergent pencil is convergent. Let F be the distance of the uncorrected focus of parallel rays from the surface of emergence, determined as before. Then, if the thickness of the lens be inconsiderable, V is determined from U by the equation.

$$\frac{1}{V}+\frac{1}{U}=\frac{1}{F}=(\mu-1)\left(\frac{1}{R}+\frac{1}{S}\right);$$

V representing the solution of this equation, the more correct value, taking the thickness t into account, is

$$V-\left(\frac{\mu-1}{R}-\frac{1}{U}\right)^2\frac{tV^2}{\mu}.$$

$$\text{Let } X=\frac{S-R}{S+R};\ W=\frac{V-U}{V+U};$$

then the above correction for the thickness is

$$-\left(\frac{X-W}{1-W}\right)^2\cdot\frac{t}{\mu}:$$

and assuming A to stand for

$$\frac{1}{\mu(\mu-1)}\left\{\begin{array}{l}\dfrac{\mu+2}{\mu-1}X^2+4(\mu+1)WX\\ +(3\mu+2)(\mu-1)W^2+\dfrac{\mu^3}{\mu-1}\end{array}\right\}$$

the longitudinal aberration is

$$-\frac{A}{8}\ \frac{V^2}{F^2}\ \frac{y^2}{F};\ \text{or}\ -\frac{A}{2(1-W)^2}\cdot\frac{y^2}{F};$$

which must be algebraically applied to the value of V (corrected for thickness. The latitudinal aberration is

$$\frac{A}{8}\ \frac{V}{F}\ \frac{y^3}{F^2};\ \text{or}\ \frac{A}{4(1-W)}\cdot\frac{y^3}{F^2}.$$

The distance of the least circle of aberration from the corrected focus is

$$-\frac{3A}{32}\ \frac{V^2}{F^2}\cdot\frac{y^2}{F};\ \text{or}-\frac{3A}{8(1-W)^2}\cdot\frac{y^2}{F};$$

and the diameter of the same circle is

$$\frac{A}{16}\ \frac{V}{F}\ \frac{y^3}{F^2};\ \text{or}\ \frac{A}{8(1-W)}\ \frac{y^3}{F^2}.$$

When two or more lenses are placed close together, in finding the approximate focal distance, uncorrected for the thic nesses, they may be considered as one lens, whose focal dista has a reciprocal equal to the sum of the reciprocals of focal distances of the component lenses. Sir J. Hersc has proposed to call the reciprocal of the focal distance the *power* of a lens; in which case it would be said that the power of a compound lens is equal to the sum of the powers of the simple lenses.

For more complicated cases see the work of Mr. Coddington, already cited.

LENS, CRYSTALLINE. [EYE.]

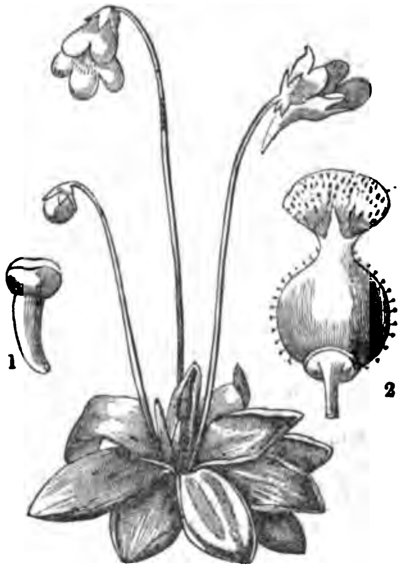
LENS. [PAS DE CALAIS.]

LENT (in Latin, *Quadragesima*), a time of mortification, commemorative of the miraculous fasting of our Saviour in the desert; used as a preparation for Easter. The Saxon term was *Lencten*, implying Spring, the season when the day increases in *length*, about the commencement of which this fast usually falls: it is in fact the Spring-Fast.

In the ancient Latin Church Lent consisted only of thirty-six days: the four additional days began in the ninth century.

Some assert that this Fast was first instituted by the Apostles. Such was the opinion of St. Jerome, St. Leo, St. Augustine, and others. Tertullian speaks of it as of long standing in his time: though some writers date it as low as the third century. It was first observed in England by our Saxon ancestors in 640, by order of Ercombert, King of Kent. (Wheatley *On the Common Prayer*, 8vo., London, 1741, p. 224; Brady's *Clavis Calendaria*, i., 209, 216; Brand's *Popular Antiq.*, vol. i., p. 79.)

LENTIBULA'CEÆ, a small monopetalous order of exogenous plants, resembling Scrophulariaceæ very much in all respects, except that their seeds are arranged upon a free central placenta. Pinguicula and Utricularia are the only genera of this order.



Pinguicula vulgaris.

1, an anther; 2, the glandular ovary, with a two-lobed stigma, of which one of the lobes is much larger than the other.

LENTICULI'NA. [FORAMINIFERA, vol. x., p. 348.]

LENTO (Ital., *slowly*), a term in music equivalent to *Largo*.

LENZINITE. Occurs massive. Fracture earthy. Sometimes slightly conchoidal. Hardness 1·5. Easily scratched by the point of a knife. Colour white. Lustre rather greasy. Translucent, transparent on the edges. Specific gravity 1·8 to 2·10.

When put into water it divides into numerous small translucent bits, which, when touched, fall into grains of great hardness; by heat loses 25 per cent. in weight, and becomes hard enough to scratch glass.

Dr. John's analysis gives—

Silica	37·5
Alumina . . .	37·5
Water	25
	100·

It is found at Eifeld in Prussia.

LEO I., Emperor of Constantinople, born in Thrace of obscure parents, entered the military service, and rose to high rank. At the death of the Emperor Marcianus. A.D. 457, he commanded a body of troops near Selymbria, and was proclaimed emperor by the soldiers, at the instigation of Aspar, a Gothic chief, who commanded the auxiliaries. The senate of Constantinople confirmed the choice, and the patriarch Anatolius crowned him. This is said to have been the first instance of an emperor receiving the crown from the hands of a bishop. Leo followed the measures of Marcianus against the Eutychians, who had been condemned as heretics, and who had recently excited a tumult at Alexandria, had killed the bishop, and placed one Ælurus in his stead. Aspar, for a time, screened Ælurus; but Leo at last had him exiled, and an orthodox bishop put in his place. The Huns, having entered the province of Dacia, were defeated by the imperial troops, and a son of Attila was killed in the battle. Soon after, Leo, in concert with Anthemius, emperor of the West, prepared a numerous fleet, with a large body of troops on board, for the recovery of Africa, which was occupied by the Vandals. Part of the expedition attacked and took the island of Sardinia; the rest landed in Libya, and took Tripolis and other towns; but the delay and mismanagement of the commander, who was Leo's brother-in-law, gave time to Genseric to make his preparations. Coming out of the harbour of Carthage by night, with fire-ships impelled by a fair wind, he set fire to many of the imperial ships, dispersed the rest, and obliged the expedition to leave the coast of Africa.

Leo gave his daughter Ariadne in marriage to Zeno, an Isaurian, whom he made patrician and captain of his guards, in order to balance the power of Aspar, whose fidelity he had reason to suspect, and whom he afterwards caused to be put to death as a conspirator. The auxiliary Goths rose to avenge Aspar's death, and it was with difficulty that Leo overpowered them. Leo died in January, 474, bequeathing the throne to his grandson Leo, the child of Zeno and Ariadne.

LEO II. was four years of age when he was proclaimed, and the people seemed to approve of the choice; but Ariadne and her mother, the empress Verina, having determined to place Zeno on the throne, induced the child one day, while in public, to place a crown on his father's head and call him his colleague. Young Leo died after a nominal reign of ten months, and Zeno himself was suspected of having procured the death of his own child.

LEO III., called Isauricus from the country of his birth, was of humble parentage, and served in the army under Justinian II. Under the reign of Anastasius II. he received the supreme command of the troops of Asia. After Anastasius was deposed and Theodosius III. proclaimed in his stead in 716, Leo would not acknowledge the latter, but marched to Constantinople, when Theodosius resigned the crown to him in March, 717. The Saracens soon after, coming in large numbers by sea and by land, laid siege to Constantinople, when the new emperor came out of the harbour with some fire-ships, which, being impelled by a fair wind among the enemy's fleet, threw it into confusion and destroyed many of their ships. The severe winter which followed killed most of the horses and camels of the Saracens, and in the course of the next summer Leo, having defeated them by land, obliged them to raise the siege. It was during this long siege that Sergius, governor of Sicily, thinking the empire at an end, made himself independent, but Leo sent a new governor to assert his authority, and the rebels were punished. In 719 Anastasius, having attempted to resume the crown, was beheaded. Thus far Leo had shown himself to be a brave and able sovereign, but unfortunately, like many of his predecessors, he began to mix in religious controversy, which rendered him tyrannical and cruel. The new religion of the Koran abhorred the worship or even the use of images, the Jewish law likewise strictly forbade it as leading to idolatry, and this principle of hostility, thus asserted by both creeds, found its way among the Christians of the East, and was adopted by some zealots, who persuaded Leo, who was a rude uneducated soldier, that the use of images in the churches was contrary to religion. He accordingly issued an edict, ordering their immediate removal. The patriarch of Constantinople and most of the Greek clergy remonstrated against this measure, and the Pope Gregory II. condemned the edict of Leo as heretical. This was the beginning of the schism of the Iconoclasts, or 'image-breakers,' which caused great calamities to the empire, and contributed to its losing Italy, as the Italians, supported by the pontiff, refused to obey the edict, and Leo, who was as obstinate as he was ignorant, resorted to violence, which irritated the people still more. It appears that a conspiracy against the life of the pope was hatched at Rome by the Greek officers there, and supported by the exarch of Ravenna; but the people of Rome rose and killed some of the Greeks, and a general insurrection took place over Italy against the emperor, of which the Longobards availed themselves to extend their dominions, and occupied the port of Classe near Ravenna. Even in the East Leo found the greatest opposition among his subjects, who were much attached to the images. The islands of the Archipelago revolted, and even sent a fleet to threaten the capital, but the Greek fire dispersed it. Great tumults broke out at Constantinople on account of the removal of the images according to the order of the emperor, several persons were killed in the confusion, and others (some women among the rest) were sentenced to death for having excited the mutiny; the patriarch Germanus was deposed, and another prelate favourable to the Iconoclasts was put in his place. Gregory II. having died in 731, his successor Gregory III. assembled a council at Rome in the following year, in which the Iconoclasts were condemned. A messenger who was despatched to the emperor with the decree of the council was detained in Sicily and not allowed to proceed. Leo, in his wrath against the pontiff, detached from the Roman patriarchate the sees of Illyricum, of Calabria and Sicily, and placed them under the patriarch of Constantinople. Meantime the Saracens were making great progress in Asia Minor, and they conquered the whole of Paphlagonia. In the midst of his unsuccessful struggle both against the Saracens of Asia and against the Italians and the pope, Leo died of the dropsy in the year 741, and was succeeded by his son Constantine, called Copronymus, who had married Irene, the daughter of a prince of the Gazari, a Turkish tribe. Constantine was also a furious Iconoclast, and showed himself more cruel and tyrannical than his father.

LEO IV., son of Constantine Copronymus, born at Constantinople in 751, succeeded his father in 775. His disposition was milder than that of his father, but unfortunately he adopted the Iconoclastic tenets with blind fanaticism, and he banished his own wife Irene on this account, and persecuted others. He died in 780, and was succeeded by his son Constantine VI. under the regency of the empress Irene.

LEO V., called the Armenian, because his father was from that country, held a command in the army under the reign of Nicephorus, but being accused of treason, he was confined in a convent. Michael Rangabé, on ascending the throne A. D. 811, gave him his pardon and restored him to his rank. Leo however was too ambitious to be grateful. After obtaining some success against the Saracens, he accompanied Michael on an expedition against the Bulgarians, in which he is charged by the historians with betraying his master, and causing the loss of the battle near Adrianople. Being left by Michael in charge of the remains of the army, he urged them to rebel, and being proclaimed emperor by them, he marched to Constantinople. Michael made no resistance, but sent to his successor the crown, sceptre and other imperial insignia, and retired into a convent. Leo entered the capital in July, 813, and was crowned at St. Sophia's by the patriarch Nicephorus. The Bulgarians having invaded the empire and threatened Constantinople, Leo took the field, defeated them at Mesembria in 814, and in the next year he obliged them to sue for peace. Leo would have been a good prince, had he not meddled in the controversy of the Iconoclasts, and become a persecutor. It appears that the worship of images among the Greeks had degenerated into idolatry, and that such was the fanaticism of the people in favour of their images, that they willingly exposed their lives for them. It is a remarkable fact, that about the same time the abuse of the images attracted the attention of the Western Church. An assembly of Western bishops took place at Paris in the year 824 to examine the subject of the worship of images, to which the opinion of those prelates was not altogether favourable. Leo however, like his Iconoclastic predecessors, went to the other extreme, fancying that the only means of correcting the abuse was by destroying the images altogether: he exiled the patriarch Nicephorus, who would not consent to an Iconoclastic proscription, and he put to death many who were on the same side, which was that of the mass of the people and clergy, and especially the monks, who had great influence in the Eastern empire. Persecution and discontent prepared the way for conspiracies. Michael, surnamed the Stammerer, who had contributed to Leo's elevation, and had been consequently made a patrician, raised his thoughts towards the Empire. He was arrested, convicted of treason, and condemned to death, but his friends, having disguised themselves as priests, introduced themselves into the chapel of the palace, where Leo used to attend matins, and on a given signal, as the emperor began chanting a new psalm, they fell upon him, and killed him in spite of his desperate resistance, A.D. 820. On learning this catastrophe in the place of his exile the patriarch Nicephorus exclaimed, 'The Church is freed from an enemy, but the State has lost an able prince.' Michael the Stammerer succeed to the throne.

LEO VI., styled the Philosopher, probably on account of his writings, for his conduct gave him no claims to the appellation, was the son of the emperor Basilius the Macedonian, whom he succeeded in 886. His brother Alexander was his nominal colleague, but through indolence left the government entirely to Leo. The reign of Leo, which lasted

25 years, was not a prosperous or glorious one for the empire, for while the armies were beaten both by the Saracens and Bulgarians, the capital and the palace were disturbed by the intrigues and excesses of the courtiers, and by the emperor's own irregularities. He again exiled the turbulent Photius, whom his father had reinstated in his see. In the year 904 the Saracens took and plundered Thessalonica, one of the principal cities of the empire, and carried away its inhabitants into slavery. Leo died in 911, at 46 years of age, leaving the crown to his son Constantine Porphyrogennetus, whom he had by his fourth wife Zoe. Although not a deserving sovereign, Leo ought to be remembered as an author; he completed and published the Basilica, or Greek compilation of the laws of the empire, undertaken by his father, and extracted it in great measure from the Justinian body of laws. [Basilica.] It does not seem to be ascertained, however, whether the work has descended to us as it was completed by Leo, or as it was afterwards reformed by his son Constantine. (Haubold, *Manuale Basilicorum*, Leipzig, 1819; and Heimbach, *De Basilicorum Origine, Fontibus, Scholiis*, &c. Leipzig, 1825.) Leo wrote also a treatise on Tactics, which has been published by Meursius; and a collection of Oracles or Prophecies (for he laid claim to an insight into futurity), which has also been published; a poem on the calamities of Greece, other verses, moral Orations, &c., are yet inedited.

LEO I. was only a deacon when he was chosen by the clergy and people of Rome to be their bishop, after the death of Sixtus III., A.D. 440, under the reign of Valentinianus III., emperor of the West, and Theodosius II., emperor of the East. He was a man of learning, and well acquainted with the world and with state affairs, having been employed on several missions by the imperial court. In his youth he had been acquainted with St. Augustine, and had profited by his instruction and example. Soon after his exaltation he had a controversy with Hilarius, bishop of Arelate (Arles) in Gaul, who had deposed Celidonius, bishop of Vesontio (Besançon), because he had married a widow, which was forbidden by the canons. Celidonius however appealed to Leo, who reinstated him in his see. Hilarius was summoned to Rome upon several charges brought against him by other bishops of Gaul, to whom his severity was obnoxious; and Leo obtained a rescript from the emperor Valentinian III., suspending Hilarius from his episcopal office. This suspension however does not appear to have been lasting, although the fact has been taken hold of by controversial writers as a stretch of jurisdiction in the see of Rome. Quesnel published a dissertation upon this controversy in his edition of the works of Leo, Paris, 1675. Leo also induced the emperor to issue, in the year 445, several laws against the Manichæans and other heretics, depriving them of the rights of citizenship and of inheritance, and excluding them from the military service. He assembled a council at Rome in 449, in which he annulled the acts of the council of Ephesus, which had absolved Eutyches. [Eutychians.] Soon afterwards the Œcumenic council of Chalcedon, A.D. 451, in which Leo's legates presided, condemned the doctrine of Eutyches, and defined the doctrine concerning the person of Christ. By a canon of this council, which was Œcumenic, or universal, both for the East and West, the bishop of Constantinople was declared to be next in place, though equal in dignity, to the bishop of Rome, and the limits of their respective jurisdictions were determined, the patriarchates of Antioch and Alexandria being placed under that of Constantinople; which canon passed the assembly, notwithstanding the opposition of the Roman legates. The story of Leo stopping Attila on his march, and persuading him to spare the city of Rome, is an embellishment; but it appears that Leo was really sent by Valentinian on a mission to Attila, who was then devastating Lombardy, and that Attila consented to a truce with Valentinian, after which he recrossed the Alps. Some years after, Leo did prevail upon Genseric, who had landed at the mouth of the Tiber, A.D. 455, to spare at least the lives and the buildings in Rome, and not to allow his Vandals to set fire to that city or slaughter the inhabitants. Genseric was satisfied with the plunder of Rome, and returned to Africa. Leo died in 461, and was succeeded by Hilarius I. His writings, especially his Sermons and his Epistles, are useful for the history of the times. Quesnel has given a full account of his life, as well as Maimbourg, 'Histoire du Pontificat de St. Léon le Grand.' Father Cacciari published an edition of Leo's works, 3 vols. fol., Rome, 1751-5, in which he has charged Quesnel's edition with great incorrectness. Leo's Sermons have been translated into French by the Abbé de Bellegarde, Paris, 1701. The Roman Church numbers him among its saints, and gives him also the epithet of Magnus, or 'St. Leo the Great.'

LEO II., a native of Sicily, succeeded Agathon in the see of Rome, A.D. 682. He put an end to the schism between the see of Ravenna and that of Rome, it being agreed that the bishops of Ravenna should receive their ordination at Rome, but that they should be exempted from the payment of money which had been exacted from them on receiving the pallium. Leo died in the year 683, and was succeeded, after a vacancy of nearly one year, by Benedict II.

LEO III., a native of Rome, was elected after the death of Adrian I., A.D. 795. He immediately communicated his election to Charlemagne, to whom he, like his predecessor, acknowledged allegiance. Charlemagne replied by a letter of congratulation, which he entrusted to the abbot Angilbertus, whom he commissioned to confer with the new pontiff respecting the relations between the see of Rome and the 'Patrician of the Romans,' for this was the title which Charlemagne had assumed. In 796 Leo sent to Charlemagne the keys of St. Peter and the standard of the city of Rome, requesting the king to send some of his nobles to administer the oath of allegiance to the people of Rome. The dominion of Charlemagne over the city and duchy of Rome is attested by Paulus Diaconus, who says that 'Charles added to his other sceptres that of the city of Romulus.' In the year 799, an atrocious assault, the motive of which is not clearly ascertained, was committed on the person of the pope. While Leo was riding on horseback, followed by the clergy, and chanting the liturgy, a canon of the name of Paschal and a sacristan called Campulus, accompanied by many armed ruffians, fell upon him, threw him down from his horse, and dragged him into the convent of St. Sylvester, when they stabbed him in many places, endeavouring to pull out his eyes and cut out his tongue. In this however it seems that they did not succeed, as Leo was delivered by his friends from the hands of the assassins, and taken to Spoleti under the protection of that duke, where he soon after recovered, and was enabled to travel as far as Paderborn in Germany, where Charlemagne then was, by whom the pope was received with the greatest honours. Charlemagne sent him back to Rome, with a numerous escort of bishops and counts, and also of armed men. The pope was met outside of the city gates by the clergy, senate, and people, and accompanied in triumph to the Lateran palace. A court, composed of the bishops and counts, proceeded to the trial of the conspirators who had attempted the life of the pope; and the two chiefs, Paschal and Campulus, were exiled to France. From this very lenient sentence, and other concomitant circumstances, it appears that Charlemagne had greatly at heart to conciliate the Romans in general, in order to deter them from betaking themselves again to the protection of the Greek emperors.

In the year 800 Charlemagne himself came to Italy, and was met at Nomentum, outside of Rome, by the pope; and the next day he repaired to the Basilica of the Vatican, escorted by the soldiers and the people. After a few days Charlemagne convoked a numerous assembly of prelates, abbots, and other persons of distinction, Franks as well as Romans, to examine certain charges brought against the pope by the partisans of Paschal and Campulus; but no proofs were elicited, and Leo himself, taking the book of gospels in his hand, declared himself innocent. On Christmas-day of that year the pontiff officiated in the Basilica of the Vatican, in presence of Charlemagne and his numerous retinue. As Charlemagne was preparing to leave the church, the pontiff stopped him, and placed a rich crown upon his head; while the clergy and the people, at the same moment, cried out, 'Carolo piissimo,' 'Augusto magno imperatori,' and other expressions and acclamations which were used in proclaiming the former Roman emperors. Three times the acclamations were repeated, after which the pope was the first to pay homage to the new emperor. From that time Charlemagne left off the titles of king and patrician, and styled himself Augustus and Emperor of the Romans; and he addressed the emperor of Constantinople by the name of brother.

Thus was the Western empire revived, 325 years after Odoacer had deposed Romulus Augustulus, the last nominal successor of the Cæsars on the throne of the West. From that time all claim of the Eastern emperors to the supreme dominion over the duchy of Rome was at an end; and the popes from the same time assumed the temporal authority over the city and duchy, in subordination however to Charlemagne and his successors; they began also to coin money, with the pontiff's name on one side and that of the emperor on the other.

In the year 804 the pope went to pass the Christmas at the court of Charlemagne at Aquisgrana (Aix-la-Chapelle), after which he returned to Italy. In the division which Charlemagne made by will of his dominions among his sons, the city of Rome was declared to belong to him who should bear the title of emperor. Louis le Debonnaire was afterwards invested with that title by Charlemagne himself, and we find him accordingly, after the death of his father, assuming the supreme jurisdiction over that city on the occasion of a fresh conspiracy which broke out against Leo, the heads of which were convicted by the ordinary courts at Rome, and put to death. Louis found fault with the rigour of the sentence and the haste of its execution, and he ordered his nephew Bernard, king of Italy, to proceed to Rome and investigate the whole affair. Leo, who seems to have been alarmed at this proceeding, sent messengers to the court of Louis to justify himself. Meantime he fell seriously ill, and the people of Rome broke out into insurrection, and pulled down some buildings he had begun to construct on the confiscated property of the conspirators. The Duke of Spoleti was sent for with a body of troops to suppress the tumult. Leo died in 816, and Stephen IV. was elected in his place. Leo is praised by Anastasius, a biographer of the same century, for the many structures, especially churches, which he raised or repaired, and the valuable gifts with which he enriched them. In his temporal policy he appears to have been more moderate and prudent than his predecessor, Adrian I., who was perpetually soliciting Charlemagne in his letters for fresh grants of territory to his see.

LEO IV. succeeded Sergius II. in 847. He was consecrated without waiting for the consent of the emperor Lotharius, because of the urgency of the circumstances. Rome was then threatened by the Saracens, who occupied part of the duchy of Benevento, and who a short time before had landed on the banks of the Tiber, and plundered the Basilica of St. Peter's on the Vatican, which was outside of the walls. In order to prevent a recurrence of this violence, Leo undertook to surround the Basilica and the suburb around it with walls, and this being completed in four years, with the assistance of money sent by the emperor, and the produce of a tax levied upon all property in the duchy of Rome, the new town was called Leonina, a name which it has retained to this day. Leo also restored the town of Porto on the Tiber, near its mouth, settling there some thousands of Corsicans, who had run away from their country on account of the Saracens. Towers were built on both banks of the river, and iron chains drawn across to prevent the vessels of the Saracens from ascending to Rome. The port and town of Centum Cellæ being forsaken on account of the Saracens, Leo built a new town on the coast, about 12 miles distant from the other, which was called Leopolis, but no traces of it remain now, as the modern Civitavecchia is built on or near the site of old Centum Cellæ. Leo died in July, 855, and, fifteen days after his death, Benedict III. was elected in his place, according to the most authentic text of Anastasius, who was a contemporary. But later writers introduced between Leo IV. and Benedict III. the fable of Pope Joan. [Joan, Pope.]

LEO V., a Benedictine monk, succeeded Benedict IV., A.D. 903. In less than two months he was violently superseded and imprisoned by a certain Christopher, who was his chaplain, and who assumed the pontifical office. But Christopher himself did not retain it long, as a new revolt of the Romans drove him from the usurped see, and put in his place Sergius III., who was the favourite of the celebrated Marozia, a powerful but licentious woman, who disposed of everything in Rome. The tenth century is the darkest æra of the papacy. How the unfortunate Leo died is not mentioned; probably he died in prison.

LEO VI. succeeded John X., A.D. 928, and died seven months afterwards; some say that he was put to death by Marozia, like his predecessor. He was succeeded by Stephen VII.

LEO VII. succeeded John XI., the son of Marozia, A.D. 937. He mediated a peace between Alberic, duke of Rome. and Hugo, king of Italy, who had offered to marry Marozia, in order to obtain by her means the possession of Rome, but was driven away by Alberic, Marozia's son. Leo is said to have been a man of irreproachable conduct, but little else is known of him. He died in the year 939, and was succeeded by Stephen VIII.

LEO VIII. succeeded John XII., who was deposed for his misconduct, by a council assembled at Rome, in presence of the emperor Otho I., A.D. 963. But soon after Otho had left Rome, John XII. came in again at the head of his partisans, obliged Leo to run away, and resumed the papal office. John however died shortly after, and the Romans elected Benedict called V. Otho, returning with an army, took the city of Rome, exiled Benedict, and reinstated Leo, who died about 965, and was succeeded by John XIII.

LEO IX., Bruno, bishop of Toul, was appointed in 1049 to succeed Damasus II. at the joint recommendation of the emperor Henry III. and of the famous Hildebrand (afterwards Gregory VII.). He was continually in motion between Germany and Italy, holding councils and endeavouring to reform the discipline and morals of the clergy, and also to check the progress of the Normans in Southern Italy, against whom he led an army, but was defeated in Apulia and taken prisoner by the Normans, who treated him with great respect, but kept him for more than a year in Benevento. Having made peace with them by granting to them as a fief of the Roman see their conquests in Apulia and Calabria, he was allowed to return to Rome, where he died in 1054, and was succeeded by Victor II.

LEO X., Giovanni de' Medici, the second son of Lorenzo the Magnificent, was born in December, 1475. He was made a cardinal at the unusually early age of thirteen, by Pope Innocent VIII., who was very intimate with his father Lorenzo. After the death of Lorenzo in 1492, Cardinal de' Medici shared in the expulsion of his brothers, Piero and Giuliano, from Florence, in November, 1494. [Medici.] After fruitless endeavours to effect their restoration, Cardinal de' Medici gave up the attempt, and quitted Italy, which country was then ravaged by foreign arms, and betrayed by the wretched policy of Alexander VI. Cardinal de' Medici travelled through Germany and France, courting the acquaintance of men of learning, and displaying his own taste for literature and the liberal arts. After the death of Alexander VI., in 1503, he returned to Rome, where Julius II. employed him as legate with the army against the French. Being taken prisoner by the latter at the battle of Ravenna, in April, 1512, he was sent to Milan, but soon after effected his escape. The French being driven out of Lombardy, and the Florentine republic, with the Gonfaloniere Soderini at its head, being charged with partiality towards the foreigners, Cardinal de' Medici contrived to employ the arms of the allied powers in replacing him and his family in their former supremacy over their native country. A body of 5000 Spaniards, brave to ferocity, were marched under Raymond de Cardona against Florence, in August, 1512. On their way they stormed the town of Prato, and massacred the citizens, which so intimidated the Florentines that they immediately capitulated; and Cardinal de' Medici and his brother Giuliano soon after entered Florence, and forced the Signoria, or executive, to call a 'parlamento,' or general assembly of the people, in the great square, on the 16th December. This general assembly of the sovereign people had repeatedly been used by ambitious men as a ready instrument of their views, and it proved such on this occasion. [Florence, *History*.] All the laws enacted since the expulsion of the Medici in 1494 were abrogated. A balia, or commission, was appointed, consisting of creatures of that family, with dictatorial powers to reform the state. No bloodshed however accompanied the re-action; but Soderini and other citizens opposed to the Medici were banished. Soon after, in March, 1513, news came of the death of Julius II. at Rome, and Cardinal de' Medici hastened to the conclave, leaving his brother Giuliano and his nephew Lorenzo, son of Piero, at the head of the affairs of Florence.

Cardinal de' Medici was elected pope, in March, 1513, at the early age of thirty-seven, when he assumed the name of Leo X. One of his first acts was to appoint two men of learning, Bembo and Sadoleto, for his secretaries. He next sent a general amnesty to be published at Florence, where a conspiracy had been discovered against the Medici, for which two individuals were executed; and others, with the celebrated Machiavelli among the rest, were arrested and put to the torture. Leo ordered Giuliano to release the prisoners, and recall those that were banished, and Soderini among the rest. Giuliano being invited to Rome, where he was made Gonfaloniere of the Holy Church, Leo appointed his nephew Lorenzo governor of Florence, and his cousin, Cardinal Giulio de' Medici, archbishop of the same. Florence was now a dependency of Rome, and such it continued during the rest of Leo's life.

The pontificate of Leo X., though it lasted only nine years, forms one of the most memorable epochs in the history of modern Europe, whether we consider it in a political light as a period of transition for Italy, when the power of Charles V. of Spain began to establish itself in that country; or whether we look upon it as that period in the history of the Western Church which was marked by the momentous event of Luther's Reformation. But there is a third and a more favourable aspect under which the reign of Leo ought to be viewed, as a flourishing epoch for learning and the arts, which were encouraged by that pontiff, as they had been by his father, and indeed as they have been by his family in general, and for which the glorious appellation of the age of Leo X. has been given to the first part of the sixteenth century.

Leo found the war renewed in Northern Italy. Louis XII. sent a fresh army, under La Trimouille, to invade the duchy of Milan. The Swiss auxiliaries of Duke Maximilian Sforza defeated La Trimouille at Novara, and the French were driven out of Italy. The Venetians however had allied themselves with Lous XII., and Leo sent Bembo to Venice to endeavour to break the alliance. Differences broke out between Leo and Alfonso d'Este, duke of Ferrara, who demanded the restoration of Reggio, taken from him by Julius II., which Leo promised, but never performed; on the contrary, he purchased Modena of the emperor Maximilian, disregarding the rights of the house of Este to that town. The pope held likewise Parma and Piacenza, and it appears that he intended to form out of these a territory for his brother Giuliano, and he made attempts to surprise Ferrara also with the same view. His predecessor, Julius, had in view the independence of all Italy, and he boldly led on the league for this purpose; Leo had a narrower object,—his own aggrandizement and that of his family,—and he pursued it with a more cautious and crooked policy.

Leo re-opened the council of the Lateran, which had begun under Julius II., for the extinction of the schism produced by the council of Pisa, which had been convoked by Louis XII., in order to check the power of that pope, who was his enemy. Circumstances were now changed, and Louis XII. made his peace with Leo in 1514, renounced the council of Pisa, and acknowledged that of the Lateran. Louis XII. died in the following year, and his successor Francis I., among his other titles, assumed that of Duke of Milan, which was the signal of a new Italian war. The Venetians joined him, whilst the emperor Maximilian, Ferdinand of Spain, Duke Sforza, and the Swiss made a league to oppose the French. The Pope did not openly join the league, but he negotiated with the Swiss by means of the cardinal of Sion, and paid them considerable sums to induce them to defend the north of Italy. The Swiss were posted near Susa, but Francis, led by old Trivulzio, passed the Alps by the Col de l'Argentier, entered the plains of Saluzzo, and marched upon Pavia, whilst the Swiss hastened back to defend Milan. The battle of Marignano was fought on 14th September, 1515. The Swiss made desperate efforts, and would probably have succeeded, had not Alviano with part of the Venetian troops appeared suddenly with cries of 'Viva San Marco,' which dispirited the Swiss, who believed that the whole Venetian army was coming to the assistance of the French. The result was the retreat of the Swiss, and the entrance of the French into Milan, who took possession of the Duchy. Leo now made proposals of alliance to Francis, who eagerly listened to them, and they had a conference at Bologna in December, 1515, in which a concordat was agreed upon, regulating the appointment to the sees and livings in the French kingdom, which concordat remained in force till the French revolution. A marriage was also agreed upon between Lorenzo, the pope's nephew, and Madeleine de Boulogne, niece of Francis de Bourbon, duke of Vendôme, from which marriage Catherine de' Medici, afterwards Queen of France, was born.

In 1516, Leo, under some frivolous pretences, deprived Della Rovere, the nephew of Julius II., of his duchy of Urbino, Pesaro, and Sinigaglia, which he gave to his nephew Lorenzo de' Medici. Soon afterwards a conspiracy to murder the Pope was discovered at Rome, and cardinal Petrucci, who was at the head of it, was hanged. In 1517 the council of the Lateran was finally closed, and in the same year Leo authorized the sale of indulgences in Germany, which was the immediate cause of the Reformation. [LUTHER.] For some years after however, Leo took little notice of the progress of Luther's opinions in Germany; and indeed to the end of his life Leo's mind appears to have been much more concerned with what occurred around him in Italy, than with the remote controversy carried on in Saxony, the consequences of which he probably did not foresee.

In 1518 a league of five years was proclaimed by Leo among the Christian princes, to oppose the advance of the Turks, who were threatening Italy. For this purpose the Pope gave to the Christian princes the disposal of part of the revenues of the clergy, which they readily appropriated to themselves, without doing anything against the Turks.

Gian Paolo Baglione of Perugia, a celebrated condottiero, had seized upon the government of his native town. Leo cited him to appear at Rome, with promises however of safety for his person. Upon his arrival Baglione was arrested, put to the torture, made to confess many crimes, and at last beheaded. Perugia was then annexed to the Papal State, as well as the duchy of Urbino after the death of Lorenzo de' Medici, who left no male issue.

The alliance of Leo with Francis I. was a hollow one, each party mistrusting the other. At last Leo, thinking that an alliance with the young monarch of Spain and emperor of Germany was likely to be much more advantageous to him, concluded a secret treaty, offensive and defensive, with Charles V., on the 8th of July, 1521, by which it was stipulated that the duchy of Milan was to be taken from the French and given to Francesco Maria Sforza, and Parma and Piacenza to be restored to the Pope. Leo subsidized a body of Swiss, and Prospero Colonna with the Spaniards from Naples joined the Papal forces at Bologna, crossed the Po at Casalmaggiore, joined the Swiss, and drove the French governor Lautrec out of Milan. In a short time the duchy of Milan was once more clear of the French, and restored to the dominion of Sforza. Parma and Piacenza were again occupied by the Papal troops. Leo at the same time declared Alfonso d'Este a rebel to the Holy See for having sided with the French, whilst the Duke on his part complained of the bad faith of the Pope in keeping possession of Modena and Reggio. The news of the taking of Milan was celebrated at Rome with public rejoicings, but in the midst of all this Leo fell ill, on the 25th of November, and died on the 1st of December, 1521, being 46 years of age, not without suspicion of poison, though some have maintained that he died a natural death.

Leo was generous, or rather prodigal; he was fond of splendour, luxury, and magnificence, and therefore often in want of money, which he was obliged to raise by means not always creditable. He had a discerning taste, was a ready patron of real merit, was fond of wit and humour, not always refined, and which at times degenerated into buffoonery. This was indeed one of his principal faults. His state policy was like that of his contemporaries in general, and not so bad as that of some of them. He contrived however to keep Rome and the Papal territory, as well as Florence, in profound peace during his nine years' pontificate, no trifling boon, whilst all the north of Italy was ravaged by French and Germans and Spaniards, who committed all kinds of atrocities. He was by no means neglectful of business, although he was fond of conviviality and ease, but even his enemies have not substantiated any charge against his morals. He did not, and perhaps could not, enforce a strict discipline among the clergy or the people of Rome, where profligacy and licentiousness had reigned almost uncontrolled ever since the pontificate of Alexander VI.

The services which Leo rendered to literature are many He encouraged the study of Greek, founded a Greek college at Rome, established a Greek press, and gave the di rection of it to John Lascaris; he restored the Roman University and filled its numerous chairs with professors; he directed the collecting of MSS. of the classics, and also of Oriental writers, as well as the searching after antiquities; and by his example encouraged others, and among them the wealthy merchant Chigi, to do the same. He patronized men of talent, of whom a galaxy gathered round him at Rome. He employed Michel Angelo at Florence and Raphael at Rome in the Vatican. He corresponded with Erasmus, Machiavelli, Ariosto, and other great men of his time. He restored the celebrated library of his family, which on the expulsion of the Medici had been plundered and dispersed, and which is now known by the name of the Biblioteca Laurenziana at Florence. In short Leo X., if not the most exemplary among popes, was certainly one of the most illustrious and meritorious of the Italian princes.

(Guicciardini, *Storia d'Italia;* Roscoe's *Life and Pontificate of Leo X.;* the same in Italian, translated by Bossi, with numerous and valuable notes and additions. For the *bulls* and *speeches* of Pope Leo X. see Fabricius, 'Bibliotheca Latina Mediæ et Infimæ Ætatis.')

LEO XI., Cardinal Alessandro de' Medici, had been sent by his predecessor, Clement VIII., legate to France, to receive Henri IV. into the bosom of the Catholic church. He was very old when elected, on the 1st of April, 1605, and he died on the 27th of the same month, it is said from the fatigue attending the ceremony of taking possession of the Patriarchal church of St. John in Laterano.

LEO XII., Cardinal Annibale della Genga, born in 1760, of a noble family of the Romagna, was employed as nuncio to Germany and France, by Pius VII., who made him a cardinal in 1816. On the death of Pius VII. he was elected pope, in September, 1823. He was well acquainted with diplomacy and foreign politics, and in the exercise of his authority, and in asserting the claims of his see, he assumed a more imperious tone than his meek and benevolent predecessor. He re-established the right of asylum for criminals in the churches, and enforced the strict observance of meagre days. He was a declared enemy of the Carbonari and other secret societies. He proclaimed a jubilee for the year 1825; and in his circular letter accompanying the bull, addressed to the patriarchs, primates, archbishops, and bishops, he made a violent attack on the Bible Societies, as acting in opposition to the decree of the Council of Trent, session iv., concerning the publication and use of the Sacred Books. Leo also entered into negotiations with the new states of South America, for the sake of filling up the vacant sees. He gave a new organization to the university of the Sapienza at Rome, which consists of five colleges or faculties, namely, theology, law, medicine, philosophy, and philology; and he increased the number of the professors, and raised their emoluments. He published, in October, 1824, a Moto Proprio, or decree, reforming the administration of the Papal State, and also the administration of justice, or Procedura Civile, and he fixed the fees to be paid by the litigant parties. He corrected several abuses, and studied to maintain order and a good police in his territories. He died in February, 1829, and was succeeded by Pius VIII.

LEO, JOHN, was a Moor of Granada, who, retiring into Africa, when his native place was taken in 1492, received the surname of AFRICANUS. After travelling a considerable time in Europe, Asia, and Africa, he was taken at sea by pirates, and subsequently abjured the Mohammedan religion under Pope Leo X. He is believed to have died about 1526. His 'Description of Africa' was first written in Arabic, and afterwards translated by its author into Italian. It was translated into Latin by John Florian, 8vo. Antw., 1556; 24mo., Lugd. Bat., Elzev., 1632; and into French by Jean Temporal, 2 tom. fol., Lyon, 1556. Marmol the Spaniard appropriated to himself the greater part of the text of this work without acknowledging it. Leo Africanus wrote also the 'Lives of the Arabian Philosophers,' printed by Hottinger, in Latin, at Zürich, fol., 1664; they were again published, from a different manuscript, in the 13th volume of Fabricius's 'Bibliotheca.' (Moreri's *Dict.;* Chalmers's *Biogr. Dict.*, vol. xx.)

LEO, LEONARDO, a celebrated composer, who flourished during the early half of the last century, was born at Naples in 1694, and received his musical education under Alessandro Scarlatti, having for his fellow-disciples Durante, Vinci, Porpora, &c. He soon distinguished himself by his Italian operas, which gained for him a high reputation, and are mentioned by musical critics in strong terms of praise. But how fleeting was the fame arising from such compositions till Mozart appeared, and gave them immortal life! Out of the many produced by Leo not one survives; and had he not dedicated a portion of his time to the church, his name would now have been utterly forgotten. His *Dixit Dominus*, his *Miserere*, masses, and other sacred music, will always be esteemed for the grandeur of their style, their deep feeling, the sensible manner in which the words are set, and for greatness of effect produced by comparatively simple means. He will be remembered too in musical history as the master of Piccini, Jomelli, and other able composers. He died at Naples, in 1755.

LEO ALLA'TIUS. [ALLATIUS.]

LEO (the Lion), a constellation of the ZODIAC, which commemorates the Nemæan lion killed by Hercules in the mythology of the Greeks. It is surrounded by Ursa Major, Leo Minor, Cancer, Hydra, Sextans, Virgo, and Coma Berenices. A line drawn through the pole star and the lowest of the four in the Great Bear (or γ) passes through Deneb (or β Leonis); and a line drawn through the bright star Regulus (or α Leonis) of the first magnitude and Deneb passes nearly through Arcturus. The principal stars are as follows:—

Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.	Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.]			Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.	
κ	1	1140	5	*b*	60	1306	5
ω	2	1149	6	p^1	61	1304	5
·	3	1150	6	p^2	62	1309	6
λ	4	1153	4	χ	63	1310	4½
ξ	5	1154	5½	p^3	65	1313	6
h	6	1155	6	p^4	66	1317	6
	7	1162	6		67	1314	6
	8	1163	6	δ	68	1320	2½
	9	1164	6	p^5	69	1321	5½
	10	1165	5	θ	70	1323	3
	11	1166	6	(*t*)	72	1324	5
	13	1170	6	*n*	73	1325	6
ο	14	1171	3½	φ	74	1327	4
ψ	16	1174	6	(*q*)	75	1328	6
ε	17	1175	3		76	1332	6
	18	1177	6	σ	77	1334	4½
	19	1178	7	ι	78	1338	4
	20	1180	6	(*r*)	79	1339	5½
g	22	1184	6		80	1345	6
μ	24	1187	3½		81	1343	6
ν	27	1193	5½		82	1344	7½
π	29	1197	4	τ	84	1347	4
η	30	1206	3½		85	1349	6
A	31	1207	5		86	1351	6
α	32	1209	1	*e*	87	1352	4½
	34	1214	7	(H)	89	1357	6
ζ	36	1221	3	(C)	90	1358	6
	37	1222	6	υ	91	1362	4
	40	1227	6		92	1366	6
γ	41	1228	2	(E)	93	1373	4
	42	1232	6	β	94	1375	1½
z	43	1233	6		(4)	1318	7
b^1	44	1237	5½		(10)	1217	7
	45	1242	6		(12)	1322	6½
i	46	1252	6		(22)	1326	6
ρ	47	1254	4		(23)	1220	6
	48	1256	6		(35)	1128	7
	49	1259	6		(50)	1336	7
	50	1263	6⅔		(60)	1341	6½
m	51	1278	6		(74)	1143	7
k	52	1279	6		(77)	1348	7
l	53	1284	6		(158)	1173	7
	54	1293	4½		(225)	1308	7
u	55	1295	5⅔		(230)	1198	6½
	56	1296	6½		(237)	1200	7
	57	1298	6		(240)	1202	7
d	58	1302	5⅔		[1313]	1132	7
c	59	1303	5		[1321]	1141	7

LEO MINOR, a constellation of Hevelius, surrounded by Ursa Major, Lynx, Cancer, and Leo. Its principal stars are as follows:—

Character.	No. in Catalogue of		Magnitude.
	Flamsteed.	Astron. Society.	
b	10	1158	4½
d	21	1204	5
f	30	1236	4¾
g	31	1240	5
l	37	1261	5¼
	40	1269	6
m	41	1271	5
n	42	1274	4½
	44	1285	6
o	46	1289	4¾
	50	1297	6

LEO'DICE (Zoology), a name given by Savigny to a genus of *Dorsibranchiata*, *Eunice* of Cuvier. [Dorsibranchiata.]

LEOMINSTER. [Herefordshire.]

LEO'N, REYNO DE, one of the former great divisions of Spain, originating in the political formation of that country into different kingdoms, which grew out of the successive conquests of the Christians from the Moors. The kingdom of Leon was the earliest of these, and was formed by the Christians coming out of the fastnesses of Asturias and extending their conquests southwards to the Duero. The immediate successors of Pelayo were called kings of Oviedo or of Asturias, because that province was then the only part free from the Moors, and had never been conquered by them. Alfonso, called the Catholic, A.D. 739 to 757, conquered the towns of Leon, Astorga, Simancas, Zamora, Salamanca, and Ledesma, as well as part of Galicia. These were added to the dominions of the Asturian kings, though held on the precarious tenure of either paying tribute to the neighbouring Moors, or having to defend them against their incursions. It was Garcia, son and successor of Alfonso III., who, about A.D. 910, transferred the seat of sovereignty from Oviedo to Leon. Henceforth the Christian kingdom in Northern Spain was called the kingdom of Leon and Asturias, and was independent of the kingdom of Navarra, which was on the other side of the Ebro. The counts of Castilla, who had formed another Christian state between the two, were for a time dependent, nominally at least, on the kings of Leon, until A.D. 1025, when Castilla became an independent kingdom under a branch of the royal house of Navarra. The boundaries of all these kingdoms were of course not clearly or fixedly determined. Almost always at war, either with the Moors or among themselves, the extent of their respective territories varied with every reign, or rather with every fresh campaign. The male line of the kings of Leon became extinct with Bermudo III. in the year 1037, whose sister had married Fernando, king of Castile, who thus united both crowns. But at his death Sancho, one of his sons, had Castile, and Alfonso had Leon and Asturias. The two kingdoms remained distinct, although their crowns were sometimes worn by the same person, for nearly two centuries, until Fernando III., in 1230, permanently united the two kingdoms, assuming the title of king of Leon and Castilla, which his successors retained.

The territory known by the name of the kingdom of Leon comprised six provinces, namely, Leon, properly so called; Palencia; Toro; Zamora; Salamanca; and Valladolid. They are all comprised in the basin of the Duero, between the Asturian mountains on the north, the Sierra de Gata and Sierra de Gredos to the south, which divide the basin of the Duero from that of the Tagus, or province of Estremadura, and between the boundaries of Burgos and Segovia in Old Castile on the east, and the frontiers of Portugal and Galicia on the west. The whole extent of the kingdom of Leon is roughly calculated at 21,000 square miles, and its population at 1,215,000 inhabitants. The name and antient boundaries of the kingdom of Leon are now a mere historical remembrance: all Spain being at present divided into provinces, the old division by kingdoms has become obliterated.

LEO'N, THE PROVINCE OF, is bounded north by the Asturias, south by the province of Zamora, east by that of Palencia, and west by Galicia. It is nearly 100 miles in length from east to west, and about 50 wide from north to south, and its population is reckoned at 311,700 inhabitants. The province belongs mainly to the basin of the Duero, being crossed from north to south by the Esla, which rises in the mountains of Valdeburon, on the borders of Asturias, and flows southwards into the province of Zamora, where it enters the Duero. The Esla is joined in its course by many streams, both from the east and the west. There is a small part of the province of Leon, west of Astorga, which forms part of the basin of the Miño, being watered by the Sil and other tributaries of that river. An offset of the Asturian chain, which runs southward to the west of Astorga, forms the limit between the two river-basins. The surface of Leon is mountainous in the north of the province where it rises towards the Asturian chain, but it slopes to the south, where it sinks into the plain of the Duero. The country produces corn, though not sufficient for the consumption; fruit and vegetables in abundance, and hemp, flax, and wine, which however is not so good as the wine of Toro and Rueda. Large herds of cattle and flocks of sheep, as well as horses and mules, are reared in this province. There are few manufactories; coarse woollen cloths are made near Astorga, and much flax is spun by the distaff and bleached, and forms an article of export. The country people of Leon are very simple in their manners, and deficient in comforts and refinement; there are few proprietors among them, most of them being tenants or labourers of the estates of the nobility and corporations.

The two principal towns of the province are:—1. Leon (Legio Septima), an old and now somewhat decayed city, said to have been built by the Roman soldiers of the 7th legion, in the time of Vespasian; it was for more than two centuries the residence of the kings of Christian Spain. Its cathedral, built in the thirteenth century, is one of the finest in Spain, and contains the tombs of the old kings. There are two other collegiate churches, San Marco and San Ysidro. The Plaza Mayor, or principal square, is handsome, and there are other squares adorned with fountains. Leon contains about 6000 inhabitants. 2. Astorga. The other towns of the province are Sahagun, with a celebrated Benedictine convent; Ponferrada; Villafranca, on the high road to Galicia; Benavides, &c.

LEONARD, ST. [Vienne, Haute.]

LEONARDO of PISA, or LEONARDO BONACCI, an Italian mathematician who lived at the commencement of the thirteenth century, was the first person who brought to Europe the knowledge of algebra. His work was never printed, but is preserved at Rome, and is described in Cossali's 'History of Algebra.' From Italy the knowledge of algebra was long afterwards communicated to the rest of Europe. He was author of a treatise preserved in the Magliabecchi library at Florence, entitled 'Practica Geographia.'

LEO'NIDAS, King of Sparta, commanded the Grecian troops sent to maintain the pass of Thermopylæ against the invading army of the Persians under Xerxes, B.C. 480. The force under his command amounted to 4200 men, besides the Opuntian Locri and a thousand Phocians. With these, during two days' fight, he defended the narrow defile which was the usual passage from Thessaly to the southern parts of Greece; and probably he would have frustrated the utmost efforts of the invader but for the discovery, by some renegades, of a circuitous and unfrequented pass by which a body of the invaders crossed Mount Œta. On receiving intelligence that his position was thus turned, Leonidas dismissed all his soldiers except 300 Spartans; the Thebans, whose fidelity to the common cause was suspected; and the Thespians, 700 in number, who resolved to share the fate and the glory of the Spartans,—for the laws of Sparta forbade her citizens to turn their backs upon any odds; and in this great emergency, when many states seemed inclined to yield to Persia, Leonidas probably thought that the effect to be produced by a great example of self-devotion and obedience was of more importance to the cause of Greece than the preservation of a certain number of her best soldiers. Being surrounded and attacked in front and rear, the Spartans and Thespians fell to a man after making vast slaughter: the Thebans asked and received quarter. The corpse of Leonidas was mutilated and exposed on a cross by Xerxes. A stone lion was afterwards raised near the spot where he fell. The slain were buried where they fell, and their memory was honoured by monumental pillars. Two of the inscriptions ran thus:—'Here 4000 men from Peloponnesus once fought three millions:' 'Stranger, tell the Lacedæmonians that we lie here, obeying their laws.' This self-devotion of Leonidas, the beginning of the grandest war related in history, has ever been held to be among the noblest recorded instances of heroism and patriotism.

We have followed the account of Herodotus (vii., 202, &c.). Diodorus and Plutarch relate it somewhat differently.

LEONINE VERSES, a kind of measure much in fashion during the middle ages. It consists properly of the Latin hexameter, or hexameter and pentameter rhymed. No less than ten varieties in the fall of the rhymes are counted; but that which is by far the most common is when the cæsura on the fifth syllable rhymes with the end of the line, as for example:

> 'En Rex Edvardus, debacchans ut Leopardus.'

There is an example of a modern attempt at Leonine verses in Parnell's translation of a passage in the 'Rape of the Lock,' beginning,

> 'Et nunc dilectum speculum pro more retectum.'

The rhymes appear universally to be dissyllabic. The classical metre is however not essential. We find in the antient hymns of the Roman Catholic Church the rhythm of modern versification:—

> 'Quid sum miser tunc dicturus,
> Quem patronum rogaturus,
> Cum vix justus sit securus?'

Or in the famous song of Walter de Mapes, archdeacon of Oxford in the time of Henry II.:

> 'Mihi est propositum in taberna mori,
> Vinum sit appositum morientis ori,
> Ut dicant, cum venerint Angelorum chori,
> Deus sit propitius huic potatori.'

The term is said to be derived from Leoninus, a monk of the twelfth century, the reputed inventor of this mode of composition, which however is shown to go back as far at least as the third. It went out of fashion with the revival of classical learning. For more particulars see Sir A. Croke, 'Essay on the Origin, Progress, and Decline of Latin Verse,' quoted in the 'Encycl. Metr.,' which has a long article on this subject; also a tract from the MSS. of Ben'et College, Cambridge, containing rules for Leonine verses, edited by Dr. Nasmith, 1778.

LEO'NTODON TARA'XACUM (Dandelion), a perennial herbaceous plant of frequent occurrence. The root, leaves, and flower stem (scape) contain much milky juice; but the root only is employed in medicine: though the leaves by blanching can be rendered fit for use as a salad, retaining then only a moderate degree of bitterness. The root of plants which are three or four years old should alone be collected, and at Midsummer; as young plants, or roots collected in spring, merely contain a reddish mucilaginous juice, while those of older plants taken up in summer have a brown bitter and saline juice. Those from rich soil are not so potent as those from a poorer land. The root may either be speedily and carefully dried for preservation, or the expressed juice may be inspissated, and so form what is termed the extract.

The chemical constitution is—a peculiar bitter principle, grumous sugar and inulin, and probably some important salts.

Either an infusion, decoction, or extract possesses sedative, deobstruent, and diuretic properties. In chronic subacute inflammation of the stomach or liver, enlargements of the liver or spleen, it proves more beneficial than almost any other vegetable remedy. In many cases of dropsy, particularly connected with obstruction of the liver, it has often succeeded when all other diuretics have failed. It is very extensively employed in Holland to obviate the effects of the intermittents or agues common there, and with the greatest advantage. The extract, unless very carefully prepared, soon ferments and spoils.

LEOPARDS, the name by which the greater spotted cats are known.

LEOPARDS OF THE OLD WORLD.

The form seems to have its most perfect development in the antient continent and the islands of the Old World, though it must be admitted that the American Jaguar, in point of size, strength, and sturdiness of make, excels the Leopards of Asia and Africa.

The Panther, *Felis pardus* of Linnæus, first claims our notice. It has been a question whether the Leopard and Panther are distinct species, or only varieties. Linnæus, in his last edition of the 'Systema Naturæ,' included under the specific name of *Felis Pardus* the *Panthera, Pardalis, Pardus*, and *Leopardus* of Gesner; *Pardus* mas, *Panthera* femina of Alpin (Ægypt); *Pardalis* of Ray, *Tigris mexicana* of Hernandez; and *Pinuum Dasypus*, Nieremb., *Nat.* Under the specific name of *Onca* he includes *Pardus* s. *Lynx Brasiliensis* of Ray, and the *Jaguara* of Marcgrave. He has no species named *Leopardus;* but Gmelin has, and in his edition we find the following species:—1. *F. pardus*—*F.* cauda elongata, corpore maculis superioribus orbiculatis; inferioribus virgatis—(the description of Linnæus) Schreb., *Saeugth.*, iii, p. 384, t. xcix., with the following references and synonyms:—*Felis* ex albo flavicans, maculis nigris in dorso orbiculatis, in ventre longis, Briss., *Quadr.;* the names of Gesner and Ray as quoted above; *Pardus* maculis seu scutulis variis, Ludolf, Æthiop.; *Panthère* of Buffon. 2. *F. Unica, Once*, Buffon. 3. *F. Leopardus*—*F.* cauda mediocri, corpore fusco maculis subcoadunatis nigris. Erxl., *Syst. Mamm.*, p. 509, n. 5; Schreb., *Saeugth.*, iii., p. 387, t. ci.; *Uncia*, Caj., *Op.*, p. 42, Gesn., *Quadr.*, p. 825; *Leopard* of Buffon. 4. *F. Onca*, the Jaguar.

Cuvier separates the Panther from the Leopard specifically. The Panther, *La Panthère*, he makes the *Felis pardus* of Linnæus, and the *Pardalis*, *ἡ πάρδαλις* of the antients. He describes the Panther as yellow above, white beneath, with six or seven rows of black spots in the form of roses, that is to say, formed by an assemblage of five or six small simple spots on each side; the tail of the length of the body, not reckoning the head. This species he speaks of as being spread throughout Africa and in the warm countries of Asia, as well as in the Indian Archipelago; and he states that he has seen individuals where the ground-colour of the fur is black, with spots of a still deeper black (*Felis melas*, Pér.), but that they do not form a species, observing that both yellow and black cubs have been seen sucking the same mother (1829).[*] Pennant (*Hist. Quadr.*, 1793) figures a *Black Leopard*, and describes the variety as follows:—'In the Tower of London is a black variety, brought from Bengal by Warren Hastings, Esq. The colour universally is a dusky black, sprinkled over with spots of a glossy black, disposed in the same forms as those of the Leopard: on turning aside the hair, beneath appears a tinge of the natural colour.'

The Leopard, *Felis Leopardus* of Linnæus, as he quotes it (but it is not mentioned by Linnæus in his last edition of the 'Syst. Nat.;' it appears, as we have seen, in Gmelin's edition), Cuvier assigns to Africa, remarking that it is similar to the Panther, but with ten rows of smaller spots. These two species, he adds, are smaller than the Jaguar; and he says that there is a third, a little lower on the legs, with the tail equalling the body and head in length, and with more numerous and smaller spots (*Felis chalybeata*, Herm. Schreb., 101).

Cuvier does not notice the Panther, *ὁ πάνθηρ* of Aristotle (*Hist. Anim.*, vi. 35), and indeed this animal is supposed by many not to have been one of the Leopard kind. In a note to *Felis chalybeata*, Cuvier states that it is to that species M. Temminck applies the name of Panther; but the former adds that it is certain that the Panther so well-known to the antients, and which appeared so often in the Roman shows and games, could not be an animal from the recesses ('fond') of Eastern Asia.

Cuvier does not insert in the text of his 'Règne Animal' the Ounce of Buffon; but in a note to the second edition he speaks of it as differing from the Panthers and the Leopards by more unequal spots, more irregularly scattered, partly notched or ringed, &c., and as appearing to be found in Persia; adding, that his knowledge of it is only derived from Buffon's figure, and from that which Mr. Hamilton Smith has inserted in the English translation of the 'Règne Animal,' from an individual which had been seen living in London.

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[*] But note M. Lesson's ('Manuel,' 1827) account of *Felis melas*, Péron, post, p. 431.

The Panther and the Leopard were once regarded by M. Temminck as varieties of the same species, *Felis Leopardus*, but he has separated them specifically in his *Monograph*.

Colonel Smith's Ounce was detected by him in the Tower when that fortress included a menagerie among its attractions. The animal is said to have been brought from the Gulf of Persia, but we only learn that it was very distinct from all other species in make, markings, and general appearance. (See post.)

The same author describes the Panther of the antients as standing higher than the Jaguar, and as approaching in its form, which is slender, to that of the Hunting Leopard, *Felis jubata*, though much larger in proportion.

M. Lesson enumerates the following Leopards as belonging to the Old Continent:—

Felis Panthère, Felis Pardus, Linn., Temm., *Monog.* Less than the Leopard; tail as long as the body and head. *Locality*, Bengal; and probably does not exist in Africa.

Felis Leopard, Felis Leopardus, Lin. (Gmel.), Temm.; *Felis Pardus*, Cuv.; *Fuahd* of the Arabs. Rather less than a lioness; tail (22 vertebræ) of the length of the body. *Locality*, Africa and India.

Felis jubata, the Chetah, or Hunting Leopard. *Locality*, Southern Asia.

Among those *Felidæ* which are distributed in the Polynesian group of islands (Iles Asiatiques de la Polynesie) M. Lesson notices

Felis Melas, Péron, observing that this animal, which M. Temminck believed to be a variety of the Leopard, constitutes, on the contrary, a species entirely confined to Java, and especially in the most isolated eastern districts, such as Blambangan. (Brambanan?) The size of the animal he states to be that of the Panther; its fur of a deep black, on which are traced zones of the same colour but less lustrous. This leopard, which is called *Arimaou* by the Javanese, is used for the singular combats of the *Rampok*, for the details of which M. Lesson refers to the 'Zool. de la Coquille,' t. i., p. 139. He adds that he saw a beautiful specimen belonging to the resident of Sourabaya, and he was assured that *Felis Melas* was not rare in the island. He also refers to *Felis Macrocelis*, Horsfield. *Localities*, Sumatra and Borneo (1827).

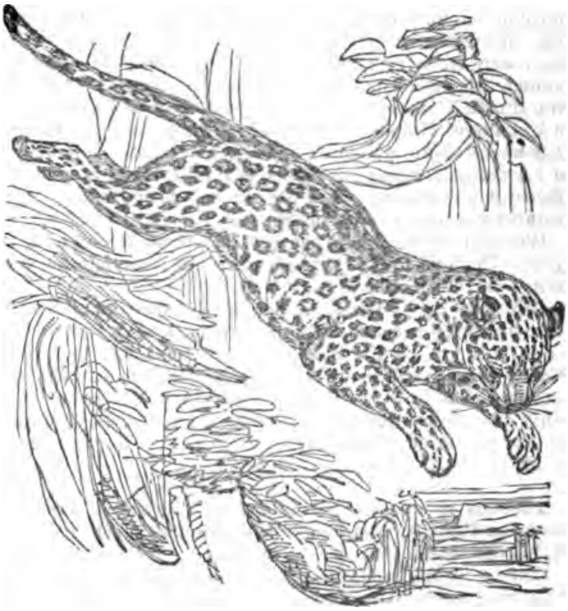
Mr. Bennett (*Gardens and Menagerie of the Zoological Society*, 1830) says, 'Whether the Leopard and the Panther are in reality distinct species, and if so, on what particular characters the specific distinction depends, are questions that have been so variously solved by writers of the highest eminence, that we cannot, without better opportunities for comparison of specimens than we at present possess, adopt the conclusions to which any one of them has come upon the subject. Linnæus, not perceiving any sufficient grounds of distinction, referred both names to one and the same animal; Buffon added a third, that of the Ounce, and increased the confusion by describing as the Panther of the antients, and an animal of the Old Continent, the Jaguar, which is now known to be peculiar to the New; Cuvier subsequently founded a distinction upon the greater or smaller number of rows of spots disposed along the sides of the body; and Temminck, rejecting these characters as unimportant, has lately fixed upon the comparative length of the tail as affording the only sure means of discrimination. In this uncertainty the question remains for the present; but there can be no doubt of the complete distinction between both the animals involved in it and that which we have figured, the mistaken Panther of Buffon, the Jaguar of Brazil, and *Felis Onça* of systematic writers. It may not however be useless to observe, that of the figures given by Buffon as Panthers and Jaguars, that which is entitled the male Panther is in all probability a Leopard; the female is unquestionably a Jaguar; the Jaguars of the original work, and of the supplement, are either Ocelots or Chatis; and that which purports to be the Jaguar or Leopard, although probably intended for a Chetah, is not clearly referrible by its form and markings to any known species.'

Mr. Swainson, in his 'Classification of Quadrupeds' (1835), leaves the question untouched. In his 'Animals in Menageries' (1838), he gives the following species:—

The Leopard, *Leopard*, Cuvier. *Felis Leopardus*, H. Smith, in Griff., Cuv

The Panther, *Felis Pardus*, Linn., Hamilton Smith. *Panthère*, Cuvier.

Panther of the antients, *Felis Pardus Antiquorum*, Hamilton Smith, in Synopsis of Griff., Cuv.



The Leopard. Senegal.

Under the title 'Leopard,' Mr. Swainson says, 'Although the names of Leopard and Panther have been long familiar in common language, and have conveyed the idea of two distinct species, yet it is perfectly clear that no scientific writer of the last generation either described, or indeed appeared to know, in what respects the animals differed. It seems that numerous specimens of what is called the leopard are in the Zoological Gardens, and one has been figured in the book so entitled; but Mr. Bennett has not made the slightest attempt to investigate the subject, or to throw any light upon this difficult question. In this dilemma we shall therefore repose on the opinions of Major Hamilton Smith, whose long experience and accuracy of observation are well known, and whose authority in this department of nature deservedly ranks above that of any other naturalist of this country. The Leopard, as defined by Major Smith, when compared with the Jaguar and the Panther of naturalists, is uniformly of a paler yellowish colour, rather smaller, and the dots rose-formed, or consisting of several dots partially united into a circular figure in some instances, and into a quadrangular, triangular, or other less determinate forms in others: there are also several single isolated black spots, which more especially occur on the outside of the limbs. The Panther, according to Professor Lichstenstein of Berlin, "resembles the Jaguar in having the same number of rows of spots, but is distinguished by having no full spots on the dorsal line." But, as Major Smith observes, it does not appear that full spots on the dorsal line always make a specific character of the Jaguar; and the Asiatic Leopard is sometimes distinguished by this peculiarity, though it does not in other respects resemble the American animal. When therefore it is said that the Panther much resembles the Jaguar, it is always to be strongly suspected that the type whence the observations have been taken is in reality an American animal.' Mr. Swainson then, after copying Major Smith's scientific description of the Leopard, proceeds to say, 'Our own opinion of the specific dissimilarity between the Leopard and the Panther, judging from what has been written on the subject, is in perfect unison with that of Major Smith; while the following remark of that observing naturalist, incidentally inserted in his account of the Panther of antiquity, seems to us almost conclusive:—"The open spots which mark all the Panthers have the inner surface of the annuli or rings more fulvous (in other words darker) than the general colour of the sides; but in the Leopard no such distinction appears, nor is there room, as the small and more congregated dots are too close to admit it." In truth, if there is any reliance to be placed in the most accurate figures hitherto published, the small spots of the Leopard and the large ones of the Panther

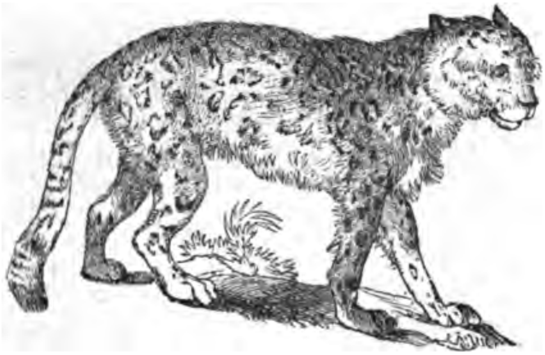
must strike even a casual observer, and lead him to believe that the two animals were called by different names.'

In the 'Gemmæ et Sculpturæ Antiquæ' of Gronovius there is an engraving of a boy driving a car drawn by two Panthers, rather high on their legs, from a cornelian, headed 'Carro di Bacho;' but Gronovius thinks that though this 'reda' may be attributed to Bacchus, it may nevertheless be taken for a representation of one from the Circensian games, for which opinion he gives his reasons. Captain Smyth, R.N., in his interesting 'Descriptive Catalogue of a Cabinet of Roman Imperial Large Brass Medals,' notices a medal of Commodus, on the reverse of which the emperor on horseback galloping across the field, with a chlamys floating behind him, is in the act of casting a dart at a Panther, which is 'showing fight.' He also refers to the figure of a Lynx or Panther on the reverse of one of Septimius Severus, and to that of a Panther (among other animals) on the smaller coins of Gallienus.

With regard to the *Felis Pardus Antiquorum* of Smith, Mr. Swainson remarks that the species, if such it really be, is supposed to be the animal known to antient writers by the name of *Panthera*. It is however, he adds, now so rare, or has been so little distinguished, that Major Smith is only acquainted with one example, which is in the museum of the elector of Hesse Cassel, in whose menagerie it had probably lived. Nothing was known of its native country or of its manners. (See H. Smith's description, including characters intermediate between the Jaguar of America and the Panthers and Leopards of the Old World.)

Mr. Swainson also notices the *Ounce* in the same work, referring to Major Smith's description, and regretting that that able zoologist had not entered into further particulars. Mr. Swainson states that, judging from the figure engraved from Mr. Smith's drawing, he should term it a lower and more thick-set animal than the Panther; the spots larger, more irregular, and much fewer, but differing more especially in having the tail decidedly annulated with black rings, while those of all the Panthers are spotted. The body, he adds, is described as whitish; while yellow or fawn-colour is the universal tint both of the Panthers and Leopards.

In June, 1837, Mr. Gray brought before the notice of a meeting of the Zoological Society of London some Mammalia which he had lately purchased for the British Museum from a collection made by the late Colonel Cobb in India, among which was an adult specimen of the *Once* of Buffon (*Hist. Nat.*), on which Schreber formed his *Felis uncia*, which has been regarded by Cuvier, Temminck, and most succeeding authors as a leopard, but which, continued Mr. Gray, 'is a distinct species, easily known by the thickness of its fur, the paleness of its colour, the irregular form of the spots, and especially by the great length and thickness of the tail. Mr. Gray observed, that a more detailed description of this animal was unnecessary, as it agreed in all particulars with the young specimen described by Buffon.



Ounce. From the specimen in the British Museum.

Of the manners of the true Leopards in a state of nature not much seems to be known. They are very active, climb well, and take their prey by surprise. In captivity they are playful, but apt to be treacherous. Mrs. Bowdich* won the heart of a Leopard by kindness, and, by presenting him with lavender-water in a card-tray, taught him to keep his claws sheathed. The luxurious animal revelled in the delicious essence almost to extacy; but he never was suffered to have it if he put forth his claws. We regret that our limits will not allow us to give this lady's graphic account of her amiable favourite 'Sai,' which the reader will find in Loudon's 'Magazine.'

For an account of the prickle occasionally found at the extremity of the tail of the Leopard, see LION.

Among the larger Spotted Cats of the Old World we must notice the *Rimau-Dahan, Felis Macrocelis*, Temm., Hors. *Felis nebulosa?* H. Smith, Griffith.

This species partakes in some measure of the markings of both the Tiger and Leopards, though it seems to be more nearly allied to the latter than to the former.

Description.—Probable size when full grown about four feet from the nose to the root of the tail, which may be reckoned at three feet six inches; height at shoulder about one foot ten inches. Colour whitish grey, with an inclination to ashy or brownish grey, no yellow or red tint. Stripes and spots dark, oblong, irregular, and broad on the shoulders, interrupted and angular on the sides, posterior edges of the broad spots and stripes marked by a line of deep velvet black; limbs stout, feet and toes robust, tail very long, large, and lanuginous.

Locality.—Sumatra. M. Temminck thinks it is also found on the continent of India, having received mantles belonging to the Diakkers made of the skin of this species.

The specimen brought to England alive by Sir Thomas Stamford Raffles was taken when very young in the forests of Bencoolen, and died during the process of dentition soon after its arrival. Dr. Horsfield gives the following dimensions: sex, female:—

	Ft.	In.
Length of the body and head, from the extremity of the nose to the root of the tail .	3	0
Length of the tail	2	8
Height at the shoulders	1	4
Height at the rump	1	3
Circumference of the abdomen . . .	2	0
Circumference of the neck	1	2

Sir Stamford Raffles gives the following account of the manners of the species from personal observation made on two individuals:—'Both specimens, while in a state of confinement, were remarkable for good temper and playfulness; no domestic kitten could be more so; they were always courting intercourse with persons passing by, and in the expression of their countenance, which was always open and smiling, showed the greatest delight when noticed, throwing themselves on their backs, and delighting in being tickled and rubbed. On board the ship there was a small Musi Dog, who used to play round the cage and with the animal, and it was amusing to observe the playfulness and tenderness with which the latter came in contact with his inferior-sized companion. When fed with a fowl that died, he seized the prey, and after sucking the blood and tearing it a little, he amused himself for hours in throwing it about and jumping after it in the manner that a cat plays with a mouse before it is quite dead. He never seemed to look on man or children as prey, but as companions; and the natives assert that when wild, they live principally on poultry, birds, and the smaller kinds of deer. They are not found in numbers, and may be considered rather a rare animal, even in the southern part of Sumatra. Both specimens were procured from the interior of Bencoolen, on the banks of the Bencoolen river. They are generally found in the vicinity of villages, and are not dreaded by the natives, except as far as they may destroy the poultry. The natives assert that they sleep and often lay wait for their prey on trees; and from this circumstance they derive the name of *Dahan*, which signifies the fork formed by the branch of a tree, across which they are said to rest and occasionally stretch themselves. Both specimens constantly amused themselves in frequently jumping and clinging to the top of their cage, and throwing a somerset, or twisting themselves round in the manner of a squirrel when confined, the tail being extended and showing to great advantage when so expanded.' (*Zool. Journ.*, vol. i.)

Dr. Horsfield, in the work above quoted, confirms the account of Sir Stamford from his own observation on the individual that was lodged on its arrival in Exeter 'Change. The Doctor, who does not appear to acquiesce in the identity of *Felis nebulosa* with the *Rimau-Dahan*, gives in the same paper a most elaborate and accurate description of the latter, to which we must refer our readers. He also gives a figure (pl. xxi.) from a drawing made by the late William Daniell, Esq., R.A., a few days after the animal had been placed in Exeter 'Change.

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* Now Mrs. Lee

Felis Macrocelis.

We now come to a very interesting form, one of those gradations by which Nature appears to pass from one type to another. The *Felis jubata* of Schreber, *Chetah Cheetah*, or *Hunting Leopard*, exhibits both in its external form and habits such a mixture of the Feline and Canine tribes as to justify apparently the appropriate name *Cynailurus*, employed by M. Wagler to designate it as a genus. Thus, as Mr. Bennett observes (*Tower Menagerie*), the Hunting Leopard, uniting to the system of dentition, the general habit, and many of the most striking peculiarities of the cats, some of the distinguishing features, and much of the intelligence, the teachableness, and the fidelity of the dog, becomes a sort of connecting link between two groups of animals otherwise completely separated, and exhibiting scarcely any other character in common than the carnivorous propensities by which both are in a greater or less degree actuated and inspired. 'Intermediate,' continues Mr. Bennett, 'in size and shape between the leopard and the hound, he is slenderer in his body, more elevated on his legs, and less flattened on the fore part of his head than the former, while he is deficient in the peculiarly graceful and lengthened form, both of head and body, which characterizes the latter. His tail is entirely that of a cat; and his limbs, although more elongated than in any other species of that group, seem to be better fitted for strong muscular exertion than for active and long-continued speed.' From these and other indications, Mr. Bennett is of opinion that the animal approaches much more nearly to the cats than the dogs, and continues it among the former. The anatomy of the Cheetah, as subsequently demonstrated by Mr. Owen, at a meeting of the Zoological Society of London, shows indeed that, in internal structure, this leopard is undoubtedly feline: of its habits we shall hereafter have occasion to speak. In the paper last above alluded to, 'On the Anatomy of the *Cheetah, Felis jubata*, Schreb.,' Mr. Owen commenced by remarking on *Felis* as a truly natural genus, and by observing that the anatomical structure of the animals composing it offers even fewer differences than their outward forms. The principal deviation from the common type was stated to be that which obtains in the organs of voice of the *Lion* (and, as Mr. Martin has observed, in those of the *Jaguar* also), where the larynx is situated at a considerable distance from the posterior margin of the bony palate, the soft palate and the tongue being proportionally increased in length, thus forming a gradually expanded passage, which leads to the *glottis*, where the air is rendered so sonorous, to the mouth. This structure, Mr. Owen remarks, may contribute in the Lion to produce the peculiar roar of that animal.

In the *Cats* generally, it was stated, the connexion of the *os hyoides* to the *cranium* is not by a long elastic ligament, as in the Lion, but by an uninterrupted series of bones. This latter structure exists in the *Cheetah*. The *Cheetah* has also the circular pupil of the *Lion, Tiger, Leopard*, and *Jaguar*, and is perhaps the most diurnal of the genus. In the form of the *œsophagus*, and in the transverse *rugæ* of its lower half, the *Cheetah* was stated to agree with the *Lion;* and, as in it and in the other *Feles*, the *œsophagus* was not prolonged into the abdomen, but terminated immediately after passing through the diaphragm in the stomach. This organ, according to Mr. Owen, has, in the *Cheetah*, all the peculiarities which are found in the genus *Felis*. The intestines also agree in character with those of that group; and the *cæcum*, as usual in it, is simple, having none of the convolution which is found in the *Dog*. The liver, *pancreas*, and spleen resembled those of the *Cats* generally; as did also the kidneys in the arborescent form of their superficial veins,—a form however equally common, Mr. Owen remarks, to the *Viverridæ* and the *Felidæ*, which also agree in having *spiculæ* on the tongue. The viscera of the thorax in the *Cheetah* agreed with those of the *Cats*. The *lytta*, or rudiment of the lingual bone, so conspicuous in the Dog, is reduced in it, as in the other feline animals, to a small vestige. There was no bone of the penis, and the *glans* had retroverted *papillæ*. The elastic ligaments of the ungual *phalanges* existed in the same number and position as those of the *Lion;* they were however longer and more slender, their length alone occasioning the incomplete retraction of the claws as compared with the rest of the *Felidæ*. Mr. Owen concluded by observing that in the circulating, respiratory, digestive, and generative systems, the *Cheetah* conformed to the typical structure of the genus *Felis*. (*Zool. Proc.*, 1833.)*

Mr. Bennett had very good opportunities of examining the Cheetah alive; and we therefore select his

Description.—Ground-colour bright yellowish fawn above; nearly pure white beneath; covered above and on the sides by innumerable closely approximating spots, from half an inch to an inch in diameter, which are intensely black, and do not, as in the leopard and others of the spotted cats, form roses with a lighter centre, but are full and complete. These spots, which are wanting on the chest and under part of the body, are larger on the back than on the head, sides, and limbs, where they are more closely set: they are also spread along the *tail*, forming on the greater part of its extent interrupted rings, which however become continuous as they approach its extremity, the three or four last rings surrounding it completely. The tip of the tail is white, as is also the whole of its under surface, with the exception of the rings just mentioned; it is equally covered with long hair throughout its entire length, which is more than half that of the body. The outside of the ears, which are short and rounded, is marked by a broad black spot at the base, the tip, as also the inside, being whitish. The upper part of the head is of a deeper tinge; and there is a strongly marked flexuous black line, of about half an inch in breadth, extending from the inner angle of the eye to the angle of the mouth. The extremity of the nose is black, like that of a dog. The mane not very remarkable; consisting of a series of longer, crisper, and more upright hairs which extend along the back of the neck and the anterior portion of the spine. Fur with little of the sleekness which characterizes that of the cats, but exhibiting on the contrary a peculiar crispness not to be found in any other of the tribe. (*Tower Menagerie.*)

Localities.—Asia and Africa, according to Mr. Bennett, who says, 'Chardin, Bernier, Tavernier, and others of the older travellers had related that in several parts of Asia it was customary to make use of a large spotted cat in the pursuit of game, and that this animal was called Youze in Persia and Chetah in India; but the statements of these writers were so imperfect, and the descriptions given by them so incomplete, that it was next to impossible to recognise the particular species intended. We now however know with certainty that the animal thus employed is the *Felis [illegible]bata* of naturalists, which inhabits the greater part both of Asia and Africa. It is common in India and Sumatra, as well as in Persia, and is well known both in Senegal and at the Cape of Good Hope; but the ingenuity of the savage natives of the latter countries has not, so far as we know, been exerted in rendering its services available in the chase in the manner so successfully practised by the more refined and civilized inhabitants of Persia and Hindostan.'

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* See further Mr. Owen's paper 'On the Anatomy of the *Cheetah*' (*Zool. Trans.*, vol. i.), especially his comparative views of the brain in that species and in the *domestic cat.*

Mr. Swainson[*] states ('Classification of Quadrupeds,' 1835) that the hunting leopards appear to be of two species,—one inhabiting Africa, the other India; and that it deserves attention that one of these possesses a sort of mane, of which the other is said to be destitute. The mane however, in specimens from both localities, seems to be much the same. The animal figured by Pennant as the hunting leopard was brought from India by Lord Pigot. Three others, captured at Seringapatam among the effects of Tippoo, were presented by Lord Harris to George III., who placed them in the Tower. The couple from which Mr. Bennett made his accurate description came from Senegal. The Cheetah was indeed, as the last-mentioned zoologist remarks, very imperfectly known in Europe till of late years. Linnæus does not appear to have been acquainted with it, and Buffon's *Guépard* was described from the skin only. *Guépard* is the name by which the skin of the animal was known commercially, in reference to the Senegal market; and Mr. Bennett is of opinion that Buffon described it without suspecting its identity with the Asiatic animal,— 'the trained habits of which, misled probably by the authority of Tavernier, he erroneously attributed to his imaginary Ounce.[†] Subsequent French zoologists had rectified this error, and it was generally believed that the tamed leopard of Bernier, the Youze, the Guêpard, and Tavernier's Ounce, were one and the same animal; but it was not until a year or two ago'— Mr. Bennett wrote the passage quoted in 1829 — 'that the possession of a living specimen, brought from Senegal, in the menagerie of the Jardin du Roi, enabled M. F. Cuvier to ascertain its characters with precision. The comparison of this African specimen with the skins sent from India, and with the notes and drawings made in that country by M. Duvaucel, at once puts an end to all doubts of the identity of the two animals.'

In 1831 Col. Sykes observed that *Felis jubata*, L., and *Felis venatica*, H. Smith (*Cheeta* of the Mahrattas), appear to be identical, the specific differences deduced from the hair originating in domestication. A skin of the wild animal, according to the Colonel, has a rough coat, in which the mane is marked, while domesticated animals from the same part of the country are destitute of mane and have a smooth coat. (*Zool. Proc.*)

Utility to Man.—In the East, where those beautiful animals are employed in the chase, they are carried to the field in low cars whereon they are chained. Each leopard is hooded. When the hunters come within view of a herd of antelopes the leopard is unchained, his hood is removed, and the game is pointed out to him; for he is directed in the pursuit by his sight. Then he steals along cautiously and crouchingly, taking advantage of every means of masking his attack, till he has approached the herd unseen, within killing distance, when he suddenly launches himself upon his quarry with five or six vigorous and rapid bounds, strangles it instantaneously, and drinks its blood. The huntsman now approaches the leopard, caresses him, wins him from his prey by placing the blood which he collects in a wooden ladle under the nose of the animal, or by throwing to him pieces of meat, and whilst he is thus kept quiet hoods him, leads him back to his car, and there chains him. If the leopard fails in consequence of the herd having taken timely alarm, he attempts no pursuit, but returns to his car with a dejected and mortified air.

The skin is an article of some importance in the trade of Senegal, but appears to be neglected at the Cape of Good Hope, where the animal is called *Luipard* by the Dutch colonists; indeed it seems to be of rare occurrence there, for Professor Lichtenstein notices one of the skins as being worn by a Kaffir chief as a badge of distinction.

Of the habits of the hunting leopard, in a state of nature, not much is known: but it may be surmised that it captures its prey much in the same way as it does when employed in the chase. Mr. Bennett gives a very pretty picture of the manners of the two that furnished his description; and as it would be spoiled by abridgment we here insert it:—'They are truly,' writes Mr. Bennett, 'an elegant and graceful pair, having, when led out into the court-yard in their couples, very much of the air and manners of a brace of greyhounds. When noticed or fondled they pur like a cat; and this is their usual mode of expressing pleasure. If, on the other hand, they are uneasy, whether that uneasiness arises from cold, from a craving after food, from a jealous apprehension of being neglected, or from any other cause, their note consists of a short uniform and repeated mew. They are extremely fond of play, and their manner of playing very much resembles that of a cat; with this difference however, that it never, as in the latter animal, degenerates into malicious cunning or wanton mischief. Their character indeed seems to be entirely free from that sly and suspicious feeling of mistrust which is so strikingly visible in the manners and actions of all the cats, and which renders them so little susceptible of real or lasting attachment. The Chetahs, on the contrary, speedily become fond of those who are kind to them, and exhibit their fondness in an open, frank, confiding manner. There can, in fact, be little doubt that they might, with the greatest facility, be reduced to a state of perfect domestication, and rendered nearly as familiar and faithful as the dog himself.'—(*Tower Menagerie*, London, 8vo., 1829.)

Most of the Hunting Leopards brought to England died in no long time after their arrival, and the French seem to have had no better success. The Zoological Society of London succeeded in keeping their specimens very well: the principal food given was lean mutton.

Felis Jubata. (Cynailurus Jubatus, Wagl.)

AMERICAN LEOPARDS.

The *Jaguar*, or *American Panther*, *Felis Onça* of Linnæus, is the form of the Leopard found in the New World. It is the *Onza* of Marcgrave and the *Panther* or *Great Panther* of the furriers.

In form the Jaguar is robust, far stouter than the Leopard, and is very strongly, not to say clumsily built. The body is thicker, the limbs shorter and fuller, and the tail scarcely reaches the ground when the animal is well up on its feet. The head is larger and rather shorter than that of the Leopard, and the profile of the forehead more prominent. When full grown, the animal is said to measure from four to five feet from the nose to the root of the tail. 'These differences of form,' says Mr. Bennett ('Gardens and Menagerie of the Zoological Society'), 'are accompanied by differences in colour and markings equally decisive. The general appearance is at the first glance the same in both; but the open roses of the Leopard are scarcely more than half the size of those of the Jaguar, and they all enclose a space of one uniform colour, in which, unless in some rare and accidental instances, no central spots exist, while in the latter animal most of those which are arranged along the upper surface, near the middle line of the back, are distinguished by one or two small black spots enclosed within their circuit. The middle line itself is occupied in the Leopard by open roses intermixed with a few black spots of small size and roundish form; that of the Jaguar, on the contrary, is marked by one or two regular longitudinal lines of broad, elongated, deep black patches, sometimes extending several inches in length, and occasionally forming an almost continuous band from between the shoulders to the tail. The black rings towards the tip of the latter are also more completely circular than in the Leopard.'

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[*] Mr. Swainson remarks (loc. cit.) that the claws are not retractile. It will be seen, on reference to Mr. Owen's anatomical description, that they are retractile, though the retraction is incomplete.

[†] But see ante, p. 432.

But the skin of the Jaguar is subject to much variation, and Sir William Jardine (*Naturalist's Library*, 'Mammalia,' vol. ii.) gives three figures from different sources illustrating strongly marked differences in the spots.

Locality, South America; Paraguay and the Brazils principally, but it is said to have been found from the southern extremity to the Isthmus of Darien.

Habits, Chace, &c.—Mr. Martin, in his anatomical description of a *Jaguar* that died in the Gardens at the Regent's Park (*Zool. Proc.*, 1832), notices the immense volume of the chest as contrasted with that of the abdominal cavity, a circumstance which might, he thinks, be considered as furnishing an index to the habits and vital energy of this tribe of active and ferocious quadrupeds. That the Jaguar is an animal of great power and frequently of a daring disposition there can be no doubt; but the balance of the evidence is against its equalling, if not exceeding, the royal tiger of the East in ferocity. Of its power D'Azara gives the following anecdote. A Jaguar had struck down a horse; and D'Azara gave instructions that the latter should be drawn within musket-shot of a tree wherein he intended to pass the night, in expectation that the Jaguar would return for his prey. While D'Azara was gone to prepare himself, the Jaguar returned from the opposite side of a river broad and deep, seized the horse in its mouth, drew it to the water some sixty paces, swam across the river with it, landed it and drew it into a wood hard by. All this was witnessed by the person whom D'Azara had placed in concealment to watch till his return.

The Jaguar is a most expert climber. Sonnini saw the scratches left by the claws of one on the smooth bark of a tree some forty feet high without branches. He traced the marks of several slips made by the climber, but the animal had at last reached the top. Humboldt heard the Jaguar's yell from the tops of the trees followed by the sharp shrill long whistle of the terrified monkeys, as they seemed to flee. None of the living quadrumanes or quadrupeds seem to come amiss to it, and birds and fish, which last it is said to take in shallows, are sacrificed to its voracious appetite. The Jaguars will openly seize cattle, horses, and sheep from the enclosures; and the havock made by them is great, as will be easily imagined when we learn from Humboldt that their numbers are such that 4000 were killed annually in the Spanish colonies, and 2000 were exported every year from Buenos Ayres only. Nor are the reptiles free from its attacks. The empty shells of turtles were pointed out to Humboldt as having been emptied of their contents by the Jaguar, which, it seems, watches them as they come to the sandy beeches to lay their eggs, rushes on them, and turns them on their backs. He then insinuates his paw between the shells, and scoops out the contents as clean as if a surgeon's knife had been employed. As the beast turns many more than he can devour at one meal, the Indians often profit by his dextrous cunning. He will, it is stated, pursue this persecuted race into the water where it is not very deep, and will dig up and devour the eggs.

With all this the Jaguar does not seem to be very dangerous to man, when boldly confronted, though D'Azara records frequent instances of his attacking the lord of the creation. The Jaguar will indeed often follow travellers, according to Sonnini and Humboldt, but the latter celebrated naturalist and observer only heard of one instance where a Llanero was found torn in his hammock, and that happened opposite the Island of Achaguas. He relates, on the other hand, a story of two Indian children, a girl and a boy, the one about seven, the other about nine years old, who were at play on the outskirts of a village, about two o'clock in the afternoon, when a large Jaguar came out of the woods bounding towards them playfully, his head down and his back arched, like a cat. He approached the boy, who was not sensible of his danger, and began to play with him, till at last the Jaguar struck him so hard on the head with his paw as to draw blood, whereupon the little girl struck him smartly with a small switch, and he was bounding back not at all irritated, when the Indians, alarmed by the cries of the girl, came up.

When Mr. Waterton (*Wanderings*) was encamped on the banks of the Essequibo, he was visited by one of these prowlers. 'Whenever the fire got low the Jaguar came a little nearer; and when the Indian renewed it, he retired abruptly; sometimes he would come within twenty yards; and then we had a view of him, sitting on his hind legs like a dog: sometimes he moved slowly to and fro; and at other times we could hear him mend his pace, as if impatient. At last the Indian, not relishing the idea of having such company, set up a most tremendous yell. The Jaguar bounded off like a race-horse, and returned no more. It appeared by the print of his feet next morning, that he was a full grown one.'

The Jaguar is said to make its attacks on quadrupeds by springing upon the neck of his prey; then placing one of his paws upon the back of its head, while he turns round the muzzle with the other, he dislocates the neck and deprives it of life.

He, in his turn, falls a victim to man. The Spaniards and Indians hunt him in various ways. Sometimes he is driven by dogs 'to tree,' in which case he is despatched with the musket or lance; sometimes the pack force him among the bushes, and then is exhibited, sometimes, a daring feat. A single Indian, with his left arm enveloped in a sheep-skin, and with a five-feet lance in his right, goes boldly in to him. The hunter parries the onset of the furious beast with his shielded arm, and at the same time deals him such a thrust with his lance as seldom requires repetition. The lasso is also used with the best effect upon the plains.

There is a black variety of the Jaguar, *Le Jaguar noir* of the French, *Felis nigra* of Erxleben, and probably the *Jaguarete* of Marcgrave.

This seems to have been the animal noticed by Lieut. Maw R.N. (*Journal of a Passage from the Pacific to the Atlantic*, 8vo., London, 1829), at Para, as a 'black onça, or tiger.' It had been procured up the rivers by Mr. Campbell, and, when Mr. Maw saw it, was a formidable animal. 'I am not sure,' says that gentleman, 'that it had the length of limb of a Bengal tiger, but it was thicker, and, I think, it would have weighed more. When lying down, there appeared to be scarcely any leg, but its thigh was like an immense ham.' Lieut. Maw relates some amusing anecdotes about this animal, for which we refer the reader to his interesting book.

Felis Onça. The Jaguar.

The *Chati*, the *Ocelots*, and other *Tiger-cats*, are noticed under the article Tigers. The *Puma* is described under the article Lion.

LEOPOLD I., emperor of Germany, of the house of Austria, son of Ferdinand III. and of Mary Anne of Spain, born in 1640, was proclaimed king of Hungary in 1655, king of Bohemia in 1657, and, lastly, was chosen emperor in 1659, after a contested election between him and Louis XIV. of France, who had gained four of the electors over to his side. The long reign of Leopold, which lasted nearly half a century, was an eventful time for Germany and Europe, not through any striking qualities of the emperor but in consequence of the many important wars in which he was concerned. On assuming the government of the hereditary states of the house of Austria in 1657, he found himself at war with the Turks, who were overrunning Hungary and had entered Moravia. His able general

Montecuccoli, an Italian by birth, defeated them completely at the battle of St. Gothard, near Neuhausel, after which a truce was concluded. Many of the Hungarian nobles however, whose pride was offended at being the subjects of a foreign power, in their blind wrath preferred joining the Turks. The Catholic intolerance of the Austrian court of that age contributed to irritate the Hungarians, among whom were many Protestants and other seceders from the Church of Rome. The plot was discovered before it was quite ripe, and the leaders, counts Sdrini, Nadasti, Frangipani, and Tekeli, were convicted and beheaded. The malcontents now broke out into open insurrection, and chose for their leader Emeric Tekeli (son of him of the same name who had been executed). In 1682 Tekeli was acknowledged by the Porte as prince of Hungary tributary to the sultan, whose grand-vizier Kara Mustapha entered the field with 150,000 men. Tekeli had with him between 30,000 and 40,000 Hungarians. The combined forces, having defeated the Imperial troops near Raab, advanced to Vienna. It was afterwards ascertained that 'His Most Christian Majesty' Louis XIV. was one of the secret movers of this Turkish invasion, as his predecessor Francis I. had excited Solyman to a similar expedition against the capital of Austria. Meantime Louis's diplomatic agent at Cracow had hatched a plot with several disaffected turbulent Polish nobles to dethrone Sobieski, who had engaged to assist Leopold. A letter of the French ambassador to his master, being intercepted, discovered to Sobieski the whole plot. With his frank decision and magnanimity of character he repaired to the Diet, read the correspondence, which implicated not a few who were present, expressing at the same time his conviction, whether real or politically assumed, that the whole was a gross fabrication. 'But,' added he, 'let us convince the world also that it is an imposture; let us declare war against the infidels.' The declaration was voted almost unanimously, and Sobieski assembled his troops at Cracow. Meantime Vienna was invested by the Turks on the 15th of July, 1683, after Leopold and his court had left it. Messenger after messenger was now despatched to Sobieski to urge him to march. He had some difficulty, owing to the wretched state of the Polish treasury, to collect even 16,000 men, with which he marched towards the Danube, and was joined by the duke of Lorraine with the Imperial forces, forming in all 70,000 men. On the 11th of September the allied army reached the summit of the Calemberg, which commanded a view of the Austrian capital, and of the wide-spreading tents of the Ottomans, who were entrenched around it. On the 12th the battle was fought, the Turks were defeated, and Vienna, and perhaps all eastern Europe, were saved. Hungary was cleared of the Turks after several hard-fought campaigns.

(*Lettres du Roi de Pologne, Jean Sobieski, à la Reine Marie Casimire, pendant la Campagne de Vienne, traduites par le Comte Platen, et publiées par* N. A. de Salvandy, Paris, 1826.)

The court of Vienna now took strong measures to prevent any recurrence of Hungarian insurrection supported by Turkish invasion. At the Diet of Presburg of 1687 the crown of Hungary was declared to be no longer elective, but hereditary in the Austrian male line. Transylvania likewise submitted to Leopold unconditionally. The Turkish war was at length concluded by a great victory gained by Prince Eugene, in September, 1697, near Zenta in Hungary, which was followed by the peace of Carlowitz.

Leopold sustained three wars against Louis XIV., whose ambition aimed at what Bonaparte effected for awhile in our time—the making of all western Europe dependent on France. The first war ended by the treaty of Nymwegen, in 1679, and the second by the peace of Ryswick, in 1697. It was in this second war that the French minister Louvois ordered the French commanders, in the name of his sovereign, to waste the Palatinate by fire and sword. The atrocities committed at Mannheim, Speyer, Oppenheim, and especially at Heidelberg, which was taken and destroyed twice, in 1688 and 1693, are frightful; a sketch of them is given by Putter in his *Historical Development of the Constitution of the German Empire*, vol. ii., p. 326. The same system was pursued at the same time, in 1690-91, in Piedmont, the sovereign of which was allied to the emperor. Catinat, who commanded the French on the banks of the Po, had instructions from Louvois to destroy everything, in order, and according to the often since repeated phrase, 'to strike terror among the enemies of France.' After some devastation Catinat, who was not a cruel man, asked for fresh instructions, and represented the deplorable state of the innocent populations. 'Burn and destroy, and burn again,' was the answer of Louvois. (Botta, *Storia d'Italia*, book xxxii.)

The third war of Leopold against Louis XIV. was that of the Spanish succession, to which his son the archduke Charles had undoubted claims. Leopold however did not live to see the termination of it; he died in 1705, and one of his last acts was to confer by letters-patent on the Duke of Marlborough the dignity of prince of the empire, for the victory of Blenheim.

The principal internal events in Germany during the reign of Leopold are: 1. The establishment of a ninth electorate in favour of Ernest Augustus, duke of Brunswick Lüneburg, who in 1692 became the first elector of Hanover. This was the act of Leopold, who procured the consent of the other electors to it, in return for important aid in money and troops from two princes of that family. 2. The assumption of the regal title by Frederic, elector of Brandenburg and duke of Prussia, in 1701. Leopold acknowledged him, as he stood in need of his assistance, and Holland, England, and Sweden followed the example. France, Spain, and the Pope refused to acknowledge the new King of Prussia for some time longer. 3. The establishment of a permanent Diet, attended, not by the electors in person, but by their representatives. (Putter's *Historical Development* already quoted; Dunham, *History of the Germanic Empire*.) Leopold's private character was estimable, and his disposition was good and well-meaning, but weak, irresolute, and inclined to bigotry. He had the good fortune to meet with, and perhaps the merit of finding out and appreciating, able ministers and generals, whilst his very want of shining talent and the fear excited by the unprincipled ambition of his antagonist Louis XIV. procured him allies in various quarters of Europe. He was succeeded by his eldest son. [JOSEPH I.]

LEOPOLD II. of Germany and I. of Tuscany was the second son of Maria Theresa of Austria and her husband Francis of Lorraine. After Maria Theresa succeeded, by the death of her father Charles VI., to the Austrian dominions, the grand-duchy of Tuscany, which, according to treaties, was to remain separate from the hereditary states of Austria, devolved upon Leopold, his elder brother Joseph being the presumptive heir of the Austrian dominions. As soon as Leopold was of age he took possession of Tuscany, in 1765, and fixed his residence at Florence. During the five and twenty years of his administration he greatly improved the condition of Tuscany, and made it, what it has continued ever since, the happiest and best governed Italian state. His principal reforms concerned the administration of justice and the discipline of the clergy in his dominions. By his 'Motuproprio,' in 1786, he promulgated a new criminal code, abolished torture and the pain of death, and established penitentiaries to reclaim offenders. He finally abolished the Inquisition in Tuscany in July, 1782, and placed the monks and nuns of his dominions under the jurisdiction of the respective bishops. The discovery of licentious practices carried on in certain nunneries in the towns of Pistoia and Prato with the connivance of their monkish directors induced Leopold to investigate and reform the whole system of monastic discipline, and he entrusted Ricci, bishop of Pistoia, with full power for that purpose. This occasioned a long and angry controversy with the court of Rome, which pretended to have the sole cognizance of matters affecting individuals of the clergy and monastic orders. Leopold however carried his point, and the Pope consented that the bishops of Tuscany should have the jurisdiction over the convents of their respective dioceses. Ricci, who had high notions of religious purity, and was by his enemies accused of Jansenism, attempted other reforms; he endeavoured to enlighten the people as to the proper limits of image-worship and the invocation of saints, he suppressed certain relics which gave occasion to superstitious practices, he encouraged the spreading of religious works and especially of the Gospel among his flock, and lastly he assembled a diocesan council at Pistoia in September, 1786, in which he maintained the spiritual independence of the bishops. He advocated the use of the liturgy in the oral language of the country, he exposed the abuse of indulgences, approved of the four articles of the Gallican council of 1682, and lastly appealed to a national council as a legitimate and canonical means for terminating controversies. Several of Ricci's propositions were condemned by the pope in a bull as scandalous, rash, and injurious to the Holy See. Leopold supported Ricci, but he could not prevent his being annoyed in many ways and at last obliged to resign his charge. The whole of this curious controversy is given in Potter's work 'Vie de Scipion de Ricci,' 3 vols., Brussels, 1825, in which the numerous annexed documents and quotations from other works form the most important part; but the opinions and inferences of the author must be received with caution. Leopold himself convoked a council at Florence, of the bishops of Tuscany, in 1787, and proposed to them 57 articles concerning the reform of ecclesiastical discipline. He enforced residence of incumbents, and forbade pluralities, suppressed many convents and distributed their revenues among the poor benefices, wherein he favoured the parochial clergy, and extended their jurisdiction, as he had supported and extended the jurisdiction of the bishops. He forbade the publication of the bulls and censures of Rome without the approbation of the government; he forbade the ecclesiastical courts from interfering with laymen in temporal matters, and restrained their jurisdiction to spiritual affairs only; and he subjected clergymen to the jurisdiction of the ordinary courts in all criminal cases. All these were considered in that age as very bold innovations for a Catholic prince to undertake.

In his civil administration Leopold favoured the independence and self-administration of the communes, suppressed feudal rights, restrained the power of creating fidei-commissa, abolished the right of common pasture, by which many proprietors were prevented from enclosing their lands, equalized the land tax, abolished the monopolies of tobacco, brandy and other articles, and in all respects favoured liberty of commerce. Meantime he drained the Val di Chiana and part of the Maremme, and fixed colonists in the reclaimed grounds, founded schools and houses for the poor, reformed the universities of Pisa and Siena, opened roads and canals, redeemed great part of the public debt, and lastly he ordered the publication of the national budget. All these and other useful provisions were effected by Leopold during the 25 years of his administration. The principles he laid down have been followed by his successors, and their happy results are more fully adverted to in the article [TUSCANY.]

By the death of his brother Joseph II., on the 20th Feb., 1790, Leopold succeeded to his vast dominions, as well as to the imperial crown, whilst his son Fredinand succeeded him as grand-duke of Tuscany. On assuming the administration of the hereditary dominions of the house of Austria, Leopold found discontent everywhere, owing, in a great measure, to the rash innovations of his brother; the Netherlands in open revolt; Hungary preparing to follow the example; Bohemia disaffected; the clergy and the court of Rome at variance with the government; Prussia hostile; England estranged; France herself convulsed, and likely to become an enemy; and Russia, the only ally of his predecessor, engaged, as well as himself, in war against the Turks. Leopold had not only abilities, but judgment and honest feelings also. He showed an earnest desire to please his subjects, and he succeeded; he abolished the more obnoxious innovations of his brother; he concluded a peace with the Porte; he pacified Hungary by restoring such of the antient privileges of its proud aristocracy as had been lately disregarded, and at the same time marching troops to restrain the more rebellious nobles, who clamoured loudly for the independence of the people, meaning of themselves, for such is the import of the Hungarian constitution. [HUNGARY.] The next step of Leopold was to endeavour to pacify the revolted states of the Netherlands, by offering to re-establish their antient constitutions. The insurgents having obstinately refused to listen to his offers, he sent troops against them, and the leaders being divided among themselves, Leopold recovered, without much difficulty, those fine provinces; but having refused to restore everything to the state in which it had formerly existed, he offended the inhabitants of Brabant, whose feelings were eagerly worked upon by the French revolutionists, who were seeking for allies everywhere. Then came fresh anxieties concerning the fate of his sister Antoinette and her husband, the convention of Reichenbach, and that of Pilnitz, in August, 1791, between Austria and Prussia, for the purpose of checking the progress of French revolutionary proselytism. But the intentions of Leopold were essentially pacific; the treaty of Pilnitz was defensive rather than offensive, and its object was to settle the affairs of France by negotiation, and not by invasion and dismemberment of that country, as was falsely represented by those who had an interest in exciting the passions of the French people, and plunging them irrevocably into war. In the midst of all these cares Leopold died, on the 1st of March, 1792, aged forty-four years. He was generally regretted for his affability, his strict justice, his kindness towards the poor, whom he admitted freely into his presence, and his enlightened understanding and sound judgment. He was succeeded by his eldest son. [FRANCIS II.]

LEO'STHENES was one of the last successful generals of Athens. He was of the party of Demosthenes: and the violence of his harangues in favour of democracy drew the reproof from Phocion, 'Young man, thy words are like the cypress, tall and large, but they bear no fruit.' He had however gained reputation enough to be chosen leader by a large body of mercenary soldiers, returned from Asia shortly before the death of Alexander, who, on that event being known, were taken openly into the pay of the republic. His first exploit was the defeat of the Bœotians, near Platæa. After this he took post at Pylæ, to prevent the entrance of Antipater into Greece, defeated him, and shut him up in Lamia, a town in Thessaly, to which he laid siege; and from that siege the Lamian war has its name. Leosthenes was killed in the course of it; and after his death success deserted the Athenian arms. [ANTIPATER.] He left a high reputation: his picture, painted by Arcesilaus, is mentioned by Pausanias (1, c. i.) as one of the objects in the Peiræus worthy of notice. (Diod., xviii.)

Another Leosthenes, also an Athenian, was condemned to death, B.C. 361, for being defeated by Alexander of Pheræ. (Diod., xv. 95.)

LEPADITES, one of the many names of the supposed bivalvular opercula of Ammonites, found at Solenhofen, termed Trigonellites by Parkinson, Solenites by Schlottheim, and Aptychus by Meyer.

LEPANTO, GULF OF, the antient Corinthian Gulf, is a narrow sea above seventy miles in length from west to east, extending between the northern coast of the Peloponnesus and the mainland of Greece. It is entered from the west, from an outer bay called the Gulf of Patras, by a strait not quite two miles wide, called the little Dardanelles, which is defended by two castles, the castle of Morea and castle of Roumili. A few miles inside of the straits, on the Roumili or northern coast, is the town of Lepanto, the antient Naupactos, built on a hill, and commanded by a castle, with a good harbour, and between 2000 and 3000 inhabitants. The town was for a long time in possession of the Venetians, who fortified it and sustained several sieges against the Turks, to whom it was finally given up by Venice at the peace of Carlowitz in 1697, as well as the castle of Roumili and the fortress of Prevesa, while the republic retained the Morea. The country around Lepanto, which is part of antient Locris, produces wine, oil, corn, rice, and tobacco. Leather is also an article of export.

The sea of Lepanto widens towards the middle to the breadth of 12 or 13 miles, exclusive of several deep bays which indent its northern coast, especially the Bay of Salona, the antient Crissæan Gulf, which stretches about eight miles to the north. The eastern extremity of the sea of Lepanto terminates in two bays; that of Corinth to the south-east, where the Lechæum or western harbour of Corinth once was, and the other, which is deeper and extends to the north-east, bordering on the territory of Megaris and stretching to the foot of Mount Cithæron. This last bay is now called Livadostro.

Lepanto has given its name to a celebrated naval battle between Turks and Christians, fought on the 7th October, 1571, in which the Ottomans were utterly defeated. The Christian allied fleet, consisting of Spanish, Venetian, Genoese, and Papal ships, about 210 in all, was commanded by John of Austria, under whom were Gianandrea Doria, the Venetian Proveditor Barbarigo, the prince of Parma, and Marcantonio Colonna. The Turks, with about 300 sail, many of them however badly equipped, were commanded by Ali Pacha, who had under him Dragut, Uluc Ali, and other veterans who had served in their youth under Khair Eddin Barbarossa. The Turks had just taken the island of Cyprus, where they had most perfidiously broken the capitulation of Famagosta, and had tortured to death many of its gallant defenders. [CYPRUS.] The Christians in the fleet were animated by indignation at this recent outrage, and burned for vengeance. The Christian fleet was stationed near the Echinades, now Curzolari, some small islands off the mouth of the Achelous, at the entrance of the Gulf of Patras, when the Turkish fleet came out of the Gulf of Lepanto to meet it. The Christians broke through the centre of the Turkish line, took the admiral's ship and killed the admiral Ali. At the same time the Turkish right being repulsed in an attack on the Venetian ships, the defeat of the Ottomans became complete. Gianandrea Doria alone manœuvred in a very suspicious manner on that day, stood off at sea, took no part in the fight, and endangered the safety of the rest of the fleet. This was attributed by some to the antient jealousy of Genoa against Venice. The conduct of Doria was generally censured, and has never been satisfactorily explained. More than 3000 of the Christians were killed, including many officers, especially of the Venetians, and a still greater number were wounded. The Venetian commander, Barbarigo, who contributed greatly to the victory, was mortally wounded, and expired after seeing the Turks utterly defeated. The lost of the Ottomans was much greater, as the Christians gave no quarter during the heat of the battle. Several thousand Christian slaves who were employed to row the Turkish galleys were liberated. One hundred and seven Turkish ships were taken and most of the others were sunk; about thirty or forty escaped. This defeat completely destroyed the ascendency of the Turkish navy in the Mediterranean. Solemn thanksgivings and rejoicings were celebrated at Venice and Rome, funeral honours were paid to the dead, and the surviving commanders on their return were received in triumph. Fernando Herrera, the lyric Spanish poet of that age, wrote some of his finest odes in commemoration of the battle of Lepanto; and it is recorded that another distinguished Spanish author, Cervantes, was present in the battle, serving on board one of the ships, where he was severely wounded, and lost for life the use of his left hand. (Herrera, *Relacion de la guerra de Chipre y Suceso de la Batalla de Lepanto*; Botta, *Storia d'Italia*, b. xiii.) The battle of Lepanto is often called by Italian writers the battle of the Curzolari.

LEPAS. [CIRRIPEDA.]

LEPEDOLITE. *Lilac Mica.* Occurs massive, and is usually composed of small flexible thin scales. Fracture uneven. Colour pearl-grey, peach-blossom, rose and purple, red, and greenish. The scales, which are sometimes hexagonal, are translucent. Specific gravity 2·85.

Before the blow-pipe melts into a spongy semi-transparent white globule.

Analysis by Dr. Turner of the red variety from Moravia:—

Silica	50·35
Alumina	28·30
Potash	9·04
Lithia	4·49
Oxide of manganese	1·23
Fluoric acid and water	5·20
	98·61

It is found in granite near Rosena in Moravia, at Perm in Russia, at the Isle of Uton in Sweden, and in North America.

LE'PIDI, the name of one of the most distinguished families of the patrician gens or clan of ÆMILII. Those most worthy of notice are:—

1. Marcus Æmilius Lepidus, who was sent as ambassador to Ptolemy, king of Egypt, at the close of the Second Punic War, B.C. 201. (Polyb., xvi. 34; Liv., xxxi. 2; compare Tac., *Ann.*, ii. 67.) He obtained the consulship B.C. 187 (Liv., xxxix. 5, 56; Polyb., xxiii. 1), and again in B.C. 175. In B.C. 179 he was elected Pontifex Maximus and Censor (Liv., xl. 42, 45: Gell., xii. 8). He was Princeps Senatus six times. (Liv., *Epit.*, 48.) He died B.C. 150.

2. Marcus Æmilius Lepidus, Prætor B.C. 81; after which he obtained the province of Sicily (Cic., *Verr.*, iii. 91). In his consulship, B.C. 78, he endeavoured to rescind the measures of Sulla; but was driven out of Italy by his colleague Quintus Catulus, and by Pompey, and retired to Sardinia, where he died in the following year, while making preparations for a renewal of the war. (Appian, *Civ.*, i. 105; Liv., *Epit.*, 90; Plutarch, *Pomp*, 16.)

3. Marcus Æmilius Lepidus, the Triumvir, the son of the preceding, was Ædile B.C. 52, and Prætor B.C. 49, in which year Cæsar came to an open rupture with the senatorian party. [CÆSAR; ANTONIUS.] Lepidus from his first entrance into public life opposed the senatorian party; and though he does not appear to have possessed any of the talent and energy of character by which Antony was distinguished, yet his great riches and extensive family connections made him an important accession to the popular cause. On the first expedition of Cæsar into Spain, Lepidus was left in charge of the city, though the military command of Italy was entrusted to Antony. During Cæsar's absence, Lepidus proposed the law by which Cæsar was created Dictator.

In the following year, B.C. 48, he obtained the province of Hispania Citerior, with the title of Proconsul; and in B.C. 46 was made consul with Cæsar, and at the same time his master of the horse,—an appointment which again gave him the chief power in Rome during the absence of the dictator in the African war. In B.C. 44 he was again made master of the horse, and appointed to the provinces of Gallia Narbonensis and Hispania Citerior; but he did not immediately leave Rome, and was probably in the senate-house when Cæsar was assassinated. After the death of Cæsar, Lepidus was courted by both parties; and the Senate, at the motion of Cicero, decreed that an equestrian statue should be erected to his honour in any part of the city he might fix upon. Lepidus promised to assist the Senate; but at the same time carried on a secret negotiation with Antony. On his arrival in his province, being ordered by the Senate to join Decimus Brutus, he at length found it necessary to throw off the mask; and instead of obeying their commands, united his forces with those of Antony.

In the autumn of this year, B.C. 43, the celebrated triumvirate was established between Antony, Lepidus, and Octavianus (Augustus); and in the division of the provinces, Lepidus received the whole of Spain and Gallia Narbonensis. The conduct of the war against Brutus and Cassius was assigned to Antony and Augustus; while the charge of the city was entrusted to Lepidus, who was again elected consul (B.C. 43). After the defeat of Brutus and Cassius, Antony and Augustus found themselves sufficiently powerful to act contrary to the advice and wishes of Lepidus; and in the new division of the provinces, which was made after the battle of Philippi, Spain and Gallia Narbonensis were taken from Lepidus, and Africa given to him instead. Lepidus had now lost all real authority in the management of public affairs; but he was again included in the triumvirate, when it was renewed B.C. 37. In the following year he was summoned from Africa to assist Augustus in Sicily against Sextus Pompeius; and he landed with a large army, by means of which he endeavoured to regain his lost power, and make himself independent of Augustus. But in this attempt he completely failed. Being deserted by his own troops, he was obliged to implore the mercy of Augustus, who spared his life, and allowed him to retain his private property and the dignity of Pontifex Maximus, which he had obtained on the death of Julius Cæsar, but deprived him of his province and triumvirate, and banished him, according to Suetonius, to Circeii (*Octav.*, c. 16).

After the battle of Actium, his son formed a conspiracy for the assassination of Augustus on his return from the East, which was discovered by Mecænas; and Lepidus, having incurred the suspicion of his former colleague, repaired to Rome, where he was treated, according to Dion Cassius (liv., p. 607, 608, Stephan.) with studied insult and contempt. He died B.C. 12.

(Cicero's *Letters and Orations*; Cæsar's *Civil War*; the *Epitomes* of Livy, Dion, Appian, &c.; Clinton's *Fasti Hellenici*; and Drumann's *Geschichte Roms*.)

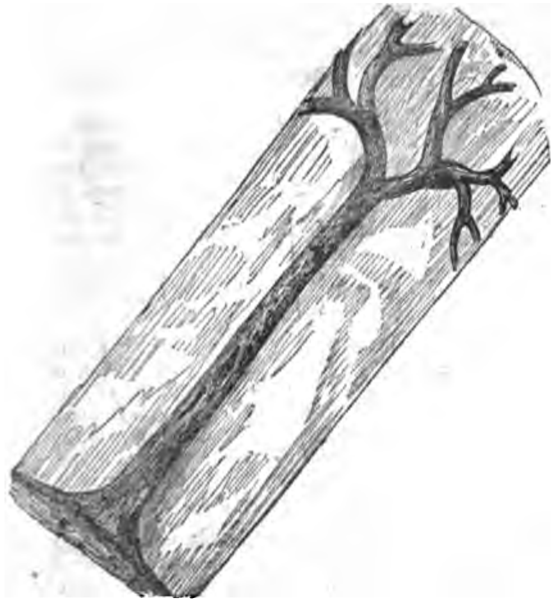
LEPIDODENDRON (λεπίς, a scale, and δένδρον, wood), an important genus of fossil plants, in the examination of which Sternberg (*Flora der Vorwelt*), Brongniart (*Végétaux Fossiles*), and Lindley (*Fossil Flora*) have signalized their abilities, not without success, though some uncertainty yet attaches to the botanical relations of these singular specimens of the flora of earlier nature. M. Brongniart in 1822 and again in his *Prodrome* (1828) referred the lepidodendra to the natural group of Lycopodiaceæ, pointing out however their analogies to Cycadeæ and Coniferæ, and assigned the following characters:—

Stems dichotomous, covered near the extremities with simple linear or lanceolate leaves, inserted on rhomboidal areolæ; lower part of the stems leafless; the areolæ for their insertion marked in the upper part with a transverse cicatrix, of a deltoid figure, the lateral angles acute, the inferior angle obtuse or wanting. The form of the cicatrix of the leaves is the essential character of the genus, it indicates that the leaves were nearly trigonal at the base, becoming plane at some distance therefrom, with a strong midrib. A rounded cicatrix distinguishes the leaf-base of stigmaria, which was perhaps an aquatic plant of the same natural group as the terrestrial Lepidodendron.

The stems thus named and characterized attain the size of 60 or 70 feet in length, with a diameter exceeding 3 feet: their whole surface is covered by rhomboidal eminences, arranged in spiral rows, so as to present a beautiful quincuncial ornament. In the opinion of M. Brongniart the mode of division (dichotomous) of the stem and the form of the leaves determine a great affinity between the Lepidodendra and Lycopodiaceæ. The growth of the stem he compares to that of Cycadeæ, and the form of the reproductive organs (cones) shows analogy to Coniferæ, and especially Araucaria.

Dr. Lindley, in the first volume of the 'Fossil Flora of Great Britain,' after discussing the botanical relations of Lepidodendra as far as the facts then collected allowed, thus expresses his opinion: 'Upon the whole, we are led to conclude that the Lepidodendron genus was not exactly like either Coniferæ or Lycopodiaceæ, but that it occupied an intermediate station between these two orders, approaching more nearly to the latter than the former.'

A great addition to the data requisite for determining the problem of the true characters of Lepidodendron was made by the Rev. C. V. Harcourt, who discovered a specimen in which the internal structure of a branch was perfectly observable, and which, when cut thin and polished, cleared up many important points. Mr. Witham, the authors of the 'Fossil Flora,' and finally M. Brongniart, have published drawings and descriptions derived from this precious fragment. Dr. Lindley and Mr. W. Hutton (*Fossil Flora*, ii., p. 51) consider their former view entirely confirmed by this discovery. 'It had a central pith, a vascular sheath surrounding that pith, and fistular passages in its cortical integument: thus far it was Coniferous. But as no trace can be found of glandular woody fibre, it can scarcely be said to have had any wood, and it is uncertain whether it had any bark.' 'Its vascular system was confined to the middle of the stem and to the curved passages emanating from it: the stem consisted of lax cellular tissue, which became more compact towards the outside, and it had a very powerful communication between the bases of its leaves and the central vascular system: thus far it was Lycopodiaceous.' Spiral vessels are stated to be seen round the central cellular tissue; and (tab. 113) it is further said, 'the genus was more nearly related to Coniferæ than to Lycopodiaceæ.'



1. Lepidodendron Sternbergii, Brong. From the 'Fossil Flora,' pl. 4.

M. Brongniart, renewing his investigations with the aid of these new facts, evidenced by Lepidodendron Harcourtii, adopted a different view concerning the vascular system of the stem, for he supposes the central cellular tissue to be entirely surrounded by a narrow zone of large vessels, 'rayés transversalement' (by Dr. Lindley considered as a loose cellular tissue), as in Lycopodiaceæ and Ferns, without medullary rays, and of which the exterior parts go off in bundles to the leaves.

From the whole discussion he adopts the conclusion that by the interior structure of the stems, as well as by their exterior form, their mode of ramification and the arrangement of their leaves, the Lepidodendra agree almost completely with Lycopodiaceæ, and may be regarded as arborescent groups of that family, which contains in the living creation only small and humble plants; nor does it appear that his conviction is weakened by the comparison of these elongated (cylindrical) fossil 'cones' (Lepidostrobi), which are by most botanists referred to Lepidodendron, with the analogous organs of Lycopodiaceæ and Coniferæ.

The species are numerous, and confined to the older strata, and specially abundant in the coal formation.

(Brongniart, *Histoire des Végétaux Fossiles;* Lindley and Hutton, *Fossil Flora of Great Britain.*)

LEPIDOPHYLLUM. Fossil leaves which occur in the coal formation are thus named by M. Brongniart. They appear to have been sessile, simple, entire, lanceolate or linear, traversed by a single, simple midrib, or three parallel nervures, and without secondary nervures. (Some of these belong to Lepidodendron, others to Stigmaria.)

LEPIDO'PTERA, one of the orders into which insects are divided, called *Glossata* by Fabricius.

This order is composed of those insects which are commonly known by the names Butterflies and Moths, and which possess four wings, usually of large size, and covered with a multitude of minute scales, which to the naked eye appear like powder. The nervures of the wings are not very numerous, and are disposed chiefly in a longitudinal direction: a small tippet-like appendage is situated on each side of the thorax at the base of the wings, which appendages are called by Latreille *pterygoda*. The antennæ are almost always distinct, and are composed of numerous minute joints. The parts of the mouth are formed into a proboscis fitted for extracting the nectar from flowers, or conveying other juices to the œsophagus. This proboscis, when not in use, lies spirally folded beneath the head and between two palpi covered with hair, which are usually directed forwards and upwards, and which represent the labial-palpi. The proboscis is called, in these insects, *antlia* by Messrs. Kirby and Spence, *spiritrompe* by Latreille, and *lingua* according to the nomenclature of Fabricius; and is composed of two subcylindrical tubes, which vary greatly in length in the different species of Lepidopterous insects, and between which there is an intermediate one, formed by their junction, which is effected by means of a series of hooks inosculating one with another like the laminæ of a feather. It is through this central tube that the juices are conveyed, the lateral tubes being intended, as it is supposed, for the reception of air; they are called by Messrs. Kirby and Spence *solenaria*, a name however which is not wanted, since the two tubes in question represent the maxillæ, and are furnished with minute maxillary-palpi at their base. The mandibles and labrum in these insects are reduced to mere rudiments. The head, thorax, and abdomen are always more or less covered with hair; the former, besides the ordinary compound eyes, is sometimes furnished with simple eyes or stemmata; these however are generally hidden by the hair of the head, and, according to M. Dalman, do not exist in the diurnal lepidoptera. Of the three segments of which the thorax is composed, the first is usually distinct, though small; the others are confluent: the scutellum is triangular, the apex of the triangle pointing towards the head. The abdomen is composed of six or seven distinct segments, and is attached to the thorax only by a small portion of its diameter. There are only two kinds of individuals, males and females.

The principal modifications of the larvæ, or caterpillars, of Lepidopterous insects are noticed in the article **Insecta**.

Their food almost always consists of vegetable substances, generally the leaves of plants; some live in rotten, or rather, dead wood, upon which they feed; others feed upon animal substances, and are very destructive to furs, woollen goods, feathers, &c.; and the larva of a species of moth (the honeycomb moth, *Galleria cereana*) subsists upon wax, living in bee-hives.*

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* This larva forms galleries in the honeycomb, which are invariably enclosed by a strong silken web, serving to protect it from the bees, and as the moths increase rapidly in number, the hive is of necessity soon deserted by its proper inhabitants.

The *pupæ*, or chrysalises, are incapable of eating or locomotion, and are termed obtected; they usually approach somewhat to an oval form, but are pointed more or less at the posterior extremity. The shape of the pupæ however varies much according to the species; and those of Butterflies often present numerous angular projections, and sometimes exhibit brilliant metallic colours. The parts of the perfect insect, such as the head, thorax, segments of the abdomen, wings and legs, can be distinctly traced. Various modifications of the pupa state of the present insects are noticed in the separate articles on species which are described.

Latreille divides this order into three principal groups, according with the three Linnæan genera *Papilio*, *Sphinx*, and *Phalæna*. To the first group he applies the name *Diurna; Crepuscularia* is used to designate the second; and the third group, or that corresponding to Phalæna of Linnæus, is called by Latreille *Nocturna*.

The group or section *Diurna* comprises those species which fly by day, called Butterflies, in which the antennæ are terminated by a knob, or are at least somewhat suddenly thicker at the extremity; the anterior margin of the posterior wings is simple; the wings are usually erect when the insect is in a state of repose; the larvæ have sixteen legs; the chrysalises are always naked, attached by the posterior extremity, so that the head hangs downwards, and have usually angular projections.

The *Crepuscularia* are distinguished by the antennæ being gradually thicker from the base towards the extremity, and forming a prismatic or fusiform club; the extreme tip is slender, pointed, and often recurved. The wings are in a horizontal position when at rest, or a little inclined; the posterior wings have a rigid spine at the anterior margin, which is received into a hook on the under-surface of the superior wings. The caterpillars have sixteen feet, six of which are thoracic, eight abdominal, and two anal; and many of them have a horn-like process on the upper side of the last segment. The pupæ are never angular like those of Butterflies, but are generally smooth, and sometimes furnished with small spines. The perfect insects generally fly in the morning, evening, or afternoon.

The *Lepidoptera Nocturna* have the antennæ setaceous, or diminishing gradually from the base to the apex, often serrated or pectinated, especially in the male sex: the wings during repose are horizontal or deflexed, and sometimes convoluted and enclosing the body; the posterior wings, as in the Crepuscularia, have a rigid seta on their anterior margin, which hooks into a corresponding groove in the anterior wings. The larvæ differ much in form and in the number of feet they possess, varying from ten* to sixteen. They frequently enclose themselves in a cocoon before assuming the pupa state. The pupa is most frequently smooth, but is sometimes furnished with spines, and in some instances it is hairy.

The perfect insect almost always flies by night or after sunset. In some species the females are apterous.

LEPIDO'STROBUS. M. Brongniart gave this name to the Fossil Fruits, supposed to be those of the Lepidodendra, which frequently occur in the coal formation, as at Coalbrook Dale, near Bradford, &c. (*Histoire des Végétaux Fossiles.*)

LEP'ORIDÆ, a family of Rodents, the type of which may be considered as existing in the *Common Hare*,

Linnæus characterized his genus *Lepus*, the second of his order *Glires*, as having two incisor teeth (*dentes primores* ii.), the upper ones double, the interior being the least, and he placed the following species under it, viz. *Lepores timidus*, *Cuniculus*, *Capensis*, and *Brasiliensis*. Gmelin added several species, some of which had no claim to a place among the Hares.

Cuvier characterized the Hares as having the upper incisor teeth double, that is to say, each of them has, behind, another smaller one. Their molars, to the number of five, are formed each of two vertical laminæ soldered together. In the upper jaw there is a sixth, which is simple and very small. They have five toes before and four behind, an enormous *cæcum* five or six times larger than the stomach, and furnished within with a spiral lamina (lame spirale) which runs throughout its length. The interior of their mouth and the bottom of their feet are furnished with hair, like the rest of their body. He divides the group into—1. *The Hares properly so called*, which have long ears, a short tail, the hind feet much longer than the fore-feet, imperfect clavicles, and the suborbital space in the skeleton pierced like network (en reseau). The species are, he observes, rather numerous, and so much alike that it is difficult to define them.

Of *Lagomys*, his second division, he says that the species composing it have the ears moderate, the legs not much differing from each other, nearly perfect clavicles and no tail: they have hitherto, he adds, been only found recent in Siberia, and fossil remains of an unknown species have been detected in the osseous breccia of Corsica.

Mr. Gray's third family of the order *Glires* is named *Leporidæ*, and is thus defined:—

Cutting teeth two in each jaw, or four in the upper one, lower one subsubulate; grinders numerous, rootless; ears generally large; tongue often hairy; eyes large; clavicles none; fore-feet short; hinder ones long; tail none, or very short, hairy; fur soft.

† Cutting teeth four above.

1. *Leporina*, genus *Lepus*? 2. *Lagomina*, genus *Lagomys*.

†† Cutting-teeth two above.

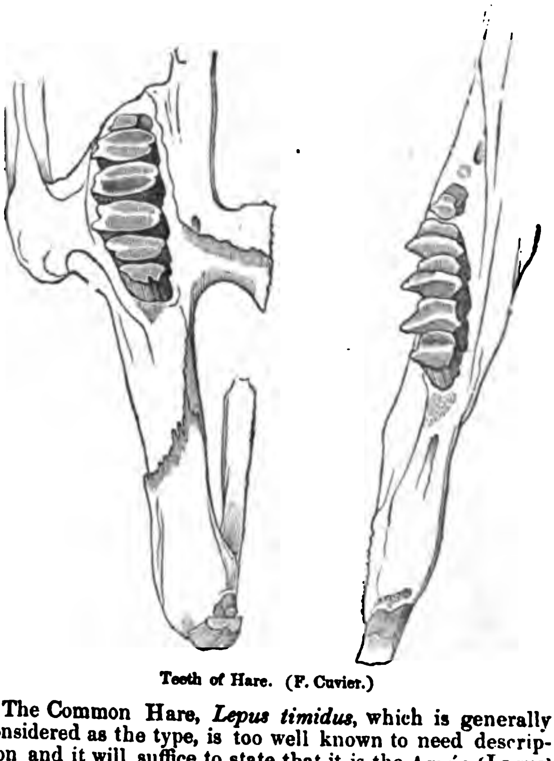
3. *Caviina*, genera *Kerodon*, F. Cuv. 4. *Hydrocharina* (Hydrochœrina?), genus *Hydrocharus* (Hydrochœrus), Brisson. 5. *Dasyporcina* (Dasyproctina?), genera *Cœlogenys*, Illig., *Dasyporca* (Dasyprocta?), Ill., *Dolichotis*, Desm.

Mr. Swainson defines the genus *Lepus* thus:—cutting-teeth $\frac{4}{2}$, the upper in pairs, two in front, large and grooved, and two smaller behind; lower teeth square; grinders $\frac{6-6}{5-5}$, composed of two soldered vertical plates; a sixth, very small, in the upper jaw; soles of the feet hairy; anterior feet with five toes; posterior with four; tail very short, turned upwards. *L. timidus*. The common Hare, 11 sp.

Lagomys, Geoff., Mr. Swainson appears to give as a subgenus of *Lepus*.

The subfamily *Leporina* seems to be strictly natural, consisting entirely of those species, and they are not few, which are usually known by the name of Hares and Rabbits.

Dental formula:—Incisors $\frac{4}{2}$, Molars $\frac{6-6}{5-5}=28$.



Teeth of Hare. (F. Cuvier.)

The Common Hare, *Lepus timidus*, which is generally considered as the type, is too well known to need description and it will suffice to state that it is the Λαγώς (Lagus) of the Greeks; *Lepus* of the ancient Italians; *Lepre* and *Lievora* of the modern Italians; *Liebre* and *Lebratillo* of the Spaniards; *Lebre* and *Lebrimho* of the Portuguese; Lièvre of the French; *Has*, *Haas*, and *Hase* of the Germans; *Haas* and *Haze* of the Danes; *Hara* of the Swedes, according to Mr. Bell; *Hara* of the Anglo-Saxons; *Ysgy-*

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* There are some few with less than ten

farnog, *Ceinach*, of the ancient British; *Maukin* of the Scotch.

The usual weight of a full-grown Hare is eight or nine pounds; but one is mentioned in Loudon's Magazine of extraordinary size: this weighed thirteen pounds one ounce and a half.

We must here notice the Irish Hare, *Lepus Hibernicus*. The Earl of Derby appears to have been the first who drew particular attention to it, and it was described in the 'Proceedings of the Zoological Society' by Mr. Yarrell in 1833. Mr. Jenyns gives it as a variety of *Lepus timidus*; but Mr. Bell (*British Quadrupeds*) states that a careful examination of several specimens has assured him that it is not merely a variety of the common Hare of England, but that it is specifically distinct. He mentions the following differences of character:—The Irish Hare is somewhat larger; the head is rather shorter; the ears are even shorter than the head, while those of the English Hare are fully an inch longer; the limbs are proportionally rather shorter; and the hinder legs do not much exceed the fore legs in length. The fur is also remarkably different: it is composed exclusively of the uniform soft and shorter hair which in the English species is mixed with the black-tipped long hairs that give the peculiar mottled appearance of that animal; it is therefore of a uniform reddish brown colour on the back and sides. The ears are reddish grey, blackish at the tip with a dark line near the outer margin. The tail is nearly of the same relative length as in the common species.

It further appears that *Lepus Hibernicus* is the only Hare found in Ireland, which may account for its remaining so long unnoticed; for opportunities of comparison could not have been very frequent. Its fur is considered valueless.

Whether the Irish Hare will take the water willingly does not appear; that the English Hare is, occasionally at least, an accomplished and bold swimmer is manifest from the following account related by Mr. Yarrell in Loudon's Magazine (vol. 5):—'A harbour of great extent on our southern coast has an island, near the middle, of considerable size, the nearest point of which is a mile distant from the mainland at high water, and with which point there is frequent communication by a ferry. Early one morning in spring two hares were observed to come down from the hills of the mainland towards the sea-side; one of which, from time to time, left its companion, and proceeding to the very edge of the water, stopped there a minute or two, and then returned to its mate. The tide was rising; and, after waiting some time, one of them exactly at high water took to the sea, and swam rapidly over in a straight line, to the opposite projecting point of land. The observer on this occasion, who was near the spot, but remained unperceived by the Hares, had no doubt they were of different sexes, and that it was the male that swam across the water, as he had probably done many times before. It was remarkable that the Hares remained on the shore nearly half an hour; one of them occasionally examining, as it would seem, the state of the current, and ultimately taking to the sea at that precise period of the tide called slack-water, when the passage across could be effected without being carried by the force of the stream either above or below the desired point of landing. The other Hare then cantered back to the hills.'

The female goes thirty days with young, and produces from two to five at a birth; these are born well covered with hair and with their eyes open. The leveret quits the mother and provides for itself in less than a month, and is capable of breeding when it is a year old.

The *Common Hare* sometimes varies accidentally; there is such a variety in the Museum of the Zoological Society of London. All attempts to promote a breed between the hare and rabbit appear to have been hitherto fruitless.

The *Varying Hare*, or *Alpine Hare*, *Lepus variabilis* of Pallas, which changes the colour of its coat with the seasons, requires a short notice. The fur, which is full and soft, is, in summer, grey, intermixed with silky hair of a yellowish brown; the ears are tipped with black, and the under parts are light grey. The tail is white beneath and grey above. As the winter approaches, the fur gradually becomes white, except that on the lips and the tips of the ears, which remains black. In the 'Edinburgh Philosophical Journal,' vol. ii., is an interesting account of the process as it occurs in Scotland, from which it would seem that the winter change of colour takes place without any removal of the hair, as in the Ermine, and somewhat in the same way that the change is effected on the head of the *Black-headed Gull*, *Xema ridibundus*, and in the feathers of other birds. 'About the middle of September,' says the writer in the Journal, 'the grey feet begin to be white, and before the month ends all the four feet are white, and the ears and muzzle are of a brighter colour. The white colour gradually ascends the legs and thighs, and we observe under the grey hairs whitish spots, which continue to increase till the end of October; but still the back continues of a grey colour, while the eyebrows and ears are nearly white. From this period the change of colour advances very rapidly, and by the middle of November the whole fur, with the exception of the tips of the ears, which remain black, is of a fine shining white. The back becomes white within eight days. During the whole of this remarkable change in the fur, no hair falls from the animal; hence it appears that the hair actually changes its colour, and that there is no renewal of it. The fur retains its white colour until the month of March, or even later, depending on the temperature of the atmosphere; and by the middle of May it has again a grey colour. But the spring change is different from the winter, as the hair is completely shed.'

The *Rabbet*, *Rabbit*, or *Coney*, *Lepus Cuniculus*, Linn., *Coniglio* of the Italians; *Conejo* of the Spanish; *Coelho* of the Portuguese; *Koniglein* and *Kaninchin* of the Germans; *Konyn* or *Konin* of the Dutch and Belgians; *Kanin* of the Swedes; *Kanine* of the Danes; and *Cwningen* of the antient British, is known to every one.

The fertility of the animal may be imagined when it is remembered that it will begin to breed at the age of six months, and produce several broods in a year, generally from five to seven or eight at a time. Pennant says, 'Rabbits will breed seven times a year, and bring eight young ones each time. On a supposition that this happens regularly during four years, their numbers will amount to 1,274,840.' The young are blind at their birth, and nearly naked.

The fur of the Rabbit is in considerable demand, particularly for the hat trade; and at one time the silver-haired varieties, or silver-sprigs, fetched three shillings a piece, for ornamental linings to cloaks, &c.; in Pennant's time however the price had fallen to sixpence.

The subfamily *Lagomina* consists of a single genus *Lagomys*, which has the muzzle acute, the ears short and somewhat rounded, the soles of the feet hairy, the claws falcular, and no tail.

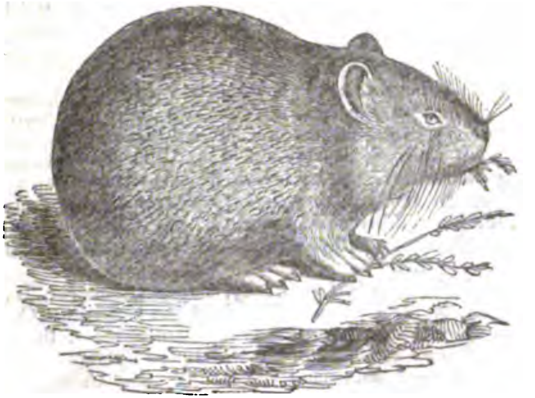
Dental formula:—Incisors $\frac{4}{2}$; Molars $\frac{5-5}{5-5} = 26$.

Examples, *Lagomys pusillus*, Desm.; *Lagomys Alpinus*, Desm., *Lepus Alpinus*, Pallas; and *Lagomys Ogotona*, Desm., *Lepus Ogotona*, Pallas. *Locality*, Northern Asia. The form has a wide geographical range, and occurs in the Himalaya Mountains at a considerable altitude. (Royle.)

The first of these species, *Lagomys pusillus* (*Lepus pusillus* of Pallas, *Semlanoi Saetshik*, or Ground Hare of the Russians about the Volga; *Tschotschot* or *Ittsitskan*, or the *Barking Mouse* of the Tartars; *Rusla* of the Kalmucs; *Calling Hare* of Pennant), has the head longer than usual with Hares, and thickly covered with fur, even to the tip of the nose; numerous hairs in the whiskers; ears large and rounded; legs very short; soles furred beneath; its whole coat very soft, long and smooth, with a thick long fine down beneath, of a brownish lead colour; the hairs of the same colour, towards the ends of a light grey, and tipt with black; the lower part of the body hoary; the sides and ends of the fur yellowish. Length about six inches; weight from 3½ to 4½ ounces; in winter scarcely 2½ ounces. (Pallas, Pennant.)

Localities.—The south-east parts of Russia, and about all the ridge spreading from the Ural chain to the south, about the Irtish, and in the west part of the Altaic chain, but nowhere in the East beyond the Oby. (Pallas, Pennant.)

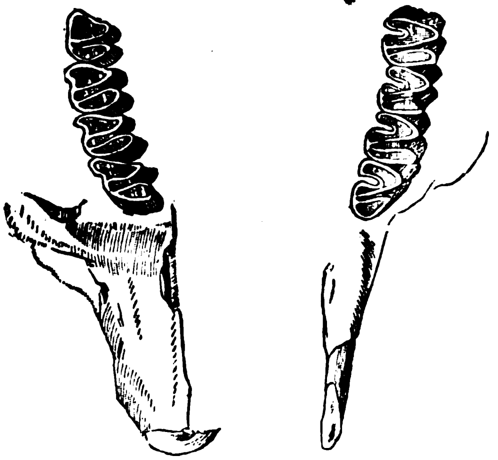
Habits.—Delighting in the most sunny valleys and hills, where the herbage is plentiful and delicate; the *Calling Hares* choose these localities when in the vicinity of a wood, which will afford them a ready refuge in the case of danger or alarm. Their burrows, especially those belonging to the old ones and to females, are curious and intricate, so well concealed amid the shrubs of some dry spot that detection is very difficult; and to increase the difficulty, the animal is said to drop its excrements under some bush, that they may not betray its abode, which would almost defy search, were it not for their peculiar cry or call. This is described as being like the piping of a quail, but deeper, and so loud as to be heard at the distance of half a German mile. It is repeated at just intervals, thrice, four times, and even six, at night and morning, but seldom in the day, unless the weather be cloudy. Both the male and female emit this note, but the latter is silent for some time after she has given birth (in May) to her young, which are born naked and blind, and are carefully attended to by the mother, who covers them up warm with the cosy materials of her nest.



Lagomys pusillus.

The subfamily *Caviina* consists of the genera *Cavia* and *Kerodon*. An account of the former genus will be found under that title; the genus *Cavia* has the following

Dental formula:—Incisors $\frac{2}{2}$, Molars $\frac{4-4}{4-4}$ = 20.



Teeth of Cavia Aperea. (F. Cuvier.)

The genus as now modified appears to contain but one species, the well-known *Guinea-Pig*, *Cavia aperea* and *Cavia porcellus* of Erxleben, *Cavia Cobaya* of Desmarest and Schreber, *Hydrochœrus aperea*, *Hydrochœrus cobaya* and *Anœma aperea* of F. Cuvier, *Mus porcellus* of Linn., *Cochon d'Inde* of Buffon, and *Variegated Cavy* of Shaw.

Generic Character.—Molars composite, having only one simple lamina and one forked; no tail; fore toes separated, nails short, robust, like little hoofs; two ventral *mammæ*.

Geographical Distribution.—The *Guinea-Pig* is now to be found in a semi-domesticated state in most parts of the world; but its original locality appears to have been South America, Brazil, Paraguay, Guiana, &c. The natives eat the flesh, which is said to be well flavoured, resembling that of our wild rabbit.

Hydrochœrina. This subfamily, consisting of one genus, HYDROCHŒRUS, has been treated of under that title.

A lengthened notice of the subfamily *Dasyproctina* will be found under the article AGOUTI. The genus *Dolichotis* appears to be founded on the *Patagonian Cavy*, *Dasyprocta Patachonica*, vol. i., p. 214.

FOSSIL LEPORIDÆ.

Of the genus *Lepus* the following species are named: *Lepus diluvianus*, Hare of the Caverns, Cuvier, Buckland, Pander, and D'Alton; *Lepus priscus*, Hare of the osseous breccias, Cuvier. Fossil Hares and Rabbits are also recorded by M. Bourdet, M. D'Orbigny, M. Risso, M. Wagner, MM. Croizet and Jobert, and MM. Marcel de Serres and Pitorre.

The following fossil species of *Lagomys* are recorded: *Lagomys Corsicanus* and *Lagomys Sardus*, from the osseous breccia of Corsica and Sardinia respectively. Other remains of *Lagomys* are noticed by Cuvier, Wagner, M. de Serres, Risso, Chabriol and Bouillet, Croizet and Jobert, Bravard, Sedgwick (Oeningen beds), and Murchison. All tertiary.

Of the Agouti (*Dasyprocta* of Illiger, *Chloromys* of F. Cuvier) remains are noticed by M. Bravard and M. Eichwald. Tertiary.

LEPRA (the Greek word *λέπρα*, scaliness), an affection of the skin, of the order Squamæ, or scaly diseases, of Willan and Bateman. It is characterised by an eruption of circular spots of inflamed skin covered with scales, varying from the size of a pin's head to that of a shilling or even a half-crown piece, occasionally mixed with large irregular patches formed by the coalescing of the borders of several contiguous spots. The scales in this affection possess a peculiar character, by which it is distinguished from pityriasis and psoriasis, other diseases of the same order. From the surface of the inflamed spots a diseased cuticle is produced, which concretes into thickish crusts or scales of a glistening white silvery appearance, and from being secreted more abundantly towards the circumference a rounded and elevated form is given to the outer margin, whilst the centre is left almost or entirely free from scale. The whole is surrounded by a slight areola of redness. In the early stage of the disease, and in the small spots, the inflamed skin, which is slightly raised above the surrounding parts, possesses only a thin scaly covering; and in the larger patches, formed by the coalescence of several spots, the characteristic appearances became somewhat confused; still, on careful examination, the elevated margin, circular outline, and central free spot may more or less be recognised.

This disease generally affects young people from the age of puberty up to thirty, and appears to occur more frequently in women than in men. Sometimes the whole body becomes affected by it, even the face and scalp, but more commonly it is confined to the limbs, and is observed especially on the skin below the knee and elbow, in which situations its true characters are generally most marked. The health of persons affected with this disease is but little disturbed, the accession of the eruption alone being preceded by headache and slight febrile disturbance. It is generally tedious of cure, recurring periodically in some constitutions, whilst in others it will continue for two or three years. Most frequently it arises without any assignable cause; occasionally it has appeared to be dependent upon suddenly suppressed cutaneous transpiration from persons drinking cold water when overheated.

This disease must not be confounded with the leprosy of the sacred and antient writers, a term which appears to have been used to express any loathsome affection of the skin, or, as some imagine, to have referred to the disease described in the present day under the term Elephantiasis. [ELEPHANTIASIS.]

LEPROSY. [LEPRA.]

LEPTIDES, a subfamily of Dipterous insects of the Family Brachystoma (Macquart). The family of insects to which the present section belongs is distinguished by the proboscis being short and membranous; the lips terminal and thick; third joint of the antennæ simple, often spatulate; stylet often dorsal; abdomen usually with five distinct segments. The wings have commonly one submarginal and three posterior cells. The family Brachystoma is divided by Macquart into four tribes or sub-families—*Xylotomæ*, *Leptides*, *Dolichopoda*, and *Syrphidæ*. The first, or the *Xylotomæ*, are distinguished by the third joint of the antennæ being conical, by the wing having two submarginal cells, and by the tarsi being furnished with two small cushions. In the subfamily *Leptides* the antennæ are inserted near the base of the head, and have generally a terminal stylet; the tarsi are furnished with three small cushions; the femora are elongated; the wings have two submarginal and generally five posterior cells. This group contains six genera, of which one (*Clinocera*) is distinguished from all the other Leptides by its possessing only three posterior cells to the wings, the remaining genera having five. In the genus *Leptis* the head is depressed;

the palpi are generally decumbent, with the second joint conical and the third joint short and generally conical. The thorax has a distinct tubercle; body conical and transparent. The species inhabit Europe. The Leptis vermileo (*Musca vermileo*, Lin.) has been separated from Leptis proper by Macquart, and forms the type of his genus *Vermileo*, distinguished chiefly by the body being elongated and depressed, the first joint of the antennæ elevated, and the last conical and horizontal in its direction.

Leptis vermileo of Fabricius, or Vermileo Degeerii, Macquart. This fly is about four or five lines in length, of a yellow colour, having four black streaks on the thorax, and five ranges of black spots on the body; the wings immaculate. The larva somewhat resembles the stick-like caterpillar of the *Geometræ*, and is nearly of a cylindrical form, but narrower towards the anterior extremity of the body; the posterior extremity is furnished with four fleshy tubercles. It lives in sandy districts, forms excavations in the soil, at the bottom of which it secretes itself either wholly or partially. If an insect falls into its trap, it rises suddenly, clasps the insect with its body, and having sucked all its juices, bends itself in the form of a bow, and by suddenly relaxing throws away the remains.

The next genus, *Chrysophila* (Macquart), has the body furnished with velvet-like hair, the palpi elevated and with the second joint cylindrical, the third being generally conical; thorax without a distinct tubercle. Several species are found in Europe. The genus *Spania*, which is the next in succession according to Macquart, has but two distinct joints to the antennæ; it contains but one species. The genus *Atherix* has the third joint of the antennæ distinct; the stylet is generally dorsal; the body depressed. All the species of this genus are European.

The third subfamily, *Dolichopoda*, is distinguished by the second joint of the palpi being membranous, depressed, and covering the base of the proboscis. The stylet of the antennæ is sometimes dorsal and sometimes apical; the eyes are generally separated in both sexes; the abdomen is somewhat cylindrical, or approaches a conical form; wings decumbent, without any discoidal cell, and generally possessing four posterior cells.

The last subfamily, the *Syrphidæ*, is a very extensive group; and although given by Macquart as a division of his family Brachystoma, certainly constitutes a section of higher value than a *subfamily*. [SYRPHIDÆ.]

LEPTOCONCHUS (λεπτὸς, thin, and κόγχος, a shell), Dr. Rüppell's name for a genus of Pectinibranchiated Gastropodous Mollusks, thus characterized by him:—

Animal.—*Head* with an elongated proboscis, but which is entirely retractile; mouth without any apparent armour; *tentacles* two, flattened, triangular, short, united at their internal base; supporting the eyes at one-half of their length on their external side. *Foot* moderate, muscular, without any operculum. *Mantle* with a circular border, without ornament, and with a slight prolongation on the left side. *Branchial cavity* with a rather large aperture, the gill composed of a single comb formed of triangular laminæ close set one against the other: at the bottom of this cavity is found the orifice of the ovaria, whence (in the month of July) the eggs come forth in numerous bundles (par paquets nombreux), each enveloped in a viscous sac, which is flattened, elliptical, and three lines in length. In the middle of the branchial cavity is the orifice of the *anus*. On the right side of the neck, a little behind the right tentacle, there is another orifice, which may have some relation to the male organs of generation.

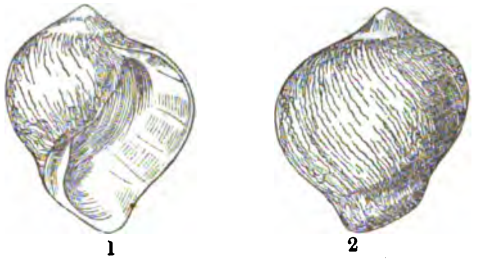
Shell subglobular, delicate, fragile, translucent, with a low spire, which is nearly effaced by the encroachment (surcroissement) of the laminæ of the last whorl; *aperture* large, suboval, with its two extremities turned contrariwise, so that the aperture has some resemblance to the letter S reversed; the two margins *not* united, the right one delicate at all ages, and a little expanded anteriorly as in adult *Janthinæ*; no *columella*; no *umbilicus*.

Example, *Leptoconchus striatus*, Rüpp. The shell of this species, which serves Dr. Rüppell for the type of the genus, is a rather dirty milk white; it is furrowed externally with numerous longitudinal undulated lines very much approximated. Length of adult 14¾ lines; breadth 12½; young 7½; breadth 6.

Locality and Habits.—The Red Sea, where it is found imbedded in the calcareous mass of Polyparia, and having no communication with the water except by a moderate opening. These corals prove almost always to be a species of *Meandrina* (*Meandrina Phrygia*), in which *Magilus*, *Venerupis*, &c., occur.

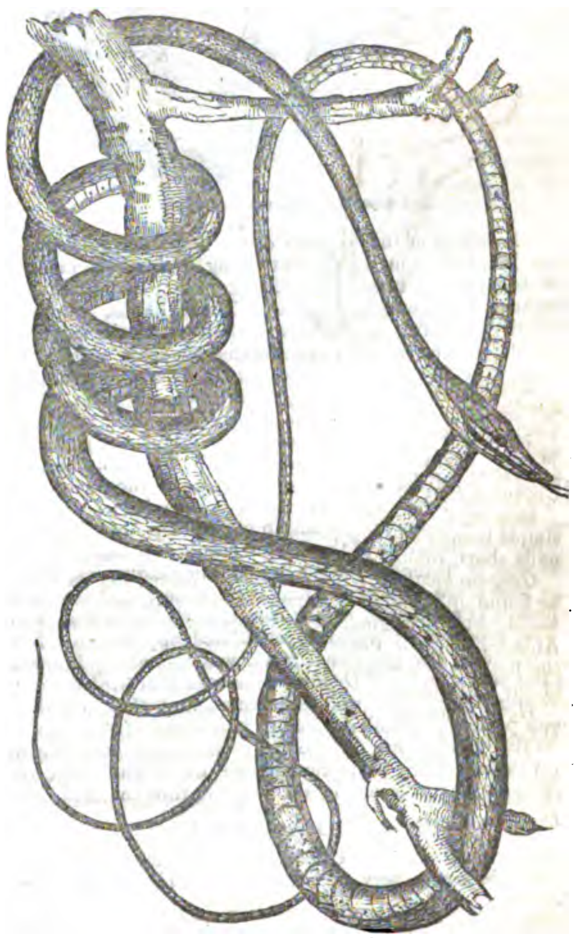
Dr. Rüppell is of opinion, from the few words of M. Rang concerning the young of *Magilus*, that the last-named naturalist had before him the genus above described. Dr. Rüppell notices the following distinctions between *Leptoconchus* and *Magilus*. In the former the margins of the shell are always disunited; in the latter they are always united. The animals of the two genera are distinguished by the possession of an operculum in the one (*Magilus*), and its absence in the other, and by the difference in the proboscis; nor is the siphon of the *Magilus* present in *Leptoconchus*.

Place in the Animal Series.—Dr. Rüppell hazards a suggestion that *Leptoconchus* approximates to the *Janthinæ*. The number of the tentacles, the oval proboscis, the mantle deprived of a siphon, the pectinated branchiæ framed of crowded pyramids, and the absence of an operculum, favour this approximation, as well as the analogies of the shell; but he adds that he is perfectly aware that the difference of the habitations of the two genera is too great to allow of a reliance on this suggestion. (*Transactions of the Zoological Society of London*, vol. i.; *Proceedings* of the same Society, 1834.)



Shell of Leptoconchus striatus. 1, anterior view; 2, view of the back.

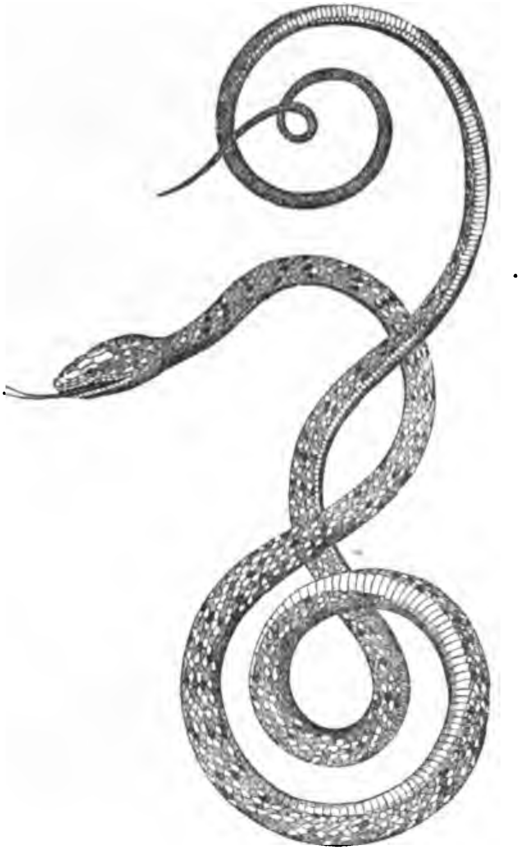
LEPTOPHI'NA, Mr. T. Bell's name for a subfamily of



Dryinus auratus. (Bell.)

serpents belonging to the family *Colubridæ*, thus defined by him:—

Head elongate, broad behind, narrowed before; the anterior part covered with nine scuta. Eyes large. Gape wide, somewhat waved. Maxillary and palatine teeth; *no poisonous fangs*. Body very slender, slightly depressed; tail very long, slender, the point acute. Dorsal scales oval, elongate, loose; caudal scales very small, closely arranged. Abdominal scuta very long;[*] subcaudal scuta small, indistinct. Genera *Dryinus* and *Leptophis*.



Leptophis purpurascens. (Seba.)

'The whole of the serpents composing these genera live,' says Mr. Bell, 'in woods, entwining themselves amongst the branches of trees, and gliding with great rapidity and elegance from one to another. These habits, combined with the graceful slenderness of their form, the beautiful metallic reflection from the surface in some species, and the bright and changeable hues in others, place them amongst the most interesting of the serpent tribe. Their food consists of large insects, young birds, &c., which the extraordinary size of the head, the width of the gape, and the great dilatability of the neck and body, enable them to swallow, notwithstanding the small size of these parts in a state of rest: in a specimen in my possession of *Dryinus auratus*, for instance, the length of which is four feet, nine inches, the diameter of the neck is hardly two lines. When the skin is distended either by food or during inspiration the scales are separated from each other, and the skin, which is of a different colour, becomes visible in the interstices, producing a curious reticulated appearance. Notwithstanding the poisonous mark was affixed by Linnæus to the only species of *Dryinus* known to him (*Coluber mycterizans*, Linn.), it is well ascertained that they are all of them perfectly harmless; and it is asserted of that species that the children are in the habit of taming and playing with them, twining them round their necks and arms, and that the snakes appear pleased at being thus caressed.'

Genera. Dryinus (Merrem).

Generic Character.—Upper jaw much longer than the lower. Rostrum very narrow, more or less acute at the apex, which in some species is distinctly mucronate and moveable. (Bell.)

Mr. Bell records six species, three of which are American, Carolina, Mexico, and Brazil; and the other three Asiatic, two from the East Indies, and one from the Island of Java.

Example, *Dryinus auratus*. Yellowish-grey, shining with pale gold colour, dotted with whitish and black; rostrum subobtuse.

Locality, Mexico.

Leptophis. (Bell.)

Generic Character.—Rostrum obtuse; upper jaw projecting but very slightly beyond the lower.

Mr. Bell records three species, three from the East Indies, and one from America (Carolina). To these Mr. Gray subsequently added two species, *L. punctulatus* and *L. spilotus* (*Coluber spilotus*, Lacép.), collected by the expedition under Captain Phillip Parker King, R.N. (*Survey of Australia*.)

Example, *Leptophis purpurascens* (*Coluber purpurascens*, Shaw). Violet, changing to green, gilded; a lateral and dorsal line of a paler hue; head obtuse. *Locality*, the East Indies. (*Zool. Journ.*, vol. ii.)

LE'PTOPHIS. [LEPTOPHINA.]

LEPTOPODI'DÆ. [MACROPODIANS.]

LEPTOSO'MUS, a genus of birds established by Vieillot, and belonging to the family *Cuculidæ*. Example, *Leptosomus afer*; *Cuculus afer*, Gmel.; Edolian Cuckoo of Shaw, noticed by the late Major James Franklin, F.R.S., &c., in his 'Catalogue of Birds' collected in the Ganges, between Calcutta and Benares, and in the Vindhyian Hills, between the latter place and Gurrah Mundela on the Nerbudda. (*Zool. Proc.*, 1830-31.) Lieutenant-Colonel Sykes also describes and notices it in his interesting catalogue as occurring in the Dukhun (Deccan), but as being rare. (*Zool. Proc.*, 1832.)

LEPTOSTOMI'NÆ. [INDICATORINÆ, vol. xii., p. 459.]

LEPUS. [LEPORIDÆ.]

LEPUS (the Hare), one of the old constellations, said by Hyginus to be in the act of running from Orion's dog, which is the greater dog, according to some, and the lesser, according to others. It is situated directly under Orion. The principal stars are as follows:—

Character.	No. in Catalogue of Flamsteed.	No. in Catalogue of Astron. Society.	Magnitude.	Character.	No. in Catalogue of Flamsteed. (Piazzi.) [Bradley.]	No. in Catalogue of Astron. Society.	Magnitude.
	1	591	6	ζ	14	711	4
ε	2	597	4	δ	15	728	3¾
ι	3	613	5	η	16	739	4
κ	4	618	5		17	756	6
μ	5	616	4	θ	18	758	4
λ	6	631	4½	τ	19	763	6
ν	7	632	5½		(102)	658	6
ξ	8	643	6		(252)	724	6
β	9	659	3		(289)	590	5½
	10	669	6		(307)	600	6
α	11	673	3		(327)	753	5½
	12	702	6		[743]	626	6
γ	13	705	3				

LE'RIDA, called ILERDA in the Roman times, is a town and fortress in Catalonia, on the right or western bank of the river Segre, a few miles above its junction with the Ebro, and not far from the frontiers of Aragon. A fine bridge, the foundations of which are Roman, connects the two banks of the Segre. Lerida is a bishop's see, has a handsome cathedral, several other churches and convents, a military hospital, and 12,600 inhabitants, exclusive of the garrison. It is built partly on the slope of a hill, on the summit of which is the citadel, which has four bastions, and partly along the bank of the river, extending to the foot of another hill, which is also crowned by a fort. Lerida has sustained many sieges; it was taken by storm by the French in the war of the succession in 1707, and again in the last war in May, 1810. The country around is very fertile in corn, wine, oil, pulse, hemp, and flax. Lerida, although it does not maintain its former importance, is still one of the most considerable towns of Catalonia. It had once a flourishing university, which was suppressed when king Philip V. established that of Cervera. [CATALONIA.] Lerida is 85 miles west of Barcelona.

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[*] The length, according to Mr. Bell, is the diameter of the *scutum* from the anterior to the posterior margin; the breadth across the abdomen.

LERISTA, a genus of reptiles belonging to the family *Scincidæ*, established by Mr. Bell, and thus characterized by him:—

Head scutated; no *eyelids; ears* hidden under the skin. *Body* slender; the *scales* smooth and equal. *Feet* four; the *anterior* little, very short, and didactylous; the *posterior* longer, and tridactylous. *Vent* simple, semicircular; no *præanal* or *fermoral pores*.

Example, *Lerista lineata*, which is bronze-green, paler beneath, with two dorsal and two lateral black lines.

Locality, Australia.

Mr. Bell observes that this new genus agrees with *Gymnophthalmus*, Merr., and *Ablepharus*, Fitzing., in the absence of eyelids, but differs from both in the number of its toes. In addition to this difference in the structure of the feet, it is, he remarks, remarkably distinguished by the want of external ears, and by its elongated and anguiform body; characters in which it agrees with *Saiphos*, Gray. The last-named genus, he adds, however, possesses eyelids, and differs also in the number of its toes from *Lerista*. (*Zool. Proc.*, 1833.)

LERNÆA, the Lernæans, which M. de Blainville collected into a family with that name, are parasitic animals adhering to fishes, and have presented some difficulty to zoologists as to their natural position. Cuvier placed them at the end of his *Intestinaux Cavitaires*, Cavitary Intestinal Worms, *Entozoa Nematoidea* of Rudolphi, but as a very different family, and requiring to be divided into many genera when their œconomy is better known. The better opinion seems to be that they are crustaceans, and M. Milne Edwards (1834) so considers them. In his proposed arrangement the *Crustacés Suçeurs* form the second subclass of his class *Crustacea*, and consist of two legions: the first, the legion of *Parasytes Marcheurs*, Walking Parasites; the second, the legion of *Parasytes Nageurs*, Swimming Parasites. This last legion is composed of the order of *Siphonostomes*, and of the order Lernæans. [PARASYTES NAGEURS.]

LEROI, JULIEN DAVID, born in 1724, was the son of an eminent watchmaker at Paris. Having made choice of architecture as a profession, he applied himself to the study of it in a very different manner from the plodding routine then established; and being anxious to become acquainted with the art in the remains of antiquity, then very little known, after passing some years at Rome, he visited Greece in 1754. On his return he gave the world the fruits of his researches in his 'Ruines des plus beaux Monumens de la Grèce.' Although not free from numerous errors, which were subsequently exposed by Stuart, and which the author corrected in his second edition (1770), this work had the merit of being the first publication of the kind—the first attempt to show what Grecian architecture actually was. Undoubtedly its value has since been greatly diminished by the more accurate labours of Stuart and others, but its appearance forms an epoch in the chronology of the art. It certainly contributed much to correct the vitiated taste that had long been in vogue in France, and to open new views in regard to architecture, which meritorious aim was assiduously followed up by its author in the excellent lessons he delivered during forty years as professor. His whole life was devoted to his own studies, and the instruction of others; and such were his zeal and disinterestedness, that he cheerfully continued his services as professor gratuitously in the latter part of his life, though the troubles of the Revolution had greatly impaired his fortune, and though the infirmities of age were increasing upon him. He died at Paris, universally regretted, in January, 1803, aged seventy-five. Besides the one above mentioned, Leroi published several other works, among which are 'Histoire de la Disposition, &c. des Temples des Chrétiens,' 8vo., 1764; 'Observations sur les Edifices des Anciens Peuples,' 8vo., 1767; and 'De la Marine des Anciens Peuples,' 8vo., 1777.

LEROS. [ARCHIPELAGO, GRECIAN.]

LESBO'NAX, a Greek rhetorician and philosopher, was a native of Mitylene. He lived in the times of Augustus, and was the father of Potamon, who taught eloquence at Rome under the reign of Tiberius, and was highly favoured by that emperor (Suidas, under *Lesbonax* and *Potamon*). We learn from Lucian that Lesbonax approved of dancing as a means of moral cultivation. (*On Dancing*, ii., p. 305, ed. Reitz.)

Suidas informs us that Lesbonax wrote many philosophical works; but none of them are extant. Photius says (*Cod.*, 64) that he had read sixteen orations of Lesbonax, of which however only two have come down to us, one exhorting the Athenians to continue the war against the Lacedæmonians, and the other advising them to attack the Thebans. Some critics have placed the author of these orations in the time of the Peloponnesian war; but a mere perusal of the speeches will show that they must have been written at a much later period. We know moreover from the writings of Libanius, Seneca, Quintilian, &c., that it was very common for rhetoricians to declaim upon subjects chosen from antient history. These orations were first published by Aldus, (Ven., 1513); and afterwards by Stephens, with the Orations of Æschines, Lysias, and others (Paris, 1575); by Gruter (Han., 1619), and also by Reiske, in the eighth volume of the 'Oratores Græci.'

There was also a grammarian of the name of Lesbonax, who probably lived at a later period, who wrote a work entitled Περὶ Σχημάτων, 'concerning grammatical figures,' &c., which was first published by Valcknaer in his edition of Ammonius, p. 177-188.

LESBOS, a large island of the Ægean Sea, near the coast of Asia Minor, being separated from the coast of Troas by the Adramyttian Gulf. Its length is 50 miles from Cape Sigrium, which is its north-western extremity, to Cape Malia, at its south-east end, which last looks directly into the entrance of the gulf of Smyrna. The breadth of the island is very unequal, owing to some deep gulfs which indent its coast, and varies from seven to fifteen miles. Mitylene, the chief town of the island, lies on the south-eastern shore opposite the coast of the antient Æolis. It had formerly two harbours, was a place of great importance, and sent out numerous colonies. Mitylene still exists as a village, and gives its name to the island. Methymna, another antient town of Lesbos, stood on its north-east coast, opposite Cape Lectum on the coast of Troas. The towns of Antissa, Eressus, and Pyrrha, stood on the western coast of the island. The deep bay of Pyrrha, which indents the middle of the island, was called Euripus Pyrrhæus, now Porto Kaloni; the other bay, farther south, west of Cape Malia, is now named Porto di Jero. The island has many villages, but no town of any importance, and contains about 40,000 inhabitants, Greeks and Turks. It is considered one of the most fertile and beautiful of the Greek islands. Its oil and figs are reckoned the best in the Archipelago. In antient times it was known as a place of refinement, luxury, and licentiousness. It produced the best musicians of Greece; some of its first lyric poets, Alcæus and Sappho among the rest; several distinguished philosophers and rhetoricians, among others Theophrastus, Diophanes the friend of Tiberius Gracchus, Theophanes the friend of Pompey, Potamon, who lived at Rome, under the emperor Tiberius, and others. The historian Hellanicus, was a native of Lesbos, as well as the musician Terpander, who invented the lyre with seven chords.

The earliest inhabitants of Lesbos are said to have been Pelasgians; it was afterwards colonized by the Æolians in their great migration. The children of Orestes are said, after fifteen years of vicissitudes and strife, to have conquered the island of Lesbos. [ÆOLIANS.]

Pittacus, who flourished about 600 years B.C., became, according to the Greek meaning of the word, tyrant of Mitylene, and he sustained a war against the Athenians, who had invaded the district of Troas, which was claimed by the Lesbians as their own. The Athenians were ultimately defeated by Pittacus. This was in the time of the Lydian monarchy, after the fall of which Lesbos was obliged to submit to the power of Persia. After the battle of Mycale (479 B.C.) Lesbos freed itself from Persian dependence, and became the ally of Athens. During the Peloponnesian war, the people of Mitylene being accused of a secret negotiation with the Lacedæmonians, Athens sent a fleet against them. The other cities in the island, except Methymna, made common cause with Mitylene. After some resistance the Athenians gained a complete victory, when the walls of Mitylene were razed, and many of its wealthier inhabitants put to death. The Athenians sent an order to their commander to put to death all the males who had attained the age of puberty, but they became ashamed of their own barbarity, and despatched messengers to revoke the order; the messenger arrived just one day previous to that appointed for the slaughter. (Thucydides, iii. 36-49; Strabo, xiii.) The whole island, except the territory of Methymna, which was spared, being divided into 3000 parts, 300 of these parts were devoted to sacred purposes, and the rest distributed among the Athenians, by whom they were rented to the antient proprietors.

The subsequent history of Lesbos is like that of Chios, Samos, and the other Greek colonies of Asia; it passed successively under the dominion of the Macedonians, the Romans, and the Byzantines; it was afterwards captured by the Venetians, A.D. 1185, was recaptured by the Greeks, and at last seized by the Turks, who retain it to this day. (Strabo, Casaub., 616.) [CLEON.]

LESGHIS. [GEORGIA.]

LESLIE, CHARLES, born about 1650, died in 1722, a person much engaged in the political and theological controversies of the age in which he lived, and some of whose writings, especially the book entitled 'A short and easy Way with the Deists,' are still read and held in esteem. His writings in the political controversies of the time were all in support of high monarchical principles. His theological writings were controversial: they are too many to be particularized in the brief space which we can allot to him, but they have been distributed into the six following classes: those against, 1, the Quakers; 2, the Presbyterians; 3, the Deists; 4, the Jews; 5, the Socinians; and 6, the Papists. Towards the close of life, he collected his theological writings, and published them in two folio volumes, 1721.

His own course in life was very eccentric. He was the son of an Irish prelate, born in Ireland and educated at Trinity College, Dublin. In 1671 he came to England and entered himself of an inn of court with a view to the study of the law. In a few years however he turned himself to divinity, was admitted into orders, and, settling in Ireland, became chancellor of Cloyne. He was living in Ireland at the time of the Revolution, and distinguished himself in some disputations with the Catholics on the side of the Protestant church.

Though a zealous Protestant, he scrupled to renounce his allegiance to King James, and to acknowledge King William as his rightful sovereign. There was thus an end to his prospects in the church, and leaving Ireland he came to England, and there employed himself in writing many of the controversial works of which we have spoken. When James II. was dead, Leslie transferred his allegiance to his son, the Pretender; and as he made frequent visits to the courts of the exiled princes, he so far fell under suspicion at home, that he thought proper to leave England, and join himself openly to the court of the Pretender, then at Bar le Duc. He was still a zealous Protestant, and had in that court a private chapel, in which he was accustomed to officiate as a minister of the Protestant Church of England. When the Pretender removed to Italy, Leslie accompanied him; but becoming at length sensible to the strangeness of his position, a Protestant clergyman in the court of a zealous Catholic, and age coming on, and with it the natural desire of dying in the land which had given him birth, he sought and obtained from the government of King George I. permission to return. This was in 1721. He settled at Glaslogh, in the county of Monaghan, and there he died in 1722.

LESLIE, SIR JOHN, was born 16th April, 1766, at Largo, a village on the coast of Fifeshire. When a child he was weak and sickly, which occasioned frequent interruptions in his elementary education. He however evinced at an early age a decided partiality for geometrical exercises, and a proportional dislike to the study of languages, more particularly of the Latin, although in this he subsequently attained considerable proficiency. With the assistance of his elder brother Alexander, he soon made sufficient progress in arithmetic and geometry to attract the attention of the parochial minister, through whose instrumentality he was probably presented to Professors Robison and Stuart, and by their suggestions, in 1779, to the university of St. Andrews. Here his abilities introduced him to the patronage of the earl of Kinnoul, the then chancellor of the university, who proposed to defray the expenses of his education on the condition that his father would consent to his being educated for the church. After prosecuting his studies at this university during six sessions, he removed in 1783-4 in company with James (now Sir James) Ivory to Edinburgh, where he attended the courses of several of the professors for three years, in which time he was engaged by Dr. Adam Smith to assist in the education of his nephew Mr. Douglas, afterwards Lord Reston. In 1788 he became tutor to two Americans of the name of Randolph, junior students at the university of Edinburgh, with whom he proceeded to Virginia, and after an absence of about twelve months, during which time he visited New York, Philadelphia, &c., he again returned to Scotland. In the early part of 1790 he set out for London with recommendatory letters from several individuals of literary and scientific reputation; and among others from Dr. Adam Smith, who is said on this occasion to have given him for advice, 'never to approach an author whose favour he was solicitous of gaining without first reading his works, lest the conversation should turn that way.'

His intention seems to have been to deliver lectures on natural philosophy, but finding, to use his own words, that 'rational lectures would not succeed,' he determined upon writing for periodical publications as the readiest means of obtaining a subsistence. He accordingly began to furnish articles for the 'Monthly Review,' and about the same time was employed by Dr. William Thomson (whose acquaintance he had originally made at St. Andrews' university) to collect and furnish notes for a Bible which was then being published in parts. From the translation of Buffon's 'Natural History of Birds,' which appeared in 1793, in nine volumes 8vo., he derived sufficient pecuniary emolument to lay the foundation of his subsequent independence.

In 1794 he visited Holland, and in 1796 he proceeded through Germany and Switzerland, in company with Mr. Thomas Wedgwood. Upon his return he became candidate for some professorship in the university of St. Andrews, and shortly after for that of natural philosophy at Glasgow, but in both instances was unsuccessful. In 1799 he again set out upon a continental tour, and travelled through Denmark, Norway, and Sweden, with Mr. Robert Gordon.

In 1805 he offered himself as a candidate for the professorship of mathematics in the university of Edinburgh, which had become vacant by the promotion of Professor Playfair to the chair of natural philosophy. At this period the only production of Mr. Leslie relative to the pure mathematics consisted in an 'Essay on the Resolution of Indeterminate Equations,' written about the time of his quitting the university, and printed in the 'Edinburgh Philosophical Transactions' for the year 1788; but he had published several papers on different branches of physics in Nicholson's 'Philosophical Journal,' and the Royal Society of London had recently awarded to him the Rumford medals for his researches on the nature and propagation of heat, an account of which had appeared the preceding year ('Experimental Enquiry into the Nature and Properties of Heat,' 8vo., 1804). In addition to the reputation he had thus acquired, he came forward with the warmest testimonials of Drs. Maskelyne and Hutton, Sir Joseph Banks, Baron Maseres, and other persons of distinction; but the appointment rested in the magistrates and town council of Edinburgh, subject to a clause in the charter of the university, which declares that the electors shall take advice of the clergy in the choice of professors; and these being desirous of promoting the election of Dr. Thomas Macknight—one of their own body, and a gentleman perhaps equally qualified for the situation—they therefore determined upon opposing that of Mr. Leslie. They grounded their objection upon a note in his 'Enquiry into the Nature of Heat' (page 135, and note 16, p. 522), wherein he refers to Hume's Theory of Causation, which he designates 'a model of clear and accurate reasoning,' whence his clerical opponents somewhat illogically inferred that he had rejected those arguments which are deducible from the observance of nature in proof of the existence and attributes of a Creator. They forthwith made a formal protest against his election, and expressed their determination, in the event of his induction into the office of professor, to prosecute for his immediate ejection. The town council notwithstanding conferred the professorship upon Mr. Leslie, and the clergy accordingly brought the affair before the General Assembly. The debate which ensued (see 'Report of the Debate,' Edin., 1805, 8vo.) and which lasted for two days, was marked by strong party spirit on the side of the plaintiffs, and by the powerful and sarcastic arguments of Sir Henry Moncrieff, who conducted the defence. Near midnight on the second day (23rd May, 1805), the case was dismissed as 'vexatious.'

Mr. Leslie entered immediately upon his official duties, which he continued to discharge with zeal and assiduity during the fourteen following years. In 1809, upon the death of Professor Playfair, he was called to the chair of natural philosophy, when his first care was directed to the extension of the apparatus required in the more enlarged series of experiments which he thought necessary for the illustration of the course. 'This indeed,' says his biographer Mr. Napier, 'was an object of which, from the first to the last hour of his incumbency, he never lost sight; and it is due to him to state that it was through his exertions that the means of experimental illustration, in the natural philosophy class, were first made worthy of the university.' He was knighted the 27th June, 1832, and died 3rd November of the same year, at his seat at Coates in Fifeshire, about two miles from the place of his birth.

It was about the year 1794-5, while occupied upon a long series of hygrometrical experiments, that he either re-invented or borrowed from the 'Collegium Experimentale' of Sturmius his 'Differential Thermometer.' [Thermometer, Differential.] He supposed the propagation of radiant heat to take place by means of aerial pulsations, a supposition which appears irreconcileable with the existence of radiation *in vacuo*, and equally at variance with the more recent experimental results of MM. Dulong and Petit. He assumed moreover the universality of what is usually termed Newton's law, namely, 'that the decrements of heat of a cooling body are proportional to the difference between its temperature and that of the surrounding medium;' whereas it is known to hold only so long as that difference does not exceed from 40° to 50°. [Heat.] His own theories indeed sometimes appear to be rather the effusions of a bold and active fancy than the logical deductions from any established facts, and, as an almost inevitable consequence, the results to which they lead him appear equally fanciful. Of this character are his conclusions, that 'the matter of the moon is phosphorescent, and at some future period our satellite will become dim and seem blotted from the blue vault of heaven;' that 'the earth contains a concavity filled with concentrated light shining with intense refulgence and overpowering splendour,' and others of like nature. He regarded the inventive faculty as the highest with which the mind can be endowed, and attached so little importance to inductive philosophy that he has been heard to deny that any merit is due to Bacon as its founder. As an author, he was deficient in systematic arrangement and simplicity of style. As a lecturer, he was liable to fall short of a satisfactory elucidation of his subject by estimating too highly either the capacity or the previous knowledge of his auditors. But on the other hand, his active curiosity, varied reading, and powerful memory, led to the acquisition of very extensive knowledge, which in many instances he successfully applied to the promotion of science, and 'his exquisite instruments and experimental devices will ever attest the utility no less than the originality of his labours.'

Besides the works noticed in the preceding article, he has left—

'Elements of Geometry, Geometrical Analysis, and Plane Trigonometry,' 8vo., 1809; the same abridged, 1828; 'Geometry of Curve Lines,' 8vo., 1821; 'Philosophy of Arithmetic,' 1817; 'Account of Experiments and Instruments depending on the relations of Air to Heat and Moisture,' 12mo., 1813; 'Elements of Natural Philosophy,' vol. i. (containing Mechanics and Hydrostatics), 8vo., 1823.

In the *Edinburgh Philosophical Transactions*:—'Observations on Electrical Theories,' 1824; 'On certain Impressions of Cold transmitted from the higher Atmospheres, with a Description of an Instrument adapted to measure them,' 1818.

In the *Encyclopædia Britannica*:—Articles 'Achromatic Glasses;' 'Acoustics;' 'Aeronautics;' 'Andes;' 'Angle;' 'Angle, Trisection of;' 'Arithmetic;' 'Atmometer;' 'Barometer;' 'Barometrical Measurements;' 'Climate;' 'Cold and Congelation;' 'Dew;' 'Interpolation;' 'Meteorology;' 'Progress of the Mathematical and Physical Sciences during the Eighteenth Century.'

In the *Edinburgh Review*:—Papers on the 'Memoirs of the Society of Arcueil;' on the 'History of the Barometer;' on 'Delambre's Arithmetic of the Greeks;' on Von Buch's 'Travels;' on Humboldt's 'Physical View of the Equatorial Regions' and his 'Travels;' on the 'Attempts to discover a North-west Passage.'

In Nicholson's *Philosophical Journal*, vols. iii. and iv., 'Description of an Hygrometer and Photometer;' 'On the Absorbent Powers of different Earths;' 'Observations on Light and Heat, with Remarks on the Enquiries of Dr. Herschel.')

Some papers on physical subjects were also read before the Royal Society of London, but none were ever printed in their 'Transactions.'

(*Memoir of Sir John Leslie*, by Macvey Napier, 1838; Chambers's *Biography of distinguished Scotchmen; Gentleman's Magazine for* 1833, taken from the 'Caledonian Mercury.')

LESSINNES, or LESSINES. [Hainault.]

LESSING, GOTTHOLD EPHRAIM. Such is the number of this author's works and so great the variety of their subjects, that to give a satisfactory account of them alone would require a volume, without touching either upon the incidents of his life or his personal character. Lessing was born at Kamentz in Upper Lusatia, of which place his father was pastor, on the 22nd January, 1729. His attachment to reading displayed itself from his earliest childhood, and he was a devourer of books at an age when others are mere school-boys. Of his extraordinary diligence in study sufficient idea may be formed when it is stated that while at the school at Meissen he perused a number of classic authors besides those which entered into the course there adopted; and further translated the third and fourth books of Euclid, and drew up a history of mathematics. He continued at that seminary till the middle of 1746, when, on taking leaving of it, he delivered a discourse 'De Mathematica Barbarorum.' From Meissen he was sent to the university of Leipzig, where, though he attended many courses of lectures on various branches of learning, his application was not very regular, his attention now beginning to be directed to other pursuits. He began here to form several literary friendships and connections, and acquired a decided taste for the theatre, much to the dissatisfaction of his parents and his sister, who warned him against it as being not only trifling but sinful; while it was also with the extremest difficulty that the family could contribute any allowance for his support. This latter circumstance convinced Lessing that it was time for him to think of shifting for himself. Accordingly he determined to devote his talents to poetry, criticism, and belles-lettres, as that field of literature which had been least of all cultivated by his countrymen, and where, besides having few rivals, he might employ his pen with greater advantage to others as well as to himself. His first productions were one or two minor dramatic pieces, which were printed in a journal entitled 'Ermunterungen zum Vergnügen.'

The departure of his friend Mylius for Berlin determined Lessing to follow him thither, as he hoped there to find himself more favoured by opportunities for literary undertakings. In conjunction with Mylius he began a quarterly publication, 'Beiträge zur Historie des Theaters,' wherein they intended to take an historical and critical view of the drama throughout Europe, a subject then hardly touched upon. The work however was not carried on beyond its fourth number. About the same time he published some of his early poems, and set about studying Spanish, from which he shortly after translated Huarte's 'Examen de los Ingenios;' but he might easily have selected something more likely to fix public attention. Perhaps he showed still less judgement when, in conjunction with his younger brother, Johann Gottlieb, he commenced a Latin translation of Klopstock's 'Messiah,' as if he should be rendering his mother tongue and his countrymen a service by diverting them from the original poem—one that forms an epoch in and gave such an impulse to the German language. Fortunately the brothers learned that a similar translation was undertaken by the Danish chaplain at Madrid; on which they abandoned the task. At this time Lessing was residing at Wittenberg, where his brother was pursuing his studies; but he again returned to Berlin, and formed a close intimacy with Moses Mendelsohn and Nicolai, which had a highly beneficial influence upon all the three. Six eyes, as one of his biographers expresses it, see more than two, especially when one pair of them is fixed upon what is at a distance, another upon what is close by, and the third upon what lies between those extremes. It is not always that such literary partnerships are successful, but in this case there was sympathy of minds and dispositions, together with unity of purpose. One of the first results of

Lessing's and Mendelsohn's joint studies was the dissertation 'Pope als Metaphysiker' (1754), the object of which was to show that the English poet had no fixed philosophical system. Omitting mention of his other literary connections, among whom Ramler stood high in his private esteem, and also of his various translations and less important productions, belonging to this period, we pass on to his 'Miss Sara Sampson,' the first specimen of domestic tragedy in German literature, and also one of the most successful that it has even yet produced. In vain did the critics object to it, that it was a dramatic nondescript, and that it was made up of reminiscences of English novels and tragedies. Little cared the public how it had been produced: it was enough for them that they felt its power and its beauties: it accordingly not only excited a great sensation in Germany, but was translated in other countries. Between this and his next dramatic masterpieces, 'Minna von Barnhelm' and 'Emilia Galotti,' which latter, though composed in 1763, was not ultimately dismissed from the hands of its author till 1772, was an interval which, so far from having been passed unoccupied, astonishes us by the multitude and variety of the subjects on which Lessing then employed his pen.

In 1757 he and his friends Mendelsohn and Nicolai undertook the 'Bibliothek der Schönen Wissenschaften,' which may fairly be said to have been the best literary journal Germany could then boast, and even now it may be referred to with both pleasure and profit for the valuable information and pieces of criticism which it contains. To this period, from 1753 to 1760, during which he resided at Berlin, belong his 'Fables' and his 'Litteraturbriefe,' or 'Letters on Literature' (1759), a life of Sophocles, after the manner of Bayle, and a translation of Diderot's dramatic pieces. From 1760 to 1765 Breslau was his residence, he having accepted the appointment of government secretary to General Von Tauenzien. Here he found himself quite in a new sphere, very advantageous in some respects but in others the reverse; for, greatly to the astonishment of all, he began to addict himself to play with an eagerness quite at variance with a philosophical temperament. If he seldom suffered in pocket, being generally successful at the faro-table, he probably suffered in health, for such was his agitation even while winning, that the perspiration would drop from his forehead. He did not however neglect his studies and his pen, but employed the latter on several antiquarian and literary subjects and topics of criticism. At length he gave up faro and his appointment; returned to Berlin, and the following year published his celebrated 'Laocoon,' the most finished of his prose works, although in itself incomplete. The following year was marked by another literary triumph, namely, his 'Minna von Barnhelm,' and the succeeding one by his 'Dramaturgie' and the 'Antiquarische Briefe.' After this he was preparing to put into execution his long-meditated journey to Italy, when his friend Ebert obtained for him the situation of keeper at the Wolfenbüttel Library (1770), of which celebrated and extensive collection, comprising about 10,000 MSS. and 200,000 printed volumes, he published an account entitled 'Wolfenbüttelschen Fragmente,' 1773. His 'Emilia Galotti,' which, after long remaining in an unfinished state, was completed and published in 1772, has been criticised as manifesting more of psychological study than of poetical impulse, to which objection it has been replied, that it would be well if other dramatists were to follow Lessing's example, and trust more to such study than to poetical inspiration. His last drama, 'Nathan,' which was translated many years ago by the late William Taylor of Norwich, was also almost the last of all his literary productions. From that time, 1779, his health and spirits visibly declined very fast; he became subject to attacks of somnolency in such a degree that he was unable to rouse himself, or even keep awake in the society of his most agreeable friends; so that if he did not, like Swift, 'expire a driveller and a show,' he at least affords another striking instance of great mental power succeeded by complete exhaustion, and that prematurely, for he had entered only into his 53rd year when he died, February 15, 1781.

Few writers who have written so much have written so carefully; and considered with regard to style alone Lessing's works had a most beneficial influence upon German literature. Among them are several masterpieces of various kinds, including his admirable Fables; yet it is not so much for these as for what he did for their literature generally that his countrymen are indebted to him. He was the first to bestow upon it those graces and those æsthetic qualities in which it had till then been deficient.

His brother Karl Gotthelf Lessing (born 10th July, 1740), who published his biography and some posthumous pieces, in 1793, wrote several comedies, which, although now almost forgotten, were not without merit for their humour and liveliness and also exhibited considerable dramatic talent.

L'ESTRANGE, SIR ROGER, was born in Norfolk in 1616. Like his father, he was a royalist, and accompanied Charles I. to Scotland in 1639. He was arrested by the emissaries of the parliament in 1644, and sentenced to be shot as a spy, but some delay having protracted the execution of this sentence, he managed to escape, in 1648, and attempted to raise an insurrection in Kent. This having failed, he fled the country, but returned in 1653, hoping to take advantage of the general act of amnesty. Cromwell having taken his part, his hopes were realized, though this circumstance caused him to be eyed with some suspicion by his friends the royalists. After the Restoration he was appointed censor of the press, and in 1665 he brought out a paper called the 'Public Intelligencer.' He was devoted to the court, and on the approach of the Revolution of 1688 lost all his appointments. He died in 1704.

His works consist of a vast number of political pamphlets, besides translations of Josephus, Cicero's 'Offices,' Seneca's 'Morals,' Erasmus's 'Colloquies,' Æsop's 'Fables,' Quevedo's 'Visions,' &c., &c. He is censured for having used too many vulgar expressions in his versions of classic authors, but on a reference to Echard's low translation o. Terence it will be found that this fault was not peculiar to L'Estrange.

In the first number of the 'Intelligencer' appears the following objection to the diffusion of news, which is curious enough as coming from an editor of a newspaper, and as being inserted in the newspaper itself: 'I think it makes the multitude too familiar with the actions and counsels of their superiors, too pragmatical and censorious, and gives them not only an itch but a kind of colourable right and licence to be meddling with their government.'

LESTRIS. [Laridæ.]

LE SUEUR, JEAN-FRANÇOIS, a very distinguished French composer, knight of the *Légion d'Honneur*, and director of the music of the Emperor Napoleon, was the descendant of an antient family, and born in 1766. After having been *Maître de Chapelle* of several cathedrals in France, for which he composed a great number of masses, motets, &c., his reputation called him to Paris, where he produced his five grand operas: *La Caverne*, *Paul et Virginie*, *Télémaque*, *Les Bardes*, and *La Mort d'Adam*, all of which display, more or less, a vigour of imagination, a grandeur of style, and a judgment in execution, which induced Sacchini to say, that he knew but two Italians who could be compared to him. That M. Le Sueur possessed a strong active mind may be inferred from his compositions; but of this he gave other proofs, as well as of literary talent; his work on music, adapted to sacred solemnities, is highly esteemed; and a *notice* by him concerning antient music, accompanying the translation of Anacreon by M. Gail, not only shows considerable learning, but, in the opinion of M. Ginguené, has thrown some new light on that very obscure subject, the music of the Greeks.

LETHARGY, a state of unnaturally deep and prolonged sleep, a condition intermediate between the sleep of health and complete coma. If not the result of unusual fatigue, it is often an alarming symptom, indicating congestion of the brain, and a disposition to apoplexy, or even an impending attack of that disease. [Apoplexy; Coma; Sleep.]

LETTER or POWER OF ATTORNEY is an instrument by which one person authorizes another to do some act for him; it may be used in any lawful transaction, as to execute a deed, to collect rents or debts, to sell estates, &c. The authority must be strictly pursued, for the principal is only bound by the acts of his agent to the extent to which the letter of attorney authorizes him to proceed, and if the agent goes beyond his authority he is personally liable to the party with whom he contracts. The power authorizing an attorney or agent to do some particular act impliedly includes an authority to do whatever is incident to that act; as for instance, a power to demand and recover a debt authorizes the arrest of the debtor in all cases where it is permitted by law. But a power to receive money and to give releases, or even to transact all business, does not authorize the attorney to negotiate bills received in payment. In fact all written powers, such as letters of attorney or letters of instruction, receive a strict interpretation; the authority never being extended beyond that which is given in terms, or is absolutely necessary for carrying the authority so given into effect. An attorney, unless power be specially given him for that purpose, cannot delegate his authority or appoint a substitute, and, generally speaking, the words of general authority usually inserted in letters of attorney, after giving the particular authority, do not enlarge it.

The authority must be executed during the life of the person who gives it, as the act done is considered to be in every respect his act.

Powers of attorney may be given either in separate instruments, or in deeds relating to other matters: the second form is usually followed where the instrument forms part of a security for money, as where a chose in action is assigned either as a security for money or to an actual purchaser. The deed of assignment contains a power of attorney authorizing the assignee to sue in the name of the assignor. Powers of attorney are generally executed under hand and seal, and where they contain an authority to bind the principal by *deed*, it is essential that they should be so executed. When the agent signs any instrument which is to bind his principal, he must sign it in the name of the principal, and not in his own name.

A power of attorney, unless it be given as a security, is revocable at pleasure, either by the personal interference of the principal or by his granting a new power to another person. But if the power has been given as a security, it has been decided that it is not revocable; and possibly, though it has been decided that a power of attorney coupled with an interest is revoked by the death of the grantor, yet if it authorize the agent to act in the name of the grantor, his executors, &c., it may be held that such a power, when given as part of a security, is not revoked by the death of the principal, and that the assignee of his interest has power to do the acts necessary to render his security available in a court of law, in the name of the representatives of the assignor; but at all events a court of equity would interfere in favour of the assignee. [Chose in Action.]

A letter of attorney is also in general revoked by the bankruptcy of the principal, unless it is coupled with an interest.

(Paley's *Principal and Agent*, and the various treatises on mercantile law.)

LETTERS-PATENT (in Law), the king's letters, sealed with the great seal. These grants, says Blackstone (*Comment.*, b. ii., ch. 21), whether of lands, honours, liberties, franchises, or anything else that can be granted, are contained in charters or letters-patent, that is, open letters, *literæ-patentes*. They are so called because they are not sealed up, but open to view, with the great seal pendant at the bottom, and are usually directed or addressed by the king to all his subjects at large. Letters-patent, in the time of Queen Elizabeth, as well as in several preceding reigns, were not unusually obtained for purposes of mere monopoly.

They are now frequently granted under the royal authority as the reward of ingenuity, and are in some cases the only means by which a man can secure any compensation for a discovery, or for the labour and expense which he may have employed in perfecting an invention. The consideration of the legal rights of patentees, and of the modes in which they may be acquired and secured, properly belongs to the head of Patents. At present it may be sufficient to refer the reader to Collier's 'Essay on the Law of Patents for New Inventions,' to which are prefixed two chapters on the general history of monopolies, and on their introduction and progress in England to the time of the Interregnum,' 8vo., Lond., 1803; to Hand's 'Law and Practice of Patents for Inventions,' 8vo., Lond., 1808; Godson's 'Practical Treatise on the Law of Patents,' 8vo., Lond., 1823, with the 'Supplement,' 8vo., Lond., 1832; and Rankin's 'Analysis of the Law of Patents,' 8vo., Lond., 1824.

Many letters-patent have been granted by the king to the founders of schools and other charitable endowments, empowering the donor to make rules and ordinances for the government of his charity, and constituting into a body corporate those persons and their successors whom the founder should choose or nominate.

LETTUCE (the *Lactúca sativa*, or garden lettuce) is one of the principal kinds of vegetables used for salads. It has been introduced and cultivated in this country for nearly three centuries, but, like many other domesticated plants, its origin is unknown. De Candolle supposes it to have been brought from India, founding his opinion upon its supposed identity with the *Lactuca bracteata* of Wallich, found wild in the mountains of Nepal. The names of several of its varieties indicate their having come to us from the Greek Archipelago and the coast of the Levant; and one of the two divisions into which the numerous varieties of lettuces are usually classed, termed *Cos lettuces*, derives its name from the island of Cos, the modern Stanco. This division includes those of an erect oblong form of growth. The other division, which comprehends those of a roundish, flattened, or spreading form, is termed that of *Cabbage lettuces*. For a selection of the best varieties see Kitchen Garden.

The excellence of lettuces consists in their being crisp and tender; their growth should therefore be so conducted as to sustain no check or interruption. If their quick vegetation is stopped by such causes as excessive drought, over-crowding in the seed-bed, or improper transplanting, they will in consequence either run to seed or become tough, and their juices at the same time will acquire an acrid quality.

The ground intended for the seed should be fresh dug, rich, and mellow. The principal summer crop should be sown in March and April, and the seed lightly covered. If the plants are intended to attain their full perfection where sown, they must be thinned out to distances of nine inches square in the case of the small cabbage varieties, and the larger sorts should be allowed at least a foot each way. In transplanting, the above distances are likewise applicable, and the operation should be performed, if possible, in cloudy weather; but at all events it must be done before the plants are too old or are in the least overcrowded; for when they are drawn, or their stems have once commenced lengthening, which, in dry weather, will sometimes happen whilst they are yet in a small state, it is useless to transplant them. It is of importance that the soil in which they are grown be neither too wet nor too dry. Where the breadth to be planted is not so great as to render the expense of labour an object of consideration, instead of making holes for the plants with a dipper, it is better to form a small trench, with a perpendicular cut next the line against which the roots are to be disposed without bruising. Water should be given, but not at any one time to excess; nor merely at the root of each plant, but over the whole of the ground.

The Cos lettuces require to have their leaves tied together moderately close with a strip of matting, for the purpose of assisting their blanching and rendering them more crisp and delicate. This should be done about a week previous to their attaining full perfection. The Paris Cove Cos requires least assistance in this way, because the tops of its leaves are concave, and successively apply themselves closely to each other. Successive sowings are requisite to be made occasionally during the summer. Those plants intended to stand the winter should be sown in the end of August or beginning of September; and when fit, should be transplanted to the bottom of walls or other fences having a south aspect, or to the sides of slopes or ridges made for the purpose, over which a protection of mats, supported on hoops, may be formed. When the demand is such as to require greater security, recourse must be had to frames or pits. The first full supply from the open ground is best obtained by sowing under glass on a decayed hot-bed in the second week in October. When the plants come up they should be regularly thinned. Abundance of air should be admitted when the state of the weather will permit, and when mild the plants should be fully exposed; but the slightest frost should be guarded against. Very little water will be required; in fact the effects of damp are to be dreaded, and therefore every favourable opportunity should be taken for the admission of air, provided it is not saturated with moisture, unless when too low a temperature would render such a proceeding injudicious. A full exposure to air, both night and day, is necessary for some time previous to planting out in the open ground, which operation may take place in February, if the weather then prove favourable. A reserve should be kept in the frames in case of severe frost occurring after the plantation has been made.

LEUCA'DIA. [Santa Maura.]

LEUCHTENBERG is a lordship in the kingdom of Bavaria, which has an area of 84 square miles, and a population of 5800 inhabitants. Till 1806 it was a landgraviate, the prince of which had a seat and vote in the Diet of the Empire. It is called after the antient mountain castle of Leuchtenberg, in the village of that name, the original seat of the landgraves. The male line becoming extinct in 1646, the country fell to Bavaria. In 1817 the late king of Bavaria, Maximilian Joseph, gave it, with the principality of Eichstädt (together 215 square miles, with 24,000 inhabitants) to his son-in-law Eugene Beauharnois, who assumed the title of duke of Leuchtenberg, and surrendered to the king of Bavaria the sum of five millions of francs, which the king of Naples was to pay him for his estates in that kingdom. The title of royal highness was conferred on the duke and his successors, according to the order of primogeniture, and the rank of princes and princesses of Leuchtenberg, with the title of serene highness, on the other members of the family. The dukes of Leuchtenberg were also declared capable of succeeding to the throne, in case the royal line of Bavaria should become extinct; and on the other hand, on the extinction of the male line of the house of Leuchtenberg, its possessions return to the crown of Bavaria, on the payment of an indemnity of 2,320,312 Rhenish florins to the female line. [Eichstadt.]

LEUCIN, a name given by Braconnot to a substance obtained by the action of dilute sulphuric acid upon fibrin, which dissolves in it when greatly heated. The solution is to be mixed with twice its weight of water and boiled for nine hours; ammonia is thus formed, which combines with the sulphuric acid, and the other principles of the fibrin give rise to three different substances from which the leucin is obtained, in an insoluble state by precipitation with carbonate of lime and the subsequent action of alcohol, and other tedious operations. Leucin is white, pulverulent, very soluble in water and crystallizable. It is only slightly soluble in alcohol, and when boiling it dissolves more than it can retain on cooling. The crystals, when heated to above 212°, fuse and suffer partial decomposition and exhale an odour of roast meat; one portion sublimes without undergoing alteration, in the form of small crystalline grains, which are white and opaque; whilst another part is decomposed, and yields water, ammonia, and a little empyreumatic oil.

The aqueous solution of leucin is not precipitated by subacetate of lead, nor in general by any other metallic salt, except nitrate of mercury, which throws it down completely in the state of a white magma, while the supernatant liquor becomes of a rose-red colour. It has not been analyzed. With nitric acid it forms a curious compound, which Braconnot calls Nitroleucic Acid.

LEUCIPPUS, a Grecian philosopher, is generally regarded as the original propounder of what has been called the atomic philosophy. The time and place of his birth are unknown; he was the disciple of Zeno and the teacher of Democritus, and was born, according to Diogenes Laert. (ix. 30), either at Elis, Abdera, or in the island of Melos. None of his writings have come down to us, with the exception of a few fragments of a treatise 'On Mind,' which have been preserved by Stobæus. Some account of his philosophical doctrines is given by Diog. Laert., ix. 30; Aristotle, *De Anima*, i. 2; Plutarch, *De Placitis Philosoph.*, c. xvii., p. 883. E.; Cicero, *De Nat. Deor.*, i. 24; Lactantius, *Divin. Instit.*, iii. 17; *De Ira Dei*, c. 10; Fabricii *Bibliotheca Græca*, vol. ii., p. 658, 659, ed. Harles; Bayle's *Dict.*; and the articles Atom and Democritus in this work.

LEUCI'SCUS, a genus of fishes of the family *Cyprinidæ*, and section *Abdominales*. This genus, which was established by Klein, contains numerous species, of which the *Roach*, *Dace*, and *Bleak* afford familiar examples. The characters which distinguish them from others of the Cyprinidæ, or Carp tribe, consist in the comparative shortness of the dorsal and anal fins, and the want of strong spiny rays at the commencement of either, the simple lips, and deficiency of barbules about the mouth. The various species of Leuciscus are divided into two sections, according to the position of the dorsal fin. Firstly, those in which this fin is situated immediately above the ventral, as in the *Roach*, *Dace*, &c., and, secondly, those species in which the dorsal fin is placed above the space intervening between the ventrals and anal, as in the *Chub*, *Rud*, *Bleak*, &c.

The *Roach* (*Leuciscus rutilus*, Cuvier) is common in most parts of Europe, swims in large shoals, and frequents rivers, lakes, &c.; preferring somewhat still and deep waters, feeding upon worms and aquatic vegetables. It usually attains from twelve to fifteen inches in length. The length of the head, compared with the whole length of the fish, is as one to five; the depth, at the commencement of the dorsal fin, is to the body alone (without the head or tail) as two to five. The number of the fin-rays are—dorsal, 12; pectoral, 17; ventral, 9; anal, 13; and caudal, 19. The scales are large, and the number forming the lateral line is 43; the number of scales in the oblique line is 11; the colour of the back and upper part of the head is bluish-green or dusky green, becoming lighter on the sides of the body, and shaded into silvery white on the belly. The dorsal and caudal fins are dusky, tinged with red; the anal, pectoral, and ventral fins are bright red; the irides bright yellow.

The *Dace* (*Leuciscus vulgaris*, Cuvier) is more slender and elongated than the Roach; the scales are proportionately smaller; the mouth is more deeply cleft, and the eye is not so large. The length of the head compared with that of the head and body, not including the tail, is as two to nine; the depth of the body, compared to the whole length, is as one to five. The number of scales composing the lateral line is 52: there are eight scales in the oblique line above it, and below the lateral to the ventral fin there are four. The dorsal fin commences rather behind the middle of the body, whereas in the Roach it is exactly half way between the nose and the base of the tail fin. The colouring of the upper part of the head and back is dusky blue, becoming paler on the sides of the body, and shaded into silvery white on the belly. The dorsal and caudal fins are pale brown; the pectoral, ventral, and anal are almost white, but tinted with pale red. The fin-rays are: dorsal, 9; pectoral, 16; ventral, 9; anal, 10; and caudal, 19. The habits of the Dace are very similar to those of the Roach. It is found in Italy, France, and Germany, as well as our own country, generally frequenting the deep clear water of quiet streams. 'The Dobule' (*Leuciscus dobula*, Cuvier), says Mr. Yarrell, 'is found in the Oder, the Elbe, the Weser, and the Rhine, as well as in the smaller streams which run into them.' As yet however but one specimen has been found in this country, and was fortunately caught by the author of the 'History of British Fishes,' while fishing, in the month of August, 1831, in the Thames, below Woolwich. It is of a slender form, and the scales are of moderate size, fifty forming the lateral line, above which there are seven in an oblique line under the dorsal fin, and below the lateral line there are four. The length of the head, compared with that of the head and body alone, is as two to nine, and the depth of the body is equal to the length of the head. The dorsal fin commences about half-way between the anterior edge of the eye and the base of the tail fin. The colouring is the same as in the Dace, excepting that the pectoral, ventral, and anal fins are pale orange-red. In the number of the fin-rays it agrees with the Dace.

The *Graining* (*Leuciscus Lancastriensis*, Yarrell). Pennant appears to be the first author who noticed this fish, but its characters were never clearly defined until Mr. Yarrell's account appeared in the 'Transactions of the Linnæan Society,' vol. xvii., p. 7, pl. 2, fig. 1. M. Agassiz having examined the species when in England, immediately recognised it as an inhabitant of some of the lakes of Switzerland. In this country it appears to be chiefly, if not wholly, confined to the Mersey and some streams connected with that river, where it is met with in considerable abundance.

The adult Graining is from about seven to nine inches in length: the length of the head, compared to the whole length of the body and tail, is as one to six; and the depth of the body, compared to the whole length, as one to five: the nose is more rounded than in the *Dace*, the eye is rather larger; the pre-operculum is less angular, the dorsal line is less convex, and the scales are rather larger and wider. The dorsal fin commences exactly half way between the point of the nose and the base of the tail-fin. There are forty-eight scales in the lateral line, those in the oblique line from the dorsal fin to the lateral line are eight in number, and below this line to the ventral fins there are four. The top of the head, the back, and upper part of the sides are of a pale drab colour tinged with bluish-red, separated from the lighter-coloured inferior parts by a well-defined boundary-line. The irides are yellowish-white; cheeks and gill-covers shining silvery white, tinged with yellow; all the fins pale yellowish-white. The fin-rays are: dorsal, 9; pectoral, 17; ventral, 10; anal, 11; and caudal, 19.

The *Ide* (*Leuciscus idus*, Cuvier), a species which is found in Norway, Sweden, Denmark, Russia, and some other parts of Europe, is said to have been taken at the mouth of the Nith. Its form is somewhat bulky, compared with the other species here described. 'The head is large, and appears somewhat truncated; the muzzle blunt; the mouth small, without teeth, as is the case also with the other species of this extensive family; the upper jaw rather the longer; the eye of moderate size; the dorsal line convex; abdominal line almost straight; the scales of the body large; the lateral line curved in its descent from the upper edge of the operculum to the centre of the body. The fin-rays in number are: dorsal, 10; pectoral, 17; ventral, 11; anal, 13; caudal, 19; vertebræ, 41.

'In colour the irides are straw-yellow, the pupils black; forehead, nape, and back, very dark bluish-black; the sides bluish-grey; the belly white; pectoral fin orange; ventrals immediately under the dorsal fin, red in the middle, the first and last rays white; base of the anal fin white, the other part red; dorsal fin and tail grey; all the rays branched.' (Yarrell.)

The *Chub* (*Leuciscus cephalus*, Flem.) is of a moderately elongated and thick form. The greatest depth of the body is contained four times and a half in the entire length, and the thickness is equal to two-thirds of the depth. The muzzle is somewhat obtuse, and the gape large. The scales are large; the number forming the lateral line is forty-four. Above this there are six scales in the oblique line to the dorsal fin; and below the lateral line there are three in the oblique line to the ventral fin. The dorsal fin commences half-way between the point of the nose and the base of the tail fin; and the ventral commences in the same vertical line as the dorsal. The fin rays are—dorsal, 10; pectoral, 16; ventral, 9; anal, 11; and caudal, 19. The colour of the upper parts is dusky green, the sides of the body and belly silvery-white; the lateral scales are dotted with black: on the cheeks and gill-covers there is a golden hue; the irides are very pale yellow; dorsal and caudal fins dusky; pectorals pale; anal and ventral fins tinged with red, with the exception of the two or three last rays.

The Chub is common in many of the rivers of this country, often frequenting holes near the roots of trees. It lives upon insects and worms, spawns in April and May, and rarely attains a weight exceeding five pounds.

The remaining species of Leuciscus belong to the second division; that is to say, they have the dorsal fin placed above the intervening space between the anals and the ventral.

The *Rud*, or *Red-Eye* (*Leuciscus erythrophthalmus*, Cuvier), somewhat resembles the Roach in form; its body however is higher and thicker, and is distinctly raised at the fore part of the dorsal fin, so as to form an obtuse angle. The greatest depth of the body is rather more than one-fourth of the entire length, and the head is one-fifth; the thickness is not half the depth. The snout is obtuse, and the mouth small, the lower jaws slightly exceeding the upper in length. The scales are large: the number contained in the lateral line is about forty. In an oblique line ascending to the dorsal fin there are seven, and below the lateral line to the ventral there are four. The dorsal fin commences half-way between the point of the nose and the end of the shorter tail-rays. The fin rays are—dorsal, 10; pectoral, 15; ventral, 9; anal, 13; caudal, 19. The upper parts are of an olivaceous colour, tinged with green and blue; the sides and the belly golden-orange; irides orange-red; dorsal and caudal fins dusky; pectorals pale; anal and ventrals tinged with red, excepting two or three of the last rays.

The Rud is found not uncommonly in rivers and other deep waters in various parts of England. Spawns in April or May, and feeds upon worms, mollusca, and vegetable substances.

The *Azurine* (*Leuciscus cæruleus*, Yarrell), a beautiful species, first described by Mr. Yarrell, from specimens received from Knowsley in Lancashire, approaches the Roach in shape, but is more tapered anteriorly and posteriorly, and is at once distinguished by its colour, which is slate-blue above and on the sides of the body, with the lower parts silvery-white, and by the position of the dorsal fin. This commences half-way between the eye and the end of the fleshy portion of the tail. The fins are white, the dorsal and caudal inclining to dusky. The greatest depth of the body is rather more than the entire length, and the head is equal to one-fifth of the length. The scales are rather large; the number contained in the lateral line is about forty-two. In an oblique line, from the dorsal fin to the lateral line, there are seven scales, and below the lateral line to the origin of the ventral there are three. The fin rays are—dorsal, 10; pectoral, 15; ventral, 9; anal, 12; and caudal, 19.

The only locality in England in which this fish is found is in the township of Knowsley. Mr. Yarrell however is informed by M. Agassiz that it is an inhabitant of some of the Swiss lakes.

The *Bleak* (*Leuciscus alburnus*, Cuv.) is of a more slender and elongated form than either of the preceding. The tail is very long and deeply forked. The greatest depth of the body is equal to one-fifth of the entire length, and the greatest thickness is about half the depth: the lower part projects beyond the upper. The scales are of moderate size; the number contained in the lateral line being about forty-eight. The dorsal fin commences half-way between the anterior edge of the eye and the end of the short central rays of the tail: the anal fin commences in a vertical line under the base of the last ray of the dorsal, and occupies half the space between its commencement and the base of the tail. The number of fin rays are—dorsal, 10; pectoral, 17; ventral, 9; anal, 18; caudal, 19. The general colour is silvery-white, which is shaded into an olivaceous green on the upper parts: all the fins are whitish; the irides are silvery.

The Bleak is a small species, rarely attaining eight inches in length, and is usually about six or seven inches long. It is common in many parts of Europe, as well as of this country, usually occurring in the same streams as the Roach and Dace, it swims in great shoals, and spawns in May. The position of the fin, and colour of the eye and fins, render it easy to distinguish the species from the Dace, which it approaches nearest in general appearance.

The *Minnow*, or *Minim* (*Leuciscus phoxinus*, Cuvier). This pretty little fish, a well known inhabitant of most of our running streams, appears to depart somewhat from the typical species of Leuciscus. Its form is slender and rounded, the greatest depth being about one-fifth of the entire length, and the thickness equal to half the depth. The fins are proportionately large, especially the *dorsal*, *anal*, and *caudal*. The last is not very deeply forked, and has the extremities somewhat rounded. The dorsal fin commences about half-way between the anterior edge of the eye and the end of the fleshy portion of the tail. The lateral line is straight from the tail to above the origin of the ventral fin, when it rises gradually to the upper edge of the operculum. The fin rays are—dorsal, 9; pectoral, 16; ventral, 8; anal, 9; and caudal, 19. The top of the head and back are of a dusky olive colour; the sides of the body are paler and mottled; the belly is white and of a fine rosy pink tint in the summer, varying in intensity according to the vigour of the fish; the irides and gill-covers are silvery; the dorsal fin is pale brown; the other fins are paler, excepting the tail, which is light brown, with a dark brown spot at the base of the rays.

LEUCITE, *Amphigene*, occurs imbedded in lava in trapezoidal crystals, and massive. Primary form a cube; cleavage parallel to the planes of the cube and the rhombic dodecahedron. Fracture conchoidal, undulating, shining. Hardness 5·5 to 6. Scratches glass with difficulty. Colour yellowish, greyish, or reddish white. Streak white. Lustre vitreous. Transparent, translucent, opaque. Specific gravity 2·483.

Massive variety amorphous, granular. Reduced to powder, it renders vegetable blues green: before the blow-pipe alone it is infusible; with borax difficultly forms a clear glass.

Analysis by Klaproth, from Vesuvius (No. 1), and by Arfwedson, from Albano (No. 2):—

	No. 1.	No. 2.
Silica . .	53·75	56·10
Alumina .	24·62	23·10
Potash . .	21·35	21·15
Oxide of iron .		0·95
	99·72	101·30

LEUCO'MA, a white opacity of the cornea. [Eye.] It is the result of acute inflammation producing a deposition of lymph on the surface and in the layers of the cornea, either with or without ulceration of its substance. In those cases in which there is merely an effusion of lymph on the surface, or between the superficial layers of the membrane, it is often re-absorbed on the cessation of the inflammation, and the cornea recovers its transparency. But when the disease is more extensive and more deeply seated, the probability of recovery is far less, and many such cases are incurable by any means at present known. The most efficient mode of treatment is that with astringent lotions, such as a solution of nitrate of silver, in the proportion of from one to five grains to the ounce of distilled water.

LEUCON. [Bosporus.]

LEUCOSIANS. [Oxystomes.]

LEUCTRA. [Epaminondas.]

LEUNCLA'VIUS, JOHN (the Latinized form of his real name, Loewenklau), was born in 1533, at Amelburn in Westphalia. He was one of the most distinguished scholars of his age; he was well acquainted with the Latin and Greek languages, the Roman law, and the writings of the fathers; and also with Turkish, which he learnt during his residence at Constantinople. He died at Vienna, 1593.

The most important of the works of Leunclavius are: editions of Zosimus, Procopius, &c., Basle, 1579; Manuel Palæologus, Basle, 1578; Dion Cassius, 1606; Xenophon, Basle, 1569, Par. 1622, 1625; John of Damascus, Basle, 1578; and many treatises of the fathers. He also wrote 'Commentatio de Moscorum bellis adversus finitimos Gestis,' in Pistorius's collection of Polish historians, 1655; 'Musulmanicæ Historiæ, libri xviii.' Frank. 1595; 'Annales Sultanorum Othomanidarum,' Frank. 1596, a translation from the German of Gaudier; 'Jus Græco-Romanum, tam Canonicum quam Civile,' Frank. 1596; 'Versio et Notæ ad Synopsim LX. Librorum Basilicon, seu universi juris Romani et ad Novellas imperatorum,' Basle, 1575, Leyden, 1617.

LEUSDEN, JOHN, was born at Utrecht in 1624. He studied the Oriental languages, and particularly Hebrew, with great success at the universities of Utrecht and Amsterdam. In 1649 he was appointed professor of Hebrew at Utrecht. He died in 1699. Leusden was one of the best Hebrew scholars of his age, though perhaps not equal to the Buxtorfs. Some of his works may still be consulted with advantage.

The most important of Leusden's works are: 'Philologus Hebræus,' Ut. 1656, 1672, 1659, Amst. 1686; 'Philologus Hebræo-Mixtus,' Ut. 1633, &c.; 'Philologus Hebræo-Græcus,' Ut. 1670, &c. These three volumes contain many curious discussions on the original languages of the Bible, the state of the Hebrew and Greek text, and that of the Septuagint, as well as considerable information on Jewish rites and antiquities. 'Jonas Illustratus,' Ut. 1656; 'Joel Explicatus,' &c., Ut. 1657; 'Scholia Syriaca,' 1658, 1672; 'Onomasticon Sacrum,' 1665; 'Clavis Hebraïca et Philologica Veteris Testamenti,' Ut. 1683, a useful book for beginners; 'Clavis Græca Novi Testamenti,' Ut. 1672; 'Compendium Græcum Novi Testamenti,' Ut. 1674, &c.; best edition 1762; 'Compendium Biblicum,' Ut. 1674, Halle, 1736; 'Novum Testamentum Græcum,' Ut. 1675. He also wrote the Preface and Introductions to Athias's 'Hebrew Bible,' Amst. 1661, 1667, and edited Pool's 'Synopsis Criticorum' (1684), and the works of Lightfoot (1699) and Bochart (1675, 1692). He published several Manuals of Hebrew Grammar, which however are almost entirely taken from Buxtorf. He had commenced an edition of the Syriac version of the New Testament, which was published after his death by Schaaf, Leyd. 1708.

LEUWENHOEK, or LEEUWENHOEK, ANTHONY VAN, was born at Delft, in Holland, in 1632, and does not seem to have had the advantage of a learned education. The skill which he possessed in grinding glasses for microscopes first brought him into notice; and his microscopes were said even to excel those of the celebrated Eustachio Divini. He did not confine his attention however to the mechanical construction of instruments, but made many researches on the minute structure and composition of various animal fluids and solid textures, and he acquired great fame as an anatomist and physiologist. Dr. De Graaf introduced him to the notice of the Royal Society of London, and the greater number of his discoveries and researches were published in the 'Philosophical Transactions' of that body. His first communication was transmitted to the Royal Society by De Graaf in 1673. His contributions to the 'Philosophical Transactions' became afterwards numerous and important, and amounted altogether to about 112 papers, which are included between No. 94 and No. 380 of that work. In 1680 he was chosen a Fellow of the Royal Society, and he was made a corresponding member of the Academy of Sciences at Paris in 1697. He appears to have passed the whole of his life at his native place, devoting his time to microscopic researches, chiefly relating to anatomy; and the success which attended his observations is said to have principally arisen from his having paid the most minute attention to the grinding and polishing of single lenses, which he always used in preference to the compound microscope.

The subjects of Leuwenhoek's labours were so numerous, that we can only briefly mention some of the most important of them. Some of the antagonists of Harvey objected to his doctrine of the circulation of the blood, on the ground that if the blood passed directly from the arteries into the veins it could not nourish the parts through which it flowed. This question was undecided, when Leuwenhoek communicated a memoir to the Royal Society, in which he stated, as the result of his experiments, that, contrary to the opinion of Harvey, the passage of the blood was not immediate from the arteries into the veins. However in 1690, having very carefully re-examined the course of the circulation through the minute vessels of a part with a more perfect microscope, he discovered and clearly demonstrated that the arteries and veins are continuous. He even refused to admit that there is any division between the arterial and venous capillaries, because he said that it is impossible to determine where arteries terminate or veins begin. The latest investigations have proved the conclusions of this great microscopist to be nearly correct; for though the transit of the blood from arteries to veins can be observed by means of the microscope in many transparent parts, as the web of the frog's foot, yet the nature of the minute or capillary vessels through which the communication is effected is little understood. 'They form a dense net-work of extremely minute tubes, in which the arteries seem to terminate and the veins to arise; for their delicacy prevents the possibility of discovering any such structure as could decide to which set of vessels they belong; and indeed it is only by observing that the currents of blood-globules pass in regular directions, that we can prove that they are canals with definite membranous walls.' [Heart, vol. xii. p. 82.]

At the time when Leuwenhoek made these observations, the chemical doctrines reigned in medicine, and all the processes in the animal economy were explained by chemical changes: the blood was said to undergo the process of fermentation. Leuwenhoek triumphantly opposed this hypothesis, objecting to it that if fermentation took place bubbles of air would be generated in the vessels, which could never be observed. He also directed his attention to the form of the globules of the blood, which Malpighi had already discovered. Leuwenhoek stated that they are oval and flattened, and that each is composed of six exceedingly minute conical particles, which separately do not reflect the red colour, but which by their union communicate to the blood the physical properties which it presents. This theory served as the basis of that of Boerhaave on inflammation. Leuwenhoek stated, in proof of his hypothesis, that the red capillary vessels divide into smaller branches, in which the circulation is beyond the influence of the heart, and where the blood appears white because its globules are divided so as to accommodate themselves to the size of the canals through which they pass. Late experiments have shown the fallacy of these ideas on the blood.

The brain and nerves were also the subjects of his researches. He described the cortical substance as being entirely vascular, and said that the vessels which compose it are 512 times smaller than the minutest capillaries, and that the globules which compose the fluid contained in these vessels are 36 times more minute than those which form the red blood. Fresh experiments made him change his opinions, and in 1717 he shewed that the brain and nerves are fibrous structures, and that the blood-vessels glide between the fibres which compose these tissues. These observations very nearly agree with those of modern anatomists as to the structure of the brain; the only part in which Leuwenhoek seems to have been deficient was in a clear knowledge of the difference of structure between the cortical or grey and the medullary or white parts of the brain. Thus when he discovered that the latter was fibrous he supposed that the former must be so also; whereas the cortical substance is composed almost entirely of blood-vessels connected by exceedingly fine cellular membrane, as first stated by Leuwenhoek, and investing, as has been since ascertained by Valentin, small grey globules or granules. It is now universally agreed that the medullary part of the brain is composed of fibres.

Leuwenhoek examined the structure of the crystalline lens, and described with exactness the disposition of the layers which compose this part of the organ of vision; and he embellished his description with several very good figures.

Much has been said concerning his investigation of the well-known and celebrated spermatic animalcules, which since the time of their first discovery in 1677 have excited the curiosity and speculative fancy of many naturalists. Haller states that Ludwig Hamm (a student at Leyden) was the first discoverer of the seminal animalcules, in August, 1677. Leuwenhoek claimed the merit of having made the discovery in the November of the same year; and in 1678 Hartsæker published an account of them, in which he professed to have seen them as early as 1674. A great deal has since been written upon them; Needman, Buffon, Der Gleichen, Spallanzani, Prevost and Dumas (their experiments were made together), and Wagner, may be mentioned as those who have devoted most attention to these curious little animals. Leuwenhoek minutely described them, and fancied that when they arrived in the uterus they irritated this organ, attracted the ovum, and communicated life to the embryo which it contained. He also held the animalcules to be of different sexes, and according as one or other gained the ovum during fecundation, it determined the sex of the offspring. Such notions as these require no refutation. The details of his observations on this subject will be found in Buffon's 'Histoire Naturelle.'

Leuwenhoek would have made both more numerous and more valuable discoveries, if he had possessed greater erudition, which would have enlarged his ideas, and prevented him from mistaking, as he did in some instances, probabilities for facts. Thus he often fancied that he saw what did not exist, and afterwards he persisted in his error. Among other mistakes he considered that the villous or mucous coat of the intestines was muscular; he also maintained that pulsation belonged to veins, and not to arteries.

Leuwenhoek's reputation was very extensive. When Queen Mary was in Holland, she paid him a visit, and she was highly delighted with his curiosities. He presented her with two of his microscopes. When the Czar Peter the Great was passing through Delft in 1698, he sent two of his attendants to request Leuwenhoek to pay him a visit, and to bring his microscope with him. The philosopher, after having shown his instruments to the emperor, exhibited to him the curious phenomenon of the circulation of the blood in the tail of an eel.

Leuwenhoek died at Delft in 1723. Besides his contributions to the 'Philosophical Transactions,' he published about 26 papers in the 'Memoirs of the Academy of Sciences.' His writings were collected and published separately in Dutch at Delft and Leyden; they were also translated for him into Latin, and printed at Delft, in 4 vols. 4to., in 1695-99. An English translation was made from the Dutch and Latin editions in 1798-1800, by Mr. Samuel Hoole, in 4to. At his death he bequeathed to the Royal Society of London a small Indian cabinet, in the drawers of which were contained thirteen little boxes or cases, each holding two microscopes handsomely mounted with silver, of which not only the lenses but the whole apparatus were made with his own hands; each microscope had an object placed before it, of which there was an accompanying drawing made by himself. (*Philosophical Transactions* for 1723; *Biographie Universelle*, &c.)

LEUZE. [HAINAULT.]

LEVA'NT, LEVA'NTE, an Italian word which means the East, and which is also commonly used, especially among seafaring and commercial people of the countries bordering on the Mediterranean, to designate the eastern or Asiatic shores of that sea, namely, those of Syria and Asia Minor, the harbours of which are styled 'Scale di Levante,' in French 'Echelles du Levant' ('stairs of the East'). Smyrna, Alexandretta, Beyrout, Acre, the harbours of Cyprus and other islands near the coast of Asia, are included within this denomination. The inhabitants of those countries, and more particularly that mixed population which is found in the seaport towns, the descendants of Europeans settled there, and of Greek, Armenian, or Syrian mothers, are called by the Italians 'Levantini,' and Levantins by the French. The Levantines, or Franks, as they are also called, are distinguished from the Greek rayahs, or subjects of the Porte, as most of them claim the protection of some European consul. They speak Greek among themselves, but their medium of intercourse with European seamen and traders is a very corrupt Italian mixed up with modern Greek words, which is known by the name of 'Lingua Franca.' French is the language of refined society. The Levantines, at least the better sort of them, are a mild, easy-tempered, and sociable people, deficient in spirit and instruction, without strong feelings or passions, and having no distinct national character. Their women are generally handsome. The Levantine or Frank population of Smyrna amounts to five or six thousand; most of them are of the Latin or Roman church. (Macfarlane, *Constantinople in* 1828, &c., ch. v.)

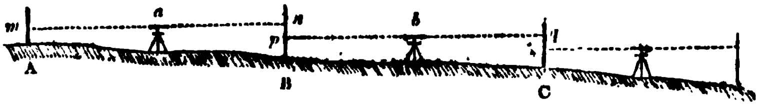
LEVANTI'NA, VAL, *Livinen Thal* in German. [TICINO, CANTON OF.]

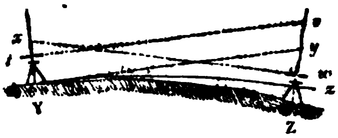
LEVELLING is the art of determining the heights or depressions of points on the ground with respect to a spherical or spheroidal surface coinciding nearly with that of the earth, or, when the extent of ground is inconsiderable, with respect to a horizontal plane passing through some given point on the ground.

In those extensive operations of this nature which are connected with the researches of physical astronomy an attention to that figure of the earth which approaches the nearest to the truth is of importance; but when the object is merely to determine the profile of the ground for a canal or a line of road, it is sufficient to consider the surface to which the points are referred as that of a sphere.

The relative heights of a series of points on the ground are obtained by means of their vertical distances from others which, on the supposition of the earth being a sphere, are equally distant from its centre; and these, which are called level-points, must be found by an instrument constructed for the purpose. Now a plane being supposed to touch the earth at any given point, all the points in the circumference of a circle described on that plane, about the point of contact as a centre, will be level-points: consequently, if a telescope be so adjusted that, when turned round upon the vertical axis of the instrument to which it is applied, its line of collimation (that which passes through the centres of all the lenses) may remain parallel to the horizon, any number of such level-points will be determined, if, being at equal distances from the said axis, they are in the direction of the line of collimation produced. The instrument alluded to is called a spirit-level [SPIRIT LEVEL; THEODOLITE]; and by certain adjusting screws the line of collimation, or optical axis of its telescope, is capable of being brought into the position above mentioned, which is indicated by a bubble of air remaining, during a complete revolution of the telescope, in the middle of the tube containing the water or spirit.

The instrument is employed for the purpose of ascertaining the relative heights of points on the ground in either of the following ways, the first of which is the most simple, and is frequently adopted. Choice is made of any convenient stations, A, B, &c., on the line of operation, and the distances between them are determined either by actual admeasurement or by computations founded on the data afforded by a previous survey of the ground. The instrument is then set up at or near the middle of the interval between every two such points in succession. When the telescope thus placed, as at *a*, has been rendered horizontal by means of the adjusting screws, an assistant at each of the stations A and B, holding what is called a station staff in a vertical position, moves a vane or index along the staff, upwards or downwards, according to the directions of the observer at the telescope, till it appears to coincide with the intersection of two wires in the telescope, that intersection having, by the adjustment of the instrument, been made to coincide with the optical axis, or line of collimation





The points thus determined on the staves are represented by *m* and *n*; and, from what has been said, these are level-points, or points equally distant from the centre of the earth. Therefore the heights *Am* and *Bn* being read on the graduated staves, the difference between them will give the relative heights of the ground at A and B; that point, of course, being the highest at which the distance of the vane from the ground is the least. A similar process is repeated with respect to the points B and C, the instrument being placed at *b*, midway between them; and the operation is to be continued to the end of the line on which the profile is required. It is customary to insert the heights B*n*, C*q*, &c., in a column headed *Fore-sights*, in a sort of field-book, and the heights A*m*, B*p*, &c., in a collateral column headed *Back-sights*. The difference between the sums of the numbers in these two columns will be equal to the height of one extremity of the line above the other.

But it is very generally the practice, with the view of diminishing the risk of error arising from the imperfection of the instrument, to execute a sort of double levelling. This consists in placing the spirit-level successively at each of the two stations, as Y and Z, and having, by the screws, adjusted the telescope as before, let *t v* be the horizontal line at Y, and *w x* that at Z; then, the heights Z *v* and Y *x* being obtained by means of the staff set up successively at each opposite station, it may be easily proved that half the difference between them will be equal to the height of the ground at one point, as Y, above that at the other. This is however strictly correct only when the staves at Y and Z are considered as parallel to one another; but the error arising from their being in the direction of the earth's radii is quite insensible in any of the ordinary operations of this nature.

In using either of these methods therefore no correction on account of the earth's curvature is necessary; but when, from any circumstances, the spirit-level cannot be placed nearly mid-way between every two stations, and particularly when it can be placed only at one station, as Y, the difference between the height Z *v* of the visual ray at one station, and Y *t*, the height of the instrument at the other, will not, on account of the earth's curvature, be the correct relative heights of the ground at the two stations. For, let Y *z* be an arc of the earth's surface, supposed to be spherical; let also Y *t*, Z *v* be in the direction of its radii, and let Y *y* be a tangent to the curve at Y: then *t v* being parallel to Y *y*, the difference between Z *v* and Y *t*, or *v y* (which may be considered as equal to Y *t*), will be Z *y*, the apparent height of Y above Z; whereas the true height should be Z *z*. Now, from the known magnitude of the earth, the distance *y z*, between the tangent Y*y* and the arc, can easily be computed when Y *z* or Y Z is of any given length. If this length is equal to 100 yards, we shall have $yz = 0{\cdot}02$ inches. Consequently, in a series of operations carried on in the manner above described, with station lines not exceeding 100 yards in length, the error in the relative heights at the end of one mile would be little more than one-third of an inch.

On ascending or descending a steep hill, no other method can be adopted than that of placing the instrument at one extremity of the station-line and the staff at the other; but as these lines are then necessarily very short, the deviation above mentioned need not be regarded.

In the determination, on uneven ground, of the length of a base-line for the trigonometrical survey of a country, the relative heights of the ground, as at A, B, C, &c., when found as above, serve for the reduction of the measured hypothenusal lines AB; BC, &c., to the corresponding horizontal lines *m h*, *p q*, &c.; these being comparatively short are then considered as circular arcs, and each is separately reduced to an arc of the earth's surface at the level of the neighbouring seas by subtracting from it the term $A\frac{h}{r}$, which is found from the proportion between the arcs and radii in the similar sectors. Here A is the horizontal line or arc as *m n*; *r* is the radius of the earth's curvature at the level of the sea, and *h* is the height of the ground at A, B, &c., above that level.

The profile of the ground is usually expressed on paper, in portions of any convenient length, for the purpose of enabling the engineer to determine the depths of his excavations, or the heights of the masses of earth to be raised, when it is proposed to execute a canal or road. A right line being drawn to represent one parallel to the horizon, and passing through the highest or the lowest point of the natural ground; the heights or depressions of the remarkable points, as A, B, &c., with respect to suchl ine, are obtained by additions or subtractions from the numbers in the field-book, and are, by a proper scale, set out from that line on others drawn perpendicularly to it at intervals equal to the horizontal distances between the same points. The series of points thus obtained, being joined by hand or otherwise, give the figure of the required vertical section of the ground. In general, for the sake of distinctness, the scale by which the heights are set out is greater than that of the horizontal distances between the points.

When the difference of level only between two places is required, a rectilinear direction from one to the other is not necessarily that in which it is most convenient to perform the operation: a circuitous route is preferable when it presents fewer impediments from woods or marshes, or when the inequalities of the ground are of less magnitude.

Among the operations of levelling, which, within a few years, have been performed on an extensive scale, may be mentioned the series of levels taken across the lands between the Black and the Caspian seas; and between the latter and the lake Aral, for the purpose of determining the relative heights of those waters: the series which, during the expedition of Colonel Chesney, were taken from Iskanderûn on the Mediterranean to Birebjik on the Euphrates; and near the Persian Gulf, between the latter river and the Tigris. To these may be added the extensive lines levelled in England and on the Continent for the several railways which have been executed or are in progress; and the important work now being carried on, under the auspices of the British Association, in order to determine the difference between the levels of the waters in the English and Bristol channels.

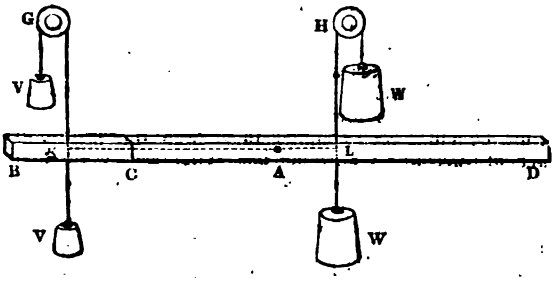
LEVEN, LOCH. [KINROSS-SHIRE.]

LEVER (*levare*, to lift up), the name of a common mechanical instrument, consisting of a simple bar of wood or metal, by fixing one point of which, called the fulcrum, a pressure at the end more distant from the fulcrum is made to counterbalance a larger pressure at the nearer end; or if both ends be equally distant from the fulcrum, equal pressures are made to balance each other.

The lever, considered as a machine, would require no further notice than a reference to the article POWER for the correction of a mistake incident to the conception of this and other machines. But as one of the fundamental principles of mechanics receives its most simple form in its application to the common lever, this instrument assumes a degree of theoretical importance which will justify some discussion of the subject: and the principle of the lever, which is often confounded with the lever itself, must be explained. Thus when it is said in popular writings on mechanics that all machines are reducible to the lever and the inclined plane (an assumption of a startling character if we consider, for instance, the works of a common watch) it is meant that every mode of communicating or relieving pressure is explicable upon the principle of one or other of those machines.

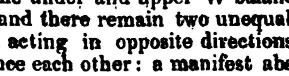
The first explanation of the lever was given by ARCHIMEDES, and that in so simple a manner, that while his method has always been the best for a popular view of the subject, it has never been surpassed, or even equalled, in rigor or purity, considered as a foundation for the science of STATICS.

It assumes two principles; firstly, that when a system is in equilibrium, the state of rest will not be disturbed if additional pressures, such as compensate each other, and would by themselves produce no motion, be introduced or removed; secondly, that when a weight is made to rest by being attached to an immoveable point (say it is suspended by a string), the point or pivot of suspension undergoes a pressure equal to the weight of the system, whatever may be the form of that system, or the dispositions of its parts. Every science must be founded upon some axiomatic assumption; and perhaps there is none which is better entitled to preference than the fact that a given weight, say a pound, suspended by a string, exerts the same pressure on the string whatever its shape may be; namely, a pressure equal to the weight of the body. This being premised, a cylindrical or prismatic bar of uniform material will necessarily rest if a pivot be passed through its middle section at A: since there is no reason why it should preponderate on either side. Divide the bar into two parts, B C and C D, of which K and L are the middle points. At K and L suspend weights equal to the weights of B C and C D; but at the same time apply counterpoises of equal weight acting over fixed pullies G and H: so that the new forces being such that each pair would be in equilibrium, they will not affect the equilibrium already established by means of the equality of the parts of the bar on each side of A. Now, equilibrium existing, we are at liberty to remove any forces which equilibrate each other, such as are the upper V and the weight of B C; such also as are the upper W and the weight of C D. For B C, if detached, would exert on the string which goes over the pulley G a pressure neither more nor less than its own weight (which is V); and C D, if detached from the pivot and from B C, would exert on the string of the pulley H a pressure equal to its own weight, or to W. But when these pairs are removed, there remain only the lower weights V and W; the substance and rigidity of the lever being retained to connect them, though its weight is removed or counterpoised. And K L, being the sum of the halves of the parts, is equal to half of the whole length, or to B A: take away the common part A K, and there remains B K, equal to A L, or K C equal to A L; also A K is equal to C L. Also V is to W in the proportion of B C to C D, or of K C to C L, or of A L to A K; that is, the weights V and W balance each other when they are inversely as their distances from the fulcrum A.



It only remains to show that no other weight except V, proportioned to W as above, will counterbalance W. If possible, let another weight, V′, produce this effect when applied at K; and upwards, by means of the pulleys H and G, apply pressures equal to W and V′, the old weights V and W remaining as before. Then there are two systems which being separately in equilibrium are so when existing in connexion. But the under and upper W balance each other; remove them, and there remain two unequal pressures, V and V′, which, acting in opposite directions at the same point K, balance each other: a manifest absurdity. Consequently, no other weight except V can balance W when placed at K.

The most simple way in which the preceding result can be stated is as follows: when V placed at K balances W placed at L, about the pivot A, the number of *pounds* in V multiplied by the number of *feet* in K A gives the same product as the number of pounds in W multiplied by the number of feet in A L; (any other units of weight and length will do equally well, if only the same be used in both). The product of a pressure and the perpendicular let fall upon its direction from a fixed pivot or fulcrum is sometimes called the moment, sometimes the leverage, of the weight.



As the pressure on the pivot A is the sum of the weights V and W, if the lever were suspended at A, by a string passing over a pulley, a counterpoise might be applied in the shape of a weight equal to the sum of the weights V and W. But when a system is at rest, the equilibrium is not disturbed by making any point an immoveable pivot, and taking away any weight which may be there, leaving its place to be supplied by the reaction of the pivot. If then we were to make K a pivot, weights equal to W and V + W, acting downwards and upwards at L and A, would counterbalance one another, and since $V \times KA = W \times LA$, add $W \times KA$ to both sides, and we have $(V+W)KA = W \times KL$.

In English treatises on mechanics, it is customary to call one of the pressures which balance on a lever, the power, and the other the weight. Levers are thus distinguished as of the first, second, or third kind, according as the fulcrum, the weight, or the power, is in the middle.

LEVERIDGE, RICHARD, a celebrated singer towards the end of the 17th and beginning of the 18th centuries, for whom Purcell wrote most of his base songs. He was in much request in all convivial parties, and as he possessed a talent for lyrical poetry as well as for musical composition, several of the songs by which he delighted his audiences where wholly the offspring of his own genius. Among these Dr. Burney mentions 'Ghosts of every occupation,' which he had heard performed by the bard himself. But we introduce his name here chiefly on account of his having set the music to Gay's 'Black-eyed Susan,' an air which, for tenderness, beauty, and fitness, has few rivals, and is one of the many that prove, to every candid mind, the English talent for music, though it is generally denied by foreigners, whose opinion on the subject long has been, and continues to be, adopted by what is called the fashionable world in this country. During his life, Leveridge published several of his songs, in two 8vo. volumes; and, though far from abstemious, he reached the advanced age of 88 years, dying in 1758.

LEVITE. [Jews.]

LEVYNE occurs crystallized; primary form an acute rhomboid; cleavage parallel to its planes. Fracture conchoidal. Hardness 4·0. Scratches carbonate of lime. Colour and streak white. Lustre vitreous. Translucent. Specific gravity 2·15. When heated, yields water and becomes opaque; swells up when heated in charcoal; with phosphoric salt gives a transparent globule, which contains a nucleus of silica, and becomes opaque on cooling. It is suspected to be merely a variety of chabasie. It is found in Ireland, Faroe, and some other places.

Analysis by Berzelius:—

Silica	48·00
Alumina	20·00
Lime	8·35
Soda	2·75
Potash	0·41
Magnesia	0·40
Water	19·30
	99·21

LEWES, a market-town and parliamentary borough in the hundred of Lewes and county of Sussex, of which it is considered to be the capital, is 49 miles south-by-east from London. It is situated partly on the level bank of the Ouse, but the greater part of the town is on the right bank of the river, and on one of the elevated masses of chalk which compose the South Downs. The town is of Saxon origin, and had acquired its present name some centuries prior to the Norman conquest. According to Camden, 'Lewes' is derived from Leswes, a Saxon word denoting pastures.

The streets are well built, paved, and lighted with gas. The principal public buildings are the churches, the assize-hall, and the house of correction. The last was erected in 1793, and enlarged in 1817. It is built on the plan suggested by Mr. Howard, and contains between seventy and eighty capacious cells, of which fifteen are solitary. The assize-hall was erected in 1812, at an expense of 15,000*l*. It is 90 feet long and about the same in width, and comprises a council chamber, the civil and criminal courts, record-rooms, and other convenient apartments.

Lewes is not incorporated. The management of the affairs of the borough is entrusted to two constables and two headboroughs, who are elected annually by the burgesses, and who are subject to the jurisdiction of the county magistrates. The summer and winter assizes are held here, and likewise the general quarter-sessions for the eastern division of the shire. The borough has returned two members to parliament continuously from the reign of Edward I. The trade in wool was formerly extensive; but it is said to have declined, and grain and malt, sheep and cattle, are now the principal articles of traffic. The maritime trade of the town is carried on through Newhaven at the mouth of the Ouse, about eight miles below Lewes. The fairs for cattle are held May 8 and the beginning of June; those for sheep on Sept. 21 and October 2. The average number of sheep sold annually at these fairs is estimated to exceed 100,000. The ecclesiastical livings are four rectories in the diocese of Chichester, and of the respective net annual values of 206*l.*, 250*l.*, 116*l.*, and 190*l.* The last two are in the patronage of the crown. The population of the borough in 1831 was 8592.

The free grammar-school of Lewes and Southover was originally founded and endowed by Agnes Morley in 1512. There are usually twelve free scholars, children of the burgesses of Lewes, who receive gratuitous instruction in the classics, writing, arithmetic, &c., and are prepared for entering the universities. There is also an exhibition, founded by George Steers in the year 1800, for the children of the inhabitants, at either of the universities. It is tenable during four years, and in 1819 amounted to 35*l.* The school-house is a large and convenient building, and in good repair. The master resides in the school-house, and receives from the funds of the charity about 90*l.* annually. During several years preceding 1819 the free scholars had been presented by Lords Chichester and Hampden. The castle, which stands upon a cliff, is supposed to have been built in the reign of William the Conqueror. Large quantities of Roman coin have been found here at different times, which renders it probable that Lewes was once a Roman station; but for an account of the antiquities, which are numerous, both in the town and suburbs, the reader is referred to Lee's 'History of Lewes and Brighthelmstone,' 1795.

(*First Report of the Commissioners on the Education of the Poor*, 1819; *Boundary Reports*; Lee's *History*, &c.)

LEWIS, Kings of France. [LOUIS.]

LEWIS. [ROSS-SHIRE.]

LEWISHAM. [KENT.]

LEX. [LAW.]

LEX MERCATO'RIA, or LAW-MERCHANT, in a general sense, denotes that body of the usages and customs of merchants which, having been adopted into the laws of most countries, and particularly of maritime states, for the protection and encouragement of trade, has been termed a branch of the Law of Nations. (Blackstone's *Commentaries*, vol. iv., p. 67.) In this general signification of the term, the law-merchant is at the present day extremely uncertain and indefinite, as different countries have adopted different portions of it, and the mercantile usages and customs common to all are few in number. Some centuries ago however, when the transactions of commerce were less complicated, and the rules by which they were governed were consequently simple, the provisions of the Lex Mercatoria appear to have been better understood and ascertained. Thus we find the law-merchant frequently referred to in general terms by our earlier English statutes and charters as a well-known system, and distinguished from the ordinary law; as, for instance, in the stat. 27 Edw. III., 1353, it is declared 'that all merchants coming to the Staple shall be ordered according to the law-merchant, and not according to the common law of the land;' and the Charta Mercatoria, 31 Edw. I., 1304, directs the king's bailiffs, ministers, &c., 'to do speedy justice to merchants *secundum legem Mercatoriam*.'

Lord Coke mentions the law-merchant as one of the great divisions of which the law of England is composed (*Co. Litt.*, 11. b.), and the custom of merchants is said to be part of the law of England of which the courts are to take judicial notice. (*Vanheath* v. *Turner*, Winch's *Reports*, p. 24.) This, however must be understood to apply only to general customs, as the rule does not comprehend particular or local usages which do not form part of any general system. The generality of the expression has caused much misunderstanding, and merchants in this country have been often led to conceive from it, that when practices or rules of trade have become established amongst them so as to amount to 'customs' in the common meaning of the term, they form part of the law of the land. This misconception has frequently led to improper verdicts of juries in mercantile trials. It is quite clear however that the Lex Mercatoria, when used with reference to English law, like the Lex et Consuetudo Parliamenti, merely describes a general head or division of the system. What customs or rules are comprehended under that division must always be matter of law for the consideration of the judges; and it is said by Chief-Justice Hobart, in the case of *Vanheath* v. *Turner* above cited, that if they doubt about it, they may 'send for the merchants to know their custom, as they may send for the civilians to know their law.' The principle seems to be as alluded to by Lord Hale in a case in Hardres's *Reports*, p. 486, that the courts are bound to take notice of the general law of merchants; but that, as they cannot know all the customs which form part of that law, they may inform themselves by directing an issue or making inquiry in some less formal manner. The latter mode has not unfrequently been adopted in modern times, and evidence of mercantile customs has sometimes been given before juries. (1 Douglas's *Reports*, p. 654; 1 Bingham's *Reports*, p. 61.)

LEXICON. [DICTIONARY.]

LEXINGTON. [MASSACHUSETTS.]

LEYBOURN, WILLIAM, a mathematician of the seventeenth century. The date of his birth is unknown, but Dr. Hutton supposes his death to have happened about the year 1690. He was originally a printer in London, and published several of the works of Samuel Foster, the Gresham professor of astronomy. Subsequently he became an author himself, and appears to have attained to considerable eminence as a practical mathematician. Among his published works are:—'Arithmetic,' 1649; 'The Art of Numbering with Napier's Bones,' 1667; 'Complete Surveyor,' 1653; 'Geometrical Exercises,' 1669; 'Art of Dialling,' 1687; 'Mathematical Recreations,' 1694; 'Panarithmalogia, or Trader's Guide,' 1693; 'Cursus Mathematicus,' comprising Arithmetic, Geometry, Cosmography, Astronomy, Navigation, and Trigonometry, fol., 1690. He also edited the works of Gunter.

(Chalmers's *Biographical Dict.*; Granger's *Biog. Hist.*; Watt's *Bibliotheca Brit.*)

LEYCESTE'RIA, a genus of plants of the natural family of Rubiaceæ, named after the late W. Leycester, Esq., of the Bengal Civil Service, who paid much attention to horticulture in India. The genus consists of only a single species *L. formosa*, a native of the Himalaya mountains, at elevations of from 6000 to 7000 and 8000 feet, in Nepal and Sirmore, where it grows among oaks and pines, and is therefore well suited to the climate of England, where indeed it may be seen growing in great luxuriance in some gardens, and showing that many others from the same situations are equally suitable to this climate, which is not the case with many shrubby rubiaceous plants. It forms a large and very showy shrub with numerous luxuriant smooth and cylindric fistulous shoots issuing from the root, which are of a purplish colour. The leaves are opposite, ovate-lanceolate, and glaucous; the flowers white with a tinge of purple, arranged in drooping racemes which are furnished with coloured foliaceous bracts.

LEYDEN, a city of the kingdom of the Netherlands, in the province of South Holland, in 52° 9′ 30″ N. lat. and 4° 29′ 13″ E. long. It is, in point of size, the fourth city in the kingdom of the Netherlands, and its population amounts to 36,000. Leyden is pleasantly situated in a level part of the country, on both sides of a branch of the Rhine, and traversed by many broad canals, bordered with trees, which, intersecting each other, divide the town into fifty small islands, connected together by 145 bridges, some of which are of wood. It is surrounded with a rampart, partly covered with turf and partly faced with brick, on which are fine shady walks; and outside there is a deep and broad moat, with eight bridges leading to so many gates. The city is well built, and the principal streets are broad and well paved. That in which the town-hall is situated extends nearly across the city from east to west; it is almost two miles in length, and is reckoned one of the handsomest streets in Europe. The houses are mostly of brick, with the gable-ends to the streets, as usual in many Dutch and German cities. Among the public buildings the most worthy of notice are the town-hall, a magnificent edifice, containing a valuable collection of paintings;

St. Peter's church, the finest of the seventeen in the city, a large and handsome Gothic building, which contains the sarcophagus of Boerhaave and the monuments of Peter Camper, Meermann, and Luzac, who lost their lives in the explosion in 1807. An ancient castle or fort, ascribed by tradition to the Romans, is in the middle of the city, and, rising above the highest houses, commands an extensive prospect of the town and the surrounding country. The handsome new Roman Catholic church, the custom-house, and hospitals likewise deserve notice. The manufactures of linen and woollens were formerly celebrated, and the chief source of wealth to the inhabitants, but they have greatly declined. It is however still the chief seat of the woollen manufactures and of the wool trade of Holland, and has an annual fair, which is much frequented. There are likewise extensive manufactures of soap and indigo, tanneries famous for their shamoy leather and parchment, salt-works, &c. Printing, especially of classical books, was formerly a great branch of trade, but is much reduced. The most remarkable event in the history of Leyden is the siege by the Spaniards in 1573, which it successfully resisted, though 6000 of the inhabitants perished by famine and pestilence. To reward the valour of the citizens, an offer was made them, either of an exemption from taxes for a certain number of years, or of the foundation of a university. They chose the latter. It was founded accordingly in 1575, and has acquired great and deserved reputation throughout Europe. It has a library of 60,000 volumes and 14,000 manuscripts, a valuable botanical garden, an observatory, a museum particularly rich in Egyptian and Etruscan antiquities, a cabinet of natural history, &c. &c. The number of students is now nearly 800. There are likewise many fine private libraries and museums, and various learned societies. In 1655, 4000 of the inhabitants were carried off by the plague; and in 1807 a boat, with 40,000 lbs. of gunpowder on board, blew up, and destroyed a large portion of the finest part of the city: several hundred persons lost their lives on that occasion.

Leyden was the birth-place of Heinsius, Salmasius, Van Swieten, Paul Rembrandt, Peter Muschenbroek, and the notorious John Bockolt the tailor, who in 1534 proclaimed himself chief of the Baptists and king of Münster.

LEYDEN PHIAL. [ELECTRICITY.]

LEYDEN, LUCAS VAN (whose proper name was L. Jacobs), called by the Italians Luca d'Ollanda, was born at Leyden in 1634. He was taught painting by his father, Hugh Jacobs, and afterwards by Cornelius Engelbrecht, a scholar of Van Eyck. He was remarkable for precocity of talent, for he began to engrave on copper when only nine years of age, and had distinguished himself both as a painter and engraver long before he attained the age of manhood. 'With fewer faults than his contemporaries,' says Fuseli, 'he possessed qualities to them unknown, more freshness and mellowness of colour, more aërial perspective, and equal dexterity in oil, distemper, and on glass. He delighted in subjects of extensive composition, though ignorant of light and shade in masses. His forms, like those of Albert Durer, are implicit copies of the model, but with less variety and less intelligence, lank, meagre, ignoble.' Other critics are more favourable to this artist, of whose works there are many at Leyden, Amsterdam, Paris, Vienna, Dresden, Munich, Florence, &c., but genuine undamaged pictures by him are very rare. His most celebrated work, a large picture of the Day of Judgment, is in the town-hall of Leyden. His drawings are highly prized, and almost as rare as his paintings. His fame now chiefly rests on his numerous engravings, which are equally distinguished by diligent execution and facility of touch. He died in 1533, aged thirty-nine years.

LEYDEN, JOHN, M.D., was born on the 8th of September, 1775, at Denholm, a village on the banks of the Teviot, in the parish of Cavers and county of Roxburgh. His parents, who were engaged in farming, gave him as good an education as their means allowed. After making great progress in his studies he was sent to Edinburgh in 1790, with the view of studying for the church. He was highly distinguished at college by his diligence and attainments, and made considerable progress in the Hebrew and Arabic languages. In 1798 he was ordained as a minister in the Presbyterian church; but he never obtained any popularity as a preacher; and finding that he was not likely to succeed in this profession, he applied himself to the study of medicine, and was appointed in 1802 as assistant-surgeon in the East India Company's service.

In 1803 he arrived at Madras, and immediately directed his attention to the study of the Eastern languages. In addition to the Sanskrit, Arabic, Persian, and Hindustani languages, he made himself master of many of the languages spoken in the Deccan, and obtained an extensive knowledge of the Malay and other kindred tongues. During his residence in India he was promoted from the office of surgeon to the professorship of Hindustani in Fort William college; and shortly afterwards to the office of judge of the Twenty-four Pargunnahs of Calcutta. In 1809 he was appointed one of the commissioners of the Court of Requests in Calcutta; and in the following year to the still more profitable situation of assay-master at the Calcutta Mint. He accompanied Lord Minto in the expedition against Java in 1811, and died in that island on the 28th of August, in the thirty-sixth year of his age.

Leyden did not publish much upon the Eastern languages, but what he has written bears evidence to the extent of his knowledge. His treatise 'On the Languages and Literature of the Indo-Chinese Nations,' published in the tenth volume of the 'Asiatic Researches,' contains an investigation of the origin and descent of the various tribes that inhabit the Malay peninsula and islands, and a comparison of their languages and customs; and his observations 'On the Rosheniah Sect,' published in the eleventh volume of the 'Asiatic Researches,' gives an account of an heretical sect among the Afghans, which appears to have arisen shortly before the accession of Akbar. His translation of the 'Malay Annals' was published after his death, by his friend Sir Stamford Raffles; and his MSS. contained many valuable treatises on the Eastern languages, translations from Sanskrit, Arabic, and Persian works, and several grammars of different languages, particularly one of the Malay and another of the Prakrit.

Leyden was an ardent admirer of poetry, and published many poems at various times, which were collected and published after his death by the Rev. James Morton, under the title of 'Poetical Remains of the late Dr. John Leyden,' Lond., 1819. He also contributed several pieces to Scott's 'Minstrelsy of the Scottish Border;' and edited the 'Complaint of Scotland,' an antient political tract in the Scottish language, as well as 'Scottish Descriptive Poems.' He was the author of 'A Historical and Philosophical Sketch of the Discoveries and Settlements of the Europeans in Northern and Western Africa, at the close of the eighteenth century;' of which an enlarged edition was published by Mr. H. Murray in 1818.

(Morton's *Memoirs of Dr. Leyden's Life*, prefixed to the 'Poetical Remains of the late Dr. J. Leyden.')

LEYT. [PHILIPPINE ISLANDS.]

LEYTON. [ESSEX.]

L'HASSA. [TIBET.]

L'HO'PITAL. [HÔPITAL.]

LI'ALIS, Mr. Gray's name for a genus of reptiles nearly related to *Bipes*. [BIPES, vol. iv., p. 417.]

LIAMONE. [CORSICA.]

LIAS, in geology, the name of a series of argillaceous and calcareous strata, forming the basis of the oolitic system. [GEOLOGY.] The term was originally applied, in the south of England, to the calcareous beds which are at the bottom of the thick argillaceous deposits, now ranked in the 'lias formation.' The lime burnt from the lias of Aberthaw, Bath, and Barrow-on-Soar, has the valuable property of setting in water. (Smeaton, in his *Account of the Eddystone Lighthouse*.)

LIBA'NIUS, a celebrated teacher of rhetoric, was born at Antioch in Syria, A.D. 314, of an ancient and noble family. After pursuing his studies with great diligence in his native city, he repaired to Athens, where he remained four years. He taught the arts of rhetoric and declamation at Athens, Constantinople, and Nicomedia, in succession; but being obliged to leave these places in consequence of the opposition of rival teachers who envied his superior talents, he returned in 354 to Antioch, where he chiefly resided during the remainder of his life. He was considered the most eminent rhetorician of his age; his school was frequented by numerous pupils, and he numbered among his disciples John Chrysostom and Theodore of Mopsuestia. The emperor Julian was a great admirer of his works; he imitated his style in his own writings, and after his accession to the empire formed an intimate friendship with the rhetorician, and bestowed upon him the dignity of quæstor. It is related by Eunapius (*De Vit. Philosop. et Soph.*, p. 135) that one of the emperors (probably Theodosius the Great) gave him the honorary rank of præfect of the prætorium, but that it was declined by Libanius as a less illustrious title than that of Sophist. Libanius was alive in the year 390; since he mentions in a letter to Priscus (*Ep.* 866) that he was then seventy-six years of age.

Libanius was a pagan, and many of his works are written in defence of the heathen religion: yet this did not prevent his being on good terms with St. Basil. [Basil.] There is a curious speech of his still extant addressed to the emperor Theodosius respecting the heathen temples, which has been translated into English by Dr. Lardner, in the eighth volume of his 'Credibility of the Gospel History.'

Most of the writings of Libanius have come down to us; they are chiefly declamations on the leading events of Greek history, and are characterized by Gibbon as 'the vain and idle compositions of an orator who cultivated the science of words; the productions of a recluse student, whose mind, regardless of his contemporaries, was incessantly fixed on the Trojan war and the Athenian commonwealth.' His oratorical works and moral treatises were published by Morel, 2 vols. fol., Par., 1606-27. The best edition of his declamations is by Reiske, 4 vols. 8vo., Leip., 1791. The letters of Libanius, which amount to more than 1600, were published by Wolf, fol., Amst., 1738.

LI'BANUS. [Syria.]

LIBATION, an essential part of sacrifice among the Greeks and Romans. It consisted in the offering up of any liquid to the gods, usually of wine, water, or milk. Libations were also made at funerals. (Pitisci *Lexicon Antiq. Roman.*, tom. ii., pp. 74, 75; Gyrald., *Syntag. Deorum*, l. xvii.)

LIBAU. [Courland.]

LIBEL is a malicious defamation, expressed either in writing, or by signs, pictures, &c., tending either to blacken the memory of one who is dead, or the reputation of one who is alive, and thereby exposing him to public hatred, contempt, or ridicule. (Hawk. *P. C.*)

This species of defamation is usually termed *written scandal*, and from the considerations that the offence is committed upon greater deliberation than the mere utterance of words, which are frequently employed hastily and without thought, and that the effect of a writing continues longer and is propagated farther and wider than verbal defamation, it is generally treated as a more serious mode of defamation than slander. [Defamation; Slander.]

Whatever written words tend to render a man ridiculous or to lower him in the estimation of the world, amount to a libel; although the very same expressions, if spoken, would not have been slander or defamation in the legal sense of those words. [Slander.] To complete the offence, publication is necessary, that is, the communication of the libel to some person, either the person himself who is libelled or any other. The mere writing of defamatory matter without publication is not an offence punishable by law; but if a libel in a man's handwriting is found, the proof is thrown upon him to show that he did not also publish it.

There are two modes in which libellers may be punished, by indictment and by action.

The former mode is for the public offence, for every libel has a tendency to a breach of the peace by provoking the person libelled; the latter, by civil action on the case, to recover damages by the party for the injury caused to him by the libel.

On the criminal prosecution it is wholly immaterial whether the libel be true or false, inasmuch as it equally tends to a breach of the peaee, and the provocation, not the falsehood, is the thing to be punished; and therefore the defendant on an indictment for publishing a libel is not allowed to allege the truth of it by way of justification. But in a civil action the libel must appear to be false as well as scandalous, for the defendant may justify the truth of the facts, and show that the plaintiff has received no injury at all.

But although the truth of a libel is no justification in a criminal prosecution, yet it is so far considered an extenuation of the offence, that the Court of King's Bench will not grant a criminal information unless the prosecutor by affidavit distinctly and clearly denies the truth of the matters imputed to him, except in those cases where the prosecutor resides abroad, or where the imputations are so general and indefinite that they cannot be expressly contradicted, or where the libel is a charge against the prosecutor for language held by him in parliament. And it has been said that a grand jury should be governed by the like rule in finding an indictment for the offence.

A fair report of judicial proceedings does not amount to a libel, but a publication of ex-parte proceedings before a magistrate may be punished as such.

A petition, containing scandalous matter, presented to parliament or to a committee of either house, and legal proceedings of any kind, however scandalous the words used may be, do not amount to a libel. But if the petition were delivered to any one not being a member of parliament, or the legal proceeding were commenced in a court not having jurisdiction of the cause, they would not be privileged. Confidential communication reasonably called for by the occasion, as charges made by a master in giving the character of his servant to a party inquiring after it, or a warning by a person to another with whom he is connected in business as to the credit or character of a third party about to deal with him, are considered as privileged communications, and are not deemed to be libels unless malice be proved, or the circumstances be such that malice may be inferred by the jury.

After some controversy, it is now settled that the jury, in a criminal prosecution for libel, must find not only the fact of publishing, but whether the matter in question be a libel or not (32 Geo. III., c. 60); but in a civil action the question whether the publication is or is not a libel is decided by the judge or court.

The punishment in a criminal prosecution may be fine and imprisonment; and upon a second conviction for publishing a blasphemous and seditious libel, the court may sentence the offender to banishment for any term it may think fit. (1 Geo. IV., c. 8.)

The law of libel has been frequently complained of, and with some appearance of reason, particularly that part of it which prevents the defendant from giving evidence of the truth of the libel in justification when subjected to a criminal prosecution. This is not the place for a discussion of the many reasons which have been adduced against the rule. Almost the only reason, if reason it can be called, which has been alleged in its favour is the one already alluded to, that the libel, whether true or false, equally tends to a breach of the peace; or, as it has been somewhat whimsically said, the being true makes the libel more likely to produce a breach of the peace. Lord Mansfield indeed from the bench has said, 'the greater the truth, the greater the libel.' Much discussion has taken place upon this subject, but it seems questionable whether any improvement will be speedily obtained.

The printer of a libel is liable to prosecution as well as the writer, and so is the person who sells it, even though ignorant of its contents.

It does not seem to be generally known, that by the 28th section of the 38 Geo. III., c. 78, a bill of discovery may be supported against the editor of a newspaper or other person concerned in the publication or interested in the property thereof, to compel a disclosure of the name of the author of the libel, or of the name of any person connected with the publication against whom the party libelled may think proper to bring an action; and such a bill might also be maintained against any person suspected of being the author, which would compel him to discover on oath whether he did or did not write the libel in question.

(Bl. *Com.*; Starkie and Holt *On Libel*; Selw., *N. P.*; Bac. *Abr.*, tit. 'Libel.')

LI'BER, the inner bark of a plant, is a layer consisting of woody tissue, cellular substance, and vessels of the latex, forming a compact zone immediately applied to the wood. The woody tissue of which it is composed quickly becomes thick-sided, by the addition of internal ligneous strata, the consequence of which is, that such tissue in this part is more tough than elsewhere. Hence it is usually from the liber that are extracted the fibres employed in making cordage or linen-thread: this at least is its source in hemp, flax, the lime-tree, the lace-bark, and the many other exogens which furnish thread; but in endogens, which have no liber, as the cocoa-nut, it is the ordinary woody bundles of the leaves, stem, and husks of the fruit from which the fibre used for ropes is procured. It is said that certain exogens, such as Menispermaceæ, have no liber. (*Comptes Rendus*, v. 393.) In many plants a new layer of liber is formed annually, contemperaneously with a new layer of wood, but this is by no means universal; on the contrary, the oak and the elm increase their liber slowly and irregularly.

It is asserted that the liber serves for the downward channel of the sap, just as the alburnum does for its upward course; but this, like many other assertions in vegetable physiology, requires confirmation. There is no doubt that fluids descend through the bark of trees and rise through their wood; but whether the former takes place exclusively through the liber, and if so, whether through the woody-tissue, the laticiferous vessels, or the cellular substance, is not proved. It may be doubted whither the whole of the mesophlæum, or inner cortical layer, does not assist in this function.

LIBER REGIS, another term for the *Valor Ecclesiasticus* of the 26th Henry VIII.; the book containing an account of the valuation of the whole ecclesiastical property of England and Wales, in the state in which it stood on the eve of the Reformation. By an act of the 23rd of Henry VIII., the payment of annates, meaning the first-fruits of bishoprics and archbishoprics, with all sums paid for palls, bulls, and the like, at the consecration of every new prelate, were restrained. This was followed by an act in the 26th Henry VIII., for the payment not only of 'first-fruits of all dignities, benefices, and promotions spiritual,' but also of an 'annual pension of the tenth part of all the possessions of the church, spiritual and temporal, to the king and his heirs,' as supreme heads of the church of England. The Valor Ecclesiasticus is the return which the commissioners under this act made into the exchequer. This record, in full, except certain portions which have been lost, was published under the orders of the commissioners upon the records of the realm, in 6 volumes folio, London, 1810-1834. An abridgement of it is preserved in the Office of First-Fruits, entitled 'Liber Valorum,' and was the foundation of the 'Liber Regis, vel Thesaurus Rerum Ecclesiasticarum,' by John Bacon, Esq., receiver of the first-fruits, with an appendix, &c., 4to., Lond., 1786. This latter work also contains an account of such benefices as have been since discharged from any payment to the above revenues, on account of the smallness of their income. Queen Anne, as an act of royal bounty to the church, in the second year of her reign, gave up first-fruits and tenths as a source of revenue; not back to the hands which had to render them; but to trustees who were empowered to administer them for the benefit of the poorer clergy. This gift of the queen was confirmed by act of parliament, 2 and 3 Anne, ch. ii.

LIBE'RIUS was elected to succeed Julius I. in the see of Rome, A.D. 353. The Semi-Arians countenanced by the Emperor Constantius had then the ascendant, and both the council of Arles, A.D. 353, and that of Milan, 353, condemned Athanasius, bishop of Alexandria. As Liberius, together with some other Western bishops, refused to subscribe to this condemnation, he was arrested, by order of the emperor, and taken to Milan, where he had a conference with Constantius. The questions and answers in this conference are still extant in Constant's 'Epistolæ Romanorum Pontificum.' The conference terminated in a sentence from the emperor deposing Liberius from his office, and banishing him to Berœa in Macedonia. The emperor caused Felix, a deacon at Rome, to be consecrated bishop. A petition was presented to the emperor by the principal ladies of Rome in favour of Liberius, but it was not till 358 that Liberius was restored to his see, and not without having first approved in several letters of the deposition of Athanasius, and subscribed to the confession of faith drawn up by the court party at the council of Sirmium. The weakness of Liberius had a mischievous influence upon many of the Italian bishops, and the council of Rimini openly countenanced Arianism; but it is not true, as asserted by some, that Liberius subscribed the Rimini confession of faith. He ended his career in orthodoxy, and died in 366. He was succeeded by Damasus I. Liberius is said to have built the Basilica on the Esquiline Mount, which has been called Liberiana, from his name, and is now known by the name of Santa Maria Maggiore.

LIBERTI'NUS. In the Roman polity persons were divided, with respect to status or condition, into freemen (liberi) or slaves (servi). Freemen again were divided into persons who were born in a state of freedom (ingenui), and libertini, or those who had been manumitted. (Gaius i., 10, &c.; and compare Horace, *Serm.*, i. 6; v. 6, 21.) A manumitted slave was called 'libertus,' that is, 'liberatus,' 'freed,' with reference to the act of manumission, and to his master, who, by manumitting him, became his patron (patronus): he was called 'libertinus' with reference to the class to which, by the act of manumission, he belonged. It is sometimes said in modern works that the 'libertinus' was the son of the 'libertus;' and such, according to Suetonius, was the meaning of the term 'libertinus' in the time of the censor Appius Claudius, and for some time after (Claud., c. 24); but the meaning of the term 'libertinus' in aftertimes was what is here stated.

A manumitted slave might either become a full Roman citizen or a Latinus [Latinum Jus], or he might obtain no higher privileges than the class called Dediticii. The grounds and conditions of this triple distinction are fully explained by Gaius (i., 12, &c.). The three modes of manumission, by any one of which the freedman might obtain the rights of a Roman citizen, were the 'vindicta,' 'census,' and 'testamentum.' The practice of manumitting slaves having become very common, and being productive of great inconvenience, various provisions in restriction of the power were imposed by the Lex Aelia Sentia, which passed in the time of Augustus. By this law, if a person manumitted a slave for the purpose of defrauding his creditors, or for the purpose of detracting from the rights of his patron, the manumission was void. By the Lex Furia (Fufia) Caninia, which was also passed in the time of Augustus, before the Lex Aelia Sentia, a man could only manumit by his testament a certain proportion of his slaves. This enactment, of wholesome tendency in a state where slavery exists, was repealed by Justinian's Legislation.

Though the sons of 'libertini' were ingenui, it appears from numerous passages of the Roman writers that they were not unfrequently exposed to the taunts and sneers of those who could boast a pure descent from free-born ancestors. Horace says of himself, 'Quem rodunt omnes libertino patre natum.' (*Serm.*, i., 6, 46.)

When we consider that Roman slaves were brought from all parts of the world and were often manumitted, not because of the goodness of their character, but from many and insufficient causes, in addition to mere whim and caprice, it may be presumed that, as a class, the 'libertini had not much to recommend them.

It appears from the definition of Gentilis, as given or sanctioned by the Pontifex Scævola (Cic., *Topic.*, 6), that a 'libertinus' could have no Gens; but the doctrine of the Gentilitas (gentilicium jus), which was once of great importance as to the succession to the property of an intestate, had fallen into desuetude in the time of Gaius (iii., 17). Two inscriptions (Nos. 3024, 3029) in Orelli, probably of a late date, commemorate the fact of a freedman marrying his former mistress (patrona).

The relation between a freedman and his patronus is more properly discussed under the head of Patronus.

LIBERTUS. [Libertinus.]

LIBERTY. The general nature of a liberty, as a portion of the royal prerogative in the hands of a subject, has been already shown under Franchise. Liberties were at first chiefly granted to monastic and other religious establishments, in ease of the consciences of the royal grantors, or in testimony of their devotion to the church; and most of the antient franchises now in existence are derived from an ecclesiastical source. They were afterwards granted as means of strengthening municipal corporations.

Though all Liberties emanate from the royal prerogative, a distinction is usually made between such liberties as have been actually exercised by the crown before the grant to the subject, and such as (being merely latent in the crown) are said to be created de novo upon their being granted. The former, when by escheat, forfeiture, or otherwise, they come again to the crown, are extinguished by merging in the general prerogative, and cannot afterwards be regranted as existing franchises: the latter still have continuance for the benefit of the crown or of any subsequent grantee. To the former class belong such privileges as the right to have the goods of felons, &c., waifs, estrays, deodands, and wreck, arising within the lands of the grantee; to the latter, the return of writs, the right of holding fairs and markets and taking the tolls, the right of holding a hundred-court or a court-leet, the privileges of having a free-warren [Warren], or a legal park [Park], and the like;

and in such cases the franchises, even whilst in the king's hands, are exempt from the jurisdiction of the ordinary officers of the crown, and are administered by bailiffs or other special officers, as when in the hands of a subject.

It is however only in a very wide and loose sense that franchises of the latter class can be said to be part of the royal prerogative of the crown, inasmuch as the prerogative is limited to the *creation* of such franchises, and they can never be enjoyed by the crown except as claiming them under a subject to whom they have been granted.

The fines paid to the crown for grants or confirmations of liberties are shown by Madox to have formed no inconsiderable part of the royal revenue. In his 'History of the Exchequer' he quotes the particulars of about 200 liberties, granted principally by King John. The following may serve as a specimen of the terms upon which the parties fined or made agreement with the crown. The men of Cornwall fine in 2000 marks and 200 marks for 20 palfreys estimated at 10 marks each, for a charter for disafforesting the county and choosing their own sheriffs. The men of Brough fine in 20 marks and 5 marks for a palfrey, for a market on Sunday, and a fair for two days. The men of Launceston fine in 5 marks for changing their market from Sunday to Thursday. Henry de la Pommeraie fines in 5 marks 'that the men of Lidford may not have a better liberty than the men of Exeter.' Alanus de Munbi fines in 100 marks and 3 good palfreys for a charter of exemption from suit at county courts and hundred-courts for his life. Thomas of York, son of Olivet, fines in one huntsman (unum fugatorem), that he may be alderman in the merchant's gild at York. Agnes, the widow of Walter Clifford, fines in one good palfrey to have her manor of Witham in Kent, and that the men of the said manor, being her men, be acquitted of shires, and hundreds, and suits to the county courts and aids of sheriffs and bailiffs, and for the king's letters-patent thereof. The burgesses of Shrewsbury fine in 20 marks and one palfrey that no one shall buy within the borough new skins or undressed cloth, unless he be *in lot* (in *lotto*), and assessed and taxed with the burgesses. [Scot and Lot.]

Many of these franchises having been found to interfere with the regular and speedy administration of justice, the extension of them by fresh grants was frequently the subject of very loud complaints on the part of the commons in parliament, who represented them as prejudicial to the crown, an impediment to justice, and a damage to the people. It appears by the Parliament Roll, that Edward I., towards the close of his reign (in 1306), declared that after the grant which he had made to the earl of Lincoln for his life, of the return of writs within two hundreds, he would not grant a similar franchise *as long as he lived* to any except his own children, and directed that the declaration should be written in the Chancery, the Gardrobe, and the Exchequer. And in 1347, Edward III., in answer to a strong remonstrance, promised that such grants should not in future be made without good advice.

The form in which the crown granted views of frankpledge [Leet] and other franchises may be seen in the charters granted by King Henry VI. to Eton College, and King's College, Cambridge. (5 *Rot. Parl.*, 51, 97.)

A person exercising a franchise to which he has not a legal title may be called upon to show cause by what authority he does so, by a writ of quo-warranto, or an information in the nature of a quo-warranto. [Information; Quo-Warranto.] And parties disturbed in the lawful exercise of a franchise may recover damages against the disturber in an action on the case.

LIBI'NIA, Dr. Leach's name for a genus of brachyurous crustaceans, placed by Mr. Bell under the family Maiidæ.

LIBOURNE, a town in France, capital of an arrondissement in the department of Gironde; situated on the north or right bank of the Dordogne, 346 miles from Paris by Orléans and Limoges, and 25 from Bordeaux. Libourne was built by Edward I. of England (at that time duke of Guienne), out of the ruins of an old Roman town or post, mentioned by Ausonius, called Condate Portus or Condate ad Portum: the name Condate, applied to seven different places in antient Gaul, is considered by M. de Valois to mean the confluence or junction of rivers, but by M. d'Anville, a tongue of land: whichever of these may be the meaning, the name is sufficiently applicable to Libourne. It is a tolerably well built town, surrounded by strong walls and pleasant promenades. The streets are wide and straight and there is a good place or open space. There are seven gates, four toward the rivers and three toward the land: there is a handsome bridge of nine arches over the Dordogne built of brick and stone; and a quay along the bank of that river, but vessels can lie also in the Isle. Vessels of 300 tons can come up with the tide, which rises 10 feet at ordinary times, and 15 feet at the equinoxes. There were several churches and religious houses before the Revolution. The population in 1831 was 8046 for the town, or 9838 for the whole commune: in 1836 it was reduced to 9714 for the whole commune. Some woollen stuffs, military accoutrements, leather and cordage are manufactured. The principal trade is in wine, brandy, and salt, which last is sent up the Dordogne for the supply of the departments of Dordogne and Lot. A considerable quantity of corn and timber is shipped here for Bordeaux. There are several yearly fairs. The town has an agricultural society, an 'Athenæum,' a public library of 3000 volumes, a free school for navigation and drawing, a museum of natural history, and a botanic garden. There are an exchange, and several government offices for fiscal or judicial purposes; also a range of barracks, and a theatre. The environs of the town are fertile in corn and wine.

The arrondissement is subdivided into nine cantons, and 133 communes; it comprehends an area of 497 square miles, and had in 1831 a population of 107,514, and in 1836 of 107,464.

LIBRA (the Balance). In the older Greek writers the Scorpion occupies two constellations of the Zodiac, or rather the body of the animal occupies one, and the claws, *chelæ* (χηλαί), another. We say this, because though the chelæ were certainly a part of the Scorpion, yet they are often mentioned (as by Aratus, for instance) by themselves, as if they formed a distinct constellation. The word *chela* had several significations; so that it may have been by simple mistranslation that the Romans (according to Hyginus, Virgil, &c.) gave the name of Libra to the part of the heavens in question, and drew back the claws of the Scorpion to make room for the scales.

Libra is surrounded by Scorpius, Ophiuchus, Virgo, Cen-

Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.	Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.) [Bradley.] Zach (Z).	Astron. Society.			Flamsteed. (Piazzi.) [Bradley.] Zach (Z).	Astron. Society.	
	2	1631	7	ζ⁴	35	1759	6
	3	1656	6	·	36	1762	6
	4	1663	6	(*f*)	37	1763	5½
(ρ)	5	1669	6	γ	38	1764	3½
	6	1678	5		39	1768	4
μ	7	1677	5		40	1774	4
	8	1680	6	(φ)	41	1778	6
α	9	1681	2	(χ)	42	1780	6
(σ)	10	1684	6	κ	43	1781	4
(*d*)	11	1683	6	η	44	1787	4
	12	1687	6	λ	45	1807	4
ξ¹	13	1688	6	θ	46	1811	4
	14	1692	6		47	1814	6
ξ²	15	1691	6	(ψ)	48	1820	4
(*c*)	16	1694	5½		49	1826	6
	17	1697	7		50	1827	6½
	18	1699	6	ξ*	51	1833	4
δ	19	1701	4		(54)	1746	6
γ*	20	1705	3		(96)	1758	6½
ν¹	21	1711	5		(120)	1773	7
ν²	22	1712	6		(127)	1651	6½
ι¹	24	1721	5		(166)	1668	7
ι²	25	1723	6		(171)	1673	7
(τ)	26	1725	6		(188)	1682	6
β	27	1732	2		(212)	1690	6
(υ)	28	1740	6		(241)	1702	7
ο¹	29	1741	6		(245)	1703	7
ο²	30	1744	6		(262)	1709	7
ε	31	1747	4		[1987]	1788	7
ζ¹	32	1750	6		1060 Z	1752	7
ζ³	34	1755	6				

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* Flamsteed used these letters (Baily's *Flamsteed*), thinking he thereby followed Bayer; whereas in fact these stars are in Bayer γ and ξ Scorpii, not and ξ Libræ.

taurus, and Lupus. Its star β is the vertex of an isosceles triangle, of which Arcturus and Spica (α Virginis) are at the extremities of the base. Its principal stars are given in the preceding page.

LIBRARY. The practice of forming collections of books would naturally commence as soon as books began to be multiplied. All the countries of the antient world in which learning had established herself possessed libraries, which are as indispensable for the sustenance of learning as food is for the sustenance of the body. The high price of books while all books were manuscripts only made it the more necessary that public libraries should be provided for the purposes of study, seeing that the purchase of books was in most cases beyond the reach of private students. Yet we read of many collections of books made by wealthy private individuals for their own use, both among the Greeks and Romans. Among the most extensive and famous of the public libraries of antiquity were the library of the Ptolemies at Alexandria, the library of the kings of Pergamus, and that founded at Rome by the emperor Trajan, which he called, after his own name (Ulpius), the Ulpian Library. The greatest libraries of the middle ages were those of the Arabs, established in their various dominions in Asia, in Africa, and in Spain, and the imperial library at Constantinople. Of all these renowned collections a few stray volumes only have come down to our times. The most extensive existing libraries in the several countries of modern Europe are: in Italy, the Vatican Library at Rome, the Magliabecchian Library at Florence, the Ambrosian at Milan, the library of Bologna, the University Library at Genoa, and that of St. Mark at Venice; in Spain, that of the Escurial; in France, the Royal Library at Paris, the Mazarin Library, and those of the Arsenal, of St. Géneviève, and of the Institute, in the same city, and the public libraries of Lyon and Bordeaux; in Germany, the Imperial Library at Vienna, the royal libraries of Berlin, Dresden, and Stuttgard, and the University Library of Göttingen; in Holland, the public library of Amsterdam, and the University Library at Leyden; in Russia, the Imperial Library at St. Petersburg; in Denmark, the Royal Library at Copenhagen; in the United Kingdom, the Bodleian Library at Oxford, the University Library of Cambridge, that of the British Museum in London, the Advocates' Library in Edinburgh, and that of Trinity College in Dublin. Most or all of these collections will be found noticed under the names of the places where they exist. In the United States of America, according to the 'Encyclopædia Americana,' the principal libraries are, or were in 1831, that of Harvard College, containing 36,000 volumes; the Philadelphia Library, containing 27,000; that of the Boston Athenæum, containing 26,000; that of Congress, containing 16,000; and that of Charleston, containing 13,000.

LIBRATION, a balancing motion, in which there is a position on one side and the other of which a body vibrates; being in fact the same in meaning as oscillation. This term is however particularly applied to a small irregularity, compounded of the moon's rotation round her axis and her orbital motion, by means of which her visible hemisphere is not always quite the same.

The mean revolution of the moon round her axis is the same period of time as her mean revolution in her orbit. If both motions were equable the moon would always present the same face to a spectator placed at the centre of the earth, on condition that the plane of her equator passed through the centre of the earth. None of these conditions being exactly fulfilled, and the variations being small and periodic, the consequence is that a small portion of the moon's surface in the eastern and western edges, and also in the northern and southern, is alternately visible and invisible. There is perhaps no subject in astronomy so difficult to explain to a reader who is not familiar with solid geometry; and the subject is not of sufficient importance to deserve any detail of illustration.

LI'BYA. [AFRICA.]

LICENTIATE IN MEDICINE is a physician who has a licence to practise granted by the College of Physicians. There are two classes: licentiates, who are authorized to practise in London and within seven miles thereof; and extra-licentiates, who are only privileged to practise in the country at a greater distance from the metropolis. The former class are authorized exclusively by the College of Physicians, but medical graduates of Cambridge or Oxford may practise in the provinces independently of the college licence.

LICHANO'TUS, Illiger's name for a genus of Cheiropeds or Quadrumanes (*Indris* of Lacépède, Geoffroy, and others) belonging to the family *Lemuridæ*.

The Indris are inhabitants of Madagascar, and two species only seem generally recognised, namely, *Indri brevicaudatus* of Geoffroy, *Lemur Indri* of Gmelin; and *Indri longicaudatus* of Geoffroy, *Lemur laniger* of Gmelin, *Indri laniger* of Fischer. Cuvier indeed recognises but one species, namely, that first above named, and says in a note that the other requires consideration ('a besoin d'être revu').

Dr. Fischer adopts both under the names of *Indri brevicaudatus*, Geoff., and *Indri laniger*, marking however the latter as doubtful.

M. Lesson, in his 'Manuel,' also gives both species under the generic name of *Indris*, Lacépède, and the specific names of *Indris brevicaudatus*, Geoff., *L'Indri*, Sonnerat; and *Indris longicaudatus*, Geoff., *Le Maki fauve*, Buffon, *Le Maki à bourre*, Sonnerat; with the following dental formula:—Incisors $\frac{4}{4}$; canines $\frac{1-1}{1-1}$; molars $\frac{5-5}{5-5}$ = 32: the same number recorded for both species by Fischer. M. Temminck (*Mammalogie*) notices only one species.

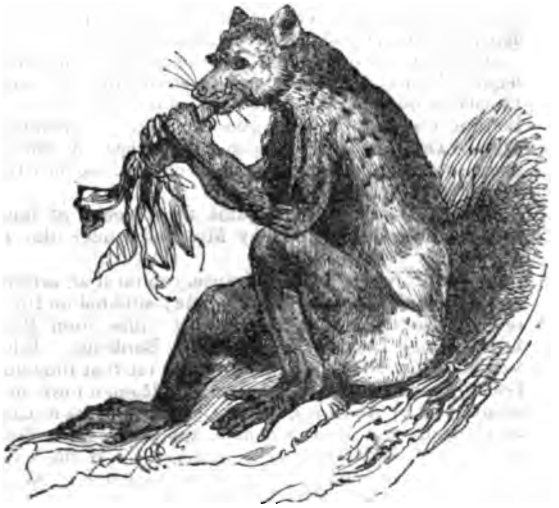
Mr. Gray places *Lichanotus* and *Indris* in his subfamily *Lichanotina*, between *Lemurina* and *Loridina*, in his third family *Lemuridæ*, which is the first in his second or Quadrupedoïd section of his order *Primates*. (*Annals of Philosophy*, 1825.)

Mr. Swainson confines the generic term *Indris*, Lacép., to the *Lemur laniger* of Gmelin, and that of *Lichanotus* to the *Lemur Indri*, Gm. To both Mr. Swainson assigns the same number of incisors and grinders as that above stated; but he gives canine teeth $\frac{1-1}{1-1}$ to *Lichanotus* only. He places these two genera between *Lemur*, Linn., and *Scartes*, Sw., in the family *Lemuridæ*. (*Classification of Quadrupeds*, 1835.)

M. Geoffroy (*Magaz. Encyclopédique*) observes that there are four cutting teeth in the upper jaw, not two, as mentioned by Sonnerat.

M. F. Cuvier states that the dental system of the *Indri* is only known to him from the extremity of the jaws, which offers in the *upper jaw* incisors like those of the *Red Lemur*, a canine tooth very much curved and entirely like two false molars which are found immediately next to it, and which have only a single point; in the *lower jaw* two incisors only, the first very narrow, and the second wider, but both couched forwards ('couchées en avant'), like those of the Makis or true Lemurs, the canine small, and resembling a false molar which follows it, which has only a single point, and which is much wider before than behind, thickening from the external to the internal edge.

The figures and descriptions of these two species are given by Sonnerat in his 'Second Voyage,' and seem to be



Black or Tailless Indri.

the source whence the subsequent accounts have been principally taken.

The first, noticed by Pennant as the Indri (under the title *Maucauco*), is described as a large animal three feet and a half high, entirely black, except on the face, which is greyish, on the lower part of the abdomen, where a greyish cast prevails, and on the rump, which is white. The face is stated to be of a lengthened dog-like form, the ears rather short but much tufted, the hair or fur silky and thick, curly in some parts. The nails are said to be flat but pointed, and there is no appearance of a tail.

Locality, Madagascar.

Habits.—The animal is described as gentle and docile, and as being trained when young for the chase, as dogs are. Its note is stated to resemble a child's crying, whence not improbably its Madagascar name *Indri*, which is said to signify *Man of the Wood*.

The other species, *Flocky Lemur* of Shaw, is stated to be a foot and nine inches from nose to end of tail, the tail being nine inches. The colour pale yellowish-ferruginous above, and white beneath; the tail bright ferruginous. The fur extremely soft, and curled deepest about the loins. Face black; eyes large and greenish-grey. The animal is described as having two fore-teeth in the upper jaw, and four in the lower (Quære tamen), and pentadactyle feet, with long claws, except the thumbs, which are furnished with rounded nails.

Dr. Shaw observes that Pennant, in the last edition of his 'History of Quadrupeds,' seems to think this animal no other than the *Lemur Mongooz*, or Woolly Macauco; but the Dr. adds, that if Sonnerat's description be just, the species must certainly be a different one from *L. Mongooz*.

Flocky Indri.

Dr. Shaw is of opinion that *Le Petit Makis Gris* (Buffon, *Supp.*, tom. vii., p. 121, pl. 34) and the *Autre Espèce de Maki* (Buff., *Supp.*, tom. vii., p. 123, t. 35) are smaller varieties of the Flocky Lemur; but this view does not seem to be adopted by the more modern zoologists. Skeletons and skins of the Indris would be an acquisition to our museums, and would clear up doubtful points.

LICHAS, Dalman's name for a group of Trilobites forming a division of the great genus Asaphus of Brongniart.

LICHENIC ACID. [Malic Acid.]

LICHENIN, a peculiar vegetable product, sometimes called *lichen starch*. It is obtained from the *Cetraria islandica*, or liverwort, which is to be cut small and infused in eighteen times its quantity of cold water, in which about a quarter of an ounce of carbonate of potash is dissolved for every pound of the liverwort employed. After remaining twenty-four hours, the infusion is drained from the liverwort without pressure: it is then to be repeatedly washed with cold water, and afterwards boiled in nine times its weight of water down to six; the decoction is strained and the liverwort squeezed while hot; a gelatinous white substance is soon formed, which, after being dried gently on cloth, becomes of a dark colour and hard. Being re-dissolved in boiling water and again strained, it gelatinizes.

When pure it is white, and it retains water; but on drying it becomes yellowish. In thin plates it is transparent. It is tough, tasteless, nearly inodorous, swells up when put into cold water, but dissolves sparingly in it. With hot water a gelatinous solution is obtained, which is decomposed, and yields a precipitate with di-acetate of lead, and with solution of iodine gives either a dingy green colour, or, as is stated by some authors, a blue one, as starch does. It is said to be poisonous.

Lichenin is stated to possess the alkaline property of combining with acids; but it does not form crystallizable salts with them. It is composed of about

Hydrogen .	7·24,	or nearly	10 equivs.	= 10	= 6·66
Carbon .	39·33,	„	10 „	= 60	= 40·00
Oxygen .	53·43,	„	10 „	= 80	= 53·34
	100·			150	100·

LICHENO'PORA. The fossils ranked under this title by Defrance are thought by Blainville to be young Reteporæ. ('Actinologie,' p. 407.)

LI'CHENS, a large and important natural order of imperfectly organized plants, containing numerous species employed in the arts as pigments, and as articles of food. It is principally in the former respect that they are of economical interest, in consequence of the great consumption of orchall, or archil [Archil], Cudbear (Lecidea tartarea), and others by the dyer; the estimated value of the annual imports of these plants being from 60,000*l.* to 80,000*l.*

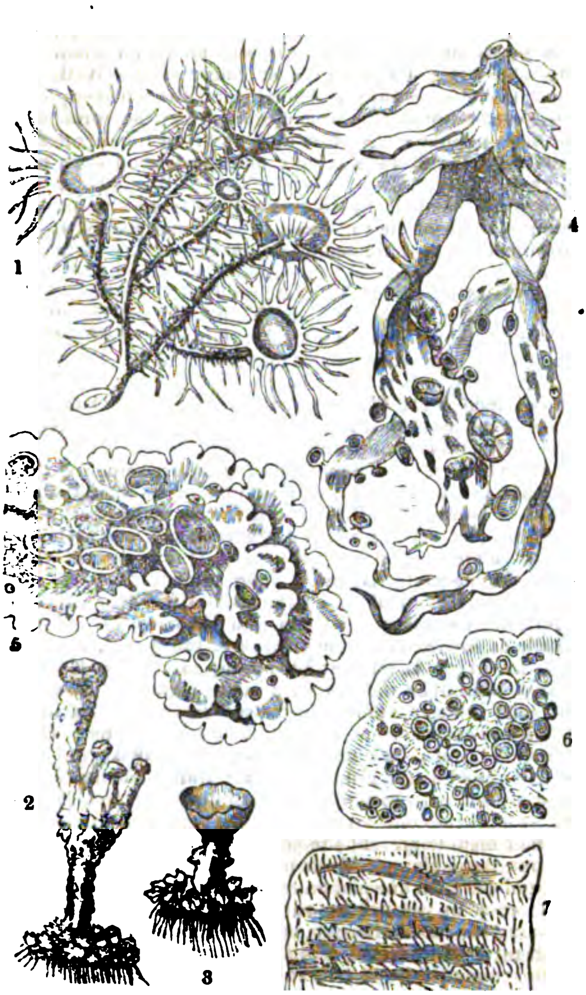
Lichens are perennial plants, requiring free access to light and air, of the most simple organization, forming irregular patches upon the surface of stones, trees, the earth, and other bodies. Their structure is imperfectly cellular, without any trace of vascularity. The cells of which they consist are spheroidal or cylindrical, tubular or fibrous, empty or filled with a grumous matter, in a loose and indefinite state of aggregation, but generally consolidated into two strata, the one external or cortical, the other internal or medullary. The membranous or other expansion, which in these plants consists of a combination of stem and leaf, is of the most unequal and uncertain degree of development, in some species appearing like misshapen leaves spreading over the surface on which it grows, in other cases rising up as a stem of various figures; but always more or less unsymmetrical, and in many instances constituting little more than a stain upon the face of a tree or rock; this body is a frond, or, as it is technically called, a thallus. The fructification of lichens consists of a round or linear, convex or concave, cup, called apothecium, or shield, at first closed, but afterwards expanding and producing a nucleus (stratum proligerum) in which are embodied the spores. The shield is surrounded by a border (excipulus) which originates either from the substance of the thallus (thallodes) or from the base of the shield itself (proprius), or from both (thallodes and proprius).

Lichens are distributed over all parts of the world, forming in the polar and similar regions a food for animals and man. Cladonia rangiferina supports the rein-deer, Cetraria islandica furnishes the nutritious Iceland moss of the druggists' shops; and various species of Gyrophora, under the name of Tripe de Roche, form a part of the supply of food scantily furnished by nature for the Canadian hunter. In warmer countries they acquire a firmer consistence and appear to form secretions of a peculiar kind in much greater abundance than in the northern parts of the world. Orchall, for example, grows in Great Britain and the Canaries, and botanists can detect no external differences between the plants of these two countries; yet in the former its dyeing matter is secreted so abundantly that Canary samples fetch from 250*l.* to 350*l.* a ton in the market, while the English are unsaleable.

The prevalent principles found in lichens are a peculiar kind of gluten resembling starch, a bitter secretion, and a resin combined with an unctuous colouring matter yielding purple, yellow, and brown dyes. In consequence of their bitterness some have been employed as febrifuges, as Variolaria faginea, Parmelia parietina, and several others.

There are between 50 and 60 genera, arranged in three suborders. (Fries, *Lichenographia Europæa*; Fée, *Méthode Lichenographique*; Wallroth, *Naturgeschichte der Flechten*; Eschweiler, *Systema Lichenum*.)

The following cut shows the various stages of development in the lichens of this country.



Lichens in fructification, in various stages of development.

1. Usnea barbata with a stem and rudimentary leaves; 2, 3, Cladonia pyxidata, in the same state, but with its leaves disappearing; 4, Ramalina calicaris, with the stem nearly lost, and the shields borne upon irregular unsymmetrical expansions; 5, Sticta herbacea, with the stem entirely lost, and the leaves spreading over the surface of the ground; 6, Parmelia pallescens, with the stems and leaves consolidated, and forming only a crust with a definite margin; 7, Opegrapha scripta, in which nothing is formed except the letter-like fructification.

LICHFIELD is a city and county of itself, although locally situated within the county of Stafford, in 52° 54′ N. lat. and 1° 44′ W. long., and 118 miles north-west by north from London. The limits of the parliamentary borough comprehend the whole of the town, together with the surrounding country, to the distance of rather more than a mile; but within this boundary, and a little to the north-west of the city, there is a small space called the 'close,' which possesses a separate jurisdiction, distinct not merely from that of Lichfield, but also from that of Staffordshire. The corporation had its origin in the year 1387, when Richard II. granted to the guild a licence to purchase lands to the amount of 10*l.* a year. This guild was dissolved by Edward VI., who granted a charter of incorporation to the city, and Queen Mary, in the first year of her reign, erected the city and suburbs into a distinct county independent of the county of Stafford. The next charter was that of 20 James I., which authorizes the establishment of two weekly markets, and empowers the bailiffs to receive the tolls and customs thereof. To this succeeded the charter of 16 Charles II. In 1686 James II. obliged the corporation to surrender their charters, which however were restored to them the following year, when all their former privileges and immunities were acknowledged and confirmed.

By the Municipal Corporation Act Lichfield is divided into two wards, with six aldermen and eighteen councillors. Neither the property nor the expenditure of the corporation is known, in consequence of the municipal authorities refusing to communicate with the parliamentary commissioners appointed in the year 1835, but the revenue is supposed not to exceed 300*l.* per annum, and arises chiefly from landed property. The tolls of the markets were compounded for in 1741 by Sir Lister Holt, one of the members for the city, who paid the corporation 400*l.*, in consideration of which it was agreed that the city should thenceforward be 'discharged from all tolls whatever upon a market-day except picking.' The fairs are held January 10, Shrove Tuesday, Ash-Wednesday, and the first Tuesday in November. The market-days are Tuesday and Friday. The borough has returned two members to parliament continuously from the reign of Edward I. The incorporated companies are seven in number, namely, the tailors, bakers, sadlers, butchers, smiths, cordwainers, and weavers, in each of which are included several subordinate trades.

The name 'Lichfield' is of Saxon etymology, and, according to Dr. Harwood, refers to the marshy nature of the surrounding country. The houses in the principal streets are handsome and well built, and the whole city is supplied with excellent water, and paved and lighted. The gaol and house of correction are well constructed, and admit of classification of the prisoners.

Lichfield, in union with Coventry, is an episcopal see. The cathedral sustained considerable injury during the civil wars, but was restored by Dr. Hacket in 1661; and more recently very extensive repairs and alterations have been effected under the superintendence of Mr. Wyatt. Its total length from east to west is 410 feet, and the width along the transepts measures 153 feet. There are three spires, of which the central rises to the height of 280 feet, the whole being ornamented with a profusion of very elaborate workmanship. In the interior are numerous monuments, and among them is one of Dr. Samuel Johnson, who was born in this city, and to whose memory a statue has been recently erected. (See Harwood's *History and Antiquities of the Church and City of Lichfield*, 4to., 1806; and also Dugdale's *Monasticon Anglicanum*.) The other churches are respectively dedicated to St. Chad, St. Michael, and St. Mary. The livings attached to the first two are paid curacies, valued at 90*l.* and 137*l.* per annum; the last is a vicarage in the patronage of the dean and chapter of Lichfield, and possesses an average net income of 458*l.* The population of the borough in 1831 was 6252, which includes the population of the 'close.'

The free-school of Lichfield is stated, but upon very doubtful authority, to have been founded by Edward VI. As early as the reign of Henry III. the bishops of the diocese founded a religious establishment, which subsequently went under the appellation of the 'Hospital School,' but near the close of the seventeenth century, in consequence of previous mismanagement, the affairs of this institution became subject to the superintendence of the master of the free grammar-school, and in 1740 the chief part of its funds were transferred to the last-mentioned establishment, since which time the two foundations are considered to have merged into one.

In 1835 there were 21 scholars upon the foundation, besides boarders, and at that time the school was described as being in a flourishing condition. For particular information relative to the management and state of the funds of this school and the other benevolent foundations of Lichfield the reader is referred to the Seventh Report of the Parliamentary Commissioners on Charities. (*Boundary Reports*, &c.; and the several authorities mentioned above.)

LICHTENBERG, a principality situated between the Bavarian circle of the Rhine, the Prussian province of the Lower Rhine, Oldenburg, and Hesse-Homburg, has an area of 236 square miles, with 31,000 inhabitants. It was formerly called the lordship of Baumholder, and according to the decision of the congress of Vienna was ceded in 1816 by Prussia to the duke of Saxe-Coburg, who gave it the rank of a principality, calling it Lichtenberg, after an ancient castle, with a representative council of seven members, chosen by fifty electors. But the French Revolution in July, 1830, and the troubles in Rhenish Bavaria, excited some disturbances in the principality, particularly in St. Wendel, the chief town, to suppress which it was necessary to call in Prussian troops. This induced the duke to cede the principality, with all the rights of sovereignty, to Prussia in 1834. Prussia in return pays the duke an annual sum of 80,000 dollars, till Coburg shall be able to purchase an equivalent in landed estates which shall in every respect supply the place of Lichtenberg. Prussia unites the contingent of 250 men to the army of the Confederation with its own

LICHTENBERG, GEORGE CHRISTOPHER, deserves a place in every English biographical work, if only on account of his admirable 'Erklärung der Hogarthischen Kupferstiche,' wherein he has entered far more completely into the spirit of our great artist's works, than any of his English illustrators and commentators, scarcely excepting Charles Lamb, whose 'Essay on Hogarth' is besides a mere sketch in comparison with the extensive canvas filled up by the German. Had he written nothing else of a humourous nature, this production would have established Lichtenberg's reputation for searching keenness of wit, comic power, and for both playful and severe satire. Hardly is this praise any exaggeration, since, independently of its literary merit as an original work, it displays an intimate acquaintance with the subject, which in a foreigner is little short of wonderful—equally wonderful is it perhaps, that scarcely one of Hogarth's later biographers or editors should have been aware of its existence, otherwise they would undoubtedly have made mention of it, if they did no more. Unfortunately however he did not live to complete his work.

Lichtenberg was born at Ober-Ramstadt, near Darmstadt, July 1st, 1742, and was his parents' eighteenth child. By his father, who was the pastor of the place, he was early initiated into mathematical and physical studies, in which he afterwards greatly distinguished himself, forming thereby a striking exception to the rule, that a mathematician, and wit, are the antipodes of each other. On the death of his father he pursued his studies, first at Darmstadt, afterwards at Göttingen, at which University he was appointed to a professorship in 1770. Although then only in his 27th year, he was well qualified for the office bestowed on him, such having been his assiduity that there was scarcely any branch of learning or science with which he was unacquainted. Just before his promotion he had made a visit to England, where he had the honour of being introduced to George III., and was noticed by the leading men of science in that day. The favourable reception he had met with induced him to pay a second visit to this country in 1774, preparatory to which he had made himself thoroughly master of our language. During this second residence among us, which was of some continuance, he was admitted into the highest literary circles. He also studied our national character with that shrewdness peculiar to him, and laid in that stock of information which he afterwards turned to such excellent account in his work on Hogarth.

From the period of his return to that of his death he resided constantly at Göttingen, devoted entirely to the duties of his professorship, to his pen and his studies. He latterly became subject to attacks of hypochondria, which induced him to lead the life of a recluse, without other society than that of an excellent wife and his five children. This malady however did not interrupt his studies, to which he continued as attached as ever, neither did it prevent his carrying on a very extensive epistolary correspondence almost to the day of his death, February 24th, 1799.

Besides the already-mentioned commentary on Hogarth (of which some specimens appeared several years ago in the 'London Magazine,' and from which there are also some extracts in the article entitled 'Lichtenberg and Hogarth,' *Foreign Quarterly*, No. 32), his other works are exceedingly numerous, and no less varied; for while some are entirely scientific, on subjects of astronomy and physics, others are pieces of wit and satire, frequently of the most pungent kind, and occasionally of the most extravagant and whimsical cast. Among these productions of humour the titles of one or two may be mentioned as conveying some idea of their subjects, viz. The Mad-house for Opinions and Inventions; A Sentimental Journey to Laputa; Consolation for those Unfortunates who are no Original Geniuses; A Patriotic Contribution to the Study of German *Methyology* (Drunkenness); and the Bedlamites' Petition.

LICHTWER, MAGNUS GOTTFRIED, born at Wurzen, in Saxony, January 30th, 1719, though only one of the minor poets of Germany, may be considered almost the first in the rank of its fabulists, in which character he holds a standard rank in the literature. When only two years old he lost his father, but his mother's circumstances enabled her to bestow upon him a good education. At her death, in 1737, the further charge of his studies devolved upon his guardian, the Stiftsrath Zahn, by whom he was sent to Leipzig, where he applied himself more particularly to jurisprudence, but also made himself master of French and Italian. In 1741 he went to Dresden, in the hope of there obtaining some office or appointment, but after fruitlessly waiting two years, quitted it for Wittenberg, where he obtained the degree of doctor of laws, and delivered lectures in jurisprudence, until the breaking of a blood-vessel compelled him to abstain from the exertion of speaking in public. He now took up his pen and produced his Fables, the first edition of which appeared anonymously in 1748. The following year he quitted Wittenberg, and went to Halberstadt, where his mother's brother was one of the dignitaries of the cathedral. This change proved highly advantageous to him, being the means of his obtaining some important charges. In 1758 he published a new edition of his Fables, with his name prefixed to it, and also his didactic poem 'Das Recht der Vernunft;' and in 1762 a 'Translation of Minutius Felix,' with notes. He died July 7th, 1783. The poem above mentioned is by no means equal to many others of the same class in the language: it is an exposition of Wolf's philosophy, formally treated, instead of the dryness of the subject being at all relieved or adorned by poetical illustration of the doctrine. His Fables, on the contrary, are master-pieces; many of them strikingly original in subject, terse and pointed in style, and admirable in their moral. They abound with gnomic sentences most happily and energetically expressed; and although some few are inferior to the rest, there is scarcely one which has not some particular merit to recommend it.

LICI'NIUS STOLO, LICINIAN LAWS or ROGATIONS. Caius Licinius Stolo, of a distinguished plebeian family at Rome, was made tribune of the people, together with his friend L. Sextius Lateranus, in the year 375 B.C. These tribunes brought forward three 'rogations,' that is to say, bills or projects of law, for the comitia or assembly of the tribes to decide upon:—1. That in future no more military tribunes should be appointed, but two annual consuls as formerly, and that one of the two should always be a plebeian. The occasional appointment of military tribunes, part of whom might be chosen from among the plebeians, was a device of the senate to prevent the plebeians from obtaining access to the consulship. 2. To deduct from the capital of all existing debts from one citizen to another the sums which had been paid by the debtor as interest, and the remaining principal to be discharged in three years by three equal payments. This seems, according to our modern notions of money transactions, a very summary and not very honest way of settling standing engagements; but if we carry ourselves back to that remote period of Roman society, and take into consideration the enormous rate of interest demanded, the necessities of the poorer citizens, who were called from their homes and fields to fight the battles of their country, and had no means of supporting their families in the mean time except the ruinous one of borrowing money from the wealthy, who were mostly patricians, and also the fearful power which the law gave to the creditor over the body of his debtor, and the atrocious manner in which that power was used, or rather abused, in many instances, such as those reported by Livy (ii. 23; vi. 14; viii. 28), we shall judge with more temper of the proposition of Licinius. The 3rd rogation has been a subject of much perplexity to modern inquirers. Its object, as briefly expressed by Livy, was that 'no one should *possess* (possideret) more than five hundred jugera (about 333 acres) of land, and until lately it has been literally understood by most readers of Roman history as fixing a maximum to private property. But Beaufort, and more lately Heyne, Niebuhr, and Savigny, have shown, that the limitation referred to the holding of land belonging to the *ager publicus*, or public domain of the state. [AGRARIAN LAW.] And when we reflect upon the insignificant extent of the original territory of Rome, and that it became gradually enlarged by the plunder or appropriation of a part of the land of the neighbouring nations, it appears evident that most of the large estates possessed by the patricians must have been portions of this conquered land, which was considered as public property, occupied, cultivated, and held as tenants at will, they and but which individuals of the influential class in the state their descendants paying to the state a tenth of all grain, a fifth on the produce of plantations and vineyards, and a certain tax per head of cattle grazing on the public pasture. This was the kind of *possession* which the Licinian rogation purposed to limit and regulate. Licinius proposed that all those who had more than 500 jugera should be made to give up the surplus, which was to be distributed among those who had no property, and that in future every citizen was to be entitled to a share of newly conquered land, with the same restriction and subject to the same duties. This might be considered as a bill for the better distribution of plunder among those engaged in a plundering expedition, for the land thus acquired and distributed cannot be compared to real property as held throughout Europe in our days, and this reflexion may perhaps serve to moderate somewhat the warmth of our sympathy in reading of the complaints of the Roman plebeians concerning the unequal distribution of land which had been taken by violence from a third party, the other nations of Italy, who were the real sufferers.

The patricians, who had had till then the best share of the common plunder, opposed the utmost resistance to the passing of these three laws. They gained over to their side the other tribunes, who put their veto on the bills. But at the end of that year Licinius and Sextius put their own veto on the election of the new military tribunes, and being themselves re-elected by the tribes every year, they renewed for five years the same opposition to the election of the curule magistrates, so that the republic fell into a kind of anarchy. In the fifth year, 370 B.C., the inhabitants of Velitræ, a Roman colony, revolted, made incursions into the Roman territory, and besieged Tusculum, the ally of Rome. Licinius and Sextius now waived their opposition, the comitia were held, and six military tribunes were elected, and as the war continued, six more were appointed in the following year, Licinius and Sextius meantime continuing to be re-elected every year as tribunes of the people. Having gained over to their side three more of their colleagues, they again brought forward their bills, asking the senators 'how they could pretend to retain more than 500 jugera of land, while a plebeian was only allowed two jugera, hardly enough to build himself a cabin upon, and to supply him with a burial-place when he died.' These expressions of Livy's text confirm Niebuhr's opinion that the whole question was about the ager publicus, or conquered land, of which the plebeians who had served in the army received small allotments of two or more, but never more than seven, jugera (between four and five acres) each. Licinius then went on to ask the patricians, who still opposed his other bill concerning the debtors, 'whether they delighted in having their houses full of plebeians in fetters, so that wherever a patrician dwelt there must be a private dungeon also?' And then turning to the plebeians, he told them that the surest remedy for such evils was contained in his third bill, namely, that they should always have one of the two consuls chosen from their own body. 'It is not enough,' said he, 'that plebeians be eligible by law to the consulship. They have long been eligible to the dignity of military tribunes, and yet the patricians have so contrived that very few plebeians have obtained that office. The number of military tribunes at their first institution was ordained to be six, in order that the plebeians might have a share in that magistracy; nevertheless their claims have been almost constantly defeated; how much easier it will be for the patricians, as there are but two consulships, to secure them both for themselves. The only remedy therefore is to make a law that there shall be always one plebeian in the consulship.' However, all proceedings concerning these laws were again suspended for that year, the five tribunes of the people who were still in the interest of the senate urging that it was proper to wait for the return of the army, which was still in the field against Velitræ. Six new military tribunes were elected for the following year, 368 B.C. At the same time Licinius and Sextius, being re-elected tribunes of the people for the eighth time, resolved to bring their bills before the tribes, without any regard to the intercession or veto of their colleagues.

The senate, seeing the final struggle approaching, had recourse to a last expedient: they appointed Camillus to the dictatorship. While Licinius and Sextius, having convened the tribes, sure of the people's favour and regardless of the veto of their colleagues, were proceeding to take the suffrages, and the first tribes had already voted for the bills, the dictator, attended by a great body of the patricians, repaired to the place of assembly, and declared that he was come to support the rights of one part of the tribunes to put their veto on the proceedings of the others; and as Licinius and Sextius paid no attention to him, Camillus ordered the lictors to disperse the assembly, threatening, in case of noncompliance, to summon the people to the Campus Martius, to enlist and march into the field. This put a stop to the voting. Licinius and Sextius then preferred a bill that M. Furius Camillus should be fined 500,000 ases, to be sued for as soon as he laid down his office, for interrupting the tribes in their right of legislating. Camillus now bent before the storm and abdicated his office. It appears that Licinius and Sextius, having assembled the tribes anew, might have passed the two bills concerning the land and the debtors, but that the people demurred to the law concerning the consulship, in which most of them felt little interest. The two tribunes however refused to separate the three bills, telling the people that they must either have all or none; and they added, that unless they agreed to pass the three bills, they, the two tribunes, were determined to serve them no longer in their office after that year. They consented however to be re-elected, and soon after obtained the passing of another bill, by which the custody of the Sibylline books, instead of being entrusted to two patricians as heretofore, should be entrusted to decemviri, half of whom were to be always plebeians. They then suffered six patricians to be elected military tribunes for the following year, 366 B.C. In that year the Gauls having again advanced towards Rome, Camillus, now nearly 80 years of age, was appointed dictator for the fifth time, and marching out of Rome completely defeated the barbarians. On his return he obtained a triumph, with the consent of both senate and plebs. Livy (b. vi., 41) here becomes extremely laconic, merely saying that the external war being concluded, the internal contest raged more violently than ever, and that after a desperate struggle the dictator and senate were defeated, and the three rogations or bills of the tribunes were allowed to pass. Plutarch, in the life of Camillus, gives some further particulars of a great tumult in the Forum, when Camillus was nearly pulled down from his seat; being protected by the patricians, he withdrew to the senate-house; but before entering it, turned towards the capitol and besought the gods to put an end to these commotions, vowing to build a temple to Concord, if domestic peace could be restored: and it appears that it was he who persuaded the senate to comply with the wishes of the plebs. Thus the three Licinian rogations passed into law after a struggle of ten years, which is remarkable for the orderly and legal manner in which it was carried on, and for the perfect temper and judgment shown by the two popular tribunes.

Sextius Lateranus, the colleague of Licinius, the first plebeian consul, was chosen for the next year, 365 B.C., together with a patrician, L. Æmilius Mamercinus. The senate however refused to confirm the election of Sextius, and the plebeians were preparing for a new secession and other fearful threatenings of a civil war, when Camillus again interposed, and an arrangement was made that while the patricians conceded the consulship to the plebeians, the latter should leave to the patricians the prætorship, or office of supreme judge in the city of Rome, which was then for the first time separated from the consulship. Thus was peace restored.

Licinius, the great mover of this change in the Roman constitution, was raised to the consulship, 363 B.C., and again in the year 360 B.C., but nothing remarkable is recorded of him while in that office. In the year 356 B.C., under the consulship of C. Marcius Rutilus and C. Manlius Imperiosus, we find Licinius charged and convicted before the prætor of a breach of his own agrarian law, and fined 10,000 ases. It seems that he possessed 1000 jugera, one half of which he held in the name of his son, whom he had emancipated for the purpose. After this, we hear no more of C. Licinius Stolo.

(Livy, vi. and vii.; Niebuhr, *Römische Geschichte*, vol. iii.; Val. Maximus, viii., 6, and Savigny's remark, *Das Recht des Besitzes*, p. 175, on his blunder about the story of Licinius violating his own law.)

LICI'NIUS, FLA'VIUS VALE'RIUS. [CONSTANTINUS; DIOCLETIANUS; GALERIUS; MAXIMINUS.]

LI'CINUS (Latreille), a genus of Coleopterous insects included in the great group Carabus of the older authors. The genus *Licinus* is placed by Dejean in his section *Patellimanes*, and, together with the genera *Dicælus*, *Rembus*, and *Badister*, constitutes a little section or subfamily, distinguished from other Patellimanes by the want of the toothlike process in the emargination of the mentum.

In the genus *Rembus* (Latreille) the three basal joints of the anterior tarsi are dilated in the male sex: the terminal joints of the palpi are elongated, somewhat ovate, and truncated at the apex; the mandibles project but little, are slightly arched, and pointed; the thorax is narrower than the elytra, which are almost parallel.

But two or three species of this genus (the *Carabus politus*, and *C. impressus* of Fabricius) are known; they are found in the East Indies, and are of a black colour.

Genus *Dicælus* (Bonelli) may be distinguished by the following characters: terminal joint of the palpi securiform; labrum emarginated and having a longitudinal impression; mandibles projecting but little, without internal denticulations, slightly arched and pointed; thorax nearly square; elytra moderately long, parallel or somewhat ovate; the three basal joints of the anterior tarsi are dilated in the male sex. The species of Dicælus appear to be confined to North America, and about twelve or fifteen are described. They are in general of a tolerably large size, averaging perhaps about three-quarters of an inch in length, or rather less. Some of the species are of a beautiful purple or bluish tint; they are however most commonly black.

Genus *Licinus*. In this genus the head is broad, short and rounded; the thorax is generally of a rounded form, and the body depressed and ovate; the labrum is short, and emarginated in front; the terminal joint of the palpi is securiform; the mandibles are stout, short, obtusely pointed, and dentate internally; the two basal joints of the anterior tarsi are dilated in the male sex. In Dejean's *Catalogue des Coléoptères* there are twelve species of the present genus enumerated, nearly all of which inhabit Europe. Three species inhabit this country. (Stephens's *Illustrations of British Entomology*.)

The genus *Badister* (Clairville) is distinguished by the mandibles being short and obtuse; the three basal joints of the anterior tarsi dilated in the male sex; the terminal joint of the palpi elongated, oval and somewhat pointed; the head rounded, and the thorax cordiform. Of this genus five species are enumerated by Dejean, all of which inhabit Europe. Their small size however renders it probable that very many more will be discovered; already as great a number as that given by Dejean has been found in this country, some of which are certainly unknown to that author. The genus *Trimorphus* of Mr. Stephens appears not to be sufficiently distinct from *Badister*.

LICKS, as they are called in North America, are small tracts of land with a sandy soil, on which salt crystallizes in the form of an efflorescence, and which are resorted to by all animals that feed on grass, for the purpose of licking up the salt. They are of great importance in Brazil, where they are called *Carreiros*. That country being comparatively newly settled, the herds of cattle are very large, and sometimes amount to nearly 50,000 head. These cattle grow lean and are reduced to bad condition if they cannot from time to time get salt, which they lick with great eagerness. When a cattle estate has no natural licks, the proprietor is put to considerable expense to provide the necessary quantity of salt for his cattle. Hence the value of a large estate is greatly enhanced by the possession of one or more licks, though in general they hardly occupy a space twenty paces long and wide. Wild animals, as deer, buffaloes, wild hogs, &c., also resort to them.

LICTOR, a public officer who attended on the principal Roman magistrates. This office is said to have been derived by Romulus from the Etruscans. (Liv., i. 8.) The kings, and afterwards the consuls, were attended by twelve lictors, the dictator by twenty-four, and the master of the horse by six. The lictors went before the magistrates one by one in a line; he who went first was called *primus lictor*, and the one who immediately preceded the magistrate *proximus lictor*.

The lictors were originally chosen from the *plebs* (Liv., ii. 55); but in the time of Tacitus they appear generally to have been freedmen (*Ann.*, xiii. 27), probably of the magistrate on whom they attended.

The duty of the lictor was to see that proper respect was paid to the magistrates, and to inflict punishment on those who were condemned; and probably to assist in some cases in the execution of a decree or judgment in a civil suit.

The lictors carried on their shoulders rods bound in the form of a bundle, with an axe in the middle.

The etymology of the name is doubtful. Gellius (xii. 3) derives it from the verb *ligare*, because the lictor had to bind the hands and feet of criminals before they were punished.

LICUALA, a genus of Palms of the tribe Coryphinæ of Martius, so named by Rumphius, from the Maccassar name of the species *L. spinosa*, figured by him in 'Herb. Amboin.,' 1, t. 9, and which is found in the islands of Maccassar and of Celebes. Another species, *L. peltata*, is described by Dr. Roxburgh as a native of the mountainous and woody parts near Chittagong, which separates that province from the Burman territories. Both species are small, with palmate somewhat fan-shaped leaves, but of little use. Rumphius describes the narrow leaves of his tree as being formed into pipes for smoking tobacco, while the broader are employed for wrapping up fruit, and for other domestic uses.

LIECHTENSTEIN, a sovereign principality, the smallest of all the states composing the German Confederation, consists of the counties of Schellenberg and Vaduz, and is situated between the Rhine, Switzerland, and the Tyrol, on the northern slope of the Rhætian Alps, the highest summits of which rise to an elevation of 5610 feet. Its area is only fifty-two square miles, with a population of nearly 6000 inhabitants, all of the Roman Catholic religion. The country is very mountainous; but it produces corn, flax, wine, fruit, and timber, sufficient for the consumption of the inhabitants, who have also a good breed of horned cattle. They are a poor but happy little community, who subsist by agriculture, cotton-spinning, and manufactures of wooden wares. The revenue is 5000 florins per annum, all of which sum is applied to the public service; the prince's private domains produce a revenue of 17,000 florins. Liechtenstein, together with the principalities of Hohenzollern, Reuss, Lippe, and Waldeck, is considered as the sixteenth member of the diet, but in the full council each of them has a vote of its own. Its contingent to the army of the Confederation is 55 men, and its contribution to the treasury 250 florins per annum.

Though the prince of Liechtenstein, as a sovereign, has a smaller territory than any other of the German princes, he possesses in the Austrian empire mediatised principalities and lordships of great extent, which comprise the principalities of Troppau and Jagerndorf in Upper Silesia, and vast estates in Moravia, making together an area of 2200 square miles, with a population of 360,000 inhabitants, and yielding to the prince an annual revenue of 1,500,000 florins. The prince, who is the head of the second or younger branch, has lordships with 60,000 inhabitants, and a revenue of 300,000 florins. The house of Liechtenstein is one of the most ancient and illustrious in Europe; it is believed to have a common origin with the house of Este; and the history of Austria, for seven centuries, exhibits a splendid list of its members eminent in the cabinet and the field, such as few other families in Europe can boast. (*Oesterreichische National Encyclopédie*; Hassel; Stein; &c.)

LIEGE (in German, *Lüttich*; in Dutch, *Luik*), a province of the kingdom of Belgium, is bounded on the north by Limburg, on the east by Prussia (province of the Rhine), on the south by Luxemburg, and on the west by Namur and South Brabant. It is composed of part of the former bishopric of Liege and of the duchies of Luxemburg and Limburg, and of the county of Namur; also the county of Dalhem, the abbey lands of Stablo, and several villages known by the name of Terres de Redemption. Its area is about 2150 square miles. The smaller and northern portion is hilly and undulating; the southern is mountainous. The Ardennes cover a great part of the province, especially about Marche and St. Hubert. The soil differs much in quality. On the west side of the Maas, and on the east side towards Limburg, the plains, valleys, and low hills are fertile and well cultivated; on the east side of the Maas, where it is joined by the Ourthe, especially towards Luxemburg, the soil is rocky and stony. In this part of the province there are extensive forests. The principal river is the Maas, which comes from Namur, and forms at first the boundary between the two provinces. After receiving the Ourthe, it flows between high, steep, and often perpendicular rocks to Liege, where it becomes broader, and enters the province of Limburg. The climate is on the whole healthy: in the northern part it is temperate, and generally damp; in the southern parts the air is more keen and the winter more severe and longer. The country produces some corn and a little wine, resembling the middle kinds of champagne and burgundy; the pastures are good, and maintain great numbers of horned cattle and sheep; the flesh of the sheep is excellent, but the wool of inferior quality. The mineral wealth of the country is considerable; there are mines of calamine, alum, lead, and iron-ore; but the most valuable product is coals, of which half a million of tons at least are annually raised, and the quantity must be constantly increasing, as not a week passes without applications to government for leave to open fresh mines. Of the mineral waters, those of Spa are the most celebrated. The manufactures of the province are very important. The vast establishments of Messrs. Cockerell at Seraing and Liege for the manufacture of spinning and other machines, of steam-engines, and the apparatus for the iron railroads, &c., are well known throughout Europe; and the fine cloths of Verviers and other towns enjoy the highest reputation. The population of the province is stated at 371,000 inhabitants.

The province of Liege was formerly a bishopric belonging to the circle of Westphalia; the bishop, who was under the archbishopric of Cologne, was a prince of the empire, and had also the title of duke of Bouillon. The revenues exceeded 100,000*l.* sterling. In 1789 an insurrection broke out, and the bishop at first granted the demands of the discontented, but afterwards withdrew to Germany; the chamber at Wetzlar annulled the agreement made by the bishop, and caused him to be reinstated by force of arms. The French however took possession in the same year, and retained the country till the overthrow of Napoleon, after which it was united with the kingdom of the Netherlands.

LIEGE, the capital of the province, lies in 50° 39′ N. lat. and 5° 31′ E. long. It is situated on the Maas, in a pleasant well cultivated valley between two hills, the higher of which, called St. Walburg's Mount, is on the north side, and is the site of the new citadel, which is very strong and built on a new plan. The Maas is joined in the valley by the Ourthe and other smaller streams, and on entering the city divides into several branches which form islands, bordered by handsome quays and connected by 17 bridges. Liege is divided into the old and the new town, and has besides ten suburbs. It is a large but by no means a handsome city. Most of the streets are very narrow, many of them being hardly six paces wide, and as the houses are generally high, the streets are very dark, and without that cleanliness which is general in the Netherlands. Some parts have broad streets, good squares, and promenades, but on the whole it is an ill built town. The city was formerly fortified, but at present is defended only by the new citadel and a great outwork on the west side. The most remarkable buildings are the cathedral, built in the eighth century; the town-hall, a large but heavy edifice; the theatre; and the university, which was founded in 1817, and has about 400 students. The university has a good library, a chemical laboratory, a botanic garden, a cabinet of natural history, &c. Liege before it fell into the power of the French had 40 churches, 44 convents, 10 hospitals, and an establishment of the Beguines, some of which have been suppressed. There are an academy of arts and sciences, a gymnasium, and numerous charitable and useful institutions. Very important manufactures are carried on here. The most celebrated are those for fire-arms, which make muskets at all prices, from one crown to 500 louis d'or a piece. There is a great cannon foundery, a zinc manufactory, one of files and anvils, and many manufactories of nails, which latter employ many thousand workmen. The woollen cloths are of excellent quality, and the tanneries have long been famous. The population is 59,600. The inhabitants are very industrious, and have a considerable trade in colonial produce and manufactured goods, as well as in coals and other productions of the province, of which great quantities are exported.

LIEGNITZ, one of the three governments into which Silesia is divided, comprises the most north-westerly part of that province, and that part of Upper Lausitz which is now part of Prussia. Having been enlarged by the incorporation of five circles of the former government of Reichenbach, and the largest part of Spremberg-Hoyerswerda, it now consists of nineteen circles. Its area is 5270 square miles, and the population, which, by the census of 1831, was 766,170, and by that of 1834, 798,082 inhabitants, had increased, by the end of 1837, to 844,281.

Goldberg, situated on an eminence on the banks of the Katzbach has double walls and four gates: the population is 7093. Grünberg, a walled town, with three gates, has 9973 inhabitants: both these towns have flourishing manufactures of woollen cloths. Lauban, on the Queis, a walled town, with four gates, has 5500 inhabitants, who have manufactures of calico and linen. Sagan, near the Bober, is a strongly fortified town, with three gates, a very fine ducal palace with a beautiful park, one Lutheran and five Roman Catholic churches, and manufactures of woollen cloth, linen, stockings, lace, and looking-glasses. The population is nearly 6000.

LIEGNITZ, the capital of the circle and of the government of the same name, is situated in 51° 12′ 30″ N. lat. and 16° 12′ 15″ E. long., at the conflux of the Schwarzwasser and the Katzbach. The population amounts to 11,674. The inner town is surrounded with a moat and earthen rampart, which is laid out in public gardens with fine avenues of lime, mulberry, and chesnut trees, and has four gates, but it is not a fortified place. The antient palace of the princes is in the town, and is surrounded by a separate moat and high wall. There are two Lutheran and two Roman Catholic churches, of which that of St. Peter and St. Paul has a large library, and that of St. John contains the magnificent chapel where the old princes of Liegnitz and Brieg were interred. Among the public institutions are a Lutheran gymnasium, with nine professors, eight Lutheran schools, two hospitals, a Catholic orphan asylum, and a Bible society. The Royal Equestrian Academy is a magnificent building like a palace; it was founded in 1708 by the emperor Joseph I., for the sons of Silesian gentlemen, Protestants as well as Catholics, and was remodelled in 1810 for the education of children of the upper classes of society, with five professors. It has a good library, mathematical and other instruments, collections of natural history, &c., and considerable revenues. Liegnitz has manufactures of woollen cloths, linen, cotton, silk, stockings, tobacco, starch, &c., and great breweries. In the suburbs and environs great quantities of fruit and vegetables are grown. Liegnitz has a theatre and other places of public recreation, and it is reckoned the most agreeable residence, after Breslau, in all Silesia. Frederick II. defeated the Austrians under Marshal Laudon between this town and Parchwitz in 1760. In the vicinity is Wahlstatt (which word means 'the battle-field'), where the celebrated battle with the Mongol Tartars was fought in 1241, in which Frederick, duke of Liegnitz, lost his life; and between this place and Brchelwitz on the Katzbach, Blücher, together with the Russians, defeated the French under Macdonald and Ney in 1813, whence he obtained the title of Prince Blücher of Wahlstatt.

LIEN (from the French *lien*, 'a tie,' or 'band'). Various definitions have been given from the bench of this juristical term, but many of them are either incomplete, or too general because of comprehending other rights besides those of lien. The following definition is perhaps as correct as any that has proceeded from the judges:—'A lien is a right in one man to retain that which is in his possession belonging to another till certain demands of him, the person in possession, are satisfied.' (Grose, J., in *Hammond* v. *Barclay*, 2 East, 227.) The definition therefore includes possession by the party claiming the lien; and an unsatisfied demand by him against the owner of the property; but it does not show wherein this right to retain another man's property differs from the right of a pawnee or pledgee.

The determination of what shall be possession sufficient to constitute one element of lien is a part of the general doctrine of possession. It follows from the definition that if the party claiming the lien has not possession, he can have no lien; and as a general rule, if he has voluntarily parted with possession he has lost his lien. What shall be a parting with possession sufficient to cause a loss of lien is also to be determined by the general doctrine of possession. When possession of the thing is regained, the lien does not revive if the possessor gets the thing back under any circumstances from which a different contract may be implied from that under which he originally obtained the lien.

The defect of the above definition in not showing wherein consists the difference between lien and pledge leads to the consideration of the way in which the right called lien arises. It has been said that 'liens only exist three ways: either by express contract, by usage of trade, or where there is some legal relation.' (Bayley, J., 1 Ba. and Ald., 582.)

When lien arises by express contract, it is either simply mortgage, pawn, or pledge, which are then the more appropriate terms; or it is an agreement (such as may exist in the case of principal and factor) that goods entrusted by one person to another for the purpose of sale, or for some other purpose than pledge, may be retained by the party entrusted with them, as a security for any debt or balance due to him from the other; or it is an agreement that he may retain the proceeds of things entrusted to him to sell, for the same purpose. Pawn or pledge is the tradition of a thing by the owner to the pawnee, to be held and retained by him as security for a debt due from the owner to the pawnee; and it is a matter of express contract. Lien by contract differs from pawning or pledging in this, that in the former the retaining the thing is not the purpose for which the goods are delivered by the owner. In pawn or pledge goods are received in order to be retained and kept; in lien by contract they are delivered by the owner for some other purpose, but may be retained as a security for a debt due from the owner to the person to whom he has delivered his goods.

Where two parties have so dealt with one another that one has claimed and the other has allowed the right of lien in respect of any their mutual dealings, lien may exist in all cases of like dealings between them, if there be no verbal or written agreement to the contrary. The acts of the parties are here the evidence of the contract, which is as express as if made by formal words.

The 'lien by usage,' and 'that where there is some legal relation between the parties,' belong to one class, and are not distinguishable. They are both included under liens which do not arise from express but from implied contract. Lien may be defined as *primâ facie* a right accompanying the implied contract. (Lord Eldon.) The 'usage of trade' is merely evidence from which contract is to be implied: parties who mutually act in conformity to a custom have in effect, though not in form, made a contract. The term 'legal relation' is only another mode of expressing the mutual rights and duties of the same parties, who by their acts have brought themselves within the limits of a custom, and so given evidence of an intention to make a contract. Thus an innkeeper has a lien upon the horse of his guest, which he takes into his stable to feed; a carrier has a lien on the goods which he carries; a tailor who is employed to make a suit of clothes has a lien on them for the price of his labour, if the cloth be given to him for the purpose of making the clothes; and if he furnishes the cloth, and his customer, after the clothes are made, agrees to have them, and so obtains the property in them, the tailor has still a lien on the clothes, or any part of them, for the whole price. The contract in these and similar cases is for payment of money on one side, in consideration for certain acts to be done on the other; and the delivery by one party of his property to the other, who is to do some act to it, or in respect of it, for money, implies a payment of the money before the owner's right to repossess the thing can commence. Where the owner never had the property or possession of the raw materials, but acquires the property in a thing by his bare assent, as in the case just mentioned, the tailor's prior right of property is converted into a mere right to hold till his debt is paid, or, in other words, instead of property he has a lien. If the owner of a thing sells it, and agrees to receive the price at a future day, he cannot retain the thing till the day of payment, for he has, by the form of his contract, excluded himself from such right to a lien.

The foundation of all lien, where there is no express contract, is in custom; and the custom becomes law when it is confirmed by a competent authority. When many customs of lien have thus become law, other cases of claims of lien are also established as law in like manner, simply from analogy to the liens originating in custom.

Lien, unless there be an express contract, or a custom to the contrary, must from its nature be *particular*, that is, must have reference to a particular transaction and to a particular thing. When it is *general*, that is, where the right to retain a particular thing is not limited to a particular transaction, but exists with respect to other transactions also, there must be express contract, or the dealings of the parties must be such as to create that implied contract which arises from acts done in conformity to well-known usage.

Lien, when it exists, may be lost by voluntarily parting with the thing, by express agreement, or by agreement to be implied from acts. In general, when a person has a lien for a debt, he waives it by taking security for the debt. A solicitor has a lien for his bill on his client's papers which come into his possession in the course of transacting his business; but if he accept a security for his debt, he can be legally compelled to give up the papers. From the expressed agreement for a special security there necessarily arises the implied agreement to give up the thing which is retained, the acceptance of such special security being equivalent to an agreement to receive the debt or demand at a future day, and such agreement as to future payment being inconsistent with the retaining the thing, which act of retaining is equivalent to a claim for present payment. A factor, who has a lien on goods in his possession, both for his outlay on or with respect to those goods and for his general balance, loses his lien if he enters into an express contract for a particular mode of payment. If usage of trade and acts in conformity to it can be considered as evidence of a contract that goods shall be retained by one person as a security for a debt or balance due to him from another, an express contract for securing payment of such debt or balance must be considered as inconsistent with the implied contract, and therefore as determining it.

In Equity, the vendor of an estate, though he has executed a conveyance and parted with the possession without being paid, still has his estate as a security for such part of the purchase-money as is unpaid. This security is generally, though not with strict propriety, called the vendor's lien. The ground of this so-called lien lies in the nature of the contract: one party contracts to give land for money, and the other contracts to give money for land. Until both parties have performed their engagement, the land and the money cannot be considered as exchanged.

The equitable mortgage which is created by a deposit of title-deeds as a security for a debt is sometimes, though not with strict propriety, called equitable lien. By this deposit the depositor's interest in the lands to which the deeds relate becomes a security for the debt.

Lien, from its nature, is incapable of transfer; and in this respect it differs from a thing pledged, which can be assigned by the pledgee to the extent of his interest in it. Generally a lien gives no right to sell, except by particular custom. Where a factor who has a lien on the goods of his principal pledges them for a loan of money, this is no transfer of the lien: the goods are a pledge or pawn in the hands of the lender, who may hold them as a security for his advance to the amount of the factor's lien. The lender may have a right to retain the goods as a security to precisely the same amount as the factor; but his right to retain flows from a different source.

The practical questions which arise under the general doctrine of lien are numerous, and sometimes not easy of solution; many of them are of the greatest importance to the mercantile community. For further information the reader may refer to the articles AGENT, ATTORNEY, BAILMENT, CARRIER, and FACTOR; and to Montagu *On Lien*, for a collection of a considerable number of particular instances.

LIEOU-KIEOU ISLANDS, also called **LOO-CHOO**, constitute the most important of the several groups of islands which, though situated at considerable distances from one another, form a marked chain of connection between the Japanese island of Kioosioo and the Chinese island of Formosa. They lie between 24° 10′ and 28° 40 N. lat. and 127° and 129° E. long., and are said to consist of thirty-six islands, of different but rather small dimensions. The largest of them, called great Loo-choo, and sometimes Doo-choo, by the natives, is very nearly sixty miles long in a north-east direction, and preserves a tolerably uniform breadth of about ten or twelve miles. The surface of these islands is mostly uneven and rugged, but the elevations do not attain a great height. The highest of the hills, Onnodake Mount, measured by Captain Beechey, does not attain 1100 feet above the sea. They seem to be of volcanic origin, but no active volcano has been observed in them. The lower tracts are of great fertility, but the most elevated are generally bare and rarely covered with wood. The fertile tracts are in high cultivation. Captain Beechey mentions sweet potatoes, millet, wheat, Indian corn, rice, potatoes, cabbages, barley, the sugar-cane, cotton, peas, tea-shrubs, tobacco, capsicums, cucumbers, cocoa-nuts, carrots, lettuces, onions, plaintains, pomegranates, and oranges, as growing on these islands. Their agriculture resembles that of the Chinese, particularly as to manuring and irrigating the ground. Along the sides of the hills and around the villages the bamboo and rattan grow to a considerable size. The pine-trees grow to a great height and size, and the banyan-tree is also common. Cattle are not abundant, and are only employed for agricultural purposes. Milk is never used; hogs, goats, and poultry, with rice and other vegetables, form the food of the inhabitants. They have no sheep nor asses; their horses are of a small slight make, and used for riding and carrying loads. The climate is very mild, these islands being situated within the range of the trade-winds. The inhabitants more resemble the Japanese than the Chinese; they are rather low in stature, but are well formed, and have an easy graceful carriage; their colour is mostly of a deep copper, but varies considerably in individuals; their hair, uniformly black, is glossy, but not so smooth and straight as that of the Chinese; their eyes are usually of a dark grey. Gentleness and simplicity characterize them all. Their language is similar to the Japanese. Gutzlaff remarked that the difference between the two languages was similar to that between High and Low German. They are acquainted with the Chinese written characters, at least the better educated classes. They seem to have made considerable progress in several branches of manufacturing industry, and prepare salt from sea-water in an ingenious manner. They have doubtless some commerce with China and Japan, but nothing precise is known respecting its extent nor the articles which are exported or imported. It would seem that sugar, salt, and sulphur are the most important articles which are sent out. The principal commercial town of Great Loo-choo is Napakiang, or, as Captain Beechey calls it, Nepa Ching, which has a good and safe harbour, and is considered the capital of the islands; but Captain Beechey thinks that the town of Shui or Shoodi is the capital and residence of the king. It is situated farther inland, on a hill, and surrounded by a wall, but has never been visited by Europeans. The stay of no European vessel in these islands has been long enough to enable us to ascertain their degree of dependence either on China or Japan, whether the sovereign is subject to one of these countries, or entirely independent and only sends some presents to the court of Peking or Yeddo, which seems the most probable. (Capt. Basil Hall's *Voyage of Discovery to the West Coast of Corea and the Great Loo-choo Island*; Capt. Beechey's *Voyage to the Pacific and Behring's Strait*; and Parker's *Journal of an Expedition from Sincapore to Japan*.)

LIER (*Lierre*, Fr.), a considerable town in the kingdom of Belgium, in the province of Antwerp, is situated in 51° 9′ N. lat. and 4° 37′ E. long., at the conflux of the Great and the Little Nethe, which after their junction are called simply the Nethe. It has eight churches, the chief of which is a handsome edifice, an hospital, and a Beguinage. The inhabitants, who are 13,000 in number, carry on various manufactures of linen, lace, woollens, cotton yarn, &c. Calico-printing is likewise carried on to some extent. The distilleries and breweries are numerous. Rape-seed is grown in great quantities in the adjacent country, and there are many oil-mills in this town.

LIEUTENANT is an officer who discharges the duties of a superior, in his name and during his absence; and who acts immediately in subordination to him when he is present.

Thus, in military affairs, the lieutenant-general and the lieutenant-colonel respectively superintend the economy and the movements of the army and the battalion under those who hold the chief command. The lieutenant of a company is also immediately subordinate to the captain, in whose absence he has the same powers. In the British service the lieutenants of the three regiments of foot-guards have the rank of captain: in the royal regiment of artillery, the royal corps of engineers and marines, and also in the rifle brigade, there being no ensigns, the subaltern officers are distinguished as first and second lieutenants.

In Ward's 'Animadversions of War' (1639), it is said, 'A lieutenant is an officer of high credit and reputation, and he ought in all respects to bee well indoctrinated and qualified in the arts military, and not inferior in knowledge to any officer of higher authority; for an unskilful captaine may better demeane himselfe with an experienced lieutenant than an unskilful lieutenant can fadge with a skilful captaine.'

The price of a lieutenant's commission is, according to the present regulation,—

	£		s.	d.
Life-Guards	1785	daily pay	10	4
Horse-Guards	1600	daily pay	10	4
Dragoons	1190	daily pay	9	0
Foot-Guards	2050	daily pay	7	4
Line	700	daily pay	6	6

A lieutenant in the royal navy takes rank as a captain in the army, and the number appointed to ships of war varies with the rate of the latter. A ship of the first rate has eight lieutenants, besides supernumeraries; those of the second, third, &c. rates, have respectively one less than the number appointed to the preceding rate; so that a sixth-rate vessel has three; sloops and bomb-vessels have only two. The monthly pay of a first-lieutenant of seven years' standing, in ships of the three first rates, and that of lieutenants commanding gun-brigs, schooners, and cutters, is 11*l.* 10*s.* The monthly pay of other lieutenants, for ships of all rates, is 9*l.* 4*s.*

LIEUTENANT-GENERAL. [GENERAL.]

LIEUTENANT, LORD and DEPUTY. [LORD-LIEUTENANT.]

LIFE. Organic matter, in which alone the phenomena of life are cognizable to our senses, is distinguished from common or inorganic matter by several peculiarities of composition and structure. Twenty elementary substances occur in organic matter, viz. oxygen, hydrogen, nitrogen, carbon, phosphorus, sulphur, iodine, bromine, chlorine, fluorine, potassium, sodium, calcium, magnesium, silicium, aluminium, iron, manganese, copper, and (Devergie, *Annales d'Hygiène*) lead. But although the elementary substances of which organic matter is composed are the same as those of common matter, their mode of combination is peculiar. In minerals, the elements are generally united in pairs, or according to a binary mode of combination; but in organic matter, three at least, and usually four elementary principles are combined in each simplest substance or proximate principle. In organic compounds again, the elements are not generally united in any simple ratio one to another, as 1 atom of one to 1, 2, or 3 of another, as in inorganic bodies, but several (as 10 or 12 of one) are united with several of each of the others to form one compound atom. Thus while the relative atomic proportions in which the different elements unite are the same in both classes of bodies, and while the laws of definite proportions, and of combination according to fixed numbers or simple multiplies of them, ascertained from the analysis of inorganic, are applicable in the study of organic bodies, yet there results from the number of elementary substances, and the number of atoms of each which unite in each atom of the organic compound, this important circumstance, that from a few elementary substances (scarcely more than one-third of those known) an indefinite number of different compounds are formed. Of the twenty above mentioned, the first three almost alone form the proximate principles of vegetables, and the first four those of animals. They are therefore called essential elements; while the others, occurring in very small quantities and according to no general rule, are called incidental elements.

In respect of structure, it is observed that all organic bodies, plants as well as animals, have a more or less rounded and cylindrical, branched or membered form, bounded by curved lines, and by convex or concave surfaces very distinct from the crystalline, the only regular form of inorganic matter. They are composed of heterogeneous substances and parts, containing in all cases both solid and fluid substances. They have a peculiar softness and flexibility dependent on the mixture of their fluid with their solid parts; their character thus varies in different situations, and is as entirely distinct from the firmness of inorganic solids, as from the incoherence of parts in inorganic fluids. They are composed of particles which when examined by the microscope have for the most part a rounded or globular form, beyond which they do not appear to be mechanically divisible. These elementary particles, united in a variety of ways, form the basis of the different animal and vegetable tissues, of which again are formed the several organs, whose assemblage constitutes the perfect organic being. It need scarcely be said, that this composition of different parts of the same body from different materials is the very opposite of the homogeneous nature of the minutest particles of an inorganic body, and of the similarity which every part of it bears to the whole.

All the parts of an organic body are, both in their origin and in their continuance, more or less dependent upon one another. In their original formation, the production of one part induced that of another; and when formed, the action of one influences the actions of all the others. Thus the solids, being regenerated from the fluids, require them to be duly formed, that they may themselves be duly maintained; while the due formation of the living fluids in its turn depends mainly on the healthy action of the solids. The forms of organic bodies undergo varied alterations in the process of growth, at different periods and according to certain laws, which are differently modified for each species. The production of new beings depends on the exercise of certain functions belonging to those already existing. The maintenance of each organic being is accompanied by a constant change of its material composition, dependent on a mutual relation between it and the external world.

This maintenance of the living being, during a certain length of time, by the mutual changes which take place between it and the external world, is the most general phenomenon observed in organic bodies during life. It is a compound process, consisting, 1st, of the reception of materials from the external world, as nutriment, which is taken up by absorption and carried on by a peculiar motion in vessels, or through the interstices of the tissues. 2nd, Attraction of aeriform substances from without, and separation of other aeriform substances from within, constituting respiration. 3rd, Conversion of the nutriment and aeriform substances imbibed, into the peculiar fluids of the body—assimilation; 4th, The motion of these fluids through the body by a circulation or other means. 5th, Conversion of these fluids into a solid form, or the combination of them with the solids, so as to maintain the peculiar properties of the latter, constituting nutrition properly so called. 6th, The preparation and separation of fluids of peculiar kinds from the assimilated fluids, or the formation of secretions. These processes, which are called the nutritive functions, occur, in a more or less distinct manner, in all living bodies, plants as well as animals, and are essentially characteristics of Life, to which nothing analogous is ever observed in inorganic bodies.

Besides these, the functions of the organic life, common to all living beings, there occur in animals peculiar processes, the functions of animal life, by which they receive impressions from external objects in the various sensations, and in their turn act upon external things by voluntary motions.

The functions above enumerated relate exclusively to the maintenance of the individual, and to its preservation from the influence of external agents, which, as soon as these functions cease to be performed, act upon it, according to the same laws as upon common dead matter, and by the processes of fermentation and putrefaction destroy all the characters of organization in it. Other functions not less distinctly characteristic of life are, the production of new individuals from parts separated by vital or mechanical processes from the parents in generation, and the peculiar modifications of the nutritive processes by which the development of the embryo, the growth of the young being through the various changes of increasing years to old age, and its passage thence to natural death, are effected.

LIFE, MEAN DURATION OF. This is commonly called the *expectation* of life, which, properly speaking, it is not. Of a thousand lives of equal goodness, any one may expect to live as long as he has an even chance of living, that is, till 500 are extinct. This period has been denominated the *probable* life.

The mean duration of life, or the number of years which, one person with another, are enjoyed by individuals of a given age, is found from the tables of mortality, which give, out of a certain number born, the number who are left at every successive birthday. If the absolute average law of human life were given, and if $\phi\, x dx$ represented the chance of an individual aged n living precisely x moments of time, then $\int \phi x dx$, taken from $x=0$ to $x=$ the longest possible term of life, would correctly represent the average duration of life in persons aged n years. The tables however are so imperfect that it is not worth while to attempt the accurate application of the preceding formula, or to use more than the roughest of the processes which will be described in Quadratures, Method of. The theoretical imperfection of this process consists in its being necessary to suppose that the individuals who die in any one year die at uniform intervals throughout that year; so that, one with another, they enjoy half of their year of death. The mean duration of life is then constructed as follows. Let a be the number living at the age in question, of whom let b, c, d, &c., be left at the end of successive years. Then $a-b$ die in the first year, enjoying among them $\frac{1}{2}(a-b)$ years of life, while b (who survive) enjoy the whole year. Consequently the a persons enjoy, in the first year of the calculation, $b+\frac{1}{2}(a-b)$, or $\frac{1}{2}(a+b)$ years; and similarly it may be proved that they enjoy $\frac{1}{2}(b+c)$, $\frac{1}{2}(c+d)$, &c., in the second, third, &c. years. If these be put together, the result is $\frac{1}{2}a+b+c+d+$. &c, which, divided by a, gives for the average quantity of years enjoyed by each individual,

$$\frac{1}{2}+\frac{b+c+d+\text{ \&c.}}{a};$$

or the rule is, add together the numbers left at every age above that given, divide by the number alive at the given age, and add half a year.

If it be judged advisable to make the preceding result a little more mathematically correct, diminish the preceding result by the 12 a-th part of $a-b$. [Mortality, Law of; De Moivre's Hypothesis.]

LIFE INSURANCE. The great importance of this subject and the number of new plans either formed or in agitation make it desirable to place this article as late as possible in the order of time of publication. We therefore refer it to Reversions.

LIFE-BOAT. A boat constructed with great strength to resist violent shocks, and at the same time possessing sufficient buoyancy to enable it to float though loaded with men and filled with water, is called a life-boat. Such boats are maintained at most of the ports of this kingdom, always ready to put to sea when vessels are seen in danger of shipwreck, and provided with means for being conveyed to the shore and launched as rapidly as possible. As early as the year 1785, a patent was granted to Mr. Lukin for a life-boat with projecting gunwales and hollow cases or double sides under them, as well as air-tight lockers or enclosures under the thwarts: these contrivances increased the buoyancy of the boat, and the air-tight cases under the gunwales, by their weight when raised above the surface of the sea, and their resistance when depressed beneath, greatly prevented rolling. Mr. Lukin's boat was strong and buoyant, but it was liable to be disabled by having the sides staved in. This defect was obviated in Mr. Greathead's boat, which was invented soon after. This life-boat is usually thirty feet in length, ten in breadth, and three feet three inches deep at midships: both extremities are made precisely of the same form, so that it goes through the water with either end foremost, and its shape lengthwise is a curve, so formed that a line drawn from the top of one stem to that of the other would be two feet and a half above the gunwale at midships. In this boat there are five thwarts, or seats for rowers, doubled-banked, so that it must be manned with ten oars. It is cased and lined with cork, which gives it such buoyancy that it will float and be serviceable though so damaged by hard knocks as to be almost in pieces; and this is an accident which the softness and elasticity of the cork is well calculated to prevent. The cork on the outside is four inches thick, and it reaches the whole length of the shear or side of the boat; on the inside it is thicker, and the whole quantity is about seven hundred-weight. It is firmly secured with slips or plates of copper, and fastened with copper nails. The advantages of this boat are stated to be, that its curvature gives it great facility in turning, a single stroke of the steering oars, of which there is one at each end, moving it as though on a centre;—that the covering of cork, being immediately under the gunwale, gives great liveliness, or disposition to recover its balance after being suddenly canted aside by a heavy wave; and that its capability of going with either end forwards increases its manageability.

The life-boat is usually kept in a boat-house near the shore, and is sometimes placed on a carriage with four little wheels for conveyance to the sea. This mode is however somewhat unmanageable, and the following is found to be more serviceable:—Two wheels, nine feet in diameter, are connected by an arched axle, to which is fixed a long pole of considerable strength to serve as a lever: the wheels are so far apart that the boat can stand between them with the arched axle over its centre. When the pole is in the horizontal position, the arch rises above the boat; but when the pole stands up perpendicularly, then the arch touches the boat. In order to move the boat, the arched axle must be brought over its centre, and the pole set upright: two chains fastened to the arch must then be hooked on to two eyebolts fixed in the inside of the boat: the pole is then lowered, the arch rises, and brings up the boat with it, ready for rapid movement. This plan also gives great facility in launching, which was difficult with the carriage.

Mr. Greathead's boat was first built at Shields in 1789; and before the year 1804, when the Society of Arts voted the inventor their gold medal and 50 guineas, it had saved nearly 300 lives from vessels wrecked near the mouth of Tynemouth haven.

The rules given for the management of this boat are applicable to all of a similar sort. It should be entrusted to an experienced man acquainted with the times and direction of tides and currents, and he is recommended to keep the boat with her head to the waves as much as possible, giving her an accelerated motion as he nears a wave. Great caution is required on approaching the ship in distress, in consequence of the reflux of the waves, which is often very dangerous; in general it is better to get to a ship on the lee side. The rowers are recommended to exercise themselves in the use of this boat, and to obey strictly the person commanding. The oars are directed to be short, as more manageable in a rough sea, and to be made of the best fir, because ash is found to be too pliant. It is also directed that the body of the boat should be painted white, to catch the eye of those in danger as soon as it rises above the waves.

In the year 1807 Mr. Wilson, of London, produced a life boat, for which he received the gold medal of the Society of Arts, although in fact its principle was nothing more than that of Mr. Lukin's, with the exception that Mr. Wilson divided his hollow outriggers into separate bodies, so that if one of them was beaten in by striking on a rock or by the force of the waves, the rest were still serviceable. This was undoubtedly a great improvement, and Wilson's plan also contained other useful suggestions in building applicable to boats for general purposes, though not essential to the peculiar object of life-boats.

Besides those life-boats which have been constructed for the especial purpose, there have been several inventions for converting ordinary ships' boats into life-boats upon a sudden emergency, which may be applied by the crew of a ship in distress. The Rev. Mr. Bremmer, some time before the year 1800, proposed that empty casks should be strongly fixed in ships' boats upon a plan described by him, which on trial was found to answer perfectly. In that year he tried several experiments in the port of Leith, in the presence of a committee named by the directors of the Trinity House there, who presented him with a piece of plate in token of their approbation. His plans were various; some of them might be put in execution with very little previous preparation, and require only such matters as are contained in almost every ship. In the year 1817 the silver medal of the Society of Arts was voted to Mr. Bray for an invention by which air-tight boxes should be fixed under the thwarts of ships' boats to render them buoyant, but these could not be applied extemporaneously, like some of Mr. Bremmer's plans. The same objection exists to Captain Gordon's life-buoy, invented in 1821, which this, not being a fixture to the boat, might be kept on board ship to be applied to any boat when wanted. It consisted of a series of bamboos of different lengths fastened together; the uppermost piece was the longest, the others diminished gradually to the lowest, which was the shortest of all; thus forming a triangle, which was covered with pieces of sound cork, strongly fixed to the bamboo rods. Two of these triangles were intended to be fastened to a boat, one on each side, the long pieces being close to the gunwale, the shortest near the keel.

Lieutenant Ansell, in 1829, proposed that bags should be made of well-tarred sheepskin, closed on all sides except at one leg, which should be furnished with a spigot to retain the air when inflated; these bags might be kept in store to be blown up at a minute's notice, when they would act as large bladders.

The most recent invention of this sort that we have seen is that of Captain Rorie, published in 1837. He proposed pieces of copper tubing, six inches in diameter and six feet long, to be fitted under the seats of ships' boats, to be always ready: he adds that in tropical climates the large trunks of bamboos are readily procured, and these, being strong and naturally divided by joints, would answer even better than copper tubes.

All these plans are serviceable, and there can be no doubt that many lives might be saved if vessels were provided with means for aiding a person in the water. Cork mattresses have been found useful, but it was alleged that they gave sailors facilities to desert, and they were discontinued: floating ropes lined with cork have also been suggested, but, like fire-escapes, these contrivances are never at hand when most wanted.

Boyce's life-buoy, invented in 1813, was different in its object from all those mentioned: it was intended to be kept suspended at a ship's stern, to be dropped into the water in case a man fell overboard. It was composed of two hollow wooden cylinders, either made air-tight or else filled with cork, and connected by a wooden grating, so as to form a sort of raft. This might lie on the water with either side uppermost, and it was therefore furnished with a rudder, and with a mast and sail on both sides. A buoy of this construction was dropped from Monmouth bridge, where the stream was very rapid, and it was found to support a man who swam to it, and to enable him to sail against the stream. If such buoys were to be generally used, some plan might surely be devised to cause them to fall always one way, and so to render the double mast and sail unnecessary.

In 1830 Captain Lillicrap, of the navy, proposed to the Admiralty to convert the warping buoys which abound in our harbours into a sort of life-buoys, by fitting them up with wooden battens placed lengthwise from end to end upon their circumference. It should be understood that these buoys are like large barrels, and the battens are merely wooden shelves or rafters nailed along their sides, with hollows for the hand to lay hold on as on a rail. These were first tried in Portsmouth harbour, and within one month the crew of a small vessel which sank in the harbour was saved by holding to them. Such battens have since been fixed on the buoys in several British ports, and in several instances they have saved many lives.

By these several appliances many persons are saved from death on our coasts, though even Greathead's boat, the best of them all, has not been infallible. A case happened in the year 1810, at Tynemouth harbour, where a life-boat, which had taken several persons on board, was almost destroyed by the waves. It continued to float as long as it remained together, but of course became unmanageable, and being driven among the rocks, it was dashed in pieces. Of twenty-seven persons on board only two were saved.

LIFFY, River. [Ireland; Dublin, County.]

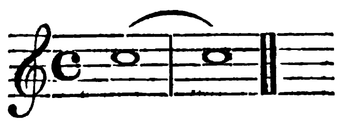
LIFTING, on Easter Monday and Tuesday; a custom which formerly prevailed among all ranks throughout the kingdom, and is yet partially practised in several of our distant counties In Lancashire, at Warrington, Bolton, Manchester, and other places, on Easter Monday, the women, in parties of six or eight each, still continue to surround such of the opposite sex as they may meet, and either with or without their consent lift them three times above their heads into the air, with loud shouts at each elevation. On Easter Tuesday the men in similar parties do the same for the women. The like practice prevails at Shrewsbury, and probably in other places. In Pennant's time it was not uncommon, if it is not still used, in North Wales. Strange as it may seem, this custom is intended to represent, or rather to commemorate, our Saviour's resurrection. The lifting of King Edward I. in his bed, on the morrow of Easter Sunday, by a party of the ladies of the bedchamber and maids of honour, together with the fee paid to them upon the occasion, occurs upon the accompts of the comptroller of the household of the eighteenth year of that king, still preserved among the records in the Tower of London. (Brand's *Popular Antiq.*, vol. i., pp. 154, 155; Pennant's *M.S.;* Brady's *Clavis Calendaria*, 8vo., Lond., 1812, vol. i., p. 274.)

LIGAMENT. [Articulation.]

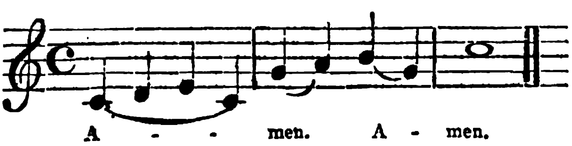
LIGAN. [Flotsam.]

LIGATURE. [Hæmorrhage.]

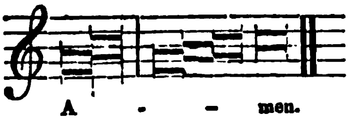
LIGATURE, in modern music, a binding, indicated by a curved line, ⌒. If two notes on the same degree are thus joined, only the first is to be struck, but the second is to continue its full time. *Ex.:*



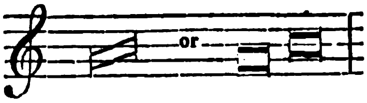
In vocal music all the notes which are set to one syllable are bound together. *Ex.:*



In music in the old character, *i.e.* consisting of longs and breves, the notes in *ligature* were joined—were written or printed side by side. *Ex.:*



And sometimes the two characters were blended into one. *Ex.:*



But the antient ligature is now become obsolete, and any further explanation of it is unnecessary.

LIGHT. The laws which govern the phenomena of light, when propagated through a vacuum or a uniform uncrystallised medium, form, with the exception of the laws of reflection, the only branch of optics with which the antients had a scientific acquaintance. The discovery of single and double refraction, of chromatic dispersion, polarization, and of mutual interferences exhibited in the various experiments of diffraction, have formed both to the practical and scientific men of modern times the sources of exploration in the grandest phenomena of the physical world, as well as in those which belong to the most delicate scale.

The first branch of this subject has been called Photometry, and is confined to light emanating from whatever sources, but unmodified in its progress through space by any external influences.

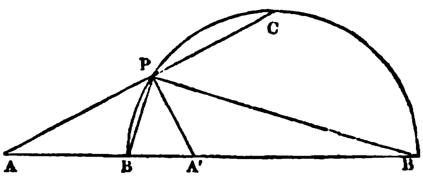
In our cognizance of the form of objects by the sense of feeling, the hand or other part of the body is brought into contact with the object of our perception, and by some antient philosophers it was supposed that in like manner rays of *sight* were emitted from the eye in straight lines, and by their impulse on distant bodies caused our perception of their form and colour. But on examining the structure of the eye [EYE] we find that to whatever luminous object we direct the optic axis, an image of the object is depicted on the retina in connexion with a system of nerves, in the same manner that similar pictures are formed by mechanical contrivances, such as lenses upon screens, &c.; hence it is obvious that vision is caused by light proceeding from the observed object. Now since bodies are perceptible in all positions, it follows that light emanates from luminous bodies in all directions; and as to opaque bodies, the light which falls on the irregularities of their surfaces is in a great measure afterwards scattered in all directions, by which they become visible to any number of observers.

Suppose that a luminous point is enveloped by a spherical surface of a certain radius, but having that point placed at its centre, it will be obviously illuminated all over uniformly with a brightness or intensity depending on the magnitude of the radius. We can ascertain the connection between this brightness and the radius, by supposing the light from the same source diffused over another and concentric spherical surface of a greater or less radius; it will evidently be more or less intensely diffused in the exact proportion in which the one surface is less or greater than the other. Now spherical surfaces are proportional to the square of the radii, therefore the intensity of light proceeding in vacuo from any luminous origin must be in the inverse proportion of the square of the distance from that point. We have employed the term *proceeding* as applicable to light, because that by two independent astronomical phenomena, namely, the aberration of light, and by the retardation of the eclipses of Jupiter's satellites, we are alike taught that light, whether of the sun, planets, satellites, or fixed stars, is not propagated instantaneously throughout space, but travels with a velocity in round numbers of 192,000 miles per second.

A ray of light has its origin at a luminous point, whence it diverges in an infinitely small solid or conoidal angle, and is the geometrical element of the total spherical emanation of that point. These rays proceed in straight lines in vacuo or a uniform medium, for no opaque body can screen the luminous point from view, except when placed in the straight line joining the eye of the observer with the origin of the light, or, which is the same, we cannot see through bent tubes; but the modifications suffered by light at the surfaces of bodies, and in the interior of media, cause generally a deflection, sometimes sudden, at others gradual, in the direction of the ray.

If the intensity of light emanating from a luminous point, that is, the illumination of a unit of spherical surface having a unit radius, be represented by i, and a small plane, of which the area is a, be exposed to the same light at a distance r from the origin, and situated perpendicular to the luminous ray, the quantity of light which it receives will be represented by $\frac{a\,i}{r^2}$; but if the plane, instead of being perpendicular, be inclined to the direction of the ray at an angle α, the total illumination of the plane will then only be $\frac{a\,i}{r^2}$, Sin (α), for a Sin α is the area of the plane projected in a direction perpendicular to the ray, and this projection at the same distance would evidently receive the whole of the light which fell on the inclined plane: we shall give a few examples of these formulæ.

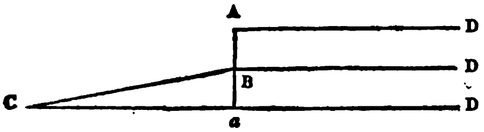
Suppose we seek the point situated between two lights which receives the least illumination from both: represent its distances from the luminous bodies by r, r', and their intensities by i, i', respectively; then if u be the actual illumination, we have $u = \frac{i}{r^2} + \frac{i'}{r'^2}$: now since $r + r' = c$, the constant distance between the lights, therefore $\frac{dr'}{dr} = -1$ and $-\frac{1}{2} \cdot \frac{du}{dr} = \frac{i}{r^3} - \frac{i'}{r'^3}$; $\frac{1}{6} \cdot \frac{d^2u}{dr^2} = \frac{i}{r^4} + \frac{i'}{r'^4}$. The last equation shows that $\frac{d^2u}{dr^2}$ is positive, and therefore corresponds to a minimum; the former, since $\frac{du}{dr} = 0$, gives $\frac{r'^3}{r^3} = \frac{i'}{i}$, which combined with the equation $r + r' = c$ gives . $r = \frac{c \,.\, i^{\frac{1}{3}}}{i^{\frac{1}{3}} + i'^{\frac{1}{3}}}$, $r' = \frac{c \,.\, i'^{\frac{1}{3}}}{i^{\frac{1}{3}} + i'^{\frac{1}{3}}}$. Hence we see that the intensities of two lights are directly as the cubes of their distances from the least illuminated point betwixt them. This result may serve in some cases to compare the intensities of different lights.

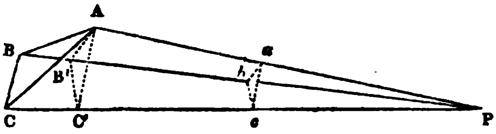


Suppose next that A, A′ represent two lights of the respective intensities i, i', and that PB. PB′ are planes, each of which bisects the angles APA′, CPA′; the angle BPB′ is obviously then a right angle, and the plane PB as well as PB′ will be equally illuminated at the point P by the two lights, provided $\frac{i}{\text{AP}^2} = \frac{i'}{\text{A}'\text{P}^2}$, that is, provided $\frac{\text{AP}}{\text{A}'\text{P}}$ be the constant $\left(\frac{i}{i'}\right)^{\frac{1}{2}}$; then by Euc., book vi., $\frac{\text{AB}}{\text{A}'\text{B}}$ is equal to the same constant, by which the point B may be found, and $\frac{\text{AB}'}{\text{A}'\text{B}'}$ being still the same, B′ is similarly known; hence if on BB′ as diameter a circle be described, each point, such as P, will have the property that planes directed through it to either extremity of the diameter will be equally illuminated by the two lights; but the different portions of the curve itself do not possess this property, which may be too readily supposed from the inaccurate statement of this question in optical treatises.

Let it now be proposed to find the nature of a curve, every element of which shall receive equal illuminations from two given lights. Let r, r' be the radii vectores to any point drawn from the two poles or lights, and θ, θ' the angles which r, r' make with the axis or line joining the lights internally; then s representing an arc of the curve, the sines of the angles at which r, r' are inclined to an element of the curve are $r\frac{d\theta}{ds}$ and $-r'\frac{d\theta'}{ds}$; and representing the intensities as before, the condition of equal illumination gives the equation $\frac{i}{r^2} \cdot \frac{r\,d\theta}{ds} = -\frac{i'}{r'^2} \cdot \frac{r'\,d\theta'}{ds}$: whence $\frac{d\theta'}{d\theta} = -\frac{i}{i'} \cdot \frac{r'}{r} = -\frac{i}{i'} \cdot \frac{\text{Sin}\,\theta}{\text{Sin}\,\theta'}$ by trigonometry. Integrating we find i Cos $\theta + i'$ Cos $\theta' =$ const. which (together with the common trigonometrical equations) gives the polar equation of the curve sought. We should obtain a negative sign, instead of a positive, if we suppose the curve equally illuminated on opposite sides.

Having now considered the laws of the emanation of light from points, we are next to consider its emanation from luminous surfaces, particularly when the direction of the light is oblique to that of the surface. To this end suppose A B, B C to be two planes of equal luminosity relative to a unit of either, and regarding only that portion of the light which emanates in the directions A D, B D, C D, perpendicular to A B produce A B to meet C D in the point a, and suppose the extent of B C to be taken, such that B a = B A, then B C will seem to the eye (receiving the rays in the directions A D, B D, C D) to be of the same extent as its projection B a, or as that of B A; but as its luminous surface is greater, it would appear brighter than B A in the ratio of B C to B A or B a, if the intensity of the oblique emanation from C B were equal to that of the direct emanation from B A. Now we know by experience that it has only the same brightness as its projection, for if we take a bar of heated iron into a dark room, it appears no brighter when viewed obliquely than direct, the only observable difference being in apparent size, which is that of the projection of the bar on the line of vision: hence it follows that the emanation from a unit of the oblique surface is less than that of the direct, in the ratio of B a to B C, or, which is the same, as the sine of the angle of emanation B C D is to unity. After emanation it follows the same law as direct light, of diminishing in intensity inversely as the square of the distance. This law has been the subject of much contention, but we may remark that something similar occurs in the action of electrodynamic currents, which though they follow the law of the inverse square at different distances in a given direction, yet in different directions the intensity varies in a trigonometrical function of the directions of the currents acting and acted upon, and the line of junction. The law above mentioned we should not be warranted in applying to luminous gases, as for instance, the flame of a candle, since the light of the different parts freely then permeates the mass.

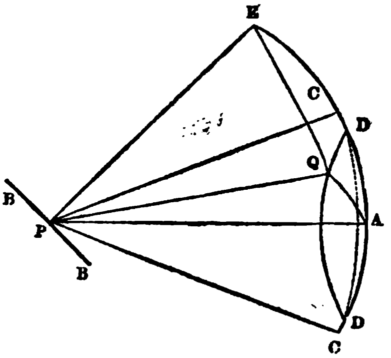




Let A B C represent a small luminous plane situated obliquely with respect to a point P and A B′ C′, its projection taken perpendicular to P A, and finally abc, a similar plane to the latter taken at a distance P a = unity, the quantity of light emitted by A B C to the point P is the same as if it proceeded from A B′ C′, and is therefore represented by $i.\frac{\text{Area } AB'C'}{PA^2} = i.\frac{\text{Area } abc}{Pa^2} = i.$ Area (abc), where i represents the intensity of the given luminous plane; hence if we have any luminous surface, we may, by dividing it into very small elements, transfer each element to another situated at a unit of distance from the illuminated point; in other words, we may substitute for this surface that portion of a spherical surface with radius unity which would be cut out by a conical surface having P for vertex and exactly enveloping the luminous surface. The calculation of the illumination of any small plane by a luminous surface of any figure is thus reduced to that arising from a portion of a spherical surface having that plane placed at its centre.

Example. A distant luminous sphere subtends a given angle 2 α at the eye of an observer: to find its total illumination of a small plane area A placed at the eye and inclined at a given angle β to the right line joining the eye and the centre of the luminous sphere.

Let B P B represent the small plane; with centre P and radius unity describe a circular arc C A C, of which the measure is 2 α, and which by rotating round its axis P A generates a spherical surface of equal illuminating power with the given sphere. Let the angle B P A = β.



Take a radius P Q forming an angle A P Q = θ, and which, by revolving round P A, traces the circle D Q D. The plane B P B is taken perpendicular to the plane of the diagram. Let ω be the inclination of P Q to the given plane. The spherical element at Q is Sin $\theta.\ \delta\theta\,\delta\phi$, where ϕ is the inclination of the plane A P Q to that of the diagram, and its illuminating power is therefore i Sin ω Sin $\theta.\ \delta\theta\,\delta\phi$, therefore the total illumination is expressed by A $\int_\theta\int_\phi i$ Sin ω Sin θ, the limits of ϕ being 0 and 2 π (where π is the semicircumference to a unit radius), and of θ being 0 or α. When the intensity is uniform, we get the illumination $I = A\,i\int_\theta\int_\phi$ Sin ω Sin θ. Draw P E perpendicular to the plane B B; then in the spherical triangle Q A E we have $QA = \theta$, $\angle QAE = \phi$, $AE = \frac{\pi}{2} - \beta$, and $QE = \frac{\pi}{2} - \omega$; hence by trigonometry

$$\text{Sin } \omega = \text{Sin } \beta \text{ Cos } \theta + \text{Cos } \beta \text{ Sin } \theta \text{ Cos } \phi.$$

$$\text{Hence} \int_\phi \text{Sin } \omega \text{ Sin } \theta = 2\pi \text{ Sin } \beta \text{ Sin } \theta \text{ Cos } \theta \ldots\ldots$$

and now integrating relative to θ, we have $I = A\,i.\ \pi$ Sin β Sin^2 α, as the illumination required. In this investigation the whole of the light is supposed to fall on the same side of the plane.

If a small hole be formed in the window-shutters of a darkened chamber, the rays of light passing from opposite parts of any luminous object outside cross each other in entering the orifice, since they necessarily proceed in straight lines, and therefore form on the opposite wall of the chamber a perfectly inverted image of the external object, and if the latter be in motion, the image will also move in the contrary direction. If m be the magnitude of the object, and x its distance from the hole, and a the width of the chamber, then the light being supposed to enter directly, the magnitude of the image, by the known laws of similar figures, will be $m.\frac{a^2}{x^2}$. Again, if i represent the intensity of the light proceeding from an object at a unit distance, the intensity as it enters the orifice will be $\frac{i}{x^2}$, and this may be taken for its intensity in the image when a, the width of the chamber, is small compared with x, the illumination of the image, for a given quantity of light is inversely proportional to the magnitude of the image, and therefore the brightness of the latter is constant for all distances of the object. The eye is such a chamber, and therefore a luminous object should appear of equal brightness at all distances, but the absorption of light by the atmosphere causes the greater dimness of distant atmospheric objects.

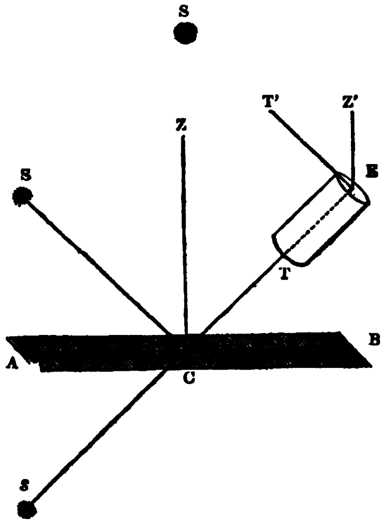
If we suppose the quantity of light absorbed by a transparent medium to be a proportional part of the incident light, then denoting by i the intensity of light which corresponds to a space x traversed, we have on this hypothesis $\frac{di}{dx} = -k.i$, k being a constant dependent on the particular nature of the medium, and by integration we find $i = I.\,\epsilon^{-kx}$ where I is the initial intensity previous to the light entering the medium, and ϵ the base of Napierian logarithms;

therefore the intensity would diminish in a geometrical progression for equal spaces successively traversed.

From these principles we are enabled to calculate the laws which the direct rays of light obey, from their emanation to their incidence. If the body on which the latter takes place be unpolished and opaque, a portion of the light enters into it for a small depth, and is there partially absorbed; the complementary portion is scattered in all directions; the surface therefore becomes itself, to that extent, a source of light, but the composition of the differently coloured rays [Dispersion] may be widely different from that of the incident light: for instance, if the incident light were an equal mixture of red and blue rays, and if the surface favoured the absorption of the latter more than of the former, the scattered or complementary light, then containing more of red than blue rays, would proportionally tinge with red the apparent colour of the surface. Solar light is a compound of various homogeneous-coloured rays; and by their unequal absorption or transmission bodies acquire these apparent colours; but the perception of form arises from the modifications of light [Diffraction] on the borders, ridges, and angles of the surfaces; and the painter, when he produces a relief on a plane surface, imitates those modifications in the colours which he applies. Hence the perception of form is lost when this incident light is excluded, as in a heated square bar of iron in a dark room, which when turned round its axis seems always to be a flat surface, growing wide and narrow alternately as its edges or faces are turned to the eye; and even when incident light is admitted, a greatness of distance from the eye renders those modifications inappreciable unless under the most favourable circumstances; and thus the heavenly bodies, instead of appearing as round solids, are projected upon a spherical surface, having the eye for the centre, unless where this surface becomes elongated by the greater dimness of rays which traverse unequal portions of absorbing media. When the body exposed to incident light has even a slight polish, the scattered light will then be most copious in the directions in which the *regular reflections* take place. Such portions of the surface as are situated, relatively to the eye, proper for regular reflections of the incident light, have therefore a much greater apparent brightness than the parts adjacent, and thus assist in producing the ideas of the position and form of the parts.

When the polish of the surface is such that the irregularly scattered rays bear but a small proportion to the regularly reflected light, we become then principally sensible of the effects of the latter in producing *images* of all the bodies of which the incident light is reflected to the eye: we are thus led to consider the laws of regular reflection.

Let A B represent a surface of mercury at rest, and therefore perfectly horizontal; E T the axis or line of collimation of a telescope, by which we perceive *s* the image by reflection of the star S, and let the angle A C *s* of its apparent depression below the horizon be measured. Then turning the telescope in the vertical plane Z C E until its line of collimation takes a position T′ E, in which the star itself becomes visible; and measuring its apparent zenith distance T′ E Z′ or S C Z, this angle is found invariably to be the complement of the former angle A C *s*. Now Z C T being the complement of A C *s* or T C B, it follows that the angles Z C S, Z C T are equal.



This experiment demonstrates that the reflected ray C T is in the same plane Z C S as the incident ray C S and the normal C Z, and that the angle formed by the reflected ray C T and the perpendicular to the surface, that is, T C Z, or the *angle of reflection*, is equal to S C Z, the *angle of incidence*. Such are the laws which govern the reflection of light.

Let us suppose that light consists of a succession of particles emitted from the luminous body at intervals sufficiently short to produce vision, which hypothesis is generally known as that of *emission;* then the preceding law would result from the supposition that the luminous molecules, on approaching and entering the reflecting medium, are subject to forces proceeding from this medium, and of which the resultant is normal to the surface. For conceive the velocity of the luminous particle as it enters the medium, or rather, as soon as it comes within the influence of its forces, to be decomposed into one parallel and one normal to it. The force of the medium can exercise no influence on the former, and it is therefore the same at the exit of the ray from the influence of the medium as at its entrance. Again, the effect of the normal force on the square of the normal velocity in a space small enough to consider the force uniform, is the product of half this force and the small interval of space, and it is therefore the same in increasing this quantity for the returning, as in diminishing it for the incident ray; and therefore the normal velocities of the incident and reflected rays are equal, as well as the parallel; from whence it necessarily follows that the angles of incidence and reflection are equal. It admits of easy geometric demonstration that the path of the ray between any fixed points in the incident and reflected parts is a minimum (neglecting the insensible curvilinear part), in reference to any other supposed positions of these rays, when the reflecting surface is plane, or any curved surface which is tangent externally at the point of incidence to a spheroid having the fixed points for foci, and the length of the ray between them as axis major; for those touching the spheroid internally it is a maximum.

If we suppose that light is propagated by undulations in a rare elastic medium from the luminous point as an origin, the velocity of the waves, after reflection, is the same as before incidence, since the medium is the same; and hence, as in sound, the angle of reflection would still be the same as that of incidence. [Echo.] Thus both the hypotheses of emission and of undulations satisfactorily account for this fundamental law.

If the reflected ray of light were transformed to an incident, reciprocally the path of the incident would become that of the reflected. The same is true for any number of reflections at different surfaces.

The *deviation* of a ray of light, after it has undergone any alteration in its course by the action of media, is the inclination of the primitive and final directions of the ray taken in the sense in which they are moving. This deviation by one reflection on any surface is the supplement of double the incidence, or is the double of the inclination of either ray to the medium.

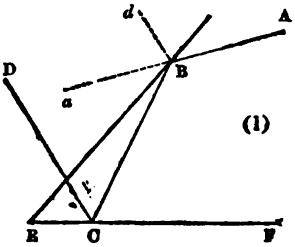
A *plane of reflection* contains a successive incident and reflected ray, and is necessarily perpendicular to the corresponding reflecting surface.

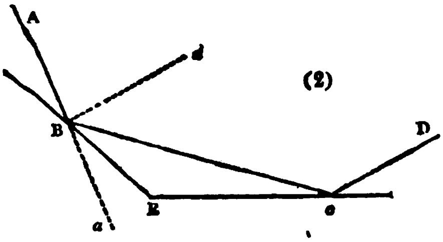
When there are successive reflections, the inclination of the plane of the first to that of the last reflection is the *deviation in plane*, the last ray being then in a different plane from the first, the first kind of deviation or that of direction is the angle between the first ray produced beyond the incident point (which is the course the ray would have pursued if unreflected), and a parallel to the last ray drawn from the same incident point.

When light is reflected by two parallel planes there will be neither deviation in plane nor in direction; more generally there will be no deviation in plane when the first incident ray is in a plane perpendicular to the intersection of the two reflecting planes.

In the latter case, where both reflections take place in the same plane, let us consider the amount of the deviation in direction.

Let ABCD represent the course of the ray reflected at B and C by the reflecting planes EB, EC. Let B*a* be the first ray produced, and B*d* the parallel to the final ray; then





the angle aBd is the deviation. When the other two rays are at opposite sides of the intermediate ray BC (*fig.* 1), then the deviation of CD from AB is the *difference* of the two deviations at B and C, or twice the angle BCF—twice the angle CBE, that is, 2 ∠E, or double the inclination of the mirrors. But when AB, CD are at the same side of BC, the total deviation is the *sum* of the deviations at B and C, or twice the angle EBC + twice the angle ECB, which is the same as 360° − 2 ∠E. This is a re-entrant angle when E is acute, and therefore we may then substitute for it the corresponding natural angle 2 ∠E. Hence the deviation is double the inclination of the mirrors when acute, and double its supplement when obtuse. This property is turned to excellent use in Hadley's sextant. In general, when there are any number of reflections in one plane, the total deviation is the sum of the deviations at each reflection, giving negative signs to those where the rays are turned in a contrary way to the first reflection; this sum is independent of the first angle of incidence when the number of planes is even.

With the exception of this case the ray will deviate not only in direction but in plane, and as the determination of these deviations is important from their connection with the subject of polarized light, we shall therefore trace the reflected rays by analytical geometry.

Take the origin of co-ordinates at the first point of incidence, and make the first mirror the plane of xy, and the plane of the first reflection that of xz, referred to which the equation of the second mirror may be represented by $Ax+By+Cz=1$, and let a be the first angle of incidence. Then the equations to the first incident ray are $x+z \tan. a=0$, $y=0$, and to the intermediate or first reflected ray $x-z \tan. a=0$, $y=0$. Hence we easily find the co-ordinates of the second point of incidenee a, b, c, to be thus expressed: $a=p \sin a$, $b=0$, $c=p \cos a$ where p is the reciprocal of $A \sin a+C \cos a$.

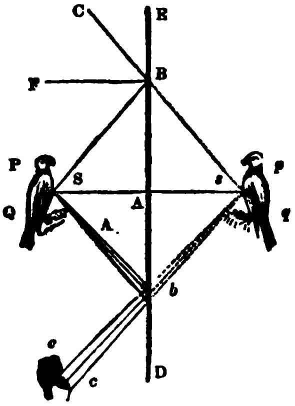
The equations to the normal of the second mirror are $C(x-a)=A(z-c)$, $Cy=B(z-c)$; the plane which passes through this normal and the intermediate ray to that of the second reflexion, and is defined by the equation $B(x \cos a-z \sin a)=(A \cos a-C \sin a)\, y=-q.y$ for abridgement. The inclication ϕ of this plane to that of xz is the deviation in plane, and we readily find $q \tan \phi=B$, by which that deviation is known.

Suppose the equations to the final reflective ray are $x-a=m(z-c)$, $y=n(z-c)$, and substitute in the equation to the second reflecting plane, we find $B(m \cos a-\sin a)=-nq$. The cosine of the second angle of reflection is $\frac{C+mA+nB}{\surd(A^2+B^2+C^2)(1+m^2+n^2)}$; ana of the second angle of incidence $=\frac{A \sin a+C \cos a}{\surd A^2+B^2+C^2}$; whence $p^2(mA+nB+C)^2=1+m^2+n^2$; we have thus two equations to determine m and n. These equations are also true for the second incident ray, and therefore if we eliminate m, the quadratic resulting must have one root $n=0$, whence the other root is known from a simple equation, and the cosine of the deviation is $\frac{1-m \tan(a)}{\surd(1+m^2+n^2)\sec^2(a)}=\frac{\cos a-m \sin 0}{p(mA+nB+C)}$.

When the deviation in plane is a right angle, it is required to find the deviation in direction and the second angle of incidence.

Since generally $\tan \phi=\frac{B}{q}$ and ϕ is a right angle, therefore $q=0$, which gives the two relations $A=C \tan a$, $m=\tan(a)$. Let a' be the second angle of incidence, we have $\cos a'=\frac{C}{\surd(C+B^2\cos^2 a)}$; or $\cos 2a'=\frac{C^2-B^2\cos^2 a}{C^2+B^2\cos^2 a}$; we also find $n=\frac{2BC}{C^2-B^2\cos^2 a}$; and if D be the required deviation, we have in this case $\cos D=\frac{C \cos 2a}{C+nB\cos^2 a}=\cos 2a \,.\, \cos 2a'$. Moreover if I be the inclination of the two mirrors $\cos I=\frac{C}{\surd A^2+B^2+C^2}=\frac{C \cos a}{\surd(C^2+B^2\cos^2 a)}=\cos a \,.\, \cos a'$; and in general if a, a', ϕ, are given, cos (I) is very easily found.

When light diverging from any luminous point falls on a plane reflecting surface, it will after reflection diverge accurately from a point similarly situate at the opposite side of the mirror. Let S be the luminous point, DE the mirror, draw SA perpendicular to the mirror, and produce it until $As=AS$; let SB be an incident ray, join sB, and produce it to C, then it is evident that ∠ SBA = ∠ sBA = ∠ CBE. Now BC, being in the normal plane SAB, and making, with the normal BF, an angle CBF equal to the angle SBF of incidence, must therefore be the reflected ray. The position of s being independent of that of B, the point of incidence, it follows that every other reflected ray bc will diverge from the same point. Thus the reflected light will appear to an eye c as if proceeding from a point s behind the mirror similarly situated with S.



Hence if any *body* PQ be placed before a mirror DE, the light which emanates from P will *appear* after reflection to proceed from the similarly situated point p behind the mirror, and thus an *image* pq exactly similar to the body PQ will be seen by looking at the mirror; the common looking-glass is a familiar example.

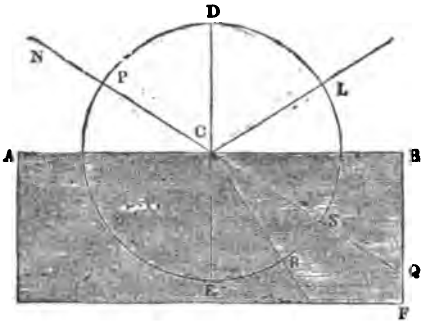
If we seek generally the nature of a surface by which light converging to or diverging from one given point may after reflection diverge from or converge to another, it will be simplest to seek first the plane curve possessing the same property, then the surface generated by the revolution of this curve round an axis passing through the two given points will evidently be of the nature required.

Let r, r' be the radii vectores drawn from a point of the curve to the given points, one will correspond to an incident, the other to a reflected ray; and let s be an arc of the curve measured from a fixed point to that of incidence, then $\pm\frac{dr}{ds}$ is the sine of the angle of incidence, using the upper or lower sine according as r increases or diminishes with s; hence we must have $\frac{dr}{ds}\pm\frac{dr'}{ds}=0$, whence $r \pm r'=$ const. Taking the upper sign we have an ellipse, or with the lower an hyperbola, of whieh the two fixed points are the foci; hence the prolate spheroid and hyperboloid are the surfaces sought. But if the incident light fall on parallel rays, and is reflected to one point, take the axis of x through this point in the direction of the rays, the sine of incidence is then $\pm\frac{dx}{ds}$, whence $\frac{dr'}{ds}\pm\frac{dx}{ds} = 0$, $r' \pm x = \text{const.}$, which is the equation to a parabola having the given point for focus; therefore the paraboloid of revolution is the required surface.

But when light diverging from a point falls on a surface, after reflection it generally does not again converge to a point, or diverge from one accurately, but each infinitesimal pencil after reflection converging to or diverging from a point, the locus of all such points forms an illuminated surface called a caustic by reflection, or catacaustic: their equations and properties are rather objects of analytical exercise than of any practical use. [OPTICS.] The caustic is a luminous space when the incident light proceeds from a surface. [CAUSTIC.]

In the case of reflection, the light is returned to the medium in which it moved previous to incidence; but when incident on a transparent medium of greater density than that of the medium in which it originally moved, a portion of the light is reflected, but another portion enters the medium, and then proceeds generally in one straight course in the plane of incidence, but not in the original direction, having a deviation *in course*, though not *in plane*, and sometimes, as in certain crystallized media, it splits into two rays, one in the plane of incidence as before, the other in a plane determined by the nature of the crystal. The same phenomena take place when light passes from a dense to a rarer medium, except that in this case the whole of the light may under a certain incidence be totally reflected.

This alteration of the path of light passing from one medium to another, which is familiarly observed in the apparently bent form of a straight stick partially immersed in water in an oblique direction, is called refraction; that portion which is in the plane of incidence is called the *ordinary ray*, and the other portion, which occurs in the double refraction of uni-axal crystals, is called the *extraordinary ray*. We shall first attend to the laws of single refraction.



Let NPC represent a solar beam in vacuo, and incident at C on a transparent medium (as water), to the surface of which DCE is normal. When the medium is fluid, place a graduated circle DSE in the plane of incidence with its centre at C; a portion of the light will be reflected in the direction CL, and another entering the medium will be refracted in the direction CR. If uninfluenced by the medium, its direction would have been CS. The angle RCE is the angle of refraction, DCN or ECS of incidence, and SCR of deviation. The arcs DP, DL, are equal by the law of reflection, and if we compare the arcs DP, ER, their sines will be found in a constant ratio, depending on the nature of the medium, but independent of the angle of incidence. Thus if I be the angle of incidence, and R that of refraction, the two are connected by the simple relation $\sin I = \mu \sin R$. The constant μ peculiar to the medium is called its *index of refraction*. When the medium is solid, we can easily compare the tangents of the angles, and thence their sines. The above law will be found rigorously exact.

This law may be accounted for on the theory of emission. Let V be the velocity of the ray before incidence, which is decomposable into a horizontal velocity, V sin I, and a normal one, V cos I. The former will not be affected by the medium; the square of the latter will be increased at the confines of the medium by a quantity n^2, which is the sum of the products of half the force into the element of the normal throughout that inappreciable space in which the forces of the medium do not destroy each other in consequence of proximity to the surface. Therefore the normal velocity of the refracted ray is $\surd\left\{V^2 \operatorname{Cos}^2 I' + n^2\right\}$ and its actual velocity $\surd\left\{V^2 + n^2\right\}$; so that the horizontal velocity in the medium is $\surd(V^2 + n^2) \operatorname{Sin} R$, which being equated with V Sin I, its value before incidence gives

$$\operatorname{Sin} I' = \mu,\ \operatorname{Sin} R,\ \text{where } \mu = \frac{\surd(V^2 + n^2)}{V}$$

How are we to account for the reflected ray CL? Why is not the whole incident light refracted? Even when the incident light is perpendicular to the refracting surface, a portion of the light is reflected; and when the ray has but a very small inclination to the surface, a portion will yet be intromitted. Hence we may consider generally that the incident light consists of portions differently disposed to be subject to the repulsive and attractive forces of the medium, or, in Newton's language, are in *fits of easy reflexion or transmission*. When the angle of incidence increases, the normal velocity of the ray diminishes, the effect of the repulsive forces is therefore augmented, or the reflexion is more copious.

If r, r' be any portions of the incident and refracted rays measured to fixed points in their directions, and V, V′ the corresponding velocities, and we make ACB the axis of x, we have $\operatorname{Sin} I' = \frac{dr}{dx}$, $\operatorname{Sin} R = -\frac{dr'}{dx}$, and since $V \operatorname{Sin} I = V' \operatorname{Sin} R$, therefore $\frac{d}{dx}(Vr + V'r') = 0$; and $Vr + V'r' = \text{minimum}$, which result is agreeable to the dynamical principle of least action.

On the undulatory theory $\frac{r}{V} + \frac{r'}{V'}$ is the time in which the wave traverses those spaces, and this interval must be the same for the various points of the internal wave, therefore $\frac{d}{dx}\left(\frac{r}{V} + \frac{r'}{V'}\right) = 0$, or $\frac{\operatorname{Sin} I}{V} = \frac{\operatorname{Sin} R}{V'}$. The ratio of Sin I to Sin R is still constant, but is the inverse of that obtained by the theory of emission. Hence there is a capital distinction between the two theories, for the velocity of light passing from a rarer to a denser medium must be increased by the doctrine of emission, and diminished by the wave theory.

The fact that the differently coloured rays have different refractive indices offers a great difficulty to the latter theory, inasmuch as their internal velocities must be different, which is contrary to the laws of elastic fluids. The circumstances are however different, as the fluid in this case envelops the material particles of the medium, and its waves may be influenced by these disturbances.

If μ be the index of refraction when light passes from vacuum to a medium (A′), and μ' when it passes from vacuum to a medium (A), then $\frac{\mu'}{\mu}$ is the index when the ray is transmitted directly from the former to the latter.

For if we look at a star through a medium bounded by parallel planes, as a plate of glass, its position will not be affected, and therefore the emergent light is parallel to the incident; but since the second angle of incidence is equal to the first angle of refraction by the parallelism of the planes, and the second angle of refraction is equal to the first of incidence by the parallelism of the rays, therefore the index of refraction out of a medium into vacuum is the reciprocal of that from vacuum into the medium. Again, if we place together two plates of different refracting media A, A′, the emergent light is still parallel to the incident. Now the second angle of incidence or first of refraction is given by the equation $\operatorname{Sin} I' = \frac{1}{\mu}. \operatorname{Sin} I$; and the second angle of refraction or third of incidence, by the equation $\operatorname{Sin} I' = \mu' \operatorname{Sin} R'$: whence $\operatorname{Sin} I' = \frac{\mu'}{\mu} \operatorname{Sin} R'$. Hence, generally, if the emergent ray be supposed to become incident, the latter would take the place of the emergent.

This fact shows that the velocity of light which traverses several media is the same as if transmitted directly from vacuum to the last medium, which is consonant to both the theories of light. In the wave theory, the velocity of the waves in a medium are independent of the mode of their propagation, and in that of emission the increment of the square of the velocity generated at one surface of a medium is destroyed by like forces on its emergence at the second, the only increment it finally receives is that generated by the surface of the last medium it enters, and which it would receive if it entered this medium directly from vacuum.

The index of refraction is greater than unity from a rarer to a denser medium, and less than unity from a denser to a rarer. Hence in the latter case there is a limit to the angle of incidence, beyond which it is impossible for the ray to emerge into the rarer medium, for since $\text{Sin R}=\frac{1}{\mu}\text{Sin I}$, it follows that R is a right angle when $\text{Sin I}=\mu$, or the emergent ray is then parallel to the surface; but if $\text{Sin I} > \mu$, then $\text{Sin R} > 1$, which being impossible, it follows that the light must then be totally reflected.

Let us now trace the progress of a ray passing through a medium terminated by planes inclined at a given angle α, as in the case of light refracted by a glass prism. Let μ, μ' be the indices of refraction into the medium through its first bounding plane, and out of it through the second, and let I, R, be the first angles of incidence and refraction, I′, R′, the second, and D the total deviation, and suppose the plane of incidence to be perpendicular to both planes, so that there may be no deviation in planes; the following equations fully describe the progress of the ray: $\text{Sin I}=\mu\,\text{Sin R}$; $\text{Sin I}'=\mu'\,\text{Sin R}'$; $\alpha=\text{R}+\text{I}'$; $\text{D}=\text{R}'+\text{I}-\alpha$: thus I being given, the first equation determines R, the third I′, the second R′, the fourth D.

When the deviation is a minimum we have $\frac{d\text{R}'}{d\text{I}}=-1$, and generally $-\frac{d\text{I}'}{d\text{I}}=\frac{d\text{R}}{d\text{I}}$; and by differentiating the other equations we have

$$\text{Cos I}=\mu\,\text{Cos R}\,.\,\frac{d\text{R}}{d\text{I}};\ \text{Cos I}'.\,\frac{d\text{R}}{d\text{I}}=\mu'\,\text{Cos R}';$$

therefore $\cos \text{I} \cos \text{I}'=\mu\,\mu' \cos \text{R} \cos \text{R}'$

by squaring $(1-\sin^2 \text{I})\,(1-\mu^2 \sin^2 \text{R}')=\mu^2\,(\mu'^2-\sin^2 \text{I})\,(1-\sin^2 \text{R})$;

$$\text{or if } m=\frac{1}{\mu'} \text{ then } (m^2-1)\,\text{Cos}^2\,\text{I}=(\mu^2-1)\,\text{Cos}^2\,\text{R}'$$

$$\text{and } \left(1-\frac{1}{m^2}\right)\text{Cos}^2\,\text{R}=\left(1-\frac{1}{\mu^2}\right)\text{Cos}^2\,\text{I}'.$$

When the ray after the second refraction moves in the same medium as before the first incidence, we find the minimum deviation when $\text{I}=\text{R}'$ and $\text{R}=\text{I}'$; the internal part of the ray is then equally inclined to both planes. We have then $\text{R}=\frac{\alpha}{2}$ $\mu=\frac{\text{Sin I}}{\text{Sin}\left(\frac{\alpha}{2}\right)}$ which affords a simple method of determining the index of refraction of media capable of being formed into prisms.

By a process similar to that employed already for reflected rays, it is easy to find both the deviations in plane and in direction, when the place of incidence is no longer perpendicular to the refracting surfaces.

When light emanating from one point is refracted accurately to another, if r, r' represent the incident and refracted rays, and s an arc of the curve by the revolution of which the refracting surface is generated, $\frac{dr}{ds}$, $\frac{dr'}{ds}$ are the sines of the angles of incidence and refraction (abstracting from their algebraical signs), therefore $\frac{dr}{ds}\pm\mu\,\frac{dr'}{ds}=0$ and $r\pm\mu r'=\text{const.}$: this equation belongs generally to a curve of the fourth order, but if r be infinite, or the incident light parallel to the axis, it gives a conic section, and if the arbitrary constant vanishes the equation $r=\mu r'$ represents a circle. If one surface be given, it is easy to find a second by which homogeneous light may be refracted accurately to a given point.

When light is incident on the generality of crystallized bodies, the ray is refracted in two directions, one of which in uni-axal crystals obeys the ordinary law of refraction, but neither in bi-axal crystals. On the theory of emission the forces cannot here be simply normal to the faces of the crystals, but have a connexion with the directions of the axes of crystallization, while on that of undulation the density of the fluid of light within such bodies is different in different directions, and the form of the wave-surface ceases to be spherical. The further consideration of that subject will be resumed in the article Polarization.

The formation of foci and images by reflection and refraction follows from the simple laws here discussed, for an account of which the reader may refer to Optics. The description of the instruments constructed to take advantage of the properties of light being given in Lens; Microscope; Mirror; Optics, Practical; Telescope.

The phenomena of diffracted and of polarized light afford more refined criteria of the probabilities of the contending theories of light than the ordinary laws noticed in this article; however, if the dispersion of light offers some difficulty to the doctrine of undulations, we have an obstacle to the theory of emission in the *uniform* velocity of light from the heavenly bodies, though differing in colour and probably in constitution. This ground of improbability is strengthened by observing that on the same theory the different refractive indices belonging to different media show that the molecular powers acting at or near their surfaces *generate* different instead of *uniform* velocities of the intromitted light. The proportion by which the velocity of light from any fixed star possessing aberration may be calculated is the following:—

Vel. of earth in orbit : Vel. of light :: Sin aberration : Sin earth's way.

By the last term is meant the angle which a right line drawn from the earth to the star forms with the direction in which the earth is then moving; in the planetary bodies we must use the *relative* velocity of the earth. [Aberration.]

The production of *colours* by ordinary refraction is considered in the articles Dispersion and Rainbow; for that produced by light passing near the edges of bodies, the reader may consult Diffraction.

LIGHT, BAROMETRICAL. Many barometers, when the mercury is shaken in the dark, exhibit a luminous appearance in the vacuum over the mercury; the light being sometimes apparently uniform throughout the vacuum, sometimes appearing almost entirely on the surface of the mercury. This appearance was first noticed by Picard, and afterwards by Cassini, Lahire, &c. Though it appears to be an electrical phenomenon, we are not aware that any satisfactory explanation has been given of it, and particularly of the reason why it appears in some barometers and not in others, and why the same barometer sometimes loses the property, and afterwards recovers it.

For a full account of the discovery, and of early hypotheses respecting it, see the first volume of De Luc's 'Recherches sur les Modifications de l'Atmosphère.'

LIGHT-EQUATION. In consequence of the time employed by light to traverse the solar system, phenomena are not seen at the exact moment of their happening. The first step in astronomical prediction is the finding the absolute moment of time at which a phenomenon occurs; the next is to apply a correction which gives the time at which it is seen at the place for which the prediction is made. This correction or equation is called the light-equation. This term is however principally applied to the correction which is necessary in the case of eclipses of Jupiter's satellites.

LIGHT, CHEMICAL AGENCY OF. There are several cases in which light exerts direct chemical agency without its being referrible to the heat which usually accompanies it when intense. Thus, if a mixture of equal volumes of chlorine and hydrogen gases be kept in the dark, no combination takes place between them; but in the light of day they unite slowly, and form hydrochloric acid gas; while, if exposed to the direct solar rays, the combination occurs instantaneously, and with loud explosion.

In the same way, chlorine gas and oxide of carbon, when mixed, unite by the direct action of the sun's rays; but this effect is not produced by the agency of heat, although the taper or the electric spark is capable of causing chlorine and hydrogen to combine.

These are instances of the power of light and the sun's rays in effecting chemical combination, but there are cases in which it possesses the opposite power of causing chemical decomposition.

Thus, if colourless nitric acid be exposed to the sun's rays, it becomes yellow, and afterwards red, and a quantity of oxygen is liberated by the partial decomposition effected by the solar rays. This gas may be received in glasses properly arranged for the purpose. So also when an aqueous solution of chlorine is exposed to solar light, the water is decomposed, the chlorine unites with its hydrogen to form hydrochloric acid, and oxygen gas is evolved. If also a piece of paper be dipped in a solution of nitrate of silver, and it be kept in the dark, little alteration ensues; but if the paper be exposed to the light, it becomes black, on account of the decomposition of the oxide of silver, and deposition of metallic silver on the paper.

The action of light on the chloride of silver is very remarkable, and it occurs very quickly. This substance, as long as it is kept from the light, even though it be exposed to heat, remains perfectly colourless; but the sun's rays, and even diffused daylight, by their peculiar action blacken it speedily. This effect is most strongly produced by what are called the chemical rays of the spectrum, which impart neither light nor heat; their greatest power is exerted beyond the violet portion of the prismatic spectrum, and the property gradually diminishes in approaching the green rays, and beyond this it is totally wanting. It appears therefore that the chemical rays are more refrangible than the violet, in consequence of which they are partly diffused throughout the blue, indigo, and violet rays.

LIGHTFOOT, JOHN, born 1602, died 1675, one of those English divines who belong peculiarly to the class called *commentators*, that is, who have written notes or comments on the Holy Scriptures. By the mass of readers these persons are not properly distinguished from each other; yet each has his own peculiarity: that of Dr. Lightfoot being an intimate acquaintance with Rabbinical literature. In this perhaps no English scholar has ever equalled him, and he has applied this species of knowledge extensively, and in many instances successfully, to the illustration of the sacred writings. His works are collected in two large folio volumes, with an account of his life prefixed, to which we refer the reader for particular details. He was the son of a clergyman at Uttoxeter in Staffordshire, studied at Cambridge for the church, was ordained, and settled early in life on the living of Stone in his native county. But the temptation of an easy access to books brought him to London; and taking a house at Hornsey, he there spent twelve years in close theological study. There it was that he laid the foundation of his own fame, and of a usefulness which reaches, we see, into a period far beyond the date of his own existence.

In the disturbed times he took part with the Presbyterians, became a member of the assembly of divines, accepted the living of St. Bartholomew beside the Exchange, and was made master of Catherine Hall by the parliamentary visitors of the university of Cambridge. He had also the living of Great Munden in Hertfordshire, which was presented to him in 1644. On the Restoration of King Charles II., when the Church of England was resettled in an episcopal form and order, Dr. Lightfoot complied with the terms of the Act of Uniformity. From that time he chiefly resided on his living at Great Munden, where he had a people who could not estimate his learning and value, but to whom he was very strongly attached. He used, when absent, to say, that he longed to be among his 'russet coats' at Munden.

LIGHT-HOUSES are buildings erected along the seashore, or upon rocks, from which lights are exhibited at night for the direction of mariners. Floating lights perform a similar office, being shown from the masts of vessels moored in certain positions, generally as beacons to enable ships to avoid shoals or sunken rocks in the æstuaries of great rivers.

It is probably from the desire of preserving property, rather than from the wish to provide for personal safety, that the systematic establishment of light-houses has sprung; and it is the practice, in this country at least, to collect the funds required for keeping up our light-houses from vessels, by a rate of charge proportioned to the size of the ship, as the best general test of the amount of property to be secured. The most celebrated light-house of ancient times was that erected about B.C. 283, in the reign of Ptolemy Philadelphus, on the island of Pharos opposite to Alexandria. [ALEXANDRIA.] It is from this building, or rather from the island on which it stood, that light-houses have in many countries received their generic name of Pharos. The most celebrated light-houses of modern times are that on Bell-rock opposite to the Frith of Tay, and that on the Eddystone rocks opposite to Plymouth sound. [BELL-ROCK; EDDYSTONE.]

The erection of light-houses in this country has not proceeded upon any systematic plan, but in every instance they have been constructed simply because of the disastrous losses that had occurred for want of them. From this cause it arises that our light-house establishments in the several parts of the United Kingdom are conducted under entirely different systems, different as regards the constitution of the management, the rates or amount of the light-dues, and the principle on which they are levied. In England there are now 44 light-houses and 13 floating lights, which are considered as general lights, besides 46 light-houses and 4 floating lights, which are local or harbour lights; altogether 107 lights. Of the general lights 30 (?) light-houses and the whole of the floating lights, 13 in number, are under the management of the Corporation of the Trinity House of Deptford Strond; 3 are in private hands under leases granted by the Trinity-House Board; 7 are in private hands under leases granted by the crown, and the remaining 4 are held by individuals under patents or by authority of acts of parliament. In Scotland there are 25 light-houses under the management of a Board entitled the Commissioners for Northern Lights, incorporated by the act 38 Geo. III., c. 58, and consisting of 25 commissioners, who hold the office by virtue of various other public situations held by them. There are besides in Scotland 18 local or harbour lights. In Ireland there are 24 light-houses and 3 floating lights, which are all general lights, besides 9 harbour light-houses under the corporation for preserving and improving the port of Dublin, and 5 other harbour light-houses maintained by various local authorities: making altogether 92 light-houses and 16 floating lights, which are general lights, and 76 light-houses and 4 floating lights, which are local or harbour lights; being in the whole 168 light-houses and 20 floating lights constantly maintained on the coasts and at the entrances of the harbours of these kingdoms.

The following statement contains the amount of light-dues collected for the general lights, the charges of collection, the expense of maintaining the different light-houses and floating lights, and the net surplus receipt in the year 1832, as contained in the Report of the Select Committee of the House of Commons upon the state and management of light-houses, presented in August, 1834:—

By whom held.	Gross sum collected.	Charges of collection.	Expense of maintenance.	Surplus.
	£	£	£	£
By Trinity House, London . . .	83,041	6,670	35,904	40,467
By private individuals	79,676	10,244	9,109	60,323
By Commissioners of Northern Lights, Scotland . . .	35,526	3,261	11,314	20,951
By Commissioners of Ballast-Board, Ireland	42,061	1,960	18,505	21,596
Total . . .	240,304	22,135	74,832	143,337

A principal object in the establishment of these buildings is to give intimation to vessels approaching the coast during the night as to the place in which they are. It is therefore of importance that the lights exhibited on the same line of coast should have some essential differences, so as to be readily distinguished by mariners.. The different appearances thus required are given by having two lights placed either vertically or horizontally with respect to each other, or three lights, as at the Casket rocks, or by causing the lights to revolve or to appear only at certain intervals, and to remain in sight only for a given number of seconds at each appearance; or by the employment of lamps of different colours, as in some of the harbour-lights, which do not require to be seen at a great distance.

The mode of lighting now generally used in this country is that of placing an argand burner in the focus of a parabolic reflector. This instrument is made of silver strengthened with copper, and is about 3 or 4 inches in focal length and 21 inches in diameter. The number and the arrangement of reflectors in each light-house depend upon the light being fixed or revolving, and upon other circumstances connected with the situation and importance of the light-house. The mode in use in the light-houses of France consists in placing a large argand lamp, having four concentric wicks, and giving a very powerful light, in the centre of the upper part of the building, and placing around the lamp a series of glass lenses of a peculiar construction; thus using a refracting instead of a reflecting instrument to collect the light, and only one lamp instead of a greater number. The lens employed is about 30 inches square, plano-convex, and formed of separate rings or zones, whose common surfaces preserve nearly the same curvature as if they constituted portions of one complete lens, the interior and useless part of the glass being removed. To form a lens of such magnitude out of one piece of glass would be hardly possible, and if it were possible, the necessary thickness of the glass would greatly obstruct the light: the merit of the invention consists in building it of separate rings. The light thus obtained is found by experiment to be equal to that afforded by nine common reflectors; and it is calculated that by a consumption of oil equal to that of 17 common argand lamps with reflectors an effect is produced equal to that of 30 lamps and reflectors. There is this further advantage in the French over the English apparatus, that in the English light-house of equal illuminating power with the French there would be daily employment in trimming 30 lamps, and cleaning an equal number of reflectors, which, having a very delicate silver surface, require much care and attention; while in the French light-house there is only one lamp to trim, and the lenses, being of glass, require little or no labour to keep them bright. On the other hand these dioptric lights have not the wide dispersive range which is so necessary in *fixed* lights.

On the northern and western coasts of France there are 89 excellent lights; and the Dutch have 20 lights on their sea-coast and in the Zuyder Zee. The Admiralty have lately published official lists of all these lights.

The rates of light-duty charged to vessels passing within certain limits vary considerably in respect of different lights: for some of those which are under the management of the Trinity House as little as a farthing per ton is charged on British, and a halfpenny per ton on a foreign vessel; while for other lights the rates are as high as a penny and twopence per ton on English and foreign ships respectively. The ships belonging to countries with which we have treaties of reciprocity are entitled to admission to our ports on the same terms as English vessels, and accordingly pay no higher rate of light-duties. The Trinity House has relinquished, in these cases, the right to any increased charge; but in the case of those light-houses which are held by private individuals, the difference is made good to those parties out of the customs' revenue. The sum paid on this account in 1832, the latest year of which we have the record, was 35,182*l*.

Light-dues are collected not only upon ships frequenting our ports for the purposes of commerce, but upon such as are driven in by stress of weather, or if they come within sight of our light-houses in the prosecution of their voyages from one foreign port to another, regulations which have occasioned much dissatisfaction, and which are perhaps justly chargeable with exaction.

LIGHTNING. The general circumstances attendant on a thunder-storm are familiar to most persons. It will however be useful to state some of the most prominent, with a view to their explanation when regarded as electrical phenomena.

At first we see light clouds forming with jagged edges, the relative motions of which are frequently opposite and variable. The atmosphere at the surface of the earth enjoys a stillness and calm, accompanied with some elevation of temperature, as well as considerable barometric and hygrometric changes, producing on the animal system the sensations of closeness, faintness, and oppression, and appearing even to the brute creation indicative of some awful and impending changes. Some of these light clouds appear stationary, as if the forces which produced contrary motions in the others made an equilibrium in these. A low murmuring and continued sound of distant thunder is soon heard, after which the lower region of the air is refreshed with cooler but light breezes of uncertain direction. The calm is resumed, but the thunder-clouds are nearer, apparently larger, and much blacker, and their influence on the nervous system is felt by an indescribable sensation of uneasiness. Lightning flashes are now perceived at short intervals; their course is sometimes zigzag, when it is called forked lightning; the aberrations in its course show that it is near terrestrial objects, and is therefore justly regarded as dangerous. In a few seconds after the discharge, heavy showers of rain or hail descend, and the atmosphere is again cooled. The blackness now becomes universal; the thunder, which before roared continuously and at a sensible interval after the discharge of the lightning, is now heard in a loud and sudden clap almost at the same instant that the lightning is seen descending towards the earth with immense velocity, and resembling a globe of flame.

These phenomena are the most common concomitants of thunder-storms, particularly in summer time. But storms are also produced by rapid changes in the atmospheric currents, for instance when the equinoctial gales usually set in; or, as in a recent instance, when the late violent and destructive gales (we write in December, 1838), crossing the Atlantic with both a revolving and progressive movement, and becoming mixed with various strata of the air through the regions which they traversed, produced in several places most destructive thunder-storms.

The colour of the lightning is a variable yellow, depending much on the density and composition of the strata of air through which the discharge takes place.

Franklin in America, and De Lomas in France, commenced, independently of each other, a series of experiments tending to identify lightning with the discharge of ordinary electricity. [Electricity.] Their identity might well be suspected from the number of analogies known to exist between them. For example, the zigzag path of the electric spark from an instrument to a conductor resembles on a small scale the course of forked lightning; both strike pointed bodies in preference to others, and lightning also prefers, cæteris paribus, the best electrical conductors. Both can dissolve metal and inflame combustibles, destroy sight and animal life, and reverse the poles of a magnet.

Franklin, in 1752, perceiving a thunder-cloud approaching, sent up a silk kite attached to a dry hempen cord. The loose threads of the cord stood erect, and upon pointing his finger to the cord, he drew sparks. When in consequence of a little rain the hempen cord became a better conductor, the supply of electricity from the cloud became more copious, and by the smartness of the shock ensuing, the danger of prolonging the experiment was sufficiently indicated.

Similar experiments were afterwards made by an assistant of Dolibard at Marly la Ville, by Canton, Wilson, Kinnersley, Bertholon, Beccaria, and many other philosophers, and the supposed identity was completely substantiated. Professor Richman of St. Petersburg attached a simple species of electrometer to his apparatus for measuring the electric intensity of a thunder-cloud. Immediately after a loud clap, he proceeded to read off the indication of his instrument, when a globe of electric fire was discharged through his body; he fell instantly on a chest quite dead, and decomposition ensued within forty-eight hours (A.D. 1753): his assistant was also much injured.

These experiments show the phenomena of electric induction or influence. [Electricity.] The clouds frequently change from negative to positive electricity; they also influence the portions of the earth near them, and sometimes so strongly as to draw the lightning *from* the earth, which is accordingly termed ascending lightning. The antients remarked this singular phenomenon, for Pliny describes the land of Etruria as emitting thunders.

When the electric discharge permeates generally the surrounding masses of weakly electrised vapour, the appearance then is that of a sudden and wide illumination, as in summer, or sheet-lightning. This lightning is harmless, and even beneficial, as indicating the restoration of atmospheric and electric equilibrium after it has been destroyed by the rapid succession of cold to heat.

The formation of vapour into rain and hail may be attributed to its violent condensation by the lightning, and the momentary vacuum in its track, the coldness produced converting the rain into hail: there are also other opinions on this subject.

The principles of electricity explain some other very curious phenomena which have been observed by travellers when near the summits of lofty mountains, as by Jalabart, Pictet, and Saussure on Mont Blanc, and Messrs. Tupper and Lanfiar on Mount Ætna. The latter running down on a field of snow (a good conductor), felt a slight electric shock as they entered a cloud which appeared electric; a pain was felt in the back, which gradually ascended to the head; the hairs (by the law of repulsion) stood erect, and upon moving the fingers near the head, a humming sound proceeded from it, which arose from the succession of sparks. In the former case the sound appeared to play round a gilt hat-band worn by one of the travellers.

The changes of temperature, the electricity of the earth in contact with the air, and that produced by the chemical changes of the various matters of the globe, are the great causes of atmospheric electricity: thus earthquakes, volcanic eruptions, &c., are generally accompanied by violent thunder-storms.

(For further information on this subject we refer to Thunder-Rods; also Bertholon, *De l'Electricité des Météores;* Franklin's *Letters;* Beccaria, *Lettere dell' Elettricismo;* Becquerel, *Traité de l'Electricité*, &c.)

LIGHTS, NORTHERN. In continuation of the article Aurora Borealis, we may add that the recommendations of the British Association have produced various good observations of these phenomena. The directions how to observe them (abstracted in the article cited) are reprinted in vol. iv., p. xxxv. of their Reports.

Of late years these phenomena seem to have become more common in England: one in particular (see Mr. Christie's communication, vol. vi., p. 29, *Rep. B. Ass.*) was observed June 24, 1837, at a time of the year in which no such appearance is recorded as observed in England. In the preceding February occurred 'one of the most extraordinary on record in these latitudes;' but during the very cold winter and spring of 1837-38 hardly any such phenomenon appeared.

By three corresponding observations (vol. ii., p. 401) of the bright arches of the aurora of March 21, 1833, it appears that these arches were 'similar to parallels of latitude round the magnetic axis.' Should further observations prove this to be a general law, no more valuable step will ever have been made towards a consistent explanation of these meteorological comets. It is to be hoped that persons living in favourable parts of the country, and disposed to observation, will not neglect to qualify themselves for observing such appearances: a single observation in connection with others made at different places may be of great value.

LI'GIA. [Isopoda, vol. xiii., p. 55.]

LIGNIN, or vegetable fibre, is the substance which remains after a plant or a portion of it has been treated with water, weak alkaline and acid solutions, with alcohol and æther, in order to dissolve all the matters soluble in these agents.

Lignin, properly speaking, constitutes the skeleton of the trunk and branches of the tree. It varies, in different kinds, as to its colour, hardness, texture, and specific gravity; and it is probable, on account of these differences, that its composition also varies. The texture of lignin is always porous, because it contains longitudinal vessels, and it is easy to split it in the direction assumed by them. The pores of lignin, when fresh, contain the juices of different substances; during the drying of lignin the water evaporates, and leaves the matters dry which it held dissolved. It is on this account that wood contracts, in drying, in breadth, but preserves its length. It is commonly admitted that timber in general consists of ninety-six parts of lignin and four parts of the substances which were held in solution by the evaporated moisture.

When lignin has been dried, it is a non-conductor of electricity; but on account of its porous nature and the deliquescent substances which it contains, it acquires moisture when exposed to the air, and then becomes a conductor: this absorption may be prevented by varnish. It is well known that wood swims in water: but when deprived of air it becomes heavier and sinks in it; its specific gravity then varying from 1·46, which is the specific gravity of fir, to that of 1·53, the specific gravity of oak and beech. Wood is gradually decomposed when exposed to the simultaneous influence of light, air, and water; but under water it may be preserved for an almost indefinite period, as is proved by the trunks of trees which have been found in a perfect state buried in the bottom of peat-mosses, and which must have been there from a period anterior to history: also when it is kept perfectly dry it is not subject to decay. The wood enclosing Egyptian mummies is found in good preservation, although some of it must be about 3000 years old.

When wood or lignin is treated with chlorine, it becomes white, but does not dissolve. Concentrated sulphuric acid in the cold converts it into gum; and if the mass thus obtained be boiled with water, it is changed into grape-sugar. When treated with sulphuric acid, it is decomposed, becomes black owing to the separation of charcoal, while sulphurous and carbonic acid gases are evolved. When treated with strong nitric acid, oxalic acid is obtained; when boiled in concentrated hydrochloric acid, it becomes first reddish, then brown, and afterwards black, without being soluble either in the acid or in water.

The caustic alkalis dissolved in a large quantity of water act but feebly on wood; but if sawdust be treated with an equal weight of hydrate of potash dissolved in a little water, it swells, yields water with an empyreumatic smell, and a homogeneous liquid is formed; when this has cooled, it is of a blackish brown colour, and contains oxalic and acetic acids, with a substance resembling soot treated with an alkali. When wood is heated in iron cylinders with the necessary arrangements for the condensation of the volatile products, a great variety of important substances are obtained, besides charcoal: in this way are procured acetic acid, commonly called, till purified, pyroligneous acid, pyroxilic spirit, creasote, and tarry matter.

LIGNITE. Fossil wood carbonized to a certain degree, but retaining distinctly its woody texture, is thus designated: a greater degree of change constitutes cannel and common coal, in which the original structure of the constituent plants can only with difficulty be traced; a less change belongs to peat.

Dr. MacCulloch observes:—'In its chemical properties lignite holds a station intermediate between peat and coal; while among the varieties a gradation in this respect may be traced; the brown and more organized kinds approaching very near to peat, while the more compact kinds, such as jet, approximate to coal.' (*On Rocks*, p. 636.)

His synopsis of lignite runs thus:—

A. Jet. Hard, compact, with pitchy lustre.
B. Surturbrand. Less compact and more brittle than jet.
C. Moor coal of some authors. Friable.
D. Bovey coal. Fibrous, the vegetable texture very apparent, colour brown or brownish black.
E. Cologne earth, earthy and pulverulent mass. The thickness said to be 50 feet.
F. Basaltic coal. Of variable structure; some parts like wood, others like coal.

Lignite often occurs in beds of considerable thickness and extent, and supplies to particular districts a bad substitute for coal. It is often accompanied by iron pyrites (Alum Bay), lies in alternating series with arenaceous and argillaceous beds, and is sometimes covered by fresh-water limestone (Käpfnach), and presents many analogies with coal; but in general lignite is most plentiful in the tertiary strata, and coal among the older rocks of the secondary series.

In the Isle of Wight (Alum Bay) lignite beds (the wood coniferous) occur amidst the sands and clays of the lower part of the (eocene) tertiary strata; in a depression of the surface near Bovey Tracey, Devon, a more considerable deposit of like nature occurs under several alternating beds of clay and gravel of considerable thickness. (De la Beche, *Geol. Manual.*) These deposits deserve attentive comparison with the peat moors of high and low situations in England, with and without buried forests, with the lignite coal of the Sussex Wealden, the coal of the Yorkshire oolites derived from equiseta, and the coal of the older rocks in which coniferous wood appears an abundant ingredient.

According to Brongniart ('Tableau des Terrains') at least three deposits of lignite of different geological ages may be distinguished in the series of tertiary strata, viz. the lignite of Switzerland, of Mont Rouge, and of Aisne (all of eocene date, according to Lyell's classification). Among the secondary strata, one deposit is noticed by Brongniart, viz. in the Isle of Aix, belonging to the lower greensand, and occurrences of less importance in the Wealden of Sussex, the Kimmeridge clay, lias, and gres bigarré. Hardly any of the clays of the cretaceous or oolitic formations are deficient of jet, which sometimes forms considerable floors (as near Whitby), but generally lies in small portions.

The plants occurring in all these deposits are terrestrial; in the Swiss and French lignites there are remains of palms; in the Meissner there are coniferous woods. Mammalia occur, especially in the Swiss lignites at Käpfnach near Zürich, where Mastodon angustidens, M. Turicense, Beaver, Rhinoceros tichorhinus, and other remains are mentioned by different writers. One of the most characteristic genera of the animals found in lignite (Tuscany, Styria) is the Anthracootherium.

LIGULATE FLOWERS, are such as have a monopetalous corolla slit on one side, and opened flat, as in the Dandelion Lilac. [Syringa.]

LIGU'RIA (called by the Greeks Ligystica, Λιγυστική, and the inhabitants Ligyes, Λίγυες; and Ligustini, Λιγυστῖνοι), a division of antient Italy, was separated in the time of Augustus from Etruria by the river Macra (*Magra*), and was bounded on the north and north-east by Gallia Cisalpina, and on the west by the province of Gallia. The most important places in Liguria were Albium Intemelium (*Vintimiglia*), a place of some importance, and a municipium, the capital of the Intemelii; Albium Ingaunum (*Albenga*), the capital of the Ingauni; Genua [Genoa]; Dertona (*Tortona*), in the interior, a Roman colony, surnamed Julia; Alba Pompeia (*Alba*); Asta (*Asti*); and Pollentia (*Polenza*).

The Ligures however in more antient times extended as far as the Rhone in France (Strabo, iv. 140); and 'if we may trust to the report which has been transmitted to us from the Carthaginian navigator Himilco, they dwelt upon the shores of the Atlantic Ocean, and were driven thence into the mountains, whence they descended to the coasts of the Mediterranean Sea, by the overpowering pressure of the Celts or Gauls. (Av., *Or. Mar.*, 129—145) It is evident that this tradition places them upon the banks of the river Ligyr, or Liger (the Loire).' (*History of Rome*, published under the superintendence of the Society for the Diffusion of Useful Knowledge, p. 63.) They are described by Herodotus as dwelling above Massilia (Marseille); and in the time of Polybius they reached as far south as the Arno (ii. 104, A. Casaubon). They also appear to have inhabited part of Spain. Thucydides says (vi. 2) that the Sicanians were an Iberian nation, who had been driven by the Ligurians from a river called Sicanus. There were also Ligurians among the inhabitants of Corsica (Seneca, *Consol. ad Helviam*, 8; *Fragm. Sallust. Histor.*, ii., p. 958, ed. Cortius); and a considerable part of Gallia Cisalpina was occupied by Ligurian tribes. The whole of Piedmont, in its present extent, was inhabited by the Ligurians; and Pavia, under the name of Ticinum, was founded by a Ligurian tribe, the Lævians. (Pliny, iii. 21; Niebuhr's *Roman Hist.*, i., p. 161, Engl. Transl.)

Dionysius says that the extraction of the Ligures was unknown. (i. 10.) According to Strabo (ii. 88), they were a different people from the Celts. They lived scattered through villages (Strabo, v. 151), and were celebrated as light-armed soldiers. (Strabo, iv. 140.) Cato stigmatized them as lying and deceitful (*Fragm. Orig.* ii., in Servius on *Æn.*, xi. 701, 715); but other writers speak highly of their industry, courage, and perseverance. (Cicero, *Cont. Rull.*, ii. 35; Virgil, *Georgics*, ii. 167.) They were not conquered by the Romans till long after the second Punic war. Strabo relates that during the space of eighty years the Romans only obtained a free passage along their shore of twelve stadia from the coast. (iv. 140.) They were finally subdued B.C. 166. (Livy, xli. 12-19; *Epit.* 46.)

LIGURITE. This mineral occurs crystallized; the primary form is an oblique rhombic prism. Fracture uneven. Hardness 5·0 to 6·0. Colour yellowish-green or apple-green. Streak greyish-white. Lustre vitreo-resinous. Translucent, transparent. Specific gravity 3·49.

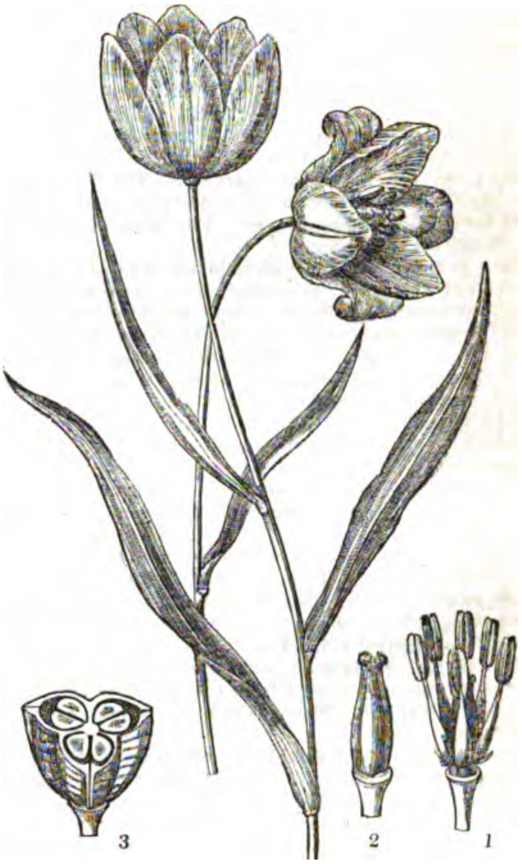
It occurs in a talcose rock on the banks of the Stura in the Apennines. It is stated as a gem to be superior to chrysolite in colour, transparency, and hardness.

LI'GUUS, De Montfort's name for a genus of terrestrial testaceous mollusks belonging to the family *Helicidæ*. Mr. Gray (*Zool. Proc.*, 1834) describes a species from Africa (*Liguus tenuis*), and observes that in shape it is most like to the young of *Helix flammigera* of Férussac, but differs in colour, in tenuity, and in the shape of the front of the pillar-lip.

LILAC. [Syringa.]

LILIA'CEÆ, an important natural order of endogens, containing many of the most beautiful plants of that class of the vegetable kingdom. A large proportion, especially of those of cold countries, consists of bulbous plants, producing annually a stem which perishes after having produced its leaves and flowers; others have an annual duration with perennial fleshy roots; and a few acquire, in warm countries, a stem of very considerable size, as the dragon-tree, Dracæna Draco, of which there is an antient specimen in Teneriffe with a stem many feet in diameter.

The flowers of liliaceous plants are generally large and showy, especially in those with annual stems, as the lily itself, the fritillary, hyacinth, star of Bethlehem, &c.; but when they acquire an arborescent stem, the size of the flowers contracts, so that the largest trees among them have the smallest flowers. Their leaves are always quite simple and undivided; and usually have the veins of the leaves running straight from the base to the apex: but in some Dracænas they diverge from the midrib to the margin, as in the plantain. Among other endogens they are readily known by having a flower of 6 coloured pieces, 6 stamens with the anthers opening inwards, and a superior 3-celled ovary changing to a 3-celled fruit. The greater part are of no known use: we find however among them aloes, yielding the valuable purgative medicine of that name; squills (squilla maritima), whose bulbs secrete a viscid substance much employed as an emetic, diuretic, and expectorant; and several plants which yield a tough and valuable fibre, such as Phormium tenax, or New Zealand hemp, Sanseviera zeylanica, or bowstring or African hemp, Yucca filamentosa, &c. What are called alliaceous plants, such as the onion, garlic, &c., are species of this order, of which between 80 and 90 genera are known.



Tulipa sylvestris.

1, a magnified view of the stamens and pistil; 2, the pistil; 3, a transverse section of a ripe fruit, showing the cells and seeds.

LILIWATI. [Viga Ganita.]

LILLE, the capital of the department of Nord in France, is situated on the canal of the Deule, which communicates with the Lys. It is 125 miles north by east of Paris, in a direct line, or 140 by the road through Peronne and Douay, or by that through Amiens and Arras.

Lille appears to have been founded in the eleventh century, and was then only a castle erected by the counts of Flanders, which grew to a considerable fortified town. The possession of this fortress was early an object of contention, and it has been several times besieged. The most memorable sieges were that in A.D. 1708 by the allies under Eugene and Marlborough, who obliged the governor, Maréchal Boufflers, to capitulate, after a protracted and honourable defence; and that of 1792 by the Austrians, who bombarded the town, but did not take it. Lille was the capital of La Flandre Françoise. It is strongly fortified; the citadel, a masterpiece of Vauban, is on the west side of the city. At the opposite side is fort St. Sauveur. The canal of the Deule enters the town on the south-west, where it is called Haute Deule, or Upper Deule; it is distributed into several channels for the purposes of manufacture or commerce, and passes out of the town on the north side under the name of Basse Deule, or Lower Deule. A canal called Moyenne Deule, Middle Deule, passes on the west side of the city, and affords a passage from the Upper to the Lower Deule for those which are too large to pass through the narrow channels in the town. The town is well laid out: there are nearly thirty market-places or other open places, of which La Grande Place is the chief. The markets, especially the fish-market, are well arranged. The greater part of the streets (which amount to 200, besides lanes, alleys, &c.) are wide: Rue Royale is the longest and straightest street, and Rue Esquermoise the best furnished with shops and the most frequented. The houses are in general of three or four stories, regularly built, and with good fronts: they are chiefly of brick, but sometimes of a white stone quarried at Lezennes in the neighbourhood. There are numerous bridges over the canals, and quays on their sides. There are six parish churches, of which the finest are those of La Madeleine (Magdalen), with a handsome cupola, St. Maurice, and St. Andrew. There are also a Protestant place of worship and a Jews' synagogue. Formerly there were many religious houses. Among other public buildings, the most remarkable are the préfet's office, a handsome new building; the custom-house, formerly a Dominican monastery; the 'grand magazin du blé,' or public granary; the bourse, or exchange; the theatre, which has a handsome peristyle; and the court-room, one of the finest in France, built upon part of the site of an antient church. The town-hall is an ill-assorted mixture of the architecture of different ages. The gate of Paris is a handsome triumphal arch.

In 1831 the population of Lille was 69,073; in 1836 it was 72,005, including the population of the five suburbs of Paris, Bethune, La Barre, Fives, St. Maurice, and St. André. The manufactures are of great importance. There were, ten years ago, 150 establishments for spinning cotton-yarn, a branch of industry which has in some degree superseded the manufacture of lace, one of the former staple articles of the town. Calicos, printed cottons, counterpanes, table-linen, bed-ticking, fine woollen cloths, velvets, serge, camlets, and other woven fabrics, are made; also hats, laces, and hosiery. There are several sugar-refining houses, a royal tobacco manufactory, and a royal refining-house for saltpetre and gunpowder, and manufactories for machinery, paper, glass, soap, starch, sulphuric and nitric acid, and rape and poppy oil. There are some potteries and other earthenware manufactories, several tan-yards, and a number of iron-works. There are a great number of oil-mills in the neighbourhood. The trade of the place is very great: several of the merchants are ship-owners, or take part in fitting out vessels from the ports of Dunkerque, Calais, and Ostend. There is one yearly fair, which lasts nine days.

Beside the public establishments already enumerated there are several hospitals. The general hospital is a handsome regular building; the military hospital occupies the former Jesuits' College; and the hospital for infirm old men and orphan boys is a very antient establishment, founded by the Countess Jeanne, daughter of the emperor Baudouin or Baldwin IX. of Constantinople, in the thirteenth century. There are at least two other hospitals, besides one for foundlings, a 'mont de piété,' or loan society, a lying-in charity, two lunatic asylums, one for males, the other for females, an asylum for poor girls, and three houses of the 'Sœurs de Charité.' There are also three houses of correction or prisons. Of literary institutions there are a considerable number, including a public library of 20,000 volumes, a cabinet of paintings, and a museum of natural history; a botanic garden, at which lectures are given, a high school, a school for drawing, modelling, architecture, and botany, and an academy for music. The head-quarters of the 16th military division, which includes the departments of Nord, Pas de Calais, and Somme, are at Lille.

The environs of the town are flat, but very productive. The arrondissement has an area of 337 square miles, with a population in 1831 of 294,541, and in 1831 of 309,349. It is divided into 16 cantons and 131 communes.

LILLO, GEORGE, was born in 1693, and carried on the trade of a jeweller near Moorgate in London. Though educated in the strict principles of the Protestant Dissenters, he produced seven dramas, three of which are printed in every collection of acting plays. He died in 1739.

In the three plays, 'George Barnwell,' 'Arden of Feversham,' and 'Fatal Curiosity,' the author evidently has but one purpose in view, to exhibit the progress from smaller to greater crimes. Thus the impure passion of Barnwell, the ill suppressed attachment of Arden's wife for the lover of her youth, and the impatience under poverty of the Wilmots (in 'Fatal Curiosity'), are the three beginnings of vice, all of which terminate in murder. Not only is the purpose of these plays the same, but the same measures are adopted in all for its attainment. In all there is a tempter and a tempted; the first determined in vice, the latter rather weak than intrinsically vicious: thus Barnwell is led on by Milwood; Arden's wife by her paramour Mosly; and Wilmot by his wife Agnes. Now Lillo having an eminently tragic idea, and one only, it might easily be inferred that he could write one and only one good drama; and this was actually the case. His 'Fatal Curiosity' stands as a masterpiece of simple dramatic construction, and the catastrophe is eminently appalling and tragic. The following is the subject: A man and his wife, who have formerly been wealthy, but are now sunk to a deplorable state of poverty, receive a stranger who asks for a lodging. Finding that he has wealth about him, they murder him, and afterwards discover that he is their own son, who has been absent many years, and who has concealed his name that he may give his parents a joyful surprise. This simple story is arranged with the most consummate art, being scarcely inferior in construction to the 'Œdipus Tyrannus' of Sophocles, with which Harris, in his 'Philological Enquiries,' has compared it. He observes that in both, the means apparently tending to happiness (namely Œdipus sending to the oracle, and Wilmot's son returning), in reality produce misery. The language is by no means equal to the construction, but is often inflated, and disfigured by conventional similes and expressions, which destroy every possibility of enunciating true feeling: characters under the most acute mental agonies seem, strangely enough, to be building elaborate and affected phrases. It is this assumption of a stilted style which has prevented the representation of nature in her various gradations in so many tragedies; for where all the personages talk in one conventional language, it is almost impossible to represent the variations of character and passion. However, there are passages and touches in the 'Fatal Curiosity' which show that had it not been for a defect in taste, Lillo could have taken a high position by this one drama, and revealed many secrets of the human heart. With respect to his other two plays, though the construction of 'George Barnwell' is skilful, and the situation in the fifth act of 'Arden' most powerful, they stand at an immeasurable distance below 'Fatal Curiosity.' The tendency to inflation, though apparent in the last, was in a great measure repressed by the shortness of the piece (it is in three acts) and by the severe simplicity of the subject; but in Arden it increases with the length of the drama, and in 'George Barnwell' inflation has no bounds; nature is sunk altogether, and the virtuous characters are not human beings, but speakers of moral essays, and those in the worst style. The prose of 'Barnwell' is remarkable; in many places line after line will read as blank verse, which might lead to a surmise that it was originally written in verse, and chopped up into prose, unless indeed the semi-metrical style may be that which naturally follows from inflated declamation. It is singular enough that 'Fatal Curiosity,' which appears the simplest expression of Lillo's idea, did not make its appearance till six years after 'Barnwell,' which is like the work of one who has exhausted his mind, and endeavours to make up for paucity of ideas by a weight of useless language.

There are several anecdotes relative to the effect produced by 'George Barnwell' on young men who have pursued vicious courses and have been reclaimed by this tragedy. It is usually acted at some of the theatres in London on the night after Christmas, and on Easter Monday, nominally for moral purposes, but really in blind pursuance of an old custom, as the boisterous holiday folks, who are impatient for the spectacle that on such occasions follows the tragedy, invariably make such a noise during the whole representation that it is acted in dumb show, and not only conveys no moral, but is perfectly unintelligible.

A collection of Lillo's works was published in 2 vols. 8vo. in 1775.

LILLY, WILLIAM, was born May 1, 1602, at Diseworth, a village of Leicestershire. When eleven years old he was sent to a grammar-school at Ashby-de-la-Zouch. His parents being poor, he removed to London in 1620, where he became servant to a mantua-maker. This situation he exchanged in 1624 for one of a less menial character. His new employer was master of the Salter's Company, who, being unable to write himself, engaged Lilly to keep his accounts, and to perform domestic offices. In 1627 his master died, whereupon Lilly married the widow, with whom he received the sum of 1000*l.*; but this lady dying within a few years, he immediately took another wife, and thus augmented his fortune by 500*l.* In 1632 he began the study of astrology under one Evans, a clergyman who had been expelled from his curacy for practising numerous frauds under pretence of discovering stolen goods. The fame which Lilly soon acquired for casting nativities and foretelling events was such, that he was applied to, in 1634, to ascertain, 'by the use of the Mosaical or Miner's Rods,' whether there was not extensive treasure buried beneath the cloisters of Westminster Abbey. Permission having been obtained from the dean on condition that he should have his share of whatever might be found, 'Lilly and thirty other gentlemen entered the cloisters one night and applied the hazel rods;' but after they had disinterred a few leaden coffins, a violent storm arose, which so alarmed them, that they all took to their heels and ran home. In 1644 he published his first almanac, by the title of 'Merlinus Anglicus, Junior,' and such was the avidity with which the people received his prognostications, that the whole edition was sold in a few days, notwithstanding the 'mutilations the work had suffered from the licenser of mathematical works.' Lilly was subsequently arrested by the commissioners of the excise, on the ground that they had been personally insulted 'by having their cloaks pulled on 'Change,' and that the Excise-office had been burnt, both which events were attributed to the malicious predictions contained in his treatise called 'The Starry Messenger;' but upon its being proved that these events had happened prior to the publication of the work complained of, he regained his liberty. During the contest between Charles I. and the parliament, Lilly was consulted by the Royalists, with the king's privity, as to whether the king should sign the propositions of the parliament, and he received 20*l.* for his opinion. At the same time he was employed by the opposite party to furnish them with 'perfect knowledge of the chiefest concerns of France,' for which he received 50*l.* in cash and an annuity of 100*l.* per annum. The latter he enjoyed only two years. Until the affairs of Charles declined he was a cavalier; but after the year 1645, he engaged heartily in the cause of the parliament, and was one of the close committee to consult upon the king's execution.

After burying his second wife and marrying a third, he died of palsy, June 9, 1681, and was buried at Walton-upon-Thames. A tablet was placed over his tomb in the chancel of the church, with a Latin inscription commemorating his great astrological skill. Previous to his death he had adopted a tailor for his son by the name of Merlin Junior, to whom he bequeathed the impression of his almanac, which had then been printed thirty-six years. 'Most of the hieroglyphics,' says Mr. Aubrey, 'contained in this work were stolen from old monkish manuscripts. Moor, the almanac-maker, has stolen them from him, and doubtless some future almanac-maker will steal them from Moor.' The character of Lilly has been faithfully drawn by Butler under the name of Sidrophel, although some authors have supposed that character to have been intended for Sir Paul Neal. By the facility with which he was enabled to impose upon the ignorance and superstition of all ranks of society, from the highest to the lowest, he succeeded in amassing considerable wealth. He was, to use the epithet of Dr. Nash, 'a time-serving rascal,' who did not hesitate to resort to any kind of deceit, and even perjury, in order to free himself from a dilemma or gratify his love of money and renown. After the Restoration he made several applications to the ministry to be employed as a prophet, in which capacity he had been so liberally patronised by the previous government, but in every instance he had the mortification of being refused.

For a list of his published works the reader is referred to Dr. Hutton's 'Mathematical Dictionary.'

(*Biographia Brit.*, fol., vol. v., p. 2964; Granger's *Biog. Hist.*; Wood's *Athenæ Oxonienses*; Nash's Notes to *Hudibras*, 4to. edit., 1793, vol. iii.)

LILY, LILYE, or LILLY, WILLIAM, an eminent schoolmaster, was born at Odiham in Hampshire, about 1468, and at eighteen years of age was admitted a demy of Magdalen College, Oxford. Having taken the degree of B.A., he quitted the University, and travelled towards the East, with the intent of acquiring a knowledge of the Greek language. He certainly remained five years at Rhodes, but it is not quite so certain, as Pits and Wood assert, that he went for religion's sake to Jerusalem. From Rhodes he went to Rome and studied. On his return to England in 1509, he settled in London, set up a private grammar-school, and became the first teacher of Greek in the metropolis. His success and reputation were such, that, in 1512, Dean Colet, who had just founded St. Paul's school, appointed him the first master. He filled this useful and laborious employment for near twelve years, and in that time educated some youths who afterwards rose to eminence in life, among whom were Thomas Lupset, Sir Anthony Denny, Sir William Paget, Sir Edward North, and Leland the antiquary. Lily died of the plague, at London, in February, 1523, at the age of 54, and was buried in the north church-yard of St. Paul's. Lily's principal literary production was his 'Brevissima Institutio, seu Ratio Grammatices Cognoscendi,' 4to., Lond., 1513. It has probably passed through more editions than any other work of its kind, and is still commonly known as 'Lily's Grammar.' The English rudiments were written by Colet, and the preface to the first edition by Cardinal Wolsey. The English Syntax was written by Lily; also the rules for the genders of nouns, beginning with 'Propria quæ Maribus;' and those for the preterperfect-tenses and supines, beginning with 'As in præsenti.' The Latin Syntax was chiefly the work of Erasmus. See Ward's Preface to his edition of Lily's Grammar, 8vo. Lond., 1732. Lily numbered Erasmus and Sir Thomas More among his intimate friends. (Wood, *Athenæ Oxonienses*, Bliss's edit.; Chalmers's *Biogr. Dict.*; Tanner, *Bibl. Brit. Hib.*)

LILYBŒUM. [SICILY.]

LIMA, the capital of the republic of Peru in South America, is situated in 12° 2′ 34″ S. lat. and 76° 58′ W. long., about six miles from its port Callao, which is on the shores of the Pacific. [CALLAO.] The road from Callao to Lima rises gradually, and the great square of the capital is 560 feet above the level of the sea. Lima is built in a spacious and fertile valley, traversed by a small river called Rimac, a name which has been corrupted by the Spaniards into Lima. The river washes the northern walls of Lima, and over it there is a handsome stone bridge leading to the suburbs of St. Lazaro, and to the Alameda, or public walk. The city is walled round, but the walls are low, and were originally erected to protect it against any sudden incursions of the Indians. The houses are low, and have rarely more than one floor: they are lightly built, on account of the frequent earthquakes, which have repeatedly reduced the city to ruins. The streets are regular and wide, but the pavement is extremely bad, consisting of large round stones, laid without the least regularity. There are no flags for foot passengers. The number of houses with glass windows towards the streets is on the increase, but they are not yet numerous. The roofs are made of coarse linen cloth or cane, the total want of rain rendering more substantial roofs unnecessary. The city occupies a nearly triangular space, the base or longest side extending along the banks of the river. A fine street leads from the bridge to the Plaza Mayor, or great square, in the midst of which is a large fountain, with a bronze statue of Fame in its centre, and at its angles four small basins. On the north side of the square is the government palace, formerly occupied by the viceroys; it is a large but gloomy-looking edifice. On the east side of the square are the cathedral and the archiepiscopal palace; the former is a handsome building of considerable extent. On the west side, which faces the cathedral, is the town-hall and the city prison; the south side is occupied by private houses, generally built in a good style.

Lima has fifty-six churches, and before the revolutionary war there were forty-six convents of monks and nuns; but most of them have since been abolished. It is not deficient in institutions for the instruction of the higher classes, having three colleges or higher schools, a college of medicine and surgery, a university, and a botanic garden. There are also several charitable institutions, and among them sixteen hospitals for sick persons and two foundling hospitals. Great sums of silver have been coined at different times in the mint of Lima.

The population amounts to about 70,000 persons. The number of creoles is about 25,000, and they constitute the most numerous class of inhabitants. There are 15,000 free mulattos, and an equal number of slaves. The Indians and mestizos living in the city and suburbs amount to nearly 12,000. The manufactures are not numerous nor extensive. The principal manufactured articles are utensils and vessels of silver, gilded leather, and cotton-cloth; gold lace and epaulettes are of excellent workmanship. Among the creole inhabitants are many rich families who owe their fortunes to the mines, and are now large landed proprietors. Though the produce of the mines has greatly fallen off, gold and silver still constitute the principal articles which are sent to foreign countries. (Ulloa, *Voyage to South America;* Humboldt; Meyen's *Reise um die Welt;* Haigh, *Sketches of Buenos Ayres, Chile, and Peru; Campaigns in Venezuela,* &c.)

LIMA. (Zoology.) [PECTINIDÆ.]

LIMACELLA. [LIMACINEA; LIMAX.]

LIMACI'NA. [HYALÆIDÆ, vol. xi., p. 372.]

LIMACI'NEA. M. de Blainville's name for his third family of *Pulmobranchiata*, the first order of his second subclass, *Paracephalophora Monoica*. M. de Blainville thus defines the family ('Genus *Helix*, Linn.'):—

Animal very variable in form; the *head* provided with two pair of *tentacula* completely retractile into the interior, the posterior pair longest, carrying the *eyes* on their extremities; one *tooth* in the upper lip; the *lingual* mass small and covered with a skin beset with microscopic teeth.

Shell of a form as variable as the body of the animal, rarely subampullaceous, often normal, oval or globular, sometimes turriculated, pupaceous or discoïd, almost constantly without an epidermis, rarely hairy (velue), with the summit always blunt; the aperture round, semilunar, oval or angular, but never notched.

M. de Blainville adds, as an observation, that all the animals of this family are terrestrial, and that all feed on vegetable substances.[*]

The following are the genera comprehended under the *Limacinea* in the 'Malacologie' of the author above quoted:

Succinea, comprehending also *Amphibulimus* of Lamarck.

Bulimus, comprehending also *Bulimulus* of Leach.

Achatina, comprehending also the genera *Liguus* of Denys de Montfort, and *Polyphemus* of the same author.

Clausilia.

Pupa, comprehending also the genera *Chondrus* of Cuvier, *Gibbus* of Denys de Montfort, *Vertigo* of Müller, and *Partula* of De Férussac.

Tomogeres of De Montfort (*Anostoma* of Lamarck).

Helix, comprehending the genera *Carocolla*, Lam.; *Iberus*, De Montf.; *Caracolus*, De Montf.; *Acavus*, De Montf.; *Helicella*, Lam.; and *Zonites*, De Montf.

Helicolimax (Vitrine), including the genus *Helicarion* of De Férussac.

Testacella.

Parmacella.

Limacella.

Limax, including the genera *Arion*, Fér.; *Philomique*, of Rafinesque; and *Eumèle*, of the last-named author. And

Onchidium, including *Veronicella*, Blainv. [HELICIDÆ; LIMAX.]

LIMAX, the Latin name for those air-breathing naked gastropodous mollusks, so injurious to the agriculturist and horticulturist, vernacularly known by the name of *Slugs*.

Linnæus employed the term *Limax* as a generic appellation for the *naked slugs*, placing the genus at the head of his (*Vermes*) *Mollusca*, and comprehending under it eight species, all terrestrial excepting the last, viz. *L. papillosus*, to which he assigns the European Ocean as a locality, adding that the animal is submarine, and should probably be rather referred to the genus *Doris*.

The following is the definition given by Linnæus:—

Body oblong, repent, with a fleshy shield above and a longitudinal flat disk below. A dextral *lateral foramen* for the genitals and excrements. Four *tentacles* above the mouth. ('Syst. Nat.' ed. 12, 1767.)

In addition to this employment of the term, Linnæus used the word *Limax* to designate the soft parts of most of the genera of his (*Vermes*) *Testacea*, indeed of all that progress upon a flattened disk or *foot*, marine as well as terrestrial; for the very imperfect information of the time when he wrote did not enable him to make those distinctions which modern zoologists have pointed out, aided by more copious materials, and by the labours of accurate zootomists and observers bestowed upon those materials. Thus we find in the 'Systema Naturæ,' '*Conus*. Animal Limax.'—'*Cypræa*. Animal Limax.'—'*Bulla*. Animal Limax.'—'*Voluta*. Animal Limax.' In short, the animal of each genus of his '*Univalvia spirâ regulari*,' with the exception of *Argonauta* and *Nautilus*, is stated to be a *Limax*, and the same animal is also assigned to *Patella*, which stands at the head of his '*Univalvia absque spirâ regulari*.'

Cuvier, in the first edition of his 'Règne Animal' (1817), places the '*Limaces*' (*Limax*, Linn.) at the head of his *Pulmonés Terrestres*, nearly all of which he describes as having four tentacles; two or three only of very small size not having exhibited the lower pair—'n'ont pas laissé voir la paire inférieure.' Those among them, he adds, which have no apparent shell formed, according to Linnæus, the genus *Limax*, which Cuvier subdivides into the groups of the *Limaces*, or slugs properly so called (*Limax*, Linn.); the *Testacelles* (*Testacella*, Lam.); and the *Parmacelles* (*Parmacella*, Cuv.). In the last edition of the 'Règne Animal' (1830), he adds under *Limax* the subdivisions distinguished by De Férussac, viz. *Arion* and *Vaginulus*.

In both editions he describes the *Limaces proprement dits* as having an elongated body, and for a mantle a fleshy compact disk, which occupies the anterior part of the body alone, and covers the pulmonary cavity only. This disk contains, he adds, in many species, a small oblong and flat shell, or at least a calcareous secretion in lieu of it. The orifice of respiration is on the right side, towards the front, and the anus is pierced at its posterior border. The four tentacles are put forth and withdrawn by unrolling themselves (en se déroulant) like the fingers of gloves, and the head itself can be withdrawn in part under the disk of the mantle. The organs of generation open under the right upper tentacle. There is but one jaw (upper), in the form of a dentilated crescent, which serves them to gnaw with much voracity the herbs and fruits to which they do so much damage. Their stomach is elongated, simple and membranous.

Lamarck ('Histoire Naturelle des Animaux sans Vertèbres,' tom. vi., part ii., 1822) thus defines his *Limaciens*:—Branchiæ creeping (rampantes), under the form of a vascular net upon the wall (paroi) of a particular cavity, the aperture of which is a hole which the animal contracts or dilates at its pleasure. They respire the free air only.

The same zoologist remarks that the *Limaciens* constitute a natural family and a very remarkable one, inasmuch as the animals which compose it are the only ones among the Gastropods whose respiratory organ, which is truly branchial, breathes nothing but free air, and he thence names them *Pneumobranches*. These mollusks, he continues, are naked or nearly entirely naked. Their body is elongated, creeping upon a ventral disk which is not separated from it, and bordered on the sides by a mantle which is most frequently very narrow. Originally from the waters (originaires des eaux[*]), they live habitually in their neighbourhood; but some inhabit, nevertheless, places which are at a distance from the water, but nearly always in cool and humid localities. They have accustomed themselves (ils se sont accoutumés) to breathe air with their *branchiæ;* so that this habit has become a necessity to them. Here it is, for the first time, as regards the mollusks, that the free air is the fluid breathed. This fluid penetrates by a hole, and without either *trachea* or *bronchiæ* into a particular cavity which is not divided into many partitions (loges) or cellules, but on the walls of which little lace-like vessels or a vascular net-work (des cordonnets ou des lacis de vaisseaux) creep in divers forms and receive the influence of the respiration. A similar or analogous cavity is found in a great number of the *Trachelipods;* but in those which respire air only, the influence of this fluid, being very superior to that of water, requires in the organ presented to it only a very small surface. Thus the vascular lace-like work (cordonnets vasculaires) which creeps over the walls of the cavity, and which in that respect resembles the same parts in the Limacians, project very little; whilst in those which respire water only the cavity offers very projecting and vascular parts (such as pectinated laminæ of different sizes) to the influence of the fluid respired. The branchial cavities of which we are speaking, even that which is adapted for breathing air only, cannot be reasonably confounded with a lung, which is a respiratory organ of a particular fashion, adapted to organizations of a superior order, an organ which is essentially cellular, and into which the fluid respired is introduced at least by an internal *trachea*, and often by *bronchiæ* besides. This modification, then, of the respiratory organ has peculiar characters which *branchiæ* or gills, whatever be their form and situation, never offer. If, in order to determine the name or the kind (espèce) of a respiratory organ, that organ is considered only with reference to the fluid respired, then all animals which respire free air may be said to possess a lung; but if, in order to facilitate the study of the different modifications of organs which serve for respiration, and in order to seize the means which nature has employed to effect the progressive composition of the animal organization as well as its perfection, one considers the characters proper to each sort of respiratory organ, it will be then evident that no mollusk nor any other invertebrate animal respires by means of a lung, although many among them respire the free air. Besides, independently of the particular and well-known structure of every lung, the air never penetrates except by the mouth of the animal, whilst in every respiratory organ distinct from a lung the fluid respired, whatever it be, is always introduced by another passage. To confound objects so different, each of which is appropriated to the degree of organization to which it belongs, and can only exist in an organization of that degree, is, in our opinion, to render the knowledge of the order of nature in her productions impossible. In fact, in the course of the animal kingdom, such a function could not be executed except by an organ or system of organs differently modified, because it must be in relation with the state of organization of which it forms a part.

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[*] But note—Testacella,[*] which M. de Blainville includes in the family, feeds principally on earth-worms

[*] Here Lamarck's system of progressive development, &c. and the effect it had upon his views peeps out. See his Life, ante, p. 280. He here pronounces terrestrial animals to be 'Originaires des eaux,' and would have us believe that having accustomed themselves—why, he does not tell us—to breathe air, the habit has become a necessity, and so they have become terrestrial.

To return, continues Lamarck, to the particular object before us, I will say that *branchiæ*, although they present themselves under a multitude of forms and different situations, never resemble, notwithstanding, a lung. This respiratory organ, then, is peculiar; and we know that it has the power of habituating itself to respire air. In fact many crustaceans which live nearly constantly on land respire there this last fluid only with their *branchiæ*. If the *Colimacés*, as well as the *Limneans*, have a branchial cavity similar to that of the *Limacians*, and breathe the free air only, this cavity is also the same as that of the *Melanians* and other *Trachelipods* which breathe water only. But in the first the respiratory organ presents a small surface only to the fluid respired; whilst in the second the organ in question offers a much larger extent of surface. In each case these organs are always branchial, but adapted to the power of the influence of the fluid respired, and situated in analogous cavities.

Thus far Lamarck, who concludes by comprehending under his *Limacians* the following five genera: *Onchidium, Parmacella, Limax, Testacella*, and *Vitrina*.

The second section of the *Limacineans* of M. de Blainville, or those which have the anterior border of the mantle enlarged into a species of buckler, the shell being null or nearly membranous, consist of the genera *Vitrina* or *Helicolimax, Testacella, Parmacella, Limacella, Limax*, and *Onchidium*, together with their subdivisions, as noticed in the article LIMACINEA. With regard to the marine species, which Cuvier has approximated to these, M. de Blainville observes that they constitute his genus *Peronia* in his order of *Cyclobranchians*. [CYCLOBRANCHIATA, vol. viii., p. 249.]

M. de Férussac's conclusions on the subject of the *Limacidæ* may be gathered from the present article and that on HELICIDÆ, as may be the opinions of Mr. Gray on the distinction between *Arion* and *Limax* pointed out by De Férussac, and Mr. Gray's views with regard to the *Arionidæ* and *Limacidæ*. [HELICIDÆ, vol. xi., p. 109.]

M. Rang arranges the *Limaces* of De Férussac (*Limaciens* of Lamarck, *Limacinés* of De Blainville, *Nudilimaces* of Latreille), as the first family of the *Pulmonés Inoperculés* of De Férussac (*Pulmobranches* of De Blainville), and makes it consist of the genera *Onchis*, Fér.; *Onchidie*, Cuv.; *Peronia*, De Blainv.; *Onchidium*, Buchanan; *Veronicella*, De Blainv.; *Vaginulus*, De Fér.; having a general cuirass:

The genera *Limacella*, Blainv.; *Limax*, Lam. (including *Arion*, Fér.); *Parmacella*, Cuv.; which have a partial cuirass: and

The genus *Testacella* (including the *Plectrophore*) of Férussac, which is without any cuirass.

M. Deshayes, who praises Lamarck's observations on the nature of the respiratory organ of the terrestrial mollusks which breathe air, remarks (second ed. of Lamarck, tom. vii., 1836), at the end of Lamarck's account of the *Limacians* above stated, that since the publication of the work of the latter many important treatises have been published both on the family of the *Limaces* and on the terrestrial mollusks taken as a whole. The most complete and the most important of these works is, he observes, most certainly that of M. de Férussac, although it may not be without some grave faults. The finished parts, laying aside the systematic ideas of the author, offer a very satisfactory collection of observations for the study of the terrestrial mollusks. After adding that the friends of science ought to regret that there remains so much to be done in order to finish this great scientific enterprise, M. Deshayes proceeds as follows:—'We have already censured in the method of Lamarck the separation of the *Gastropods* and the *Trachelipods*, a separation artificial and useless, especially as regards the grand series of mollusks, where this division is the less tolerable, because there it is that the passage of the *Gastropods* properly so called and of the *Trachelipods* is effected in the most imperceptible manner and by means of a curious series of modifications. Cuvier, who, in his memoir on the *Limaces* and *Helices*, has justly advanced the proposition that there scarcely exist any zoological characters proper for the distinction of these two genera, could not coincide in the opinion of Lamarck, and in this he was wisely imitated by the greatest number of zoologists. M. de Férussac collected into two orders all the air-breathing mollusks, according as they were or were not provided with an *operculum*. Those which are operculated are few, and consist of two genera only, which we find among the *Trachelipods* of Lamarck. Those which are not operculated comprise a considerable number of genera grouped in families. The first is that of the *Limaces*, corresponding, exactly enough, with the family of *Limacians* of Lamarck. It comprehends however twelve genera, whilst that of Lamarck only contains five; but when we come to examine attentively these different genera admitted by M. de Férussac, we soon perceive that many are too uncertain to be definitely adopted. M. de Blainville himself has rejected many of the genera of this family which he had at first adopted; and in his 'Treatise on Malacology' he has reduced them to five. M. Cuvier, in the last edition of the 'Règne Animal,' has not adopted more than the genus *Vaginulus*, to which M. de Blainville has given the name of *Peronia*, which occasions a sad confusion in nomenclature. It will suffice, then, to add the genus *Vaginulus* to the family of *Limacians* of Lamarck, to render it as complete as the most positive observations require.'

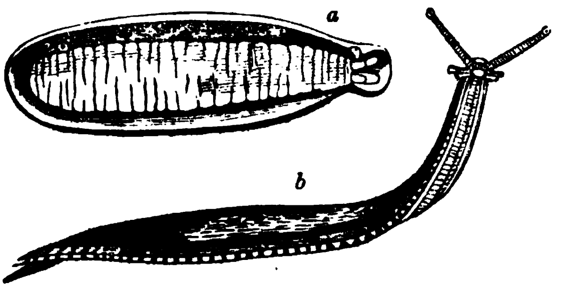
Mr. Gray, as we have seen in the article *Helicidæ*, is of opinion that, at present, only a few genera, as *Arion* and *Helicarion*, Fér., *Nanina*, Gray, and *Stenopus*, Guilding, can be referred with certainty to the *Arionidæ*, though he thinks it very probable that, when the animals of other shells are known, many of them may be found to belong to that family. In this state of our information we shall confine ourselves in this article to those forms of the naked truly terrestrial *Limacidæ* which are, for the most part, popularly known under the name of *Slugs*, and shall notice the genera with external shells under their respective titles, though we quite agree in the principle of the general similarity of the zoological characters of the *Limaces* and *Helices*, and the almost imperceptible gradation of form among them.

Vaginulus. (Férussac.)

Animal oblong, elongated, often very slender in its state of extension, convex above; a *cuirass* covering the whole of the body, extending beyond it, and forming in front a sort of hood, wherein the head can be withdrawn; *mouth* armed with an upper jaw; four contractile *tentacles*, the two upper ones long and oculiferous, the anterior short and, as it were, palmated or bifurcated at their extremity; the *foot* oblong, elongated; the *respiratory cavity* towards the middle of the body having its orifice behind, at the extremity of a long canal, and separated from the *anus* by a membrane only; *organs of generation* very distinct on the right, the male organ being near the small tentacle, and the orifice for the eggs towards the middle; no terminal mucous pore.

Shell null, there being neither rudimentary internal shell nor calcareous concretion. (Rang.)

Example. — *Vaginulus Taunaisi* (*Onchidium læve*, Blainv.).



Vaginulus. *a*, the animal contracted—under-side; *b*, the animal extended and in progression.

Geographical Distribution of the Genus.—East and West Indies. M. Rang, who remarks that they have been said to be both terrestrial and fresh-water, states that he never met with them in Bourbon and Martinique, except in the woods and gardens under old fallen trunks.

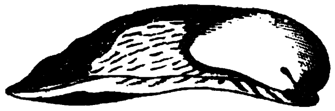
There is great confusion about the nomenclature of *Onchidium*, *Peronia*, *Veronicella*, and *Vaginulus*. Cuvier observes that *Vaginulus* is different from *Onchidium*, with which M. de Blainville has united it, at the same time that he has detached the true *Onchidia*, to form his genus *Peronia*. It appears in fact, as M. Deshayes observes, that M. de Blainville has made of the marine *Onchidia* of Cuvier his (De Blainville's) genus *Peronia*, which he places in his family *Cyclobranchiata* near *Doris*, and that he collects the fresh-water species under the genus *Vaginulus*, to which he unites his genus *Veronicella*, which last he has himself rejected.

Limacella. (De Blainville.)

We give a figure and description of this genus, premising that M. de Blainville himself, who separated it, says, that the combination of characters appears to him so anomalous that he doubts really whether he had well observed the mollusk on which he has established the genus. M. Rang however gives it a place in the family, merely copying the description and M. de Blainville's expressions of doubt above stated.

Generic Character.—*Animal* elongated, subcylindrical, provided with a foot as long and as large as itself, from which it is separated only by a furrow; enveloped in a thick skin, forming at the anterior part of the back a sort of buckler for the protection of the pulmonary cavity, the orifice of which is at its right border; the orifices of the generative apparatus distant, that of the oviduct at the posterior part of the right side, and communicating by a furrow with the termination of the male organ, situated at the root of the right tentacle.

Example, *Limacella Elfortiana.*



Limacella Elfortiana.

Limax.

Animal oblong, more or less elongated, demicylindrical, furnished with a cuirass at the anterior part; head sufficiently distinct, retractile under the cuirass, carrying two pairs of tentacles equally retractile, terminated in a rising (bouton), the upper pair long and oculiferous, the lower pair short; foot great and oblong, the pulmonary cavity situated under the cuirass, and opening under its right border; orifice of the anus at the posterior border of that of the respiratory cavity; organs of generation united and showing themselves at the right side anteriorly, near the great tentacle; sometimes a terminal mucous pore.

Shell.—A rudimentary internal shell, or calcareous concretions in the thickness of the cuirass.

Such is the general definition of *Limax* by M. Rang. He observes that M. de Férussac seized on certain anomalies in the characters of these mollusks, which led the latter to separate a certain number, out of which he forms his genus *Arion*. M. Rang observes that this distinction has not been adopted by M. de Blainville, excepting for the establishment of two sections; but M. Rang thinks it better to form the whole into two subgenera, viz. *Arion*, Fér., and *Limax*, the latter consisting of the slugs properly so called.

M. de Blainville divides the genus *Limax* into four sections: the 1st consisting of those species in which the pulmonary orifice is very anterior, the tail carinated, and the rudiment of the shell most evident. This section consists of the *Grey Slugs*; and *Limax griseus* is given as an example.

The 2nd section consists of species whose pulmonary orifice is more posterior; the tail not carinated, hollowed at its extremity into a blind sinus, and the rudiment of the shell granulous. This section consists of the *Red Slugs* (genus *Arion*, De Fér.). The example given is *Limax rufus*.

The 3rd section consists of species whose buckler is not distinct, and which have the ocular tentacles club-shaped, and the others lateral and oblong (genus *Philomique* of Rafinesque). The example given is *Limax Oxyurus*.

The 4th section comprehends those species whose buckler is not distinct, and which have the two pairs of tentacles cylindrical, nearly on the same line, the smaller ones being between the greater (genus *Eumeles*, Rafinesque). The example given is *Limax nebulosus.*

The two last sections are not noticed by M. Rang; and Cuvier is of opinion that the two genera recorded by M. Rafinesque are too imperfectly indicated to be admitted into his (M. Cuvier's) work. M. Rang also declines to admit them till there is more information on the subject.

Subgenus *Arion.*

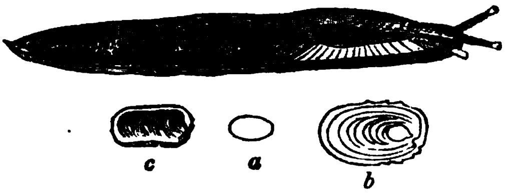
Respiratory orifice situated comparatively forward, towards the anterior part of the buckler, which is rough (chagrinée) and contains small calcareous concretions. There is a terminal mucous pore.

Example, *Arion rufus*, Fér., *Limax rufus*, Linn. This species is sometimes nearly quite black.

Arion rufus. Red Slug.

Subgenus *Limax.*

Respiratory orifice situated comparatively backwards; the buckler is marked with fine and concentric striæ, containing a testaceous rudiment which is solid but without any volutatory impression. There is no terminal mucous pore. Example *Limax antiquorum*, Fér., *Limax maximus*, Linn., *Grey Slug.*



Limax antiquorum, Fer., Limax maximus, Linn., Grey Slug. *a*, internal shell; *b*, the same enlarged; *c*, internal view of the shell from another individual.

Geographical Distribution of the Genus very wide; but the northern and temperate countries of both continents seem to be plagued with a greater number than those of the torrid zone. They are found in Africa, and have been noticed at each extremity of that quarter of the globe. MM. Quoy and Gaimard describe some from New Holland, and M. Rang saw them in India and in the Isle of France.

Utility to Man.—The species of this genus can hardly be of any direct utility to man, with the exception of the supposed virtues of a decoction or 'bouillon' of *Red Slugs* in disorders of the chest, whilst the injury which they inflict on the garden and the field is most devastating, notwithstanding the number of birds which prey upon them. Gardeners are constantly racking their invention to free themselves from these devouring hosts. Quicklime, soot, fine coal ashes, and saw-dust have been used as defences for young and tender plants. The virtue of the first is soon exhausted and the slugs do not care much for the second after awhile, but if the soot be plentifully and frequently renewed it will keep them away in great measure. Coal-ashes, not too coarse, and saw-dust annoy them by sticking to their foot and impeding them. A stout, coarse, horsehair line, such as is used for hanging clothes out to dry, coiled round the stems of wall fruit-trees and stretched along the wall, will operate as a protection to the fruit from both snails and slugs, in consequence of the bristly surface presented to them, and which they shrink from encountering. Care must of course be taken that they do not get under it. Watering evening and morning with strong fresh lime-water is said to have a good effect, for it penetrates about the roots of the plants and into the earth, where they lie hid. Thin slices of any vegetable of which they are more fond than of the crop to be protected will allure them, and they may be thus killed by scores early in the morning by dividing them suddenly with a sharp instrument. The dead bodies should be left on the spot as a bait, for we have seen the living slugs preying upon the exposed bowels of the dead ones, most probably attracted by the half digested vegetable matter. Ducks destroy great numbers of these pests, whilst they improve themselves, but they are apt to trample down a young and delicate crop of vegetables.

Obs.—M. Deshayes, in the last edition of Lamarck (tom. vii., 1836), remarks that the great genus of the *Limaces* is not so easy to study as might be supposed; the colour of the species is easily modified, and everything leads to the belief that they have been multiplied by those authors who have attached too great importance to these characters. M. Deshayes presumes that the European species are less numerous than some naturalists suppose. In passing from the north to the south, the *Limaces* undergo modifications similar to those undergone by other mollusks; and when we have under our eyes a series of modifications impressed upon a species which has lived under different circumstances with regard to temperature, and when we remark that these modifications are capable of being reduced to constant laws, we may believe that modifying agencies, which have acted with so much power on certain races, have had an equal effect on others; and we may foresee, by an induction not at all forced, the future results of observation on this subject. If we see, in fact, species of *Helices* modified, we may believe that similar modifications have taken place in the *Limaces*. These modifications are doubtless less easily recognised in the last-mentioned genus; for there is no solid shell by means of which they may be traced. In this state of things M. Deshayes is of opinion that the only means which science offers for the distinction of the different species of *Limaces* coming from the warm and cold regions of Europe are to be found in a minute dissection. A comparison resting on the form and disposition of certain internal organs would lead, he doubts not, to satisfactory results. Cuvier, continues M. Deshayes, in his anatomical memoir on the *Helices* and *Limaces*, has demonstrated all the analogy which exists between these two genera. Thus those zoologists whose habits of observation enable them to discover the ordinary march of nature might expect to see filled up the considerable interval, in reference to the shell, which would seem to exist between the two genera. The marine mullusks have already offered, if not in the same family, at least in the same group, a phenomenon sufficiently similar to that which is exhibited among the *Limaces* and *Helices*. In many of the *Limaces* we find no trace of a shell; in others, some calcareous grains are observed in a sac included in the thickness of the buckler, placed above the heart and *branchia*. These grains agglutinated constitute in a considerable number of species a flat calcareous plate, entirely internal; soon we find this plate coming out and showing some of its parts externally, while the remainder is still embedded in the thickness of the mantle, but its free extremity begins to be twisted spirally. This sub-internal shell, quite incapable of containing the least part of the animal, increases gradually, changes its place when the organ of respiration changes its situation, and finishes by possessing, by very insensible degrees a development sufficiently considerable to contain the entire animal, as in certain *Vitrinæ* and in all the *Helices*. Of the different degrees which exist between these two extremes of the series of these different modifications, zoologists have made so many genera.

M. Deshayes concludes his interesting observations by remarking that the history of the *Limaces* is, at the present day, become very considerable, and he finds it impossible to exhibit a complete view of it; for even the greatest brevity would lead him to overstep the limits which he necessarily imposed on himself in editing the work from which we have quoted. He refers the reader particularly to the memoirs of Cuvier for the anatomical part, and to the great work of De Férussac for the history of the genus, the distinction of the species, and the discussion of their characters.

The reader will find parts of the organization of some of the *Limaces*, and a notice of the preparations in the Royal College of Surgeons illustrating them, mentioned in the article *Helicidæ*, vol. xi., pp. 104, 105.

Since the publication of that article, the 4th volume of the 'Catalogue of the Museum of the Royal College of Surgeons' has appeared. Numbers 2297 to 2302 (Gallery), both inclusive, exhibit the generative system of the *Slugs*. Numbers 2303 to 2311, both inclusive, illustrate the same system in the *Snails* (*Helix*). No. 2315 is a specimen of the *spiculum amoris* or calcareous dart of a *Snail;* and Numbers 2846 to 2849, both inclusive, are illustrative of the *coitus* in *Helix aspersa*.

Parmacella.

Animal elongated, oblong, demi-cylindrical, covered on the middle of the back by a rounded, oblong, fleshy cuirass, which is to a great extent free in front; *head* sufficiently distinct, carrying two pairs of retractile tentacles, the one superior, long and oculiferous, the other anterior and short; *foot* large and oblong; respiratory cavity under the posterior part of the cuirass, opening, as well as the anus, by a common solution of continuity under its right border, a little backwards; orifice of generation single, near the right tentacle.

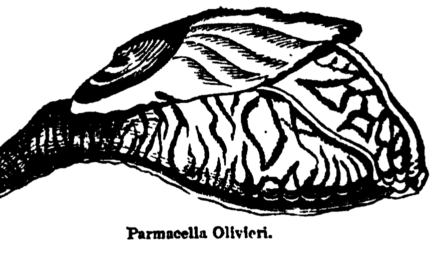
Shell flattened, calcareous, with a membranous epidermis, oval, slightly bent in the direction of its width, with a summit marked by a deep sinus on the right side posteriorly, placed in the thickness of the cuirass, above the respiratory cavity. Cuvier remarks that the shell exhibits behind a slight commencement of a spire.

M. de Blainville divides the genus into two sections: the 1st consisting of species whose tail is not carinated, and whose shell is subspiral (Example, *P. Taunaisi* and *P. Palliolum*, Fér.); the 2nd of species which are more depressed, the tail carinated and the shell scutiform (Example, *P. Olivieri*).

Geographical Distribution of the Genus.—M. de Blainville (*Malacologie*) observes that only two species are known, one from South America, the other from Persia.* Cuvier, in his 'Règne Animal,' notices the species first known, *Parmacella Olivieri*, and says that there is another from Brazil (*P. Palliolum*, Fér.), and some others from the Indies, meaning probably the East Indies. M. Rang, who remarks that the *Parmacellæ* form a very natural genus, very closely approximating to the slugs, states that in Brazil they inhabit the woods, but that at Bourbon and Madagascar he never found them except upon rocks near fresh-water torrents. He adds that Olivier brought the first specimen from Mesopotamia, and that it was this which served for the anatomical researches of Cuvier, under the name of *P. Olivieri;* that M. de Férussac has described another under the name of *P. Palliolum;* and that he (M. Rang) brought back from his voyage in the Indian Seas two others, one of which, *P. Rangianus*, has been described by M. de Férussac as an *Arion* ('Bull. des Sciences,' February, 1827); this was from the Isle of Bourbon and Madagascar.

Example, *Parmacella Olivieri*.

Locality, Mesopotamia.



Parmacella Olivieri.

M. Deshayes (2nd ed. Lam., tome vii., 1836) does not add to the single species given by Lamarck, viz. *P. Olivieri*,

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* Mesopotamia?

Cuv., *P. Mesopotamiæ*, Oken; but he states that an animal coming from Brazil had been sent to M. de Férussac, and anatomized by M. de Blainville; and had been assigned by those authors to the genus *Parmacella*. This animal, according to M. Deshayes, offers nevertheless remarkable differences in the disposition of the organs of generation: but he thinks that these characters do not appear sufficient for the establishment of a genus. Since then, he adds, MM. Webb and Berthelot, who have explored the Canaries with such scrupulous attention, have observed there a mollusk closely approaching the *Parmacellæ*, and especially that from Brazil, and in their synoptic Prodromus ('Ann. des Sci. Nat.,' March, 1833) they have proposed to establish for it a genus under the name of *Cryptella*. But M. Deshayes states that he waits for the description and figure before he pronounces on its admission or rejection.

LIMB. (Astronomy.) The edge of a planet is called its limb; also the edge of any circle which forms part of an astronomical instrument.

LIMBILITE, a mineral so called by Saussure, which occurs in the volcanic hill of Limburg. It is found in irregular grains. Structure compact. Hardness 6·0 to 7·0. Scratches glass easily. Colour honey-yellow. Melts into a black enamel.

LIMBORCH, PHILIP VAN, was born at Amsterdam, the 19th of June, 1633, and was educated at the University of Utrecht. He was one of the most distinguished of the Remonstrant or Arminian theologians, whose tenets were condemned at the Synod of Dort in 1618. [DORT, SYNOD OF.] In 1657 he became pastor of the Arminian or Remonstrant church in Gouda; and in 1668 of another church of the same persuasion in Amsterdam. He was also professor of theology in the same place, in the college of the Remonstrant party. He died the 30th of April, 1712.

Limborch was a man of considerable learning; and his connection with the Arminian party, which suffered considerable persecution at that time from the Dutch government, probably led him to espouse those principles of religious liberty which distinguish most of his writings. He was on intimate terms with Locke; and carried on an extensive correspondence with him for many years. Several of his letters are printed in the third volume of Locke's Works.

The most important of Limborch's works are: 'Præstantium ac Eruditorum Virorum Epistolæ,' Amst., 1660, 1684, 1704; this volume contains the letters of Arminius and the most eminent of his followers on the distinguishing tenets of their system. 'Theologia Christiana,' 1686; 'De Veritate Religionis Christianæ, amica Collatio cum erudito Judæo,' 1687; 'Historia Inquisitionis,' 1692; 'Commentarius in Acta Apostolorum et in Epistolas ad Romanes et Hebræos,' 1661. He also edited many works of the principal Arminian theologians.

LIMBURG (Limbourg) was a province of the kingdom of the Netherlands, as constituted after the overthrow of Napoleon. It consisted of the city of Maastricht and the county of Broenhove, a part of the Dutch portion of the duchy of Limburg, the Dutch portion of the upper quarter of Gelderland, a part of the bishopric of Liege, Austrian Gelderland, parcels of Brabant, Cleves, and Juliers, the little counties of Gronsfeld and Reckheim, and the lordships of Witten, Eys, and Schlenacken, which formerly belonged to the circle of Westphalia in Germany. This province is situated between 50° 44′ and 51° 45′ N. lat., and 4° 57′ and 5° 49′ E. long. It is bounded on the north by North Brabant and Gelderland, on the east by the Prussian provinces of the Rhine, on the south by Liege, and on the west by South Brabant and Antwerp. The figure of the province grows gradually narrower from south to north till it ends in a point about two miles and a half broad; the area is about 1500 square miles, and the population (in 1838) nearly 383,000. The surface of the country is generally level, being diversified only in the south-east part by some slight elevations. The Maas is the principal and the only navigable river. In the adjoining province of Liege, the banks of the Maas are lofty and precipitous; but in the province of Limburg there are elevations only at a distance from the stream as far as Maastricht, from which place the banks are low. In the valley watered by the Maas the soil is very fertile, being covered with a rich black mould. In general the south-western part of the province, especially in the district of Maastricht, has a fertile soil, even where it consists of clay or sand; but the north-west part of this district contains extensive heaths. Of the two other districts, Hasselt and Roermonde, the only fertile portions are, in the first, the southern part between the rivers Jaar and Demer (the former belonging to the basin of the Maas, the latter to that of the Schelde), and in the second, the part along the Maas: the remaining and larger portion of these two districts is occupied by great tracts of heath and moor, where only a few cultivated spots are met with. Besides this, a large part of the great morass called Peel extends from North Brabant into the north of Limburg, and forms a desolate waste. The natural productions are corn, pulse, garden vegetables, fruit, madder, flax, tobacco, chicory; the chief mineral product is coal (150,000 tons annually), and St. Petersberg, near Maastricht, yields good stone for building; the inhabitants have the usual domestic animals, poultry, and small game. They are very industrious agriculturists, and have a good breed of cattle. There are no manufactures of importance in this province. The principal towns in the province of Limburg, besides Maastricht, the capital [MAASTRICHT], are—Bilson, on the Demer, 2800 inhabitants; Hasselt, on the Demer, a pretty well-built town, with 6500 inh., and manufactures of lace and linen; Maseyk, on the left bank of the Maas, 3400 inh.; Heerlen, 4000 inh.; Roermonde, at the junction of the Roer and the Maas, 4500 inh.; Sittard, 3400 inh.; Tongern, on the Jaar, formerly an important town, 4000 inh.; St. Tron, between Brussels and Liege, has manufactures of small-arms, lace, &c., 8000 inh.; Vaels has a great manufactory of woollen cloth, and 2500 inh.; Venloo, a strongly fortified town on the right bank of the Maas, has 5200 inh.; Weerdt, on the Bree, has great brandy distilleries, and 5500 inh.

In consequence of the Revolution of 1830, the province of Limburg was divided between Holland and the new kingdom of Belgium. The division, as sanctioned by treaty in 1831, is stated in detail in a preceding article. [BELGIUM.] We have now only to add, that the province of Limburg, belonging to the kingdom of the Netherlands, has an area of 530 square miles, and 156,000 inhabitants; and that the Belgian province of Limburg has an area of 970 square miles and 227,000 inhabitants. Belgium however is at present in possession of nearly all the portion of the province that is assigned to Holland by the last treaty, and it is now (December, 1838) uncertain how the difference will be decided. [NETHERLANDS.]

LIME. [CALCIUM.]

LIME, Medical Properties of. Though lime exists in almost all plants, yet it is more particularly the characteristic element of animal structures, into which it is introduced with the food, as well as often by the water drank, especially when hard. A deficiency of lime in the body causes a softness of the bones to result; while an excess of it occasions preternatural induration of the bones, morbid growths from them, or exostoses, ossifications of the cartilages, of the heart and arteries, as well as depositions of calcareous concretions in various glands and cavities, such as the urinary bladder. [CALCULUS.] The action of lime on the human system varies considerably according to the state in which it is when introduced into or applied to it. Thus quick-lime is violently escharotic, causing inflammation and often decomposition of the part which it touches, and is never employed save when the actual destruction of the part is intended. In a state of great dilution, such as that of lime-water, or when rendered mild by combination with carbonic acid or phosphoric acid, it scarcely produces any immediate or direct action beyond what results from its combining with the acids of the stomach, and, if in considerable quantity, absorbing the mucous and other secretions. It likewise checks the secretions of mucous membranes with which it is not brought into contact, such as those of the bronchia. After its absorption into the system, it augments the secretion of the kidneys, and at the same time hinders the excessive formation of uric acid.

Lime-water has an effect beyond what results from its combining with any excess of acid, creating diarrhœa, for it acts as an astringent and tonic. Hence it removes a tendency to the disease, as well as cures it, when debility is the cause. Its action is often promoted by combination with aromatics, as in the aromatic confection, and occasionally with opium. Carbonate of lime in the form of prepared chalk acts in a similar way, but is accompanied with a disengagement of carbonic acid, which is sometimes beneficial, at other times distressing to the patient. [ANTACIDS;

ASTRINGENTS.] Lime-water is often the most effectual means of reconciling the stomach to a milk-diet, and is also of great service in removing the tendency to the generation of worms. [ANTHELMINTICS.] Lime-water with olive oil is a useful application to burns.

Chloride of lime appears to exercise a specific power over the lymphatic vessels and glands, increasing their activity, so that under its influence various swellings and indurations have first softened and then disappeared. This is the more remarkable as bronchocele, or enlargement of the thyroid gland, seems to be caused chiefly by drinking water abounding in calcareous salts. Chloride of lime has been strongly recommended in scrofula. It is generally given in the form of solution, but in a dry state, with extract of conium, it is even more useful.

The great tendency of chloride of lime to absorb humidity from the air renders it of much utility in preserving steel and surgical instruments from rust. Hence the presence of a portion of it in chests sent to sea protects the fine edge from erosion. For the use of the chloride (hypochlorite) of lime as a disinfecting agent see ANTISEPTICS and CHLORINE.

Phosphate of lime has been recommended in rickets and other diseases of the bones in which this earth is deficient. Its utility is increased by using at the same time phosphate of iron, or, if that cannot be obtained, the sesquioxide or rust of iron. This salt and many other salts of lime exist in different mineral waters, and some of their effects are due to this impregnation. [MINERAL WATERS.]

LIME. [MANURE.]

LIME TREE. [TILIA.]

LIMERICK, an inland county of the province of Munster, in Ireland, bounded on the north, except at the city of Limerick, by the river Shannon, which separates it from the county of Clare, on the east by the county of Tipperary, on the south by the county of Cork, and on the west by the county of Kerry. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge, it is situated between 52° 17′ and 52° 47′ N. lat., and between 8° 5′ and 9° 22′ W. long., and extends from O'Brien's Bridge on the north, to the Cork boundary at Knockea on the south, 35 statute miles, and from Abbeyfeale on the west, to the Tipperary boundary at Gaultybeg on the east, 54 miles. The area, according to the same map, is 479,580 statute acres, or 749 statute square miles, inclusive of the county of the city of Limerick. It is elsewhere estimated at 640,621 acres, of which 546,640 are cultivated, and 91,981 are unimproved bog and mountain; but this calculation is probably much more accurate in the relative proportion of arable and waste than in their united absolute extent. In 1831 the gross population was 248,201.

The general character of the surface of Limerick is that of an extended undulating plain, sloping with a gentle declivity towards the Shannon on the north, and surrounded on its southern and western borders by a well defined margin of mountain groups and hilly uplands. A mountainous tract occurs also in the north-eastern extremity of the county, between which and the mountains on the south the plain spreads eastward into Tipperary. The group on the north-east constitutes the southern extremity of that extensive chain which, commencing at Keeper mountain and its subordinate range in Tipperary and Limerick, runs northward to the King's County, where it terminates in the range of Slieve Bloom. The names of the Slieve Phelim and Bilboa mountains are applied to those subordinate portions of the Keeper group which spread southward into the counties of Limerick and Tipperary respectively, and it is by the declivities of these united ranges that the level district uniting those counties is limited on the north. The general direction of the Slieve Phelim hills is from north-east to south-west, and this is also the course pursued by the streams descending from them. These streams, falling into the Bilboa river, which runs westward along the foot of the mountains of that name out of Tipperary, form the Mulkern river. The Mulkern, increased by the Newport descending direct from Keeper, carries a good body of water to the Shannon, which it enters a little above the city of Limerick. The county between the western declivities of the Slieve Phelim hills and the Shannon is, towards the extremity of the county, flat and boggy, but has a pleasingly diversified surface along the banks of the Mulkern. The villages of Cappamore, Abington, and Annacotty are situated on this river. About midway between the embouchure of the Mulkern and O'Brien's Bridge, at the extremity of the county, is Castle Connell, a well built small town, surrounded by delightful scenery. It is built on the eastern side of the Shannon, which, flowing between well-timbered banks, chiefly occupied by demesnes and pleasure-grounds, forms a series of precipitous rapids of uncommon grandeur, the principal of which is known as the Leap of Doonass. The valley of the Shannon is here contracted by the Slieve Baughta mountains on the one side, and the range of Keeper on the other, and presents features of a highly grand and striking character throughout a distance of several miles.

The principal features of the great plain of Limerick, extending from the Mulkern westward and southward to the mountains on the borders of Kerry and Cork, are the rivers Maigue and Deel, which traverse it from south to north in nearly parallel courses. The basin of the Maigue embraces the entire eastern and south-eastern division of the county. This river has its source in the high land stretching southward to Charleville, in the county of Cork, from whence it runs a little west of north to the Shannon, and pretty nearly bisects the central plain of Limerick. Its chief feeders have their sources among the mountains which occupy the south-eastern division of the county. These consist of a continuation of the great Gaultee range, and of a detached group called the Castle Oliver mountains, rising at a short distance from its western extremity. The Looba, formed by the streams descending from the northern and north-western declivities of the latter, runs westward from Kilfinnan by the decayed town of Kilmallock through a rich grazing country, and joins the Maigue near its source. The Star river, rising near Galbally, in the interval between the Gaultee and Castle-Oliver mountains, traverses a similar vein of deep pasture and tillage lands in a north-western course through Bruff, and joins the Maigue about five miles from its junction with the Looba. The Camogue, the most considerable stream of the three, rises on the borders of Tipperary in the open country skirting the northern declivities of the Gaultees, and runs nearly parallel to the Star, at an average distance of about five miles, by Hospital and Six-mile-Bridge, to a mile above Croom, where it meets the Maigue, which, five miles below the point, becomes navigable at Adare. From Adare to the Shannon is a distance of twelve miles of navigable river. The only striking feature of the plain watered by the above tributaries of the Maigue is Loch Gur, a picturesque sheet of water three-quarters of a mile in length, embosomed among romantic knolls, some of which have a considerable elevation, about midway between Six-mile-Bridge and Bruff. A cave and the ruins of a strong fortress on an island in the lake add to the interest of the scene. From the summit of Knockfennel, one of the hills forming the basin of the lake, a magnificent view is obtained of the surrounding plain, comprising the greatest extent of arable land unencumbered with bog in Ireland, bounded by an imposing amphitheatre of distant mountains. The country north of the Camogue, between it and the Mulkern and Shannon, have a more varied surface than that above described. The conical hills of Kilteely and Knockdirk, Pallas Hill, and the hill of Knockrua, rise within a short distance of one another on the Tipperary border, about midway between the more marked mountain boundaries which limit the plain on the north and south Several minor heights rise throughout the plain immediately south of the liberties of Limerick, which lie along the Shannon. The small town of Pallasgrean is situated on the Tipperary side of this district, Caberconlish about its centre, and Patrick's-well, towards the Maigue, on the road from the city of Limerick to Adare.

The county west of the Maigue for about two-thirds of its extent has much the same character of surface as the district last described, the remainder being included in the mountainous region stretching westward into Kerry. It is watered by the Deel, a river of nearly equal size with the Maigue, and also navigable for three miles above the Shannon, into which it falls below Askeaton. The lower portion of the courses both of the Deel and Maigue is through so flat a country that their respective valleys are scarcely observable, but in the district intervening between their sources there is a good deal of high ground, particularly about the small town of Ballingarry, in the neighbourhood of which are the steep hills of Knockfeernha and Kilmeedy; the former of which has an elevation of 907 feet;

The valley of the upper Deel lies between these heights on the east, and the high country towards Kerry on the west, which latter rises round this margin of the level district in a continuous sweep of upwards of twenty miles in compass from Drumcullagher, at the head of the river, to Shanagolden and the Shannon. The town of Newcastle is situated on the south-western border of the plain between the river and these mountains; and lower down upon the Deel, on the road from Adare to Newcastle, is Rathkeale, the most considerable place, next to the city of Limerick, in the county. At the northern extremity of the mountain-range the detached hill of Knockpatrick rises boldly between the town of Shanagolden and the Shannon. From Shanagolden westward the surface is rough and hilly, rising at the distance of two or three miles from the Shannon into sterile tracts of bog and mountain, which spread southward and westward into the counties of Cork and Kerry, forming altogether a mountainous area of 900 square miles. The village of Glin is situated on the shore of the Shannon under the northern termination of these highlands, in the north-western extremity of the county. The mountains which rise in a continuous ridge towards the valley of the Deel are backed by other groups running east and west, the valleys formed by which are traversed by various streams, which join the Geale and Feale rivers, running westward into Kerry. On the Feale, at its junction with the Ulahane, which descends from one of these glens, is situated the town of Abbeyfeale, in the extreme south-west of the county, and nearly in the centre of the mountainous region above mentioned.

Although the Shannon does not lose the character of a river until after passing beyond the bounds of this county, yet for all the purposes of commerce it is equivalent to an equal length of sea-coast from Glin to Limerick, a distance, including the windings of the river, of about 35 miles. With the exception of a few points, which may be improved at a small expense, the navigable channels of this part of the river are capable of admitting vessels of heavy burthen as far as the pool of Limerick, situated about two miles below the city. At present there is a great deficiency of beacons, buoys, and marks to guide vessels in these channels, and there are no suitable piers or landing-wharfs along the shore. Several such works are however contemplated by the present commission for the improvement of the Shannon, including piers at Glin and Kilteery, of an estimated cost of 5879*l.* and 1836*l.* respectively, and quays at Foynes and Askeaton, the estimated cost of the latter being 900*l.* It is also proposed to widen and deepen the channel of the Maigue, as well as the old branch canal and basin connecting that river with the town of Adare, so as to form an inland navigation for vessels of considerable draught, of 12 miles from the Shannon. [SHANNON.]

The leading lines of road diverging from Limerick to Clonmel, Cork, and Tralee are carried nearly in straight lines over the open country. The two latter lines pass through the principal places in the county, the Cork road running by Bruff and Killmallock, and that to Tralee by Patrick's-well, Adare, Rathkeale, Newcastle, and Abbeyfeale. A new road by Croom to Charleville, and thence to Cork, is in progress. The opening of several new roads by government in 1829, through the mountainous district surrounding Abbeyfeale, has had the best effect in promoting peaceful and industrious habits among the population of that portion of the counties of Limerick, Cork, and Kerry.

A line of railroad from Dublin through Limerick, along the southern bank of the Shannon, to Tarbert in Kerry, has been recommended by the commissioners appointed to consider and recommend a general system of railways for Ireland.

The climate is remarkably good, and the least variable of that of any of the western counties of Ireland. Instances of longevity are very numerous.

Geology.—The level part of the county consists of the carboniferous limestone of the central plain of Ireland. The mountain groups and detached eminences of its eastern and southern margins are formed by the protrusion of older rocks, and the high lands on the west consist of more recent series superimposed. The Slieve Phelim and Bilboa groups, in common with the extensive range of which they form a part, consist of a nucleus of clay-slate supporting flanks of yellow sandstone and conglomerate disposed in conformable beds. Towards the south-western extremity of the Slieve Phelim group the yellow sandstone disappears and the clay-slate is bordered by a tract of old red sandstone. Old red sandstone also forms the nucleus of the Slievenamuck chain, an offset of the Gaultees, the western declivities of which spread into Limerick above Galbally. The clay-slate reappears in the central summits of the Gaultees and Castle Oliver mountains, flanked by old conglomerate with red, purple, and green clay-slate, sustaining a margin of yellow sandstone. Old red and green sandstone, the latter supported by the former, compose the various protrusions which rise between and in the valleys of the Upper Maigue and Deel rivers, except in Knockfeernha hill, where a mass of crystalline greenstone trap supplies the place of the more general nucleus. Trap protrusions occur in twelve distinct localities in the eastern part of the county, between the embouchure of the Maigue and the border of Tipperary. Of these the most striking are the hills of Pallas, Kilteely, and Knockdirk. The interstratification of the floetz limestone and trap rocks is here well marked, both on the large and on the small scale, the open country exhibiting numerous parallel ridges of low elevation, caused by the successive outcrops of massy beds of trap and limestone in alternation with each other, and the escarpments of the hills exposing the subordinate divisions that arise from the interposition of thinner strata of limestone in the igneous rock. The general structure of these greenstone protrusions resembles that of the hill of Croghan [KING'S COUNTY], particularly in the case of Pallas hill, which is, like Croghan, remarkable for the great fertility of its soil. Pallas hill is further distinguished by the presence of columnar basalt, which overlies the amorphous trap of its northern brow. A façade of about sixty yards in length by seventy to eighty feet in height has been exposed by quarrying. The columns incline towards the north at an angle of 75°, and are of irregular figures, chiefly disposed to the pentagonal and hexagonal forms. There are two clusters of such pillars. On the west of the hill is an outcrop of red iron claystone. Felspar porphyry occurs in various forms throughout the hills of Knockdirk, Kilteely, and Knockrua. The mountainous district on the west of the county belongs to the great Munster coal-tract, which is probably the most extensive in the British islands. The coal occurs in troughs, as in the Killanaule district. [KILKENNY.] Six distinct beds have been observed; but the coal is usually of a slaty structure, and much softer than that of Tipperary or Kilkenny: it is chiefly used for burning lime. Owing to the undulating character of the surface and the consequent magnitude of the angle (usually from 60° to 70°) which the beds make with the horizon, the mining operations are conducted upon the same system as those of the metallic veins. The only workings within Limerick have been at Newcastle and Loughill, in the north-western extremity of the county, where the shale and sandstone repose immediately on the upper or splintery limestone. The latter is the surface-rock throughout the rough tract west of Shanagolden, between the Shannon and the bolder acclivities of the highland country. About seven miles from the city of Limerick, near the Askeaton road, is a quarry producing a fine maroon-coloured marble, which can be raised in blocks of any size, and to an unlimited extent; and in the more immediate vicinity of the city black marble, but of an inferior quality, is got in abundance, and generally used as a building-stone.

Iron, copper, and lead ores are found in various localities throughout the district occupied by the trap protrusions, but no veins are at present worked.

Soil and Agriculture.—A tract of extraordinary fertility, called the Golden Vein, stretching westward out of the county of Tipperary, occupies the greater part of the eastern plain of Limerick. It extends from the sources of the Maigue to the Mulkern, and has an area of about 160,000 statute acres. The soil is a rich, mellow, crumbling loam, and is equally suited to grazing or tillage: it is chiefly in pasture. One acre is considered sufficient to fatten the largest bullock and a sheep. A still richer soil is that of the 'Corcasses,' which extend for fifteen miles along the southern bank of the Shannon, from a little below Limerick to the embouchure of the Deel. They are similar in character to those of the opposite side of the river [CLARE], having a soil of yellow or blue clay, covered with a deep rich black mould. They yield the greatest wheat crops raised in Ireland; and their produce of potatoes sometimes amounts to one hundred barrels of twenty-two stone each to the Irish acre. The soil of the remainder of the limestone plain is light and sweet, very good for tillage, and yielding an excellent pasture for dairy cattle and sheep. Not more than one-fourth of the level district is however under tillage. Pasture and dairy farming are the staple occupations of the people. The store-farmers are comparatively a wealthy class, and frequently have stocks of from 400 to 600 head of cattle; they usually purchase at Ballinasloe, and sell at the fairs throughout the county, which are regularly attended by Cork buyers. The sale of stock in Limerick city has latterly been inconsiderable. Great quantities of butter are made throughout the county. Limerick is the chief point of exportation, but considerable quantities find their way to Cork from the extreme south and south-west. The butter of Limerick ranks above that of Cork in the London market, but does not in general bring so high a price as the butters of Belfast and Carlow. The making of cheese is not attended to. Pigs of a very superior description are bred in great numbers by the dairy farmers. An excellent cider is made in the districts about Rathkeale, Adare, Croom, and in some other localities. The apple which produces the most esteemed liquor is called the Cackagee. The following table shows the sales of grain in the years 1826 and 1835:—

	Barrels of Wheat, of 20 Stone.		Barrels of Oats, of 14 Stone.		Barrels of Barley, of 19 Stone.	
	1826.	1835.	1826.	1835.	1826.	1835.
City of Limerick	51,555	132,608	290,957	321,326	13,533	36,953
Kilfinnan . .			4,285	4,295		
Newcastle .	20	25	1,542	1,607	250	281
Rathkeale .	4,515	8,960	1,647	1,931	375	243
Shanagolden .	1,460	2 437				
Kilmallock ,	2,409	6,122				
Cahirass . .	10,751	20,750				
Bruff . .	922					
Greenville .			7,000	8,342		
Askeaton ,	3,500	7,820				

There are no returns for Glin and Croom, and those for Askeaton are deficient.

There is a small manufacture of coarse woollens for home consumption, and the bleaching of linen is carried on, but on a contracted scale. There are three paper-mills, and large and powerful mills for the grinding of corn at Cahirass, Askeaton, Corbally, Croom, Rathkeale, Kilmallock, and Greenville. In 1831 there were in the county, exclusive of the county of the city, 25 flax-dressers, 36 millers, 5 paper-makers, 15 tanners, 9 tobacconists, 1146 weavers, and 11 wool-combers.

The condition of the peasantry is better in the grazing than in the tillage districts. The subdivision of farms and the system of con-acre have contributed, in some localities in the south-east and north of the county, to reduce the labouring population to a very low standard of subsistence. The average wages of agricultural labourers are, in winter, eightpence, and during the rest of the year tenpence per day, for 140 working days in the year.

There is a numerous resident proprietary, whose seats and demesnes afford a pleasing contrast to the generally bare aspect of the county; for, except about the residences of the upper classes, timber is very scarce. The number of large absentee proprietors is however very considerable, and they do not in general keep up establishments within the county. Among the residents are many gentlemen farmers who practise the most approved systems of green-cropping and stall-feeding. Their example has of late years led to a marked improvement in agriculture, as well as in the breed and quality of stock.

Limerick is divided into the baronies of *Owneybeg* on the north-east, containing the village of Murroe, population (in 1831) 256; *Clanwilliam*, south of Owneybeg, containing the town of Cahirconlish (pop. 703); *Coonagh*, south-east of ditto, containing the village of Pallasgrean (pop. 379); *Small County*, south of the two latter, containing the town of Hospital (pop. 1131); *Coshma*, south of Small County, containing the towns of Bruff (pop. 1772), Croom (pop. 1268), and Adare (pop. 766); *Coshlea*, in the south-eastern extremity of the county, containing the towns of Kilfinnan (pop. 1752) and Galbally (pop. 560); *Pubblebrien*, on the west of Clanwilliam, containing the town of Patrick's-well (pop. 512); *Kenry*, west of Pubblebrien, containing the town of Pallaskenry (pop. 630); *Lower Connello*, containing the towns of Rathkeale (pop. 4972), Askeaton (pop. 1515), Glin (pop. 1030), and Shanagolden (pop. 847); and the villages of Ardagh (pop. 415), Loughill (pop. 277), and Croagh (pop. 274); and *Upper Connello*, containing the towns of Newcastle (pop. 2908), Ballingarry (pop. 1685), Drumcullagher (pop. 658), and Abbeyfeale (pop. 607); and the villages of Bruree (pop. 451) and Knockaderry (pop. 351). Besides these the county contains the liberty of Kilmallock, including the town of Kilmallock (pop. 1213).

Kilmallock is an antient disfranchised borough which possessed a charter in the reign of Edward III., and appears to have existed as a corporation long prior to that time. Its latest charter bears date the 10th of January, 27 Eliz. The corporation is now virtually extinct. The town, during the 15th and 16th centuries, was a place of very considerable importance. Its walls included a spacious quadrangular area with gate-towers in each front and a strong castle in the centre. The houses of the nobility and gentry of the county, many of whom resided here, were built in the castellated style, and constituted separate fortalices. In addition to these there were numerous religious edifices of a corresponding character. The place having been repeatedly besieged during the various civil wars of which the Desmond territory was the theatre, was finally dismantled at the close of the war of the Revolution of 1688. One only of the gate-towers is now standing, with part of the old wall, and the remains of the castle in the centre of the town. The castles and mansions of the former residents are, with the exception of two, in ruins; so also are the religious houses; and a few years since, the only inhabited dwellings in this formerly flourishing place were mud cabins or portions of the ruined edifices thatched in. It has however latterly revived, and there are at present some good houses and shops in the main street. There are several handsome residences in the vicinity, the principal of which is a seat of the Coote family.

Askeaton was incorporated by charter of the 11 James I., but the corporation is now extinct, and the borough disfranchised. The earl of Desmond had a strong castle here, the remains of which still overhang the river at the east end of the bridge. It was besieged and taken by Sir George Carew in 1579, and again by Lord Broghill's forces in the war of 1642. Vessels of 60 tons burthen come up to the town, which has an increasing trade in grain and the manufacture of flour and oatmeal. A rapid on the Deel above the town affords a good water-power and salmon-fishery.

Rathkeale is not incorporated, but is a place of brisk traffic. A colony of German Protestants planted in the neighbourhood by the family of Southwell has contributed in a great measure to the prosperity of the town. Castle Matras, the seat of the Southwell family, erected in the reign of Queen Elizabeth, is the principal mansion in the vicinity. The farms of the 'Palatines,' as the German settlers are called, exhibit a pleasing contract to the slovenly appearance of small Irish farms in general. They are usually distinguished by an orchard and garden attached to the dwelling-house.

Adare on the Maigue is not a place of much importance; but it is situated in the midst of a highly improved district, and possesses great interest for the historian from the number and preservation of its ruined religious houses. Adare Castle, the seat of the earl of Dunraven, is situated on the west bank of the river close to the town. The mansion is in the later English style, and when completed will be one of the most splendid in the south of Ireland. Between Askeaton and Adare is Currah, the residence of Sir Aubrey de Vere, Bart. The demesne is extensive, and possesses a great variety of beautiful scenery. The house is a fine pile of building, 116 feet by 72 feet. Rockbarton, the seat of Lord Guillamore, and Killballyowen, another residence of the O'Grady family, are in the neighbourhood of Bruff, the former finely situated about a mile to the west of Loch Gur. The principal seats along the Shannon, including those within the county of the city of Limerick, are Mount-Shannon, the residence of the earl of Clare; Roxborough, that of Lord Gort; Clarina Park, of Lord Clarina; Hermitage, of Lord Massey, and Shannon Grove, of the earl of Charleville, all in the immediate neighbourhood of Limerick; Tervoe, the residence of the Maunsell family, and Castletown, of the family of Waller, between Limerick and the river Deel; and Mount Trenchard, near Shanagolden, the seat of Mr. Spring Rice.

Prior to the Union, the county of Limerick returned six members to the Irish parliament; two for each of the borough towns of Askeaton and Kilmallock, and two for the county. It is now represented in the imperial parliament by two county members only. At the close of the year 1835 the constituency was composed of 2891 electors. The assizes for the county are held at the city of Limerick, where are the county gaol and courthouse. Quarter-sessions are held at Limerick, Rathkeale, Newcastle, and Bruff, where there are courthouses and bridewells. There are bridewells also at Croom, Glin, and Kilfinnan. The police force of the county on the 1st of January, 1836, consisted of two chief constables of the first class, four of the second class, twenty-five constables, 144 subconstables, and six horse of the constabulary force; the cost of which establishment for the year 1835 was 6967*l.* 6*s.* 3*d.*, of which 3624*l.* 17*s.* 4*d.*, was chargeable against the county. At the same time there were in the county and city of Limerick one magistrate, twenty-four constables, and ninety-nine subconstables of the peace preservation police, the cost of which establishment for the year 1835 was 6,444*l.* 15*s.* 10*d.* The total number of persons charged with criminal offences who were committed to the county gaol during the year 1836 was 803, of whom 728 were males and 75 females. Of these, 161 males could read and write at the time of their committal, 114 males and two females could read only, and 458 males and 73 females could neither read nor write. The district lunatic asylum for the counties of Limerick, Cork, and Kerry is at the city of Limerick, where are also the county infirmary and fever hospital. There are four other fever hospitals and twenty-four dispensaries throughout the county.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	23,848	..	..	..	..	..	..	130,000
1821	Under Act 55 Geo. III., c. 120	35,201	38,746	..	..	..	108,799	109,633	218,432
1831	Under Act 1 Will. IV., c. 19 .	36,981	40,894	31,236	5,186	4,472	123,211	125,590	248,801

Prior to the arrival of the English, Limerick constituted part of the petty kingdom of Thomond, or North Munster. Donald O'Brien was prince of this territory at the time of the English invasion, and at first united with Roderick O'Connor, whom he attended to the siege of Dublin in resisting the English. Being married however to a daughter of Dermod MacMurrogh, he soon after consented to receive the assistance of his father-in-law's allies in carrying on a feud which had long subsisted between him and Donald, prince of Ossory, and on the arrival of King Henry II., A.D. 1172, he was among the first to tender his homage and receive an English garrison into his city. But he did not long continue loyal, and in 1176 it was found necessary to send Raymond le Gros with a large army to recover from him the city of Limerick, which he had wrested from its new occupiers. In the next year he got the city again into his hands on pretence of a peace, but again revolted, and his territory being thus fortified, King Henry bestowed all Limerick, excepting the city and the cantred adjoining, on the brothers and nephew of Richard, earl of Cornwall. But they, being unable to get possession, in a short time surrendered their unprofitable grant. The king then, A.D. 1179, bestowed it on Philip de Braosa, at a rent of sixty knight's fees. Braosa had no better fortune than the first grantees, and Donald continued in possession till his death in A.D. 1194. In 1199 King John renewed his father's grants to the De Braosa family, and bestowed a part of the reserved territory on William de Burg, to whom he committed the custody of the city. William de Braosa having fallen under the king's displeasure, and fled to Scotland, was attainted, and his lands again reverted to the crown. A portion of the forfeited lands, comprising the barony of Owneybeg, was then conferred on Theobald FitzWalter, the ancestor of the Ormonde family, and other portions on Hamo de Valois, William FitzAdelm de Burgho, and Thomas, son of Maurice Fitzgerald, the ancestor of the great family of Desmond. These new settlers brought in a colony of English, chiefly from Bristol and Chester, who took up their residence chiefly in the city and towns near the river. The growth of the family of Desmond has been referred to in preceding parts of this work. [CORK; KERRY.] Maurice Fitzgerald, earl of Desmond, in the beginning of the reign of Edward III., had become possessed of a great part of the counties of Limerick, Kerry, Cork, and Waterford, from which he derived a revenue of 10,000*l.* per annum, a vast income in those days. His pride and turbulence led to several invasions of his territory by the king's forces, and to his own imprisonment on two occasions. Thomas, another earl of Desmond, who lived in the reign of Edward IV., and whose unrestrained authority and Irish habits had led him into frequent collisions with the government, was attainted of treason at Drogheda, A.D. 1468, and there executed. His son was however restored to the title and estates, which continued in this family until their final forfeiture by Gerald, the sixteenth earl, in 1586. [KERRY.] The estates of this unfortunate nobleman in the county of Limerick alone consisted of 96,165 acres, which were granted among the following twelve individuals: Sir Henry Billingsley, William Carter, Edward Mannering, William Trenchard, Sir George Bourchier, Sir George Thornton, Richard Fitton, Robert Annesley, Edward Barkley, Sir Henry Uthered, Sir William Courtenay, and Robert Strowde, most of which names are now extinct in the county. The war which ensued throughout Munster forms the subject of an interesting historical work entitled 'Pacata Hibernia,' attributed to Sir George Carew, afterwards earl of Totness, in which the reduction of the various strongholds of the insurgents in Limerick, including the castles of Loch Gur, Croom, Glin, &c., is minutely detailed. On the breaking out of the rebellion of 1641, the city of Limerick and all the chief castles of the county, with the exception of Loch Gur and Askeaton, which latter now belonged to the earl of Cork, fell an easy prey to the insurgents, in whose hands they for the most part continued until the capture of Limerick by the parliamentary forces under Ireton in 1651. The forfeitures which ensued embraced almost the entire county, and introduced a numerous new proprietary. The events which followed on the accession of King James II. are detailed under the head of the city of Limerick. The war of the Revolution terminated in further forfeitures comprising 14,188 acres, of a total estimated value of 61,470*l.* 10*s.* The families of Fitzgerald, Rice, Trant, and Brown were the principal sufferers. From this time until the latter end of the last century the county continued undisturbed. A spirit of insubordination among the peasantry, arising, it is said, from the severe exaction of rack-rents, broke out in insurrectionary acts in 1762, and again in 1786 and 1793. These at the time were suppressed, and many of the ringleaders executed. The rebellion of 1798 did not affect the county; but the spirit of agrarian disturbance still continued. In 1815, 1817, and finally in 1821-2, the peasantry rose in arms and committed the most atrocious outrages. After several conflicts with the king's troops, and the loss of much life on both sides, the insurrection was at length put down by the energy of the magistracy, assisted by a special commission. Great numbers of the offenders were executed or transported, and a failure of the crops in 1823, added to the rigour of summary justice, completely broke the spirit of the insurgents. The construction of new roads, by which the mountain districts were rendered accessible, in 1829, contributed materially to the permanence of the tranquillity so produced, and since that time Limerick has remained undisturbed and comparatively prosperous.

Limerick is among the richest of the Irish counties in antiquities. There are extensive Cyclopean remains on the hill of Knockfennell near Loch Gur. The fort on the western pinnacle of the hill is a circle of 360 feet in circumference, with a wall ten feet thick composed of massive blocks of dry stone. Walls of a similar construction extend on one side to a morass, and on the other to a smaller fort which occupies the eastern point of the hill. Other Cyclopean buildings are situated on a rocky height to the east of the lake. Military earthen works are numerous in all parts of the county. The largest raths are those at Bruree, Kilpeacon, Pallasgrean, and Kilfinnan. At Carrigeen near Croom are the remains of a round tower still fifty feet in height. For the first sixteen feet from the base it is composed of solid masonry. Another round tower at Ardpatrick in the south-east of the county was standing until recently. There was a third in the city of Limerick, of which there are now no remains. The ruins of religious houses are very numerous. Adare, Kilmallock, and Askeaton are peculiarly interesting from the number and extent of their ecclesiastical remains. The river Camaigue alone has the ruins of seven religious houses on its banks. Manister-Nenagh, the most considerable of these, is the most extensive pile of monastic ruins in Munster. It was founded by O'Brien, king of Limerick, in A.D. 1148. The entire number of such foundations in the county was about thirty-five, chiefly erected by members of the house of Desmond. Of the castles of the early proprietors nearly one hundred still remain. Of these the most remarkable are Croom Castle on the Maigue, from which the Fitzgerald family take their their motto of *Croom aboo*, and Shanet Castle near Shanagolden, from which the Desmond branch of the same house took their motto and war-cry of *Shanet aboo*. The walls of the latter are ten feet thick. Cappa Castle, near Askeaton, was another seat of the Fitzgeralds. Part of the keep, 100 feet high, is still standing. It is remarkable for the superior style in which it is built, the quoin-stones being polished. At Castle Connel are the ruins of a noble castle, once a seat of the O'Briens, which was dismantled by General Ginkle in 1691. Carrickagonniel Castle, another stronghold of the O'Briens, is boldly situated on a basaltic rock rising suddenly from the plain to a height of several hundred feet over the southern bank of the Shannon. It was blown up by General Scravenmore in the war of the Revolution; but, although 84 barrels of gunpowder were exploded under it, two of the towers are still tolerably perfect. There are several stone circles, and other supposed remains of Druidical worship throughout the county.

The county lies chiefly within the diocese of Limerick, and embraces small portions of the dioceses of Emly and Killaloe, from the returns under which articles a judgment may be formed of its educational statistics.

The amount of grand-jury assessment for the year 1835 was 32,088*l.* 5*s.* 3*d.*, of which 16,651*l.* 2*s.* 7*d.* was for public establishments, salaries, &c., and the remainder for the construction of roads, &c., and for the maintenance of the police.

(Fitzgerald and M'Gregor's *History of Limerick*, Dublin, 1826; *Transactions of the Geological Society*, v. 5; *Report of the Irish Railway Commissioners*, 1838; Cox's *History of Ireland*; *Parliamentary Reports and Papers*.)

LIMERICK, a city and county of a city in the province of Munster in Ireland. The county of the city, exclusive of the site of the town, comprises an area of 16,468 Irish acres, equal to 26,650 statute acres, of which the north liberties, consisting of 1714 acres, lie north of the Shannon, on the county Clare side, and the south liberties, consisting of 14,754 acres, lie south of the river, encompassed by the county of Limerick. The city, which is chiefly built on the county Limerick side of the river and on an island, is situated in 52° 40′ N. lat. and 8° 35′ W. long., and is distant from Dublin 93 Irish or 118 statute miles. The population of the county of the city in 1831 was 66,554, of which number 44,100 were in the city and suburbs.

The island on which the old town of Limerick stands was probably selected as the site of a city from the circumstance of this being the first point at which the Shannon is fordable above its embouchure. The island, called King's Island, is about a statute mile in length, by from a quarter to half a mile in breadth, and lies nearly north and south, having the main stream of the Shannon, about 500 feet in width, on the western side, and a smaller branch, called the Abbey river, of an average breadth of 200 feet, on the east and south.

The antient city of Limerick is by some supposed to be the Regia of Ptolemy. It certainly was a place of some note in the fifth century when visited by Patrick. From that time until the arrival of the Danes little is known of its history. The Danes made their first attempt on Limerick in the year 812; and, although repeatedly baffled, succeeded about the middle of that century in getting possession of the place. They appear to have been an enterprising and trading people, and to them the first effectual fortification of the island of Limerick is attributed. Towards the close of the tenth century, they were reduced by the celebrated Brian Boroimhe, and rendered tributary to the kings of Munster. The effectual introduction of English government did not take place till after the death of Donald O'Brien, who was their king at the time of the invasion by Henry II. of England. [LIMERICK, County.] The first provost under the new administration was appointed A.D. 1195. King John coming to Ireland in 1210, visited Limerick among other places, and caused Thomond Bridge, which up to the last year (1838) was still standing, to be erected over the Shannon. He also had the castle of Limerick built, and established a mint in the city, to which he granted large privileges by a charter of the 2nd year of his reign. Great numbers of English settlers now arrived, and the city continued to prosper until the invasion of Ireland by Edward Bruce, who burned the suburbs in 1314, and during the winter of 1316 made Limerick the rendezvous for his Irish allies. On the termination of this war the citizens obtained a grant of murage for the further strengthening of their fortifications. The suburb of Irishtown, which had now grown up on the southern bank of the Shannon, was partly walled in, and in 1495 its fortifications were completed by the erection of St. John's Gate. A tholsel, or town-house, was erected in 1449, and in 1500 a vaulted pier, which served both as a quay and a battery, was built. Throughout the disturbances caused by the rebellions of the earls of Desmond and the other turbulent Irish potentates in the reigns of Henry VII., Henry VIII., and Elizabeth, the citizens of Limerick remained strictly loyal.

At this time the town appears, from various maps remaining, to have been remarkably well built. In addition to King John's castle, commanding the bridge into Clare, there were twenty-four towers at the several angles of the wall which surrounded Englishtown, or that part of the city which was built on the island. Dromcore Castle, in the centre of Irishtown, consisted of twelve towers connected by high walls and surrounded by a fosse and outworks, and there were towers defending the several gates in the wall which encompassed this entire suburb. The separation of the county of the city from the surrounding country took place under the provisions of a charter granted by King James I., A.D. 1609. Early in the war which succeeded the Rebellion of 1641, Limerick was seized by the Roman Catholic party under Lords Muskerry and Ikerrin, and in 1643 they considerably strengthened the fortifications of Irishtown by the erection of towers and ramparts inside John's Gate. The supreme council of the Roman Catholics having removed hither in 1646, Limerick became the scene of various commotions and outrages produced by the bigotry of those who adhered to the extreme measures of the Nuncio Rinuncini. General Ireton, at the head of the parliamentarian army, appeared before the city in April, 1651. The garrison was commanded by General O'Neil, whose defence of Clonmel had already gained him much reputation, and who fully sustained his character for skill and courage during a severe siege of nearly six months. On the surrender of the city, several leading persons of the Roman Catholic party, including the titular bishop of Emly and a friar Woulfe, who had been excepted out of the terms of capitulation, were executed. Tranquillity being restored by the re-establishment of English government, a considerable influx of Protestant settlers took place; but the accession of King James II., and the consequent discountenance of those of the Reformed faith in Ireland, deprived them of their influence in the city and caused great numbers to return to England. Immediately after the battle of the Boyne and the flight of James, King William advanced against Limerick, now strongly garrisoned by the flower of the Irish army, under the duke of Berwick and General Sarsfield. He arrived at Cahirconlish on the 7th August, 1690, and, after some skirmishing, opened his fire on the citadel on the 9th. Sarsfield having intercepted and destroyed the heavy artillery which was on its way from

Cashel, prevented the construction of an effective battery until the 17th. A practicable breach having been effected between John's Gate and the Black Battery, on the 26th, the assault was made the following day.

The besiegers twice gained the counterscarp, and were twice driven back: at the third attempt a considerable body of troops forced their way into the town. One division of these was disorganized, and to a great extent destroyed, by the explosion of a mine under the Black Battery, which they had scaled. The other division was assailed with amazing fury by a mixed crowd of soldiers, citizens, and women, and was almost to a man exterminated. The besiegers, after a loss of 1700 men killed and wounded, were forced to return to their trenches; and on the 30th of August dismantled their batteries and retired towards Clonmel. In the early part of the next year Athlone was carried by the Protestant army, and the decisive victory at Aughrim soon after compelled St. Ruth, who commanded the Irish, to draw again towards Limerick as the last tenable position which was now left him in Ireland. On the 25th of August, 1691, General Ginkle invested the town on the south side of the river; and on the 30th opened his batteries. The fire against the English town was directed from a battery of ten field-pieces for hot shot on the left, another of twenty-five heavy battering cannon on the right, and eight mortars in the centre. A fort, which had been captured early in the siege, and another battery on the south-west, cannonaded the Irish town. On the 15th of September a force was detached by a pontoon-bridge across the Shannon, to cut off the communication with the county of Clare, which being effected, and the works of the besiegers everywhere pushed close to the walls, provisions failing, and the expected succours from France not having arrived, the garrison on the 23rd of September proposed an armistice. Negotiations were now opened, which terminated, on the 3rd of October, in the signature of the celebrated treaty of Limerick, by which it was agreed that in consideration of the surrender of the place the Roman Catholics should enjoy the same privileges which they had in the reign of Charles II. The garrison were allowed to march out with arms, baggage, and colours flying, and either to embark for France, or enter the king's service, at their option. Of 14,000 men so circumstanced, about 11,000 went on board the French fleet, which, two days after the execution of the treaty, arrived off the coast. These formed the nucleus of the Irish brigade, which was afterwards so celebrated on the Continent.

The city now began slowly to recover from the effects of these repeated disasters. In 1696 lamps were put up in the public streets at the expense of the mayor. In the following year the castle in the Irish town was thrown down, and a market-house erected on its site; and in 1717 the Abbey river was partly quayed in. About 1760, besides several new roads, a canal was commenced, by which the Shannon was rendered navigable to Killaloe. A sum of 19,500*l.* was granted towards this work by the Irish parliament, and in 1768 the works were committed to a company of undertakers, who subscribed a further sum of 10,000*l.* At the same time the old walls began to be taken down to make room for the increase of the city. The communication between Englishtown and Irishtown had hitherto been by one narrow bridge encumbered with a row of houses. In 1761 a commodious bridge was erected between Englishtown and the southern bank of the main river, close to the latter. The new custom-house was next built on the south side of the main river, near the new bridge. In 1766 a further portion of the south side of the Abbey river was quayed in. In 1796 the buildings of the Irish town began to extend along the southern bank of the main river, on an open elevated plot of ground called South Prior's Land, or Newtown-Pery. This division now constitutes the best part of Limerick, and is justly considered one of the most elegant towns in Ireland.

The corporation is governed by several acts and charters, but chiefly by act of 4 Geo. IV., c. 126. The governing body consists of the mayor, two sheriffs, and an indefinite number of aldermen and burgesses elected by the common-council. The freedom is acquired by birth, marriage, apprenticeship, and the election of the common-council. The recorder is elected annually by the same body. The acts of the council are controlled by the freemen's court of D'Oyer Hundred, which is held four times a year. The president of this court is the common speaker, who is elected every two years by the freemen. The criminal jurisdiction of the corporate authorities includes all offences, and is exclusive, the city being a county in itself. The civil jurisdiction of the recorder's court extends to all personal actions to an unlimited amount. The revenue of the corporation, arising chiefly from tolls, amounted in 1833 to 4418*l.* 16*s.* 8*d.*, but is variable. Their annual average expenditure, exclusive of payments in reduction of debt, is 3000*l.*

Prior to the Union Limerick was represented in the Irish parliament by two members; the representation was then limited to one; but recently, by act 2 Wm. IV., c. 88, the old representation has been restored. By this act the franchise is extended to householders and leaseholders, and the non-resident freemen are disfranchised. In 1837 the number of electors was 3186, of whom 280 were freemen. The assizes for the county of the city are held twice a year before the mayor and the going judges. The assistant barrister for the county sits twice a year for the trial of civil bills. The recorder's court and the court of conscience sit once a week, and there are also petty sessions twice a week. The police force of the city is included in that of the county. In 1826 there were committed to the city gaol of Limerick 981 males and 291 females charged with criminal offences. Of these 532 males and 41 females could read and write at the time of their committal, 60 males and 31 females could read only, and 389 males and 219 females could neither read nor write.

Newtown-Pery now forms by much the most important portion of the city. Englishtown has been deserted by the wealthier classes, and is daily decaying; and Irishtown, although better built and inhabited, wants the frontage to the main river, which gives the new town its great advantages. There is a considerable suburb on the county Clare side, round the old castle of Thomond, which defended that end of King John's bridge. The streets of Englishtown are narrow and irregular, but it still contains several important buildings. St. Mary's cathedral occupies an open space about the centre of this division of the city. It is a venerable cruciform structure, measuring 156 feet by 114, and has a square embattled tower 120 feet high. St. Munchin's church, supposed to have been the former cathedral, is situated on an elevated open plot in the north of Englishtown, overlooking the Shannon. The Exchange was built in 1778, and has a commodious hall and handsome portico. The city court-house stands near the Abbey river; the county court-house, which stands towards the main stream of the Shannon on the west, is a very handsome building, and was erected in 1808 at a cost of 12,000*l.* It is quadrangular, built of hewn stone, and has a fine portico of four Roman Doric columns. The castle-barrack, constructed within the remains of King John's castle, at the eastern end of Thomond bridge, consists of three sides of a square, and has accommodation for 400 men. The chief public buildings of Irishtown are the corn and butter markets, and the linen-hall and the fever-hospital. At the southern extremity of the new bridge which leads from Englishtown into Newtown-Pery, facing the main river, is the new custom-house, a handsome structure, built in 1769, at a cost of 8000*l.* The Chamber of Commerce was erected in 1805. East of the new bridge, on Charlotte quay, is the assembly-house, built in 1770, at a cost of 4000*l.* It has recently been converted into a theatre. West of the new bridge from the area in front of the custom-house the quays extend round a basin included between the confluence of the Abbey river with the main stream of the Shannon and Wellesley bridge, which unites the new town with the opposite or Clare side of the river. The passage for vessels is by a lateral cut at the south end of the bridge, and west of Wellesley bridge the quays project irregularly into the river for a distance of about three-quarters of a mile, terminating at Kelly's quay, beside the gas-works, which bound the new town in that direction. Back from this line of quays the new town extends in a series of wide and elegant streets, crossing each other at right angles to the confines of Irishtown on one side, and to the new barracks, which occupy an elevated site above the gas-works, at the other. A handsome square has recently been built at the southern extremity of Harrington-street; and between George's-street and the Military Walk is an elegant crescent. In the southern suburbs of the town are the new county gaol and lunatic asylum. The former was erected in 1821, at a cost of 25,000*l.* It consists of a central polygonal tower, 60 feet high, surrounded by five diverging ranges of prison buildings, and having a fine Doric entrance in front. The whole has a fine architectural effect. The lunatic asylum, opened in 1821, for 150 patients, cost a total sum of 29,856*l.* 11*s.* 5½*d.* It is a plain extensive collection of buildings, also on the radiating principle.

The port of Limerick is under the control of commissioners appointed by act of parliament in 1823. Their revenue averages 1500*l.* per annum, and they have obtained loans amounting to 55,384*l.* from government for the purpose of improving the river by the construction of floating docks. The plan adopted is from a design by the late Mr. Rhodes. It is intended to construct a weir across the river at Kelly's quay, with locks at each side, and a foot-bridge above. This would give a constant depth of from sixteen to eighteen feet in that part of the river extending from a little below Thomond bridge to the proposed dam. It is also proposed to deepen the river along its southern bank west of Wellesley bridge, and to convert the present irregular series of wharfs into one continuous line of quays. The estimated expense is 53,730*l.* 10*s.* The corporation are also at present engaged in rebuilding Thomond bridge, for which purpose they have procured a loan of 9000*l.* from the Board of Works. The estimate is 12,600*l.* Wellesley bridge above-mentioned was commenced in 1824, and cost 60,000*l.* It has five elliptical arches, each 70 feet in span, and a level roadway defended by an open balustrade. Baal's bridge has been recently taken down and replaced by a beautiful structure of a single arch. The Abbey river is also crossed by Park bridge, a little higher up.

Limerick is the head-quarters of the south-western military district, and, besides the barracks mentioned above, contains an artillery and infantry barrack in Irishtown; making, on the whole, accommodation for about 2000 men.

The trade of Limerick has increased with the growth of the city, though not in an equal degree. Being the natural outlet for the produce of a great part of the counties of Limerick, Clare, Tipperary, Cork, and Kerry, it has since the termination of the civil wars been, next to Cork, the chief seaport of Munster. In 1825 the exports consisted of 2654 tierces and 258 barrels of beef, 4417 tierces and 9100 barrels of pork, 19,750 cwt. of bacon, 65,000 firkins of butter, 61,000 barrels of wheat, 364,000 barrels of oats, and 12,500 barrels of barley. In 1835 there were exported of corn, meal, and flour 49,000 tons and 15 cwt., value 380,400*l.*; of provisions, 7705 tons and 15 cwt., value 337,200*l.*; of feathers 9 tons, value 900*l.*; of wine 850 gallons, value 470*l.*; of spirits 16,640 gallons, value 4200*l.*; of beer 5640 gallons, value 260*l.*; and of other commodities to the value of 3000*l*: making a total value of exports of 726,430*l.* In the same year the imports amounted to a total value of 323,740*l.*; of which the chief items were, for tobacco 71,400*l.*, sugars 36,800*l.*, fish 25,800*l.*, tea 24,200*l.*, iron 23,490*l.*, and coal 21,000*l.* Limerick has also an extensive and increasing export trade through the Shannon and Grand Canal by way of Dublin.

Return of goods carried from Limerick and shipped at Dublin for Liverpool:—

	Wheat.	Flour.	Oatmeal.	Butter.
In 1833	187 tons	520 tons	543 tons	4,998 firkins.
1834	1,218	1,750	1,192	10,097
1835	402	5,269	533	10,771
1836	289	7,158	1,156	12,796

The gross freight from Limerick to Dublin, for grain or flour, is 15*s.* per ton, and the total distance 133 miles. There is also a very brisk passenger traffic on the same line, as well as from Limerick downwards. The number of passengers conveyed to and from Limerick by the navigation above the city, in 1836, was 14,600. The number of passengers carried to and from Limerick by the navigation below the city, in the same year, was 23,851. It is estimated that the total quantity of agricultural and other produce carried by inland conveyances into Limerick, in the year 1837, amounted to 232,000 tons, of which 60,000 tons were for exportation, and that the total quantity of goods carried by inland conveyances from the city, in the same year, was 32,400 tons, including 15,000 tons of imported goods. On the 5th of January, 1836, the number of vessels registered as belonging to this port was 71, of an aggregate registered tonnage of 5008 tons. The number of vessels which entered inwards from all parts, in 1835, was 548, of an aggregate tonnage of 66,184 tons; the number of vessels which cleared outwards, in the same year, was 592, of an aggregate tonnage of 70,327 tons. The customs for the year 1835 amounted to 142,636*l.* 11*s.* 8*d.*, and the excise duties for the same year to 71,616*l.* 6*s.* 6½*d.*

In 1831 there were, in the county of the city of Limerick, 9 brewers, 6 glovers, 18 paper-makers, 22 tanners, 198 weavers, 3 woolcombers, 1 bleacher, 3 flax-dressers, and 18 shipwrights. About 500 females are occupied in the manufacture of lace and tambour-work. The glove-trade, which was formerly carried on extensively, has now declined: most of the goods sold as Limerick gloves are manufactured in Cork. There are one large distillery, seven breweries, and some small iron-foundries and cooperages. The first steam-engine erected in Limerick was put up in 1818. There are twelve engines now at work in the city, of an aggregate power of 206 horse-power. There are branches of the Bank of Ireland, provincial, national, and agricultural and commercial banks, established in Limerick.

The city has been lighted with gas since the year 1824. The supply of water is from elevated tanks, to which the water is raised from the river by steam-power. The chief fuel is turf, of which 60,000 tons are annually consumed. The annual import of coal and culm is nearly 30,000 tons, but of this about one-half is for country consumption. The streets are well paved, particularly in the new town.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	4,900	..	..	..	..	..	..	40,000
1821	Under Act 55 Geo. III. c. 120	7,208	12,419	..	..	..	28,117	30,928	59,045
1831	Under Act 1 Will. IV. c. 19	7,820	11,953	2,798	4,057	5,098	30,414	36,140	66,554

In 1834 there were, in the parishes of St. Michael, St. Mary, St. John, St. Nicholas, and St. Munchin, which comprise the city, 37 day-schools, educating 1496 males and 1139 females. Of these one is a diocesan school for males, supported by contributions from the clergy of the diocese; four are parochial schools, supported by bequests and small payments; seven are free-schools, supported chiefly by private contributions; and two are in connection with the National Board of Education. The nuns of the Presentation Convent educate 320 females in their school, and a monastic society called the Christian Brothers educates 280 males. The nuns have a grant of 40*l.* per annum from the National Board. Besides the Brothers of the Christian Schools there are fraternities of Dominican, Augustinian, and Franciscan monks in the city, whose convents and chapels form prominent architectural objects. Since 1834 several large schools have been opened. There is a library of 2000 volumes attached to the Limerick Institution, which was founded in 1809. There are four newspapers published in the city, the number of stamps issued to which, in 1835, was 242,533.

The charitable institutions, beside the free-schools, are the county hospital; the house of industry, founded in 1774; the fever and Lock hospital, said to be the first fever hospital established in the United Kingdom, founded by Lady Hartstonge in 1781; the lying-in hospital, opened in 1812; Hall's almshouses, founded by Dr. Jeremy Hall in the early part of the last century; the corporation almshouse, for reduced widows; the St. George's widows' asylum; Mrs. Villiers's almshouses, also for widows, erected in 1826; and several other minor charities.

The grand-jury presentments for the county of the city, for the year 1835, amounted to 6311*l.* 16*s.* 4*d.*, of which 3894*l.* 9*s.* 11*d.* was for buildings, salaries, &c., 525*l.* 10*s.* 4½*d.* for police, and the remainder for roads, bridges, and the repayment of government loans. The parish of St. Michael, which comprises the entire new town, is exempt from grand jury assessment. Its proportion of the general taxation is levied under the 47th and 51st of George III. The weight of taxation falls chiefly on the agricultural districts.

(Fitzgerald and Macgregor's *History of Limerick*, Dublin, 1826; Cox's *History of Ireland; Parliamentary Reports and Papers*.)

LIMERICK, a bishop's see, late in the archiepiscopal province of Cashel, and now in that of Dublin, comprises a large part of Limerick, and a small portion of Clare, extending 34 statute miles by 21 miles. The chapter is complete, having the five greater dignitaries and 11 prebendaries. The number of parishes is 88. In 1792 they constituted 47 benefices, and had 26 churches. In 1834 the number of benefices was 65; churches of the Establishment 42; other places of Protestant and Dissenting worship 7; Roman Catholic churches 78. In the latter year the population of the entire diocese was 257,700, of whom there were 11,122 members of the Established Church, 85 Presbyterians, 191 other Protestant Dissenters, and 246,302 Roman Catholics, being in the proportion of rather more than 21 Roman Catholics to one Protestant. In the same year there were in this diocese 231 daily schools, educating 11,475 young persons, being in the proportion of 5·23 per cent. of the entire population under daily instruction, in which respect Limerick ranks 26th among the thirty-two dioceses of Ireland. Five of the above schools in 1834 were in connection with the National Board of Education.

The see is said to have been founded by St. Munchin, whom some refer to the sixth and some to the seventh century. Little is known of the affairs of the diocese before the beginning of the twelfth century, when Gille or Gillebert, the first ecclesiastic who exercised legantine authority in Ireland, was bishop; he is stated to have been mainly instrumental in assimilating the Irish church to that of Rome. There is nothing of interest in the subsequent history of the diocese, which, in 1663, was united to that of Ardfert and Aghadoe. Some of the statistics of the latter are given under the head of Kerry. It comprehends the entire county of Kerry and a part of Cork, and comprises 86 parishes, constituting 49 benefices; it has 35 churches of the Establishment, eight other places of Protestant worship, and 88 Roman Catholic churches.

The see lands of the united diocese comprise 6720 acres, the annual revenue from which, on an average of the three years preceding 1832, was 5368*l.* 13*s.* 5*d.* The bishop's palace is situated in the new town of Limerick, overlooking the Shannon. This see is not affected by the 3 and 4 Will. IV., c. 37.

(Beaufort's *Memoir of a Map of Ireland; Parliamentary Reports and Papers*.)

LIMESTONE. This term is applied to a great variety of earthy compounds, in which carbonate of lime is the predominant ingredient. The chemical, molecular, and structural characters of limestone are extremely interesting to mineralogy, and deserve from geologists a greater share of attention than has usually been given to them. In regard to the chemical composition of limestones, we may notice that some, as statuary marble, are nearly pure carbonate of lime; others, as the dolomitic rocks of the Alps, contain a certain proportion of carbonate of magnesia; and some are penetrated by bituminous matter, as the black marbles of Yorkshire. Limestones also vary in quality, and become debased, by admixture with sand, clay, oxide of iron, pyrites, &c.; so that there is in fact a real gradation from limestone to schist, to sandstone, to shale, to ironstone, &c. Limestones have a crystalline aggregation, as statuary marble, and generally the limestones mixed with primary systems of strata; or they are composed of small crystalline grains, as the magnesian limestone of Mansfield in Nottinghamshire; full of round concretionary parts, as the oolites of Portland, Bath, and Oxford; earthy, as chalk, and some magnesian limestones; or compact, as the lithographic stone of Solenhofen. The limestone rocks of Building Hill, Sunderland, resemble a coral reef. The beds of calcareous rocks are of every thickness, from a mere lamina to some yards thick; they are traversed by divisional planes, more or less regular, and very thick beds assume a prismatic structure, as in Yorkshire. The colours of limestone vary indefinitely. When argillaceous matter is mixed with the calcareous basis of the rock, the colour generally approaches to blue; magnesian and oolitic limestones are often yellow; primary limestone and chalk are generally white; the Tiree marble is red; some of the Derbyshire and Kilkenny marble is black; and there are many veined and party-coloured marbles, as those of Babbacombe, Sienna, &c.

Limestones contain a very large proportion of the organic bodies which diversify the stratified rocks, few except the early primary limestones being wholly deficient of shells, corals, fishes, &c. Occasionally shells and zoophytes contribute to the beauty of particular marbles, as the shell marble of Carinthia, Purbeck, &c., the crinoidal marble of Derbyshire, and the coralliferous limestone of Weardale.

LIMIT; LIMITS, THEORY OF. The word limit implies a fixed magnitude to which another and a variable magnitude may be made as nearly equal as we please, it being impossible however that the variable magnitude can absolutely attain, or be equal to, the fixed magnitude. In this strict sense of the word there are two conditions which must be fulfilled before A can be called the limit of P: first, P must never become equal to A; secondly, P must be capable of being made as nearly equal to A as we please.

The method of limits is in reality nothing more than one way of evading the use of the word infinite in an absolute sense [Infinite]: which may be shown as follows. If we take two common algebraical expressions, such as x and xx, or x^2, there can be no objection to saying that when $x = 7$, $x^2 = 49$, because 7 is a definite number, and the operation 7 × 7 is perfectly intelligible. And we may, if we please, say that when x approaches 7, x^2 approaches 49, so that if x may be made as near as we please to 7, x^2 can be made as near as you please to 49. Or, 7 being the limit of x, 49 is the limit of x^2. The preceding is superfluous, because it is more simple to say at once that x^2 *is* 49 when x *is* 7. But suppose that x, instead of being taken at pleasure, must be determined by means of y; and let the investigation of the relation between x and y lead to

$$x = 7 + \frac{1}{y}:$$

then, so long as y has any finite value, x must be more than 7; nor can the assertion $x = 7$ be made without the implication that y is infinite. In this case then we can only say that x can be made as near as you please to 7, if we may take y as great as we please; in which case x^2 can be made as near as you please to 49. In the language of the article infinite, we say (for abbreviation, as explained in Infinite) that x is 7, and x^2 is 49, when y is infinite: in the language of the present article, we say that x *has the limit* 7, and x^2 the limit 49, when y *increases without limit*. We shall now translate the various illustrations given in the article just cited, from the language of infinites into that of limits. (pp. 471-2.)

When z is infinite, A is equal to B. If A be a fixed magnitude, read—If z increase without limit, A is the limit of B: if B be a fixed magnitude, read—If z increase without limit, B is the limit of A: if both A and B be variables, read—When z increases without limit, A and B approach to the same limit.

A finite quantity x, divided by an infinite quantity, is nothing. For this read—When the denominator of a fraction increases without limit, the numerator remaining the same, the fraction diminishes without limit.

Every circle is a regular polygon of an infinite number of sides. For this read—If the number of sides of a regular polygon inscribed in a circle be increased without limit, the polygon approaches without limit to the circle: or, the circle is the limit of all the regular polygons which can be inscribed in it.

When x is infinite, A and B are both infinite, but A is infinitely greater than B. For this read—When x increases without limit, A and B both increase without limit, but the ratio of A to B also increases without limit, or the ratio of B to A diminishes without limit.

When $x = a$, z is infinite. For this read—When x approaches without limit to a, z increases without limit.

Two infinitely great quantities may have a finite ratio. For this read—When two quantities increase without limit, their ratio does not necessarily increase without limit, but may have a finite limit.

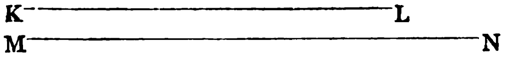
Two infinitely small quantities may have a finite ratio: or—when two quantities diminish without limit, their ratio does not necessarily diminish without limit, but may have a finite limit.

When A is infinitely small, B is infinitely great. For this read—When A diminishes without limit, B increases without limit.

An infinitely small arc of a curve is equal to its chord. For this read—When the arc of a curve diminishes without limit, the ratio of the arc to the chord, or the fraction $\frac{\text{arc}}{\text{chord}}$, approaches the limit unity.

Of two infinitely small quantities, one may be infinitely smaller than the other. For this read—When two quantities diminish without limit, it is also possible that their ratio may diminish without limit.

Hitherto we have been dealing with purely verbal considerations. These are not unimportant, since it is of great consequence that the fundamental notions of mathematics should be expressed in those terms which have always represented the rude and unrigorous form in which they are expressed in common life: and also, when the form just alluded to has given birth to several different modes of expression, it is necessary to point out the connexion of these with each other, and to assimilate their defined meanings. But, so far as demonstration is concerned, we have made no step by using one form of words instead of another, or even by substituting the notion of a limit unattainable for that of the same magnitude attained by the supposition of absolute infinity. The theorem by which rigorous results are obtained is the following:—If two variable magnitudes, A and B, be always equal, and if they have limits, namely, P the limit of A, and Q of B; then P and Q must be equal. This proposition may seem almost self-evident; it is not however a perfect axiom, and the method of exhaustions [Geometry] was employed by Archimedes to prove it, or rather, to prove the proposition that if two variable magnitudes be always in a given ratio, their limits are in that ratio. The latter form of the proposition is requisite in Geometry [Proportion]; the former is sufficient in Algebra; and the proof is as follows:—Supposing A and B for instance to be varying lines, always equal, let their limits, if possible, be the unequal lines K L and M N.



Since A and B are equal, and since the first can be made as near as we please to KL, and the second to MN, it follows that the latter pair are as nearly equal as we please. But this is not true, since the limits are fixed and invariable magnitudes, differing (if they differ at all) by a fixed and invariable quantity. Consequently the limits cannot be other than equal. The proof of the proposition of Archimedes is given in Geometry, p. 154.

This proposition, being once understood, is more fruitful in applications than almost any other. We shall give one instance from geometry and one from algebra.

Circles are to one another as the squares on their diameters. For this proposition is evidently true of the regular polygons inscribed in the two circles with the same number of sides; and the polygons may be made as nearly equal as we please to the circles. The limits of the polygons then (or the circles themselves) are in that ratio which the polygons always preserve.

As an instance from algebra, apply the Binomial Theorem to the development of

$$(1+nx)^{\frac{1}{n}}=\text{A},$$

which gives, by an easy transformation,

$$1+x+\frac{1-n}{2}x^2+\frac{1-n}{2}\;\frac{1-2n}{3}x^3+\ldots\ldots\ldots\ldots\text{(A)},$$

a series which (by the method in Convergent) is always convergent when nx is less than unity. Apply the same method to the development of

$$(1+nx)^{\frac{y}{n}}=\text{B};$$

which gives in the same manner

$$1+yx+y\frac{y-n}{2}x^2+y\frac{y-n}{2}\;\frac{y-2n}{3}x^3+\ldots\ldots\quad\text{(B)}.$$

Now B is evidently A^y; and if when n diminishes without limit, B and A approach the limits P and Q, then B and A^y (equal quantities) will approach the limits Q and P^y, which are therefore equal. But the limit of A, when n diminishes without limit, is

$$1+x+\frac{x^2}{2}+\frac{x^3}{2.3}+\ldots\ldots\qquad=\text{P},$$

That of B, on the same supposition, is

$$1+xy+\frac{x^2y^2}{2}+\frac{x^3y^3}{2.3}+\ldots\ldots=\text{Q}.$$

Hence the second of these series is the yth power of the first; a theorem which the algebraical student will recognise as one of the most important in that science.

The *method of limits* generally means the Differential Calculus exhibited upon the principles explained in the article Differential Coefficient. It is admitted, by a large majority of those who are capable of forming a judgment, that the method by which this theory should be established is either the method of limits, or that of Lagrange [Functions, Theory of], or a mixture of the two. The number of those who contend for the second has very much diminished of late years; and the controversy (if such a thing can be said to exist) lies between the first and third. The reader will find in the eighth number of the Treatise on the subject, published by the Society for the Diffusion of Useful Knowledge, some additional reasons for considering the use of assumed expansions as fallacious. See also Series.

It has been customary in elementary mathematical works to endeavour to postpone the theory of limits as late as possible. Such an attempt can never be very successful; a clear understanding of the notion of a limit may easily be, and often is, deferred *sine die*, but the necessity for such an understanding enters with the sixth book of Euclid. We shall even undertake to show [Proportion] that the fifth book cannot be properly understood without it.

One of the best studies in the theory of limits is the first section of Newton's Principia. In the article Prime and Ultimate Ratios we shall present one or two of the leading propositions.

LIMITATIONS, STATUTE OF. [Statute of Limitations.]

LIMMA (λεῖμμα, *a remainder*), in antient Greek music, is that which remains of the greater tone when the apotome is taken from it. [Apotome.] The greater tone, as, for instance, c d, is divisable into nine commas; of these, five constitute the apotome, four the *limma*: or, $\frac{5}{9}+\frac{4}{9}=\frac{9}{9}$. The ratio of the *limma* is $\frac{243}{256}$, and for all practical purposes it may be considered as the minor semitone of the modern scale.

LIMNA'CEA. [Limneans.]

LIMNE'ANS, *Lymnéens*, or more properly *Limnéens*, in French (λίμνη, *limnē*, a marsh, pool, or lake), Lamarck's name for a family of fresh-water testaceous mollusks, consisting of the genera *Planorbis*, *Limnæa*, and *Physa*. The family name now in general use is *Limnæidæ*.

Two of these forms (*Planorbis* and *Limnæa*) were included by Linnæus under his great genus *Helix*; the third was arranged by him among the heterogeneous assemblage of testaceous animals, which he placed under his genus *Bulla*. Müller separated the first of these under the name of *Planorbis*, and the second under the name of *Buccinum*, a name already pre-occupied by Linnæus for a genus of marine testaceous gastropods entirely different, and Lamarck changed the name to *Lymnæa*, or, as it should be more correctly written, *Limnæa*. Adanson appears to have been the first who established the genus afterwards named *Physa* by Draparnaud, and the former gave it the appellation of *Bulin*. Bruguières followed Müller as far as regards *Planorbis*, but he placed the other two forms under his genus *Bulimus*, a name which we have reason to think owed its origin to the confused engraving of the word Bul*in*us, 'Le Bulin Bulinus,' on Adanson's plate (*Histoire Naturelle du Sénégal*, pl. 1), the Latin word at first sight being liable to be mistaken for Bul*im*us. (*Zool. Journ.*, vol. iv., p. 222, and the article Bulinus, vol. vi.)

Lamarck collected these three genera in the following order, *Planorbis*, *Physa*, and *Limnea*, under one family, his *Lymnéens*, with the following definition:—

Amphibian Trachelipods, generally deprived of an operculum, and having flattened tentacles. They live in fresh water, and come to respire the air at the surface.

Their shell is spirivalve, most frequently smooth on the external surface, and always having the right edge of its aperture sharp, and not reflected.*

The general opinion seems to be that these three genera are well associated in forming the family *Limnæidæ*.

Cuvier, though he gives them no common family name, places the three genera together, observing that the *Planorbes* are the faithful companions of the *Limnææ* in all our stagnant waters.

M. de Blainville makes his first family of *Pulmobranchiata* (*Limnacea*) consist of these three genera; and M. Rang, retaining Lamarck's name, places the '*Limnéens*,' consisting of the same genera, as the fourth family of the *Pulmonés Inoperculés* of Férussac (*Pulmobranches* of De Blainville).

Mr. G. B. Sowerby however is of opinion that the genera *Physa* and *Limnæa* ought not to be separated. He observes ('Genera. Limnea,' No. 8), that he finds himself obliged either to unite two genera which have appeared distinct to Lamarck and Draparnaud, and which have been adopted by some succeeding writers, or, contrary to his wishes, and, as he thinks, to the interests of conchological science, we must not only separate the *Physæ* from the *Limnææ*, but we must also adopt Dr. Fleming's *Aplexa*, and Dr. Leach's *Myxas*, each of which would, as far as we yet know, only contain one species. These, he adds, are all fresh-water shells; and the only describable difference in the shells, except mere specific differences, consists in the *Aplexa* and *Physa* being heterostrophe shells, while the *Limnæa* and *Myxas* are dextral. Greater differences he acknowledges are found in the animals, chiefly in their *tentacula* and in their mantles; the *Myxas* of Leach and the *Physa* of Draparnaud having the power of extending the edges of their mantle over a large portion of the external part of their shell, which the *Limnæa* of Lamarck and the *Aplexa* of Fleming have not, while the tentacula of all but *Physa* are compressed and triangular, and even in *Physa* they are compressed according to Lamarck, though filiform: in all of them the eyes are found at the internal base of the *tentacula*, supported on very short tubercular pedicles. He concludes by uniting the whole of these genera under the generic appellation of *Limnea*, and divides them into four sections, thus:—

1. *Shell* very thin, subglobose, polished; internal lip dilated; aperture ovate, dextral. *Animal* with the mantle reflected: the tentacles short and trigonal. *Myxas*, Leach's MS.; *Helix glutinosa*, Mont.; *Limnea glutinosa*, Drap.
2. *Shell* thin, obovate, polished; internal lip dilated, the aperture ovate or ovato-lanceolate, sinistral. *Animal* with the mantle reflected; the tentacles subulate. *Physa*, Lam.; *Bulla*, Linn.
3. *Shell* thin, oblong, polished; the internal lip equalling the external, the aperture lanceolate and sinistral. *Animal* with the mantle not reflected; the tentacles trigonal. *Aplexa*, Fleming; *Physa*, Drap.; *Bulla hypnorum*, Linn.
4. *Shell* thin, generally oblong, rather solid; the aperture oval and dextral, the inner lip equalling the external one. *Animal* with the mantle not reflected, the tentacles compressed and trigonal. *Lymnæa*, Lam.; *Helix*, Linn.

M. Deshayes rejects this opinion, and retains *Physa* as a genus, for reasons which the reader will find under that head in this article.

Returning to Lamarck, we find him remarking upon the cause which led to the peculiar organization of his *Lymnéens*, in accordance with one of his favourite fanciful theories. It would seem, says he, that those fluviatile Trachelipods, which inhabited waters of little depth, such as those of small rivers, ponds, and marshes, which are exposed to the accident of being dried up, were often reduced to live in mud more or less desiccated. They then found themselves forced to habituate themselves to the air, to breathe it.† This habit having modified their *branchiæ*, like those of the *Colimacés*, is become to them a matter of necessity; so that though living in the water, they are now obliged to come from time to time to its surface in order to breathe the free air. This circumstance in their manner of life seems to have had its influence in rendering an *operculum* useless to them; and they are in general deprived of one. Those fluviatile Trachelipods, on the contrary, which we know to be unable to respire anything but water, have all an operculum.

It is only necessary to reflect for a moment on the principle involved in these suppositions, to reduce them to their true value.

Leaving his theoretical views for his practical observations, we find Lamarck thus neatly pointing out a leading character for distinguishing the family. 'The Limneans have only two tentacles; they are flattened and never oculated at their summit.'

M. de Blainville thus defines his family *Limnacea*:—

Body very variable in form; two tentacles eminently contractile, carrying sessile eyes at the internal side of their base.

Shell delicate, with the external border constantly trenchant.

He further observes that the animals of this family are always found in fresh waters, stagnant or running, often at their surface, and sometimes in their depths. The shell, he remarks, presents very variable forms. He arranges the genera in the following order: *Limnæa*, *Physa*, *Planorbis*.

M. Rang gives a more extensive definition of the Limneans of Lamarck (*Limnacea* of De Blainv.; *Limnocochlides*, without a collar, of Latreille), thus:—

Animal elongated, having the *body* distinct from the foot, and twisted spirally backwards; never any *buckler* (or cuirass), but a *collar* formed all round the neck by the edge of the mantle; *head* surmounted by a sort of veil which is very large; *tentacles* two in number. the eyes differently situated at their base; *pulmonary cavity* showing its orifice upon the collar; *organs of generation* separated; *anus* near the orifice of the lung.

Shell always complete, very much rolled up (très enroulée), delicate, and with the external border or lip trenchant.

All fluviatile.

M. Rang arranges the genera in the following order. *Planorbis, Limnæa, Physa.* This is the order given by Cuvier, and, as far as these three genera are concerned, by Draparnaud, who however makes *Ancylus* intervene between *Planorbis* and 'Limneus.'

Planorbis.

Animal elongated, compressed, slender, and very strongly rolled up; head furnished with two tentacles, which are contractile, setaceous, very long, and oculated at their internal base; mouth furnished superiorly with a crescent-shaped tooth, and below with a lingual mass armed with small hooks, and surmounted by a sort of veil which is short and notched; foot oval and rather short; respiratory orifice on the left, upon the collar, and approximated by that of the anus; organs of generation separate, on the same side; the male organ near the tentacle, and the ovary at the base of the collar.

Shell rather delicate, sinistral, very much rolled or coiled up on the same plane; concave on each side, the spire reentrant (rentrant); aperture rounded with a sharp border, and interrupted by the convexity of the whorl which precedes it. (Rang.)

Planorbis. Shell and animal; and eggs.

a. Planorbis carinatus; b, mass of eggs of Planorbis corneus on a leaf.

Geographical Distribution.—Widely diffused. Very few fresh-waters, either running or stagnant, are without some of the species.

M. Rang remarks that the genus *Planorbis* offers a curious anomaly, namely, that the animal as well as the shell is sinistral, and consequently the orifices, instead of being situated on the right side, as in other gastropods, are placed on the left

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* M. Rang says that he has sometimes seen a small internal 'bourrelet' on the right edge of certain species of *Physa* and *Limnæa*.

† See ante, LIMAX, p. 484.

Mr. Sowerby (*Genera*, No. 4) remarks that the principal peculiarity in this genus appears to him to consist in the fact that the shells of the genus are what are called reversed, a fact doubted by some, who have described the species as umbilicated above.* A careful examination of many of the species in a living state satisfied Mr. Sowerby that the animals carry their shells in a direction opposite to that of the generality of turbinated mollusks, and that the heart is placed in the *Planorbes* on the right side, and the respiratory orifice on the left, exactly the reverse of their position in most others. But, he further observes, the knowledge of the animal is not indispensably necessary to prove this, as the shell itself carries the demonstration, it being only needful to observe on which side of the shell the very apex of the spire is to be seen; if we take that side for the upper, in conformity to the strict rules of analogy, it will, he remarks, be evident that the aperture is on the left-hand side. Mr. Sowerby had for a long time entertained great doubt about the identity of some of the fossil species, which he is now satisfied are reversed shells, in the same manner as the other *Planorbes*, although the lower part of the disk is almost flat and carinated at its edge, and therefore bears a considerable resemblance to the flattened spire of some land shells, particularly the *Helix albella*.

Mr. Sowerby thus defines the genus:—Shell discoid with a depressed spire, whose apex is always distinct: its whorls turn from right to left, so that when the spire is held upwards and the aperture seen, it is on the left-hand side. The shells are ventricose, frequently carinated, either above or below; the aperture is entire, its breadth equal to its length, sometimes greater but (Mr. S. believes) never less; sometimes the *peritreme*, or lip, is thickened and expanded, and its lower part is always extended forwards: the umbilicus is very much expanded, and there is no operculum.

Mr. Sowerby further remarks that some species, particularly when young, are covered with a hairy epidermis.

M. Deshayes (ed. Lam., tom. viii., 1838) does not make any allusion to Mr. Sowerby's observations; but he comes to a very different conclusion. The *Planorbes*, says he, as all naturalists know, are discoïd shells, generally delicate and fragile, found in abundance in stagnant waters. Some of the species are so much flattened that they seem perfectly symmetrical, so that it is difficult, in these last at least, to distinguish the upper surface from the lower. This difficulty brings with it another, namely, that of determining whether the species are dextral or sinistral. These interesting questions had not been deeply discussed when M. Desmoulins published (1831), in the Transactions of the Linnean Society of Bordeaux, a well executed and very extensive memoir, in which he examines these different questions. 'In my preceding works,' continues M. Deshayes, 'I have not perhaps attached sufficient importance to those researches for which it was necessary to examine the living animals, but nevertheless in 1824 I disposed conchologically of a part of the difficulty by saying, in my work on the fossils of the Paris basin, that the upper side of the *Planorbes* may be distinguished from the lower by means of the obliquity of the aperture, the upper part of which is most prominent (avancé).' This mode of distinguishing the upper surface from the lower, and of placing the shell in its normal position, once granted, it becomes easy to recognise which species are dextral and which sinistral. By these means we perceive, as M. Desmoulins has very well demonstrated, that nearly all the known species of *Planorbes*, both living and fossil, are dextral; even those which the most esteemed authors had judged to be sinistral, from the depth of the umbilicus. But if by the observation of the aperture we come to the conclusion that the shell of the *Planorbes* is dextral, a difficulty presents itself, namely, that the animals which inhabit these dextral shells are sinistral, if we judge by the position of the three orifices which the pulmoniferous mollusks exhibit exteriorly. Thus Cuvier has well remarked this transposition of the orifices in *Planorbis corneus*, and has not hesitated to declare this species sinistral, contrary to the opinion of Linnæus, of Müller, and of Draparnaud, who state that the species is umbilicated above. Cuvier corroborates his opinion by an important fact, namely, that the heart is on the right side in *Planorbis*, whilst it is on the left in dextral shells of other genera: but Cuvier did not pay attention to the organs of digestion: finding the heart on the right and the orifices on the left, he came to the conclusion that *Planorbis corneus* is sinistral; he ought nevertheless to have seen, before he delivered this definitive judgment, in what real position the organs are. It is to this point that M. Desmoulins has especially applied himself, and he saw that all the organs of digestion and generation remain in the position which they hold in the dextral mollusks, and that the orifices only have an anormal position. Thus the observations of M. Desmoulins explain how, in the genus *Planorbis*, appearances place a sinistral animal in a dextral shell (a phenomenon which we cannot conceive), and how, in reality, the animal is dextral as well as its shell, and that there is no other derangement in the relationship of these organs excepting in regard to the heart, and the termination of the digestive organs and those of generation.'

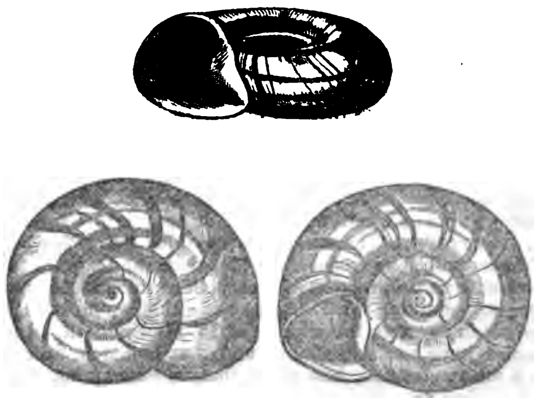
The species are numerous. Lamarck recorded twelve recent species, including *Planorbis Cornu Arietis*, which is not a *Planorbis*, but a discoid *Ampullaria* *, as its animal and operculum testify. M. Deshayes adds ten more in the last edition of Lamarck; Conrad, Troschel, and Broderip, have each described one in addition; and new species are brought home by almost every expedition. M. Rang states that he has known individuals of *Planorbis leucostoma* collected at Seize near Bordeaux, by M. Durieu, where the animals had closed the shell by a kind of *epiphragma* analogous to that of the *Helices*.

Example, *Planorbis corneus*; *Helix cornea*, Linn.

Description.—*Shell* opaque, plano-depressed above, widely umbilicated beneath; of a horny or brown chesnut colour; the whorls transversely striated.

Locality.—This, the largest living species of Europe, if not the largest generally, is found in sluggish rivers and stagnant waters, such as old water-courses and drains in low swampy situations. Thus it is plentiful about Oxford. Montagu says that it is certainly more local than it is described to be by Da Costa, who states that it is common in all ponds, rivers, and lakes throughout England. This, adds Montagu, is far from being the case, although it is sufficiently plentiful in some parts, and he states that he never found it further westward than in Dorsetshire, where, about Wareham, it is abundant. Lamarck records it as an inhabitant of France in the rivers, and very common, about Paris, in that of Gobelins.

Montagu as well as others have observed that this species yields a beautiful purple dye (whence perhaps De Férussac's name *Planorbis purpura*), all attempts to fix which, either by acids or astringents, have hitherto proved ineffectual. The inside of the mouth of the *shell* in fine specimens is occasionally of a colour approaching to violet.



Shell of Planorbis corneus.

Physa.

Animal of an oval form, more or less spiral; head furnished with two long tentacles, which are setaceous and oculated at their internal base; mantle with two lobes digitated on the edges, which can be turned back so as to cover a considerable part of the shell; the foot is long, rounded anteriorly, pointed posteriorly; the rest of the organization as in *Limnæa*, with the exception that the orifices are generally on the left.

Shell generally sinistral, oval, elongated or nearly globular, smooth, delicate, and very fragile; the aperture oval, a little narrowed behind; edge of the right lip sharp,[*] columella a little twisted, but without any plait; spire more or less sharp and elongated; the last whorl larger than all the others conjoined. (Rang.)

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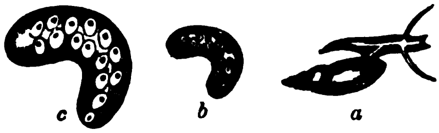
* Draparnaud, among others, appears to have been of this opinion. See his figure of Planorbis corneus, &c., pl. i.

* Mr. G. B. Sowerby appears to have been the first who assigned the proper position to this species from observation of the shell only. (*Genera*, No. iv.) For this he was at the time undeservedly censured.



Physa. Shell and animal; with eggs.

a, Physa hypnorum; *b*, mass of eggs, nat. size; *c*, the same, magnified.

Geographical Distribution of the Genus.—Very extensive, species having already been found in the tranquil fresh-waters of all the four quarters of the globe. Europe has several species, and the form occurs in America, in Africa (there being little doubt that the *Bulin* of Adanson is a *Physa*), in New Holland, where it was found by M. Quoy, and in the Isles of Bourbon and France, whence it was brought by M. Rang. Mr. Gray has named two species from the East Indies and one from Peru.

Mr. G. B. Sowerby, as we have already seen, unites *Physa* and *Limnæa*, making the latter include the former for the reasons above given. M. Rang, who notices their inhabiting the same places as the *Limnææ*, and their resemblance in organization, observes that the animal of *Physa* is distinguished from that of *Limnæa* by the form of its tentacles, as is the shell by its generally sinistral disposition, like that of the *Planorbes*. He also notices the observation of M. de Blainville that there exist dextral species.

M. Deshayes, in the last edition of Lamarck (tom. viii., 1838), remarks, that the genus *Physa*, established at first by Adanson under the name of *Bulin*, was not definitely introduced till Draparnaud presented it anew under the name which it still bears. Adanson, he continues, had too much sagacity not to perceive the relationship of his *Bulin* with the *Planorbes*, and fails not to insist upon this point, although he points out the characteristic differences of the two genera. After some observations on the doubts of naturalists as to the analogy presented by the animals of *Planorbis*, and those of *Physa* and *Limnæa*, and the absence of doubt as to the distinguishing characters of the two last-mentioned genera, M. Deshayes thus continues: 'Certainly, if we consider the shells only, there is a very great resemblance between a *Physa* and a *Limnæa*, but all the *Physæ* are sinistral, the *Limnææ* are dextral; the *Physæ* have a polished and shining shell, because the animal has its mantle lobated and turned back upon the shell, which is not the case in *Limnæa;* the animal of *Physa* carries on its head elongated and narrow tentacles, like those of *Planorbis*, and not triangular and thick ones, like those of *Limnæa*. These characters seem sufficient to retain the two genera in the system, and, consequently, to reject the opinion of Mr. Sowerby, who unites them in his genera.'

Lamarck recorded four species of *Physæ* (recent). M. Deshayes, in the last edition of the 'Histoire,' increases the number to ten; and he regrets that M. Michaud has given no detail with regard to some species indicated as found in France, but which do not appear to live there. He observes that Lamarck has recorded two *Physæ* (*P. castanea* and *P. subopaca*), the first from the Garonne, and the last from the environs of Montpelier, which M. Michaud does not mention. M. Deshayes adds, that we must probably conclude, from the silence of M. Michaud, that these species have not been found, and that Lamarck, deceived by a false indication, has given them a *habitat* not theirs. Conrad has described an additional species.

Example, *Physa fontinalis*, Drap.; *Bulla fontinalis*, Linn.

Description.—Shell sinistral, oval, diaphanous, smooth; of a yellowish horn-colour; spire very short and rather pointed.

Locality, temperate Europe, probably; England and France, certainly.—North America (Claiborne, Alabama), Conrad.

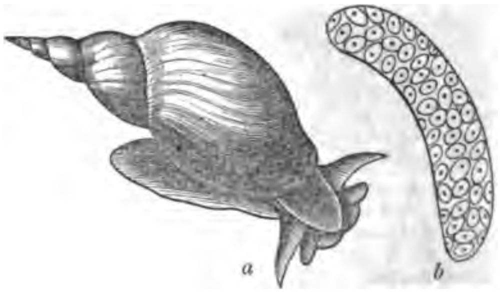
Habits, &c.—Col. Montagu (*Testacea Britannica*) notices the species as not uncommon in stagnant pools, as well as running waters, in many parts of the kingdom, and as most frequently found on the under part of the leaves of aquatic plants. He gives a description of the animal, and says that when in motion it covers a great part of the shell with a thin pinnated membrane, thrown out on the right side, extending quite behind and partly on the left side, covering the smaller volutions: this membrane (mantle) s, he says, very deeply divided, or digitated, the points of which meet and sometimes intersect on the back of the shell, and it is so transparent as scarcely to be distinguished but by the assistance of a glass. The foot he describes as long and narrow, and the foramen on the left side, 'as must be the case with all the animals of this kind inhabiting *heterostrophe* shells.' Col. Montagu concludes his remarks on this species as follows: 'It has a very considerable locomotive power, and transports itself by adhering to the surface of the water, with the shells downwards: against which it crawls with as much apparent ease as on a solid body; and will sometimes let itself down gradually by a thread affixed to the surface of the water, in the manner of the *Limax filans* ('Linn. Trans.,' iv., 85, t. 8.), from the branch of a tree. The property of crawling under water, against its surface, is not wholly confined to this species;[*] but we know of no other testaceous animal capable of supending itself under water in the same way.[†] It has the power of throwing its shell about in an extraordinary manner, either in defence or to remove obstructions, continuing at the same time fixed by its foot. Probably this singular motion is sometimes occasioned by a minute species of *Hirudo* (*Gordius inquilinus*, Müll., *Verm.*) which infests this and many other fresh-water testaceous animals; twenty or more may be seen adhering to its sides like slender white filaments.'

Shell of Physa fontinalis.

Limnæa.

Animal of oval form, more or less spiral; head furnished with two flattened triangular tentacles, carrying the eyes at their base, on the internal side; mouth furnished with an upper piece for mastication, surmounted by a sort of very short veil; foot oval, bilobated anteriorly, narrowed posteriorly; orifice of the pulmonary cavity on the right side, on the collar, in form of a furrow, and capable of being covered by a fleshy appendage which borders it below; anus on the side, organs of generation distant, the orifice of the male intromissive organ being under the right tentacle, and that of the vagina at the entry of the pulmonary cavity.

Shell delicate, fragile, of an oval oblong, with a spire more or less sharp and elongated, and an aperture longer than it is wide, oval, sometimes very large, with a sharp edge,[‡] not continuous, on account of the convexity of the preceding whorl; on the columella an oblique plait. (Rang.)



Limnæa stagnalis.

a, the animal in the shell; *b*, mass of eggs, magnified.

M. Deshayes observes (last edition of Lamarck) that the animal of *Limnæa* presents peculiar characters. On the head are two triangular tentacles very much enlarged at the base, and having the eyes rather projecting on the upper and internal part of that base. The head is large and flattened, separated from the foot by a shallow furrow. The foot inclines to oval, terminated in a point posteriorly, and delicate and flattened on the sides. The mantle, closed anteriorly and narrow, forms a sort of collar, as in the *Helices*. There is a great cavity behind its border. The upper wall of this cavity, delicate and transparent, is covered on its internal surface by a very well developed vascular net-work, destined for respiration: it is near the aperture of the mantle and a little below it that the orifice of the anus is seen.

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[*] See above: note to description of the shells of the Limneans, p 498.

[*] See post, Limnæa.

[†] See post, LITIOPA, which is said to have a similar power.

[‡] See note at the commencement of the article, p. 498.

Geographical Distribution of the Genus.—*Limnææ* appear to occur in almost all parts of the world, but the form is most seen in the temperate and northern regions.

Habits, Food, Reproduction, &c.—Fresh-waters, especially those which are stagnant, are the resort of the *Limnææ;* in such situations they abound, feeding on the aquatic plants on whose stems they creep, and coming to the surface to respire the air. Here they may often be seen in a reversed position, and probably maintained in it by the air in the branchial cavity. Like the *Physæ* they have the power of locomotion when so situated, and may be observed moving their ventral disk, as if they were employing it against a solid surface, whereas the animal only touches an extremely thin lamina (so to speak) of water, which offers sufficient resistance for its progression. In the reproduction of the species the animals are employed somewhat differently from the *Helicidæ* and *Limacidæ*, though, like them, each individual is furnished with both male and female organs of generation; for the same *Limnæa* is capable of serving at the same time as a male for a second, and as a female for a third, and by this connexion of one individual with two others a continuous chain of some length is not unfrequently produced. No. 2313 of the fifth or allotriandrous series of preparations illustrating the principles of generation, in the Museum of the Royal College of Surgeons in London (*Catalogue*, vol. iv., 'Physiological Series'), exhibits the soft parts of the generative anal and respiratory orifices of *Limnæa stagnalis*, and shows how this gastropod differs from the *Limacidæ* and *Helicidæ* in the separation of the above-mentioned orifices from one another. The number of eggs is very great, and they are deposited on stones, stems of vegetables, &c., in elongated masses enveloped in a glairy substance, which is said to increase in proportion to the development of the embryos. For very interesting details on the reproduction and embryogeny of these mollusks we refer the reader to the works of M. Pfeiffer and of M. Dumortier.

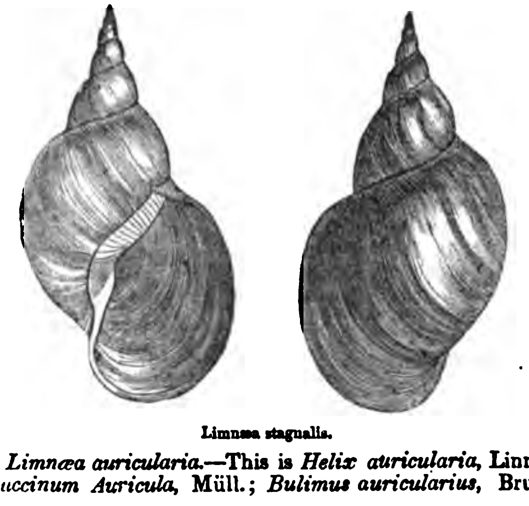
The recent species are numerous; Lamarck recorded twelve, including *L. columnaris*, which is considered to be an *Achatina*. M. Deshayes, in the last edition of Lamarck's 'Histoire,' has added eight more. Bean and Troschel have each added one.

We select as examples *Limnæa stagnalis* and *Limnæa auricularia.*

Limnæa stagnalis.—This is *Helix stagnalis*,[*] Linn.; *Buccinum stagnale*, Müll.; and *Bulimus stagnalis*, Brug.—*Description:*—*Shell* ovate-acute, ventricose, thin, pellucid, substriated longitudinally, of a horny colour; the last whorl subangulated above; the spire conico-subulate; the aperture large.

Montagu observes that it is frequently covered with a green epidermis, and sometimes a concreted stony matter that almost obliterates the upper volutions; he adds that some authors have made this shell into two or three species, apparently from size only.

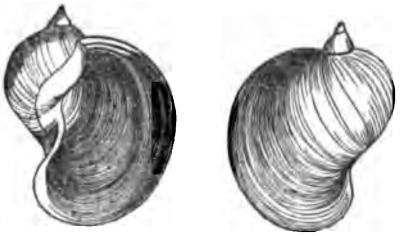
Locality, The fresh sluggish or stagnant waters of England, France, &c.



Limnæa stagnalis.

Limnæa auricularia.—This is *Helix auricularia*, Linn.; *Buccinum Auricula*, Müll.; *Bulimus auricularius*, Brug. *Description:*—*Shell* ampullaceous, ventricose, ovate, thin, transparent, of a horny colour, marked with very delicate close-set longitudinal striæ; the spire very short and acuminated.

Locality, the same with that of *L. stagnalis.*



Limnæa auricularia.

Fossil Limnæidæ.

Planorbis.—M. de Blainville ('Malacologie') mentions the number of fossil species as four or five, adding that Defrance, who increases the number to eighteen, acknowledges that the fossil state of some of them is doubtful; he notices four as analogues. Mr. G. B. Sowerby (*Genera*) states that several fossil species abound in the distinctly fresh-water strata of the Isle of Wight and the neighbourhood of Paris, where they are very abundant, and accompanied by as great a profusion of *Limnææ* and some other decidedly fresh-water shells.

Lamarck records only three fossil species, nor does he mark any of the recent species as occurring in a fossil state. M. Deshayes, who in his tables (Lyell) makes the number of species 23 living and 26 fossil (tertiary), records in the same place the *Planorbes corneus, marginatus, carinatus, spirorbis*, and *nitidus* as both living and fossil (tertiary). We cannot find *P. marginatus* in Lamarck's first edition nor in that edited by M. Deshayes (tom. viii.) in 1838, except as a synonym to *P. complanatus.* In this last work the following recent species are marked by M. Deshayes as occurring in a fossil state:—*corneus, spirorbis, vortex, contortus, nitidus, complanatus*, and *Leucostoma*, on the authority of M. Bouillet; and the number of fossil species is made to amount to nine. Dr. Fitton, in his 'Stratigraphical and Local Distribution of Fossils,' in the strata below the chalk, notices an indistinct species of *Planorbis*, (Purbeck, Oxfordshire and Bucks).

Physa.—M. de Blainville, in his *Malacologie*, states that it would appear that no *Physæ* had at the time of his publication been found fossil. M. Deshayes in his tables (Lyell) gives the number of species as nine living and one fossil (tertiary): in the last edition of Lamarck the number of recent species given is ten; but the number of fossil species is the same as that stated in the tables.

Limnæa.—M. de Blainville (*Malacologie*) remarks that if it were clear that the species of this genus established by geologists, and among others by MM. Lamarck, Brard, Brongniart, Sowerby, and De Férussac, were true, there would be at least twenty fossil species in France alone; but he adds that M. Defrance does not carry the number further than ten, two of which (from the Plaisantin) are analogues according to Brocchi. Mr. G. B. Sowerby, who unites the genera *Physa* and *Limnæa*, observes ('Genera') that several fossil species of this genus occur abundantly in company with various *Paludinæ* and *Planorbes* in the fresh-water formations; these, he adds, occur in the neighbourhood of Paris, and in the upper and lower of these formations at Headen Hill, and in other parts of the Isle of Wight. He also found them sparingly 'in the mixed stratum commonly called the upper marine formation, between the two,' but he believes that they do not occur in any other. Lamarck noticed but one species as fossil, viz. *Limnæa palustris*, this being in his opinion really the analogue of the recent species of that name. M. Deshayes in his tables (Lyell) gives the number of *Limnææ* as fifteen living and twenty-seven fossil (tertiary), and the species *peregra, auricularis, rivalis*, and *palustris* as both living and fossil (tertiary). In the last edition of Lamarck the following recent species are marked by him as also occurring in a fossil state:—*palustris, ovata, peregra*, and *minuta. L. auricularia* is not marked as fossil in this edition, and we do not find *L. rivalis* as a species in either. The number of strictly fossil species recorded in the last edition of Lamarck is eleven, and in that edition M. Deshayes remarks that a sufficiently great number of *Limnææ* are found in a fossil state, but that up to the time when he wrote no species was recorded in the beds below the tertiary, and even in these the *Limnææ* only appear in the lower fresh-water strata. They show themselves, he adds, in the upper beds of the Paris calcaire grossier, and are also recognised in nearly all the lacustrine deposits, not only of the Parisian epoch, but also in the two great tertiary groups that surmount it. Dr. Fitton, in the table above quoted, records a *Limnæa* (with a note of interrogation) as occurring in the Purbeck strata, Oxfordshire, in the 'malm,' Garsington.

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[*] 'Syst. Nat.,' ed. 12, p. 1249, No. 703. On the opposite page (1248) the specific name *stagnalis* is again given to a small and apparently different shell.

Mr. Lea, in his 'Contributions to Geology' (8vo. Philadelphia, 1833), notices the tufaceous lacustrine formation of Syracuse, Onandaga county, New York. He found the substratum which lined the side of the canal to consist of a calcareous marl of a whitish colour, bordering on that of ashes, friable, and rather soft to the touch. A subsequent analysis by Professor Vanuxem proved it to be nearly pure carbonate of lime. Numerous perfect specimens of the genera *Limnæa*, *Physa*, *Paludina*, and *Ancylus* were obtained, all being analogous to the species inhabiting at that time the fresh-waters of that region; and Mr. Lea states that it was evident that the deposit was caused by the drainage of the lake. The specimens were found to be completely bleached, and were generally in an unbroken state. 'A lacustrine formation of so recent a nature,' says Mr. Lea in continuation, 'as this appears to be, is not, I believe, of frequent occurrence. It is the result however of one of those causes which are now in action; and another instance might be mentioned, in which the effect of this cause, though striking, has not advanced to that period when it would make a finished deposit; I mean the small lake, or pond, in Sussex county, New Jersey, well known by the descriptive name of Milk Pond *. Here countless myriads of bleached shells of the families *Lymnæana* and *Peristomiana*, analogous to the species now inhabiting the adjacent waters, line and form the shores of the whole circumference of the lake, to the depth and breadth of many fathoms. Not having visited this interesting lake myself, I repeat what has been communicated to me by intelligent scientific friends who have examined it, and on whose report the most implicit reliance may be placed. Such is the quantity of bleached shells now remaining there, that thousands of tons of these small species, in a state of perfect whiteness, could be obtained if any useful purpose required the removal of them. For agricultural purposes this mass might prove of great utility. One friend, I remember, mentioned to me that he had obtained a sharp pointed pole, which he inserted ten or twelve feet perpendicularly into the mass, on the shore, near to the edge of the water, without its having passed through it. As far as can be ascertained, this mass seems to form the whole basin of the lake, and it may at some future and perhaps not far distant period form a tufaceous lacustrine deposit similar to that of Syracuse.'

LIMNO'RIA. [Isopoda, vol. xiii., p. 53.] In 1838 the Rev. F. W. Hope exhibited to a meeting of the Zoological Society a piece of deal perforated throughout by *Limnoria terebrans*, in which many of these destructive crustaceans might still be detected; and he stated that the oaken piles of the pier at Southend had been cased with deal, and then surrounded with a sheathing of iron, to protect them from the *Limnoriæ*. Instead of producing the desired effect, this plan appeared to have accelerated the destruction of the piles; for the *Limnoria* made its way from beneath between the sheathing and the pier, and very quickly destroyed the deal casing, as shown by the piece exhibited. Mr. Hope expressed his belief that wood could not by any means be effectually shielded from this animal if exposed to its attack; and that iron, protected from the decomposing action of the water by some varnish, although requiring a much greater outlay at first, would in the end be found the least expensive of the two. (See further, *Edinb. New Phil. Journal*, 1834 and 1835.)

LIMOGES, a city in France, capital of the department of Haute (Upper) Vienne; situated on the right bank of the Vienne, 215 miles in a direct line S.S.W. of Paris, or 236 miles by the road through Orléans and Châteauroux. Limoges was the chief town of the Celtic tribe the Lemovices, to whom both the town and the province of Limousin owe their names. It was called Augustoritum by the Romans, under whom it was a place of considerable importance, and became in the third century the seat of a bishopric. It was at the convergence of several Roman roads. There was an amphitheatre, said to have been built by the emperor Trajan, of which there were sufficient remains in 1713 to admit of a plan being drawn; it was about 1500 feet in circumference. It was entirely destroyed in 1714, in order to form the Place d'Orsay. There are now no Roman remains at Limoges in good preservation, except a subterraneous aqueduct, which conveys the water of a fountain in the upper part of the town. In the fifth century Limoges came into the power of the Visigoths; and was successively pillaged or destroyed by the Franks (twice) and Northmen. It was ceded to the English by the treaty of Bretigny, and formed part of the great duchy or principality of Aquitaine under Edward the Black Prince. [Bordeaux.] The people of Limoges were persuaded by their bishop to revolt from Edward, one of whose last exploits (A.D. 1370) was the capture of the town. Irritated by treachery, the Prince, who was then wasting under the disease which ultimately brought him to his grave, put three thousand of the inhabitants, men, women, and children, to the sword; the bishop, who had been ordered for execution, was released by the intercession of the Pope.

Limoges is built on a hill which commands a prospect of the delightful valley of the Vienne. The older part of the town consists of narrow and steep streets, with houses, from the first floor upwards, built of wood: the more modern part contains broad and straight streets, the handsome 'Place d'Orsay,' several excellent houses, new boulevards, and a number of public fountains. Of the public edifices the principal are the town-hall, a handsome modern building; the cathedral, a fine Gothic edifice of the thirteenth century; and the episcopal palace. The population was, in 1831, 23,804 for the town, or 27,070 for the whole commune; in 1836 it was 29,706 for the whole commune. The chief manufactures are of broad-cloth, kerseymere, drugget, flannel and other woollen goods; cotton-yarn and calico; linen and hempen cloth; hosiery, both cotton and woollen; paper, leather, hats, glue, wax candles, and porcelain. There are dye-houses for wool and cotton, and several iron-works. The Vienne is not navigable here; but the position of the town on one of the high roads from Paris to Perigueux and Bordeaux and into Spain, and to Cahors and Toulouse, is favourable to inland trade, of which it has a good share. There are roads to Poitiers, Angoulême, and Clermont Ferrand. There is a great monthly market or fair for cattle, and nine yearly fairs, two of which last eleven days each. There is an Exchange for the convenience of traders.

Limoges is the seat of a Cour Royale, or high court of justice, and of an Académie Universitaire; the circuit or jurisdiction of both which comprehends the departments of Haute Vienne, Corrèze, and Creuse. There is a mint. It has a royal college or high school, and a diocesan seminary for the priesthood; a royal society of agriculture, sciences, and arts; a drawing-school, a school of commerce, and a museum of natural history and antiquities; three public libraries; a depository of objects of art and mechanical science, and a departmental nursery-ground. There are a mont-de-pieté, several benevolent institutions, and a central house of correction.

The arrondissement of Limoges comprehends 780 square miles: it had a population of 115,488 in 1831, and in 1836 of 120,476. It is subdivided into ten cantons, two which are in and just about Limoges, and 78 communes.

The diocese of Limoges comprehends the departments of Creuse and Haute Vienne; the bishop is a suffragan of the archbishop of Bourges.

LIMO'SA. [Scolopacidæ.]

END OF VOLUME THE THIRTEENTH.

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* From the milky appearance of the waters near the shore, caused by the mass of bleached shells deposited there. In Gordon's map of New Jersey it is named *White Pond.* (Lea.)

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THE

PENNY CYCLOPÆDIA

OF

THE SOCIETY

FOR THE

DIFFUSION OF USEFUL KNOWLEDGE.

VOLUME XIV

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LIMO'NIA, a genus of plants of the natural family of *Aurantiaceæ*, so called from the original Indian names, *Neemoo* and *Leemoo*, of the Lemon. Several of those described under this genus by Dr. Roxburgh have been referred to *Atalantia* and *Glycosmis*. The species still included are rather heterogeneous in nature, and will probably require further separation. As most of the family abound in essential oil, so the leaves of some of the Limonias are fragrant, and the fruit, though small, of *L. acidissima* and *crenulata* is very acid. *Limonia laureola*, referred to this genus by Dr. Wallich, in his 'Plantæ Asiat. Rar.' t. 245, is remarkable as the only plant of this family found on the tops of cold mountains. The people of the Himalayas, remarking its highly fragrant leaves, fancy that it is by feeding on them that the musk acquires its strong and peculiar flavour.

LIMOUSIN, or LIMOSIN, a province of France, now comprehended in the departments of Corrèze and Haute Vienne. Limousin comprehended an area of 3900 square miles, watered by the Vienne, one of the great tributaries of the Loire, and by the Dordogne, and its tributaries the Isle and the Vezère, all belonging to the system of the Garonne. The province was divided into two parts by the Vezère. Haut or Upper Limousin was to the north-west of that river, and had Limoges for its capital: Bas or Lower Limousin was to the south and east; its chief towns were Brives and Tulle. Limoges was the capital of the whole province. Limousin was included in the dioceses of Limoges and Tulle, the bishops of which were both suffragans of the archbishop of Bourges.

This district was antiently inhabited by the Lemovices, a Celtic people conquered with the rest of the Celts by Cæsar. In the subsequent division of Gaul into provinces, Limousin was included in Aquitania: and upon the subdivision of that province, in Aquitania Prima. It formed part of the dominions of the Visigoths till the overthrow of Alaric II. by Clovis at the battle of Vouglé, or Vouillé, in Poitou. It was subsequently under the government of the dukes of Aquitaine, or of Guienne, from whom it was taken by Pepin le Bref. It was subsequently included in the great duchy of Guienne, under which Limoges, its capital, became a vice-county. It was in a quarrel with Adémar V., viscount of Limoges, that Richard I. (Cœur de Lion), king of England and duke of Guienne, lost his life, being shot with an arrow as he was besieging the castle of Chalus in Limousin. The possession of Limousin was subsequently disputed by the kings of England, as dukes of Guienne, and the kings of France. It afterwards came by marriage into the hands of the dukes of Bretagne, and later still into those of the counts of Albret. It was inherited by Henri IV. from his mother Jeanne d'Albret, and was by him united to the French crown.

LIMOUX, a town in France, capital of an arrondissement in the department of Aude, and on the bank of the river Aude. The streets are paved and lighted, and the houses are of tolerably good appearance. The market-place is a regular square. There are two churches, four public fountains, and a public walk. The public edifice most deserving notice is the gate of La Trinité, a modern erection, near the bridge over the Aude. The population in 1831 was 6247 for the town, or 6518 for the whole commune; in 1836 it was 7105 for the commune, showing an increase in five years of nearly 600, or almost 10 per cent The principal manufactures are of leather and woollen cloth; there are several oil-presses, and in the neighbouring district there are iron-works. The surrounding country produces good white wine. There are a high school, an agricultural society, an hospital, and a small collection of paintings, beside several government offices for judicial or fiscal purposes. The town is about 12 miles south-west from Carcassonne, the capital of the department.

The arrondissement comprehends 688 square miles, and had a population in 1831 of 72,707, in 1836 of 75,891: it is subdivided into four cantons and 150 communes.

LI'MULUS, the name for a genus of crustaceans, one of the most known of which is popularly called *The King Crab.* [XIPHOSURIANS.]

LINA'CEÆ, a small natural order of plants, related to Cistaceæ, from which it differs in having an ovary with many cells, containing one or two seeds each, several styles, a definite number of stamens, &c., and to Geraniaceæ, from which the separate styles and peculiar fruit of Linaceæ abundantly separate that order. The definition of Linaceæ may be briefly expressed thus: polypetalous, hypogynous, monadelphous exogens, with a broken-whorled calyx; a many-celled, many-styled ovary, containing one or two pendulous ovules in each cell, and a capsule splitting at the point into as many valves as there are cells. The fruit is remarkable for having each of its carpels divided into two cells by a spurious dissipiment originating inside the back, so that in reality each cell is two-seeded, although from the presence of this spurious partition it seems to be one-seeded.

But although Linaceæ approach the two orders already named in the structure of the organs of fructification, the vegetation is essentially different, the leaves being alternate, free from all trace of a volatile secretion, and destitute of stipules, and the nodes of the stem not being capable of disarticulation. The whole order contains but two genera, Linum and Radiola: the former comprehends many species, the most important of which is common flax, Linum usitatissimum, the woody tissue of whose stems is so valuable for its toughness and fineness, and whose seeds furnish linseed oil. [FLAX, where the plant is called by mistake *Linum perenne;* LINSEED OIL; LINUM.]

LINACRE, or LYNACER, THOMAS, one of the most eminent physicians of his age, descended from the Linacres of Linacre Hall, in the parish of Chesterfield in Derbyshire, was born at Canterbury about 1460. He received his first education in his native city, under William Tilly, or De Selling, and afterwards entered at Oxford, where he was chosen a fellow of All Souls College in 1484. Anxious for further improvement in learning, he accompanied De Selling into Italy, whither he was sent on an embassy to the court of Rome by King Henry VII. De Selling left him at Bologna with strong recommendations to Angelo Poliziano, then one of the best Latin scholars in Europe. Linacre removed thence to Florence, where Lorenzo de' Medici allowed him the privilege of attending the same preceptors with his own sons; and under Demetrius Chalcondylas, who had fled from Constantinople at the taking of that city by the Turks, he studied Greek. He then went to Rome, and studied medicine and natural philosophy under Hermolaus Barbarus. He applied himself particu larly to the works of Aristotle and Galen, and is said to have been the first Englishman who made himself master of those writers in the original Greek. He also translated several of Galen's treatises into elegant Latin, and with Grocyn and William Latymer undertook a translation of Aristotle, which was never completed. On his return to England he was incorporated M.D. at Oxford, which degree he had taken at Padua, and gave temporary lectures in physic, and taught the Greek language at Oxford. His reputation became so high that King Henry VII. called him to court, and entrusted him with the care both of the health and education of Prince Arthur.

In the reign of Henry VIII. Linacre stood at the head of his profession, and showed his attachment to its interests by founding two lectures on physic in the university of Oxford, and one in that of Cambridge. He may also be considered the founder of the College of Physicians in London; for in 1518 he obtained letters-patent from King Henry VIII., constituting a corporate body of regularly bred physicians in London, in whom was vested the sole right of examining and admitting persons to practise within the city and seven miles round it; and also of licensing practitioners throughout the whole kingdom, except such as were graduates of Oxford or Cambridge, who by virtue of their degrees were independent of the college, except within London and its precincts. The college had likewise authority given to it to examine prescriptions and drugs in apothecaries' shops. Linacre was the first president of the new college, and at his death he bequeathed to it his house in Knight-Rider-street, in which the meetings of the members had been held. Before this time medicine had been practised without control by pretenders of all kinds, but chiefly by monks, who were licensed by the bishops; and this charter was the first measure by which the well-educated physician was afforded the least advantage, beyond that which his own character would give him, over the most ignorant empiric.

Highly as Linacre was esteemed in his profession, he became desirous to change it for that of divinity, or rather to combine the two pursuits. In 1509 we find him in possession of the rectory of Mersham, which he resigned in the latter part of the same year, and was installed into the prebend of Eaton in the church of Wells; and afterwards, in 1518, he became possessed of a prebend in the cathedral of York, where he was also for a short time precentor. He had other preferments in the church, some of which he received from Archbishop Warham, as he gratefully acknowledges in a letter to that prelate. Dr. Knight informs us that he held a prebend in St. Stephen's chapel, Westminster; and Bishop Tanner, that he had the rectory of Wigan in Lancashire. He died of the stone, after great suffering, Oct. 20, 1524, and was buried in St. Paul's cathedral, where Dr. Caius erected a monument to his memory.

In his literary character Linacre holds a high rank among the men of learning in this country. He was one of the first, in conjunction with Colet, Lily, Grocyn, and Latymer, who revived or rather introduced classical learning into England; and he conferred a benefit on his profession by translating into Latin several of the best pieces of Galen. These were, the treatises 'De Sanitate tuenda,' fol., Par. 1517; 'Methodus Medendi,' fol., Par. 1519; 'De Temperamentis,' 4to. Cambr. 1521;[*] 'De Pulsuum Usu,' 4to. Lond. 1522; 'De Naturalibus Facultatibus,' 4to. Lond. 1523; 'De Symptomatum Differentiis liber unus. Ejusdem de Symptomatum Causis liber tres,' 4to. Lond. 1524. In these versions Linacre's style was excellent.

Linacre's translation of Proclus, 'De Sphæra,' was printed in the 'Astronomi Veteres' of 1499. His translation of Paulus Ægineta, 'De Crisi et Diebus decretoriis, eorumque signis, Fragmentum,' 8vo. Bas. 1529. He also wrote a small book upon the Rudiments of Latin Grammar, in English, for the use of the Princess Mary, first printed by Pynson without date, and afterwards translated into Latin by Buchanan. But his most learned work was his treatise 'De Emendata Structura Latini Sermonis libri sex,' printed at London immediately after his death in 1524, and frequently reprinted in later years in the sixteenth century.

Of Linacre's talents as a physician no testimony remains except the high repute which he enjoyed. For the excellence of his translations from Galen it may be sufficient to quote the praise of Erasmus, who, writing to a friend, says, 'I present you with the works of Galen, now, by the help of Linacre, speaking better Latin than they ever before spoke Greek.'

There are two copies of Linacre's 'Methodus Medendi, upon vellum, in the British Museum: one a presentation copy to King Henry VIII., the other to Cardinal Wolsey; and a dedicatory letter, in manuscript, to Wolsey, precedes, *in his copy*, the dedication to Henry VIII. The Museum also contains the treatise 'De Sanitate tuenda,' upon vellum. This was Wolsey's copy, and has the cardinal's hat illuminated in the title, and a similar dedicatory letter similarly placed.

(*Biogr. Brit.*; Herbert's edit. of Ames's *Topogr. Antiq.*; Wood's *Athenæ Oxon.*, by Bliss, vol. i., col. 42; Tanner, *Bibl. Brit. Hyb.*; Chalmers's *Biogr. Dict.*)

LINCOLN. [LINCOLNSHIRE.]

LINCOLN COLLEGE, Oxford, was founded in 1427, by Richard Flemming, or Flemmynge, bishop of Lincoln, for a rector and seven fellows; it was afterwards greatly augmented by Thomas Rotherham, bishop of Lincoln, subsequently archbishop of York, and lord high chancellor of England, who added five fellowships, and gave a body of statutes to the foundation, in which he limited the election of the fellows to the old dioceses of Lincoln and York, with the exception of one to the diocese of Wells. This was in 1479. Lord Crewe, bishop of Durham, and sometime rector of this College, in 1717 made an addition to the emoluments of the rector and fellows, and in 1718 endowed twelve exhibitions of 20*l.* a year a-piece. The scholarships and exhibitions received a further augmentation at a later time, by the will of Richard Hutchins, D.D., rector from 1755 to 1781.

The present foundation consists of a rector, twelve fellows, eight scholars, twelve exhibitioners, and one bible-clerk. The total number of members upon the books on December 31, 1837, was 132. The patronage consists of the rectories of Cublington and Twyford in Bucks, of Winterborne Abbots with Winterton Stapleton in Dorsetshire, of Hadleigh and Leighs Magna in Essex, and of Waddington in Lincolnshire; with the curacies of All Saints and St. Michael's in Oxford, and of Forest Hill and Combe-Longa in Oxfordshire. The buildings of Lincoln College retain much of their original character. They consist of two quadrangles, besides six sets of rooms erected at a later period. The largest quadrangle includes the rector's lodgings, library, and hall, built in the fifteenth century; the library was originally the chapel. The smaller court was in part built about 1612 by Sir Thomas Rotherham. The present chapel, upon its south side, was built in 1631, by archbishop Williams. The windows are rich in painted glass procured by the archbishop from Italy in 1629. In 1818 the whole front of the college was repaired, and much improved in its appearance by the addition of battlements and the introduction of appropriate Gothic windows. Among the more eminent members of this college were Dr. Robert Sanderson, bishop of Lincoln, archbishop Potter, Sir William Davenant the poet, Dr. George Hickes, Sir George Wheler, Hervey, the author of the 'Meditations,' and the celebrated John Wesley. (Gutch's and Chalmers's *Colleges and Halls of Oxford*; and the *Univ. Calendar* for 1838.)

LINCOLNSHIRE, an English county bounded on the north by the æstuary of the Humber, which separates it from Yorkshire; on the north-west by the county of York; on the west by the county of Nottingham, from which it is partly separated by the Trent; on the south-west by the counties of Leicester and Rutland; on the south by Northamptonshire; on the south-east by the counties of Cambridge and Norfolk, from the last of which it is separated by the Cross Keys Wash; and on the east by the North Sea or German Ocean. Its form is irregular, having its greatest length from north to south, 75 or 76 miles, from the bank of the Humber near the town of Barton to the bank of the Welland in the neighbourhood of Market Deeping; and its greatest breadth, 51 or 52 miles, from the junction of the three counties of York, Nottingham, and Lincoln, to the sea at Saltfleet. The area is estimated at 2611 square miles; and the population, in 1831, was 317,465, giving 122 inhabitants to a square mile. In size it is the second English county, Yorkshire alone exceeding it; in population the fourteenth, being rather less populous than Essex, and rather more so than Hampshire; and in density of population inferior to all other counties except Northumberland, Cumberland, and Westmoreland. It is comprehended between 52° 39′ and 53° 45′ N. lat., and between 0° 22′ E. and 0° 57′ or 0° 58′ W. long. Lincoln, the county town, is 121 miles north by west from London in a straight line, or 134 miles by the mail-road.

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[*] This was the first book printed in England in which *Greek types* were introduced.

Coast-line.—The coast, from the Welland to the Humber, forms a tolerably regular curve convex to the sea, and is low and marshy, except about Clea Ness, near Grimsby, where the coast rises into cliffs. A belt of sand skirts the land, of varying breadth; and the forest which once occupied the fen country, where the trunks of trees are found under the soil, extended over a considerable space now covered by the sea. From the mouth of the Welland to that of the Nene the coast is so low as to require the protection of a sea-wall or bank. The present bank is more advanced toward the ocean than what is termed the old or Roman bank, so as to gain a considerable extent of land. The æstuary of the Wash is occupied for the most part by sand-banks, dry at low water. Between these banks the streams which flow into the æstuary have their channels. Two wide spaces, or pools of deeper water, between the banks, afford anchorage to vessels. The opening near the Norfolk coast is termed Lynn Well or Lynn Deeps, though in some maps the name of Lynn Deeps is given to the eastern channel of the Ouse. The opening near the Lincolnshire coast is called Boston Deeps: it forms a long narrow anchorage, sheltered to seaward by Long Sand, Dog's Head, and Outer Knock, a range of sand-banks which run parallel to the coast to Skegness, north of Wainfleet. The water in Boston Deeps is usually from three to six, but in some places seven or eight fathoms deep. The coast between Boston and Wainfleet is occupied by a line of salt-marshes. There are other salt-marshes along the æstuary of the Humber. (Arrowsmith's *Map of England*; Greenough's *Geological Map.*)

Surface and Geological Character.—A considerable part of Lincolnshire consists of alluvium, constituting a vast extent of flat or marsh land, from the border of which the subjacent strata rise and form comparatively elevated tracts. The alluvial soil occupies the whole of the coast, with the exception of the small insulated spot about Clea Ness. It skirts the bank of the Humber, and that of the Trent, as far up as Gainsborough. West of the Trent it spreads over Thorne Waste, or Thorne Level, from the midst of which rises the Isle of Axholme. This level was antiently occupied by a vast forest; the trunks of the trees are still found in great abundance beneath the present surface, rooted in the firm ground in which they grew. [AXHOLME, ISLE OF.] West of the Wash the alluvium extends inland from Wainfleet, by Spilsby, to the river Witham, up the bank of which it extends far above Lincoln. It spreads in breadth to a considerable distance (three or four miles) from each bank nearly up to Lincoln, where it is contracted to a narrow strip. Southward from the Witham the alluvium occupies half the breadth of the county, being bounded westward by a line drawn from Heckington, between Sleaford and Boston, to Uffington on the Welland, between Stamford and Deeping, and extending beyond the Welland and the Nene into Northamptonshire and Cambridgeshire. The alluvial country, from Wainfleet and Spilsby southward, forms part of the great fen country of England. The alluvium between Louth and the sea consists principally of unstratified clay mixed with sand and various marine deposits.

From Barton-upon-Humber to Burgh near Wainfleet a line of chalk downs extends, called the Wolds of Lincolnshire. These downs sink on the north and east beneath the alluvium described above. They form part of the great chalk formation which, though occasionally interrupted or covered by other beds, extends through England from Flamborough Head in Yorkshire to the coast of Dorsetshire. The length of the Lincolnshire Wolds is about forty-seven or forty-eight miles, their average breadth six or seven, their greatest breadth twelve or thirteen. The chalk is of two colours, red and white, disposed in regular strata, the red commonly undermost: in the white chalk seams of flint, two to six inches thick, frequently occur. The chalk is found extending under the alluvium in the marshes round the Wolds: water is obtained from it by boring through the superincumbent soil; and along the coast north and south of Saltfleet are natural outlets of water called provincially 'blow wells' ('flow wells' in Greenough's map), deep circular pits, which furnish a continual flow of water, and are vulgarly reputed to be unfathomable; they are presumed to communicate with the chalk. The chalk has been pierced by well-diggers 300 feet; but it is not mentioned whether the wells were sunk wholly in the chalk or through it.

The Wolds have their steepest escarpment towards the west, on which side the green-sand crops out and forms a narrow belt, skirting the chalk from Barton to Burgh. This formation is supposed to be thin. At the south point of its extension the green-sand sinks under the alluvium of the fen district. The iron-sand occupies a narrow belt of land west of the green-sand. These two formations constitute a range of hills extending from north-west, near Market Raisin, to south-east, near Spilsby, running nearly parallel to the Wolds, to which they adjoin at their north-western end, forming an inferior terrace, while in other parts they are separated from them by the valleys of the Bain and the Steeping.

Westward of the iron-sand extends a wide flat, watered toward the north by the Ancholme, and toward the south by the Witham, occupied, except where overspread by alluvium or by chalk rubble, by the Oxford or clunch clay. The district occupied by this formation is very narrow in the north, and becomes wider as it proceeds southward, until it disappears beneath the fens. Its breadth near the Humber is about three miles, east of Lincoln about fifteen miles, and between Sleaford and Spilsby twenty-five miles; but in this part it is partially covered by the marshes of the Witham. The elevation of this stratum scarcely exceeds that of the adjacent fens. It has been penetrated to the depth of nearly 500 feet, and its breadth may be probably estimated at 700.

The low district of the Oxford clay forms a large central valley separating the Wolds, with the adjacent hills, from the higher grounds formed of the oolitic strata, which extend southward through the county from the marshes which line the Humber. They are bounded on the east by a line drawn by Lincoln (where the oolites subside, forming a narrow gap of a mile or two wide, occupied by the Witham and the adjacent marshes), Sleaford, and Bourne to Uffington. This range of high land forms part of what have been termed the stonebrash hills, and separates the valleys of the Ancholme and the Lower Witham from those of the Trent and the Upper Witham: they have their steepest escarpment on the western side, which is called, south of Lincoln, Cliffe Row. This western escarpment runs southward from Lincoln to the neighbourhood of Grantham, and then westward into Leicestershire. From the Humber to Lincoln these formations occupy a very narrow strip, varying from one or two to four miles wide; between Folkingham and Grantham they extend eight or nine miles in width; and between Bourne and Ab-Kettleby in Leicestershire, twenty-five miles. The eastern side of this range of hills consists, from Barton to Lincoln, chiefly of the great oolite; and south of Lincoln of the cornbrash and great oolite, separated by a thick bed of clay. The west side is occupied by the inferior division of the oolitic formations. Several stone-quarries are opened between Sleaford and Grantham. There are one or two outlying masses of oolite about Grantham, and between Grantham and Newark, separated from the principal oolitic range by intervening valleys occupied by the subjacent strata of lias.

This last-named formation occupies nearly all the rest of the county. Commencing at the Humber, where the district occupied by it is not more than two or three miles wide, it proceeds due south to Lincoln, southward of which it pervades all the western side of the county, except one small spot extending over the border into Nottinghamshire and Leicestershire. It is conterminous on its eastern side with the oolitic formations, from beneath which it crops out. The north-western corner of the county is occupied by the new red sandstone or red marl, which extends along the banks of the Trent, and from them westward into Nottinghamshire and Yorkshire. It is covered all round the Isle of Axholme (which is composed of red marl) by the alluvium of the Thorne Level, Hatfield Chase, and the contiguous marsh-lands. Gypsum occurs plentifully in this formation in the Isle of Axholme and on the border of the Trent; and there are mineral springs containing sea-salt and other purging salts in the neighbourhood of Gainsborough.

Hydrography and Communications.—The Trent touches the border of the county nearly midway between Newark and Gainsborough, and for about fifteen or sixteen miles separates the counties of Lincoln and Nottingham; from below Gainsborough to its junction with the Yorkshire Ouse its course of nineteen miles is almost entirely within the border of Lincolnshire. This river is navigable throughout that part which belongs to this county; and vessels of 150 tons can ascend to Gainsborough, where the river is crossed by a bridge. The Idle, which comes from Nottinghamshire, or rather the Bykerdike or Vicardyke, a cut from the Idle, skirts the southern boundary of the Isle of Axholme, and falls into the Trent a little below Gainsborough on the left bank. The Bykerdyke and the Idle are navigable from East Retford. The old river Torne, another affluent of the Trent, skirts the Isle of Axholme on the north-west, and cuts (not navigable), distinguished as the New river Idle and the New Torne, pass from the rivers after which they are respectively named, through Axholme Isle into the Trent.

The Ancholme rises near the village of Spridlington between Lincoln and Market Rasen, and flows north-east six or seven miles to Bishop Briggs, when it is joined by a little river Rase from near Market Rasen. Here the navigation commences, and the stream is carried in an almost direct line by an artificial cut, about twenty miles long, into the Humber, a short distance west of Barton. The old channel of the river winds much more than the navigable cut, but coincides with it in the general direction of its course. This river serves to drain the marshes through which it flows. The Ancholme carries off the drainage of the valley between the Wolds and the oolite or stonebrash hills. The streams which fall into it are all small.

The Tetney river rises from two springs, one near Normanby and the other at Thorpe-le-Mire, near the south-western escarpment of the Wolds, between Binbrook and Market Rasen; the streams from these springs unite and flow by Binbrook and Tetney into the German Ocean between Grimsby and Saltfleet. The length of the river is about twenty-two miles. The mouth has been made navigable, the Louth navigation entering the sea there.

The Ludd rises near the south-west escarpment of the chalk range. It is formed by the junction of two or three brooks which unite above Louth and flow north-east into the German Ocean by several arms, one of which enters the sea by Grainthorpe sluice between Tetney and Saltfleet, another near North Somercoats, and the third at Saltfleet. The length of the Ludd is about eighteen miles. The Louth navigation consists partly of this river and partly of an artificial cut from the village of Alvingham to the mouth of the Tetney river: the navigation is about fourteen miles long.

The Withern or Withern Eau rises near Ashby Puerorum, and flows north-east into the sea at Saltfleet, where its æstuary receives one of the arms of the Ludd: its length is about twenty-four miles. In the upper part of its course it is called the Calceby Beck. The Steeping rises near Ashby Puerorum, and flows south-east, not far from Spilsby, twenty miles into the sea. Wainfleet stands on a small feeder of this river, about three or four miles from the sea: small craft can get up to the town. This river was formerly navigable for larger vessels, but the water has been drawn off by the dykes cut for the purpose of draining the adjacent fen.

South of Wainfleet the fen district commences: and from the extensive system of draining that has been carried on, the hydrography of the county becomes very complicated. The rivers have in several places been diverted from their natural beds, and now flow in artificial channels in direct lines; and are connected with artificial cuts, which open a communication between rivers naturally unconnected. We must therefore comprehend the natural and artificial hydrography in one view, from the impossibility of drawing exactly the line of demarcation between them.

The Witham, the most important river in the county, rises near the village of Thistleton, just within the border of Rutlandshire; but almost immediately enters Lincolnshire, flowing northward to the town of Grantham, and receiving by the way several brooks. Below Grantham the river flows first north, then west, then north, and north by east to Lincoln; two or three miles of its course in this part are on the border of the county, which it separates from Nottinghamshire; the rest within the county. A few miles above Lincoln it receives, on the right bank, the little river Brant, nearly fifteen miles long, from Brandon, north of Grantham. At Lincoln the river turns eastward, and flows to the neighbourhood of Bardney Abbey, where it receives the united stream of the Langworth river and the South Beck. The principal source of this stream (the Langworth) is in the chalk hills between Market Rasen and Louth, and its whole course is about eighteen miles. From the junction of the Langworth, the Witham flows south-east to the neighbourhood of Tattershall, where it receives, on the left bank, the river Bain; and on the right bank the Sleaford river, or Kyme Eau. The Bain rises in the chalk hills at Ludford, between Market Rasen and Louth, and flows southward by Horncastle and Tattershall. Its length is about twenty-six miles: it receives the Waring, Scrivelsby, and Enderby Becks. There is a navigation eleven miles long, partly artificial, partly natural, from the Witham up to Horncastle. The Sleaford river rises near Ancaster, and flows north-east by Sleaford and South Kyme into the Witham; its course is about twenty-two miles: there is a navigable channel thirteen and a half miles long, partly natural, partly artificial, from the Witham up to Sleaford. From the junction of these streams, the Witham flows by an artificial cut to Boston, below which town it flows in its natural bed into the Wash. The whole length of the Witham may be estimated at from seventy-five to eighty miles, for about half of which it is navigable. In the upper part of its course to Beckingham, just above which it divides Nottinghamshire from Lincolnshire, its banks are diversified with rising grounds and picturesque objects. From Beckingham to Lincoln it flows in a wide sandy valley; at Lincoln it passes through a depression in the oolite or stonebrash hills; and soon after enters the fens, through which it has the rest of its course. At Lincoln it communicates with the Foss Dyke, and below that with the Horncastle and Sleaford navigation; there are also numerous cuts connected with it for the purpose of draining the fens. It is supposed that before the Conquest the Witham had a tideway navigation for large vessels up to Lincoln; but its navigation has been liable to frequent impediments, and has required much attention.

The Welland rises in Northamptonshire, and flows along the border of that county, which it divides successively from Leicestershire, Rutlandshire, and Lincolnshire. It first touches the border of Lincolnshire just above Stamford, from whence it flows to Deeping and Crowland, where what is termed the Old Welland runs northward to Spalding, while another arm called the Shire Drain proceeds along the border of the county, into the Wash at the mouth of the Nene. From Spalding the Old Welland is conveyed in a direct line by an artificial channel into the Wash. There is a navigation up to Stamford. Between that town and Deeping there is a canal by the side of the natural stream: below Deeping the natural channel is employed for about two miles; and then there is a navigable cut to Spalding. The navigation is about twenty-eight miles long from Stamford to the Wash.

The Glen rises between Grantham and Folkingham, and flows south by Corby to Barholm not far from Stamford; in this part of its course it crosses a projecting corner of the county of Rutland. Just below Barholm it receive a stream which rises near the Glen and has a course almost parallel to it. From the junction of this stream at Wilsthorpe the Glen flows north-east into the Wash at the mouth of the Welland. Its whole length is about thirty-six miles. A small rivulet which joins the Glen has been made navigable for three miles and a half, up to the town of Bourn; and below the junction of this rivulet the Glen is navigable for about twelve miles into the Welland between Spalding and the Wash.

A general account of the great fen district of England, and of the changes which it has undergone, is given elsewhere. [BEDFORD LEVEL.] The limits of the Lincolnshire fens have been already given, and it is only requisite to notice some of the principal cuts and drains. The Car Dyke, which skirts the western border of the fens, commences in the Welland between Stamford and Deeping, and runs northward nearly thirty-five miles into the fens of the Witham, with the drainage of which it is connected. Some authors state that the Car Dyke runs into the Witham, but this appears not to be the case at present, though it may have originally been so. This canal is supposed to be of Roman origin: it is sixty feet wide, and has on each side a wide flat bank.

The South Forty-Foot is cut from the Glen by a circuitous course to the Witham at Boston: its length is about twenty-two miles: it receives a number of small streams flowing from the hills that form the western boundary of the fen country.

The North Forty-Foot runs ten miles from the Kyme, or Sleaford river, near its junction with the Witham, parallel to the Witham, into the South Forty-Foot, near Boston.

The West Fen Catch-water Drain, and the East Fen Catch-water Drain bound the fen district on the north side, and extend about ten and seven miles respectively; they do not immediately communicate. The Old and New Hammond Beck runs by a circuitous course from the Welland near Spalding to the South Forty-Foot near Boston. Its length is about twenty miles. The other cuts, provincially termed 'Leams,' 'Droves,' 'Drains,' 'Becks,' 'Eaus,' and 'Dykes,' are two numerous to admit of distinct notice. In the fens between the Glen and that arm of the Welland called the Shire Drain they are particularly numerous. The drainage of the northern fens is noticed elsewhere. [AXHOLME.]

Of navigable canals, beside the Ancholme, Louth, Horncastle, Sleaford, Bourn, and other navigations already noticed, there are only two. One of them, the Foss Dyke, is probably a Roman work, and appears to have been used for navigation previous to the Conquest. Henry I. had it cleaned out and the navigation improved. Some have supposed him to be the author of it. It extends from the Trent at Torksey, once a place of some consequence, above Gainsborough, to the Witham at Lincoln; its length is eleven miles; it is level throughout, but its waters are four or five feet above those of the Trent. It is supposed to have been a continuation of the Car Dyke, which, though now used only for draining, is supposed to have been formed for the purpose of navigation: but there is no need to assume any connection between the Car Dyke and the Foss Dyke, if, as is likely, the Witham was antiently navigable for ships up to Lincoln. The other canal is the Stainforth and Keadby Canal, which opens a communication between the Don or Dun navigation at Stainforth near Thorne in Yorkshire, and the Trent at Keadby in Lincolnshire. This canal, which is fifteen miles long, has a part of its course in the Isle of Axholme in Lincolnshire.

Among the projected railways the Northern and Eastern was designed to pass through this county. It was to run from London by Cambridge to York. It was to enter Lincolnshire a little to the east of Market Deeping, and was designed to run nearly parallel to the present coach-road to Lincoln; and from thence first on the left, then on the right of the Foss Dyke to the Trent above Gainsborough. The execution of this railroad, except of the part from London to Cambridge, has been given up for the present,

The principal coach-road is the Hull, Barton, and Lincoln mail-road. This enters the county at Market Deeping, 90 miles from London, and runs north by west by Bourne (97 miles), Folkingham (106 miles), and Sleaford (115½ miles) to Lincoln (134 miles). From Lincoln the road runs due north in a direct line along an old Roman road for many miles: and then turning north by east, runs by Brigg, or Glanford Bridge (156 miles) to Barton (167 miles), on the south bank of the Humber, opposite Hull. The Louth and Boston mail-road branches off from the above just before it enters Lincolnshire, and passing through the opposite extremity of the town of Deeping, runs by Spalding (101 miles), Boston (116½ miles), and Spilsby (133¼ miles), to Louth (148 miles); from whence a road runs onward to Great Grimsby (165 miles) on the Sea. The great north road (travelled by the Thurso, Edinburgh, and York mail, and by the Glasgow and Carlisle mail) enters the county at Stamford (89 miles), and runs north-north-west by Grantham (110 miles) into Nottinghamshire. Roads lead from Lincoln by Wragby to Louth, and on to Saltfleet; by Market Rasen to Grimsby; and by Newark to Nottingham. A road from Nottingham by Bingham falls into the high north road at Grantham; and a road from Yarmouth and Norwich, by Lynn and Wisbeach, falls into the Louth and Boston road at Spalding. The other roads do not require specific notice.

Agriculture.—The agriculture of Lincolnshire is interesting on many accounts. The soil varies greatly in different districts. In some places it is as rich and productive as the greediest farmer could desire, and in others so poor as to weary the patience and industry of the most persevering. The grazing land in this county cannot be surpassed in its capabilities for fattening cattle; and some of the drained fens and warp lands along the rivers possess a high degree of fertility when cultivated. From these circumstances it follows that every variety of cultivation which this island presents may be observed in this county. There are still some lands which are under the old course of two crops and a fallow, while others are cultivated with all the care which an improved system of husbandry recommends.

To give a general idea of the various kinds of soil, we will follow the division given by A. Young in his Report of this county; premising however that it cannot be considered as entirely correct, but only an approximation to the truth.

	Acres.
He reckons of fen lands	776,960
Of loamy and sandy heaths, now mostly cultivated	118,400
Of wolds, chiefly chalk	234,880
Of various loams and sands of moderate quality	718,080
Making a total of . .	1,848,320

Upon the whole the majority of the lands in Lincolnshire may be said to possess a soil of more than medium fertility, compared with the average of Great Britain, and the produce of the county, both in grain and cattle, is very considerable.

The temperature of Lincolnshire is nearly the same as that of the centre of England. The flatness of the surface allows the winds to blow uninterruptedly over it, and of these the western are the most violent. Near the coast the sea tempers the cold easterly winds in winter, and the snow seldom lies long.

The climate in the lower parts, where, in spite of extensive drainings, much marshy ground still remains, is not very healthy, and intermittent fevers are prevalent; but they are becoming much less frequent since the draining and improvement of the soil. The water in the lower parts is bad and brackish, being procured only from wells and ponds; there is no such thing as a spring of pure water in the fens. The lands which have been reclaimed from the sea by banking and draining are mostly laid in large farms, which require a considerable capital. In other parts of the county there are many small properties, cultivated by the owners, and kept with great neatness. There were formerly many more of these than there are now. Lincolnshire exhibits great neatness in the care with which the land is weeded and manured, especially the light sands. The introduction of bones for manure has made many poor light sands in Lincolnshire vie with the best in production, and nowhere have ground bones been used so long and so abundantly. The turnips, which are raised by means of this manure on the poorest sands, being fed off with sheep, lay the foundation of a productive course without any other manure.

Among the different manures which are used for the arable land in Lincolnshire, we must not pass over that of fish, especially that small fish which abounds in shallow waters, and is named the stickleback. It is very soon putrid, and greatly assists the natural juices of the earth in producing vegetation.

On the richest fen lands the most profitable rotation consists of the following crops:—1. Cole, fed off with sheep; 2, oats; 3, beans; 4, wheat; 5, clover; 6, wheat. If wheat were sown immediately after the cole, it would be rank, and probably lodged. The oats and beans reduce it to a proper state, by exhausting a portion of the manure and preparing the soil better for wheat. The oats are always fine and abundant, seldom less than 8 quarters per acre, and often 10 and even 12 quarters.

In some heavy soils the Essex rotation is adopted:—1, fallow; 2, barley; 3, beans; 4, wheat; and this, alternated with the other, answers well on rich lands. A fallow once in ten years is almost indispensable, to keep the land free from root-weeds. The clover also recurs less often, and is consequently less apt to fail than when it is sown every sixth year on the same land. Those who have been induced by some eminent agricultural writers, such as Arthur Young, and others, to attempt to cultivate heavy and wet soils without an occasional fallow, have soon been obliged to return to this effective mode of cleaning land: the hoeing of beans or other green crops can never be executed so perfectly as to keep the land entirely free from those destructive weeds which have perennial roots. For the poor sands there is no system so advantageous as that of raising turnips, and feeding sheep with them on the land where they grew. The tread and urine of the sheep give consistency to the loose sand, and, for a time, impart to it the properties of a good loam, so that it will retain water sufficiently to supply the roots of the growing corn. If marl can be put on the surface at the same time, the nature of the soil will be greatly improved; and that which would only bear a crop of oats, will now become capable of giving a good return of wheat. Manure alone cannot effect this;

it would only cause the wheat to run to straw and lodge, and give no grain. To manure poor lands highly, without first consolidating them, is absolute loss of both dung and labour.

From the returns of forty different farms, A. Young has given the average produce in Lincolnshire as follows:—

Wheat—seed, 3 bushels; average crop, 3½ quarters. Barley—seed, 3¾ bushels; average crop, 4½ quarters. Oats—seed, 6 bushels; average crop, 6½ quarters. Beans—seed, 3¾ bushels; average crop, 3¾ quarters.

It is probable that the general adoption of the drill in sowing, and the improvement of the cultivation since the report of A. Young, have increased the proportion of the crop compared with the seed about one-eighth.

The crops usually raised on the arable land are mostly the same as in other counties on similar soils. There is some woad cultivated in the neighbourhood of Boston on rich warp land; some sainfoin grown on the chalky soils, and lucern on the richer; but not to the extent to which this useful plant ought to be cultivated as green food for horses and cattle. Cabbages and carrots are cultivated to a considerable extent; the former on the heavy clays, and the latter on the light and deep sands.

The grass-lands of Lincolnshire and of the neighbouring county of Leicester are some of the best feeding lands in the kingdom. The average number of beasts of a moderate size, about 70 or 80 stone of 14 lb., which can be kept on an acre, taken from twenty-six places, is stated by A. Young to be as follows:—sheep in summer, per acre, 3¾; sheep in winter, per acre, 2; acres to feed a bullock in summer with the sheep, 1½. So that 1¾ acres of grass-land will feed—in summer, 1 bullock and about 6½ sheep; and in winter, 3½ sheep, which is a high average: some of these lands will feed a bullock and 6 sheep per acre all the summer.

Some of the finest pastures are fed off by horses which are fatted for the markets; but horses soon deteriorate the grass, while sheep improve it.

Graziers are not fond of mowing grass for hay. It renders the pasture coarse, and the hay is not of so rich a quality as might be expected, owing, probably, to a want of care in making it. Grass-land is occasionally broken up to grow woad or flax on it. When this is done very judiciously, it may be laid down with grass seeds and soon be good pasture again: but, in general, it is a long time before the newly-sown herbage is so fattening as the old grass. When grass-land is broken up it gives such rich crops, that the temptation to overcrop it is too strong to be resisted; and once exhausted to a certain degree, it cannot be restored to its richness for a long time. When arable land is laid down to permanent grass in a rich, clean, and unexhausted state, the success is invariable; but it is often done without attention, and a failure is the consequence.

One of the most effectual improvements on land, by the side of some rivers in which the tide flows rapidly, is that of warping; or, in other words, retaining the water on the land so long as to let it deposit a layer of sand and mud. Thus a new soil is created over an old one; and this deposited soil is always very fertile. Such is the benefit produced by warping, that expensive works have been raised for the purpose, and extensive tracts of poor land have been covered in a short time with a new soil of the finest quality, as the crops raised upon it will clearly show.

The warping is effected by letting in the water of the rivers, which have a muddy current, by artificial channels and sluices, and retaining it there till low water. The river Humber carries off, in its course over various soils, all the finer particles which are too light to be immediately deposited. These consist of every kind of earth and portions of vegetable and animal matter. The tides, which are continually changing the direction of the current, keep this earth in suspension by the agitation which is produced; and when the water charged with earth is let in on the low grounds by the side of the river by means of canals and sluices, the earth is soon deposited and forms a coat of mud of a highly fertile nature. Such is the quantity of earth contained in the water, that a layer one-tenth of an inch in thickness is often deposited between one tide and the next. Thus in a very short time a new soil is formed of any depth which may be desired, provided the land lies below the level of the river at high tides.

Besides creating a soil, the warping fills up all inequalities, and a perfectly level surface is produced. Warp land possesses a natural power of production, which cultivation and manuring cannot imitate. The basis of the soil is fine clay and sand, the latter minutely divided and intimately mixed with the former, with a considerable portion of fine calcareous earth. Very little vegetable matter can be extracted by analysis, but there is no doubt a very considerable portion of it in an insoluble state, probably combined with lime or argilla. Sufficient experiments have not yet been made to show this combination, as likewise the galvanic effects of the intimate mixture of the different earths. It is to be hoped that the attention of agricultural chemists will be turned to this subject. Considerable light may thus be thrown on the causes of fertility in soils.

The atmospheric air seems to act powerfully on the newly deposited warp; for before a fresh layer is deposited, which is within twelve hours, such an alteration has already taken place on the surface, that the new deposit does not unite in one mass with the last, but a regular stratification can be observed, which shows the quantity deposited in each tide. The new warp also requires to be stirred and exposed to the air for some time before it acquires its great fertility. It is therefore probable that the insoluble vegetable earth requires to be oxygenated and rendered soluble. The richest crops of beans, wheat, oats, and rape are raised without manure on the warp lands. It is not so well adapted for barley or turnips on account of its slimy nature.

It has added much to the produce of Lincolnshire, that the crops raised on the warp lands have enabled the farmer to employ all the manure made by the abundance of straw which these lands produce to improve the lands that lie above the reach of the waters. As long as the level of the warp lands allows a fresh addition of warp, this system is highly advantageous; but as soon as the surface rises to high-water mark, this system must cease, or the warp lands will be exhausted in time, like the Dutch and Flemish *polders*, and require manure like other lands. The best mode of treating warp lands which are too high to admit of being warped over again is to lay them down to grass in a state of great fertility. The pasture upon them will soon equal the best old grass, carrying a bullock per acre, besides several sheep during the whole of the summer.

In a county which contains so rich pastures it is of great importance that the breed of cattle and sheep be of the most profitable kind; accordingly we find that no county possesses finer breeds of horses, oxen, and sheep. The Lincolnshire horses are celebrated for their size and power. Horncastle fair is the great resort of all the London dealers, who purchase hunters and carriage-horses at very high prices. The horses which are bred in the fens are apt to have rather too flat and broad feet, from the softness of the pastures there. This is a great defect when they are intended for speed on hard roads; but for farm purposes they answer as well as those bred on drier soils. The best hunters are bred on the higher and drier lands; but they are generally turned out for a time in the richer pastures to give them flesh before they are sold.

The oxen which are preferred for grazing are the short-horns, and some crosses of long-horns. Mr. Collins's Durham breed has been introduced and kept up with considerable success. Some rich proprietors and farmers are very careful in maintaining the reputation of their stock; and fine bulls are reared without regard to expense, which is well repaid by the superiority of their produce. The most judicious graziers are of opinion that middle-sized oxen are more profitable for grazing than the larger: an ox of about 80 stones of 14 lb. is thought to fatten more rapidly in proportion than either larger or smaller, provided the breed be good.

There are not many dairies in Lincolnshire: breeding and fatting are considered more profitable and less troublesome. There is however some excellent cheese made of the Stilton kind. A. Young mentions Mr. Grundy, of Heath Hall, near Grantham, as an eminent cheese-maker. A descendant of his is now residing at Old Windsor, in Berkshire, where he makes the famous Forest cheese, which still goes by the name of Grundy cheese, and is the best cheese of the Stilton kind made in England. He was brought from Lincolnshire by George IV., and established in a royal dairy in Windsor Forest. The sheep which are bred in this county are principally of the long-woolled, commonly called Leicesters. But the two counties differ only in the great proportion of fen lands to be found in Lincolnshire. The rich upland pastures are similar in both counties. The old Lincoln sheep are larger than the improved Leicester and carry a heavier fleece; they are also hardier; the latter however are generally preferred, from their greater propensity to fatten. A cross has been produced which partakes of the qualities of both breeds, and is preferred by some for the fens.

There is nothing particular in the breed of pigs, except that it has been much improved of late years by crossing with improved breeds.

The principal fairs in Lincolnshire are:—Alford, Whit-Tuesday, November 8; Barton-upon-Humber, Trinity Thursday; Belton, September 25; Boston, May 4, August 5, November 18, and lasts four days, December 11; Bourne, March 7, May 6, October 29; Brigg, August 5; Burgh, May 13, October 2; Burwell, Old Michaelmas-day; Caistor, Friday and Saturday before Palm Sunday, Friday and Saturday before Whit-Sunday, Friday and Saturday after Old Michaelmas-day; Caythorp, Good Friday; Corby, August 26, Monday before October 11; Coulthorpe, April 29; Crowle, last Monday in May, November 22; Donnington, May 26, August 17, September 4, October 17; Epworth, first Tuesday after May 1; first Thursday after September 29; Falkingham, Ash Wednesday, Palm Monday, May 13, June 16, July 3, Thursday after Old Michaelmas-day, November 10 and 22; Gainsborough, Easter Wednesday, October 20, if it falls on a Wednesday, then the Wednesday after; Grantham, Easter Eve, Holy Thursday, July 10, December 17; Heckington, Thursday before October 10; Holbeach, May 17, second Tuesday in September; Horncastle, June 19-22, August 11-21, October 26-29; Kirton-Lindsey, July 18, December 21; Lincoln, Tuesday to Friday in the last whole week in April, July 5, first Wednesday, Thursday, and Friday after September 12, November 28; Louth, third Monday after Easter Monday, November 23; Market Deeping, second Wednesday after May 11, October 10, November 22; Market Rasen, September 25; Nevenby, August 18, October 17; Partney, August 1 and 25, September 18 and 19, October 18 and 19; Sleaford, Plough Monday, Easter Monday, Whit-Monday, August 1, October 20; Spalding, April 27, June 29, August 26, September 25, Wednesday before December 6; Spilsby, Monday before Whit-Monday, Monday after ditto, Monday fortnight after Whit-Monday if it fall in May (if not, there is no fair), first Monday in July, old style; Stamford, Tuesday before February 13, Monday before Midlent, Midlent Monday, Monday before May 12, Monday after Corpus Christi, August 5, November 9; Stow Green near Sleaford, July 4; Swineshead, first Tuesday in June, October 2; Tattershall, May 15, September 25; Wainfleet, third Tuesday in May, July 6, August 24, October 24; Wintringham, July 14; Wragby, Holy Thursday, September 29.

Divisions, Towns, &c.—Lincolnshire has long been divided into three 'parts,' as they are termed, Lindsey, Kesteven, and Holland. Lindsey, which is mentioned by Bede under the name Lindesse, and in the Saxon Chronicle by the names Lindissi, Lindesse, and Lindesige, is by far the largest, and comprehends all that part of the county which lies north-east of a line drawn from Clifton-upon-Trent, partly along the Foss Dyke, to Lincoln (which city, with a small territory to the south-east, is included in it), thence by the Witham to near Boston, and from just above that town north-eastward to the sea between Boston and Wainfleet. The name Lindsey, like that of the county, is derived from Lindum, the Roman name of Lincoln. From the name, with the subjoined epithet Colonia, came Lincoln,* and thence Lincolnshire; and from the name without the epithet, Lind-sey. The latter part of this name appears to be the Saxon 'ey,' an island; 'the Isle of Lindum,' a name sufficiently descriptive of the district, which is insulated by the sea, the Humber, and the Trent, the Foss Dyke and the Witham, with their connected marshes.

Kesteven comprehends the south-western part of the county; it extends on the north and north-east to the Foss Dyke and the Witham, except just about Lincoln, where Lindsey encroaches upon these boundaries. It is bounded eastward by a line drawn south from the Witham, at the junction of the Kyme, or Sleaford river, to the Welland, between Deeping and Croyland. The origin of this name is very obscure.

Holland, called by Ingulphus Hoilandea, comprehends the rest of the county, including the greater part of the fens. The name appears to be derived from the Saxon Hol, 'a hole or hollow,' a name not inappropriate to the fen district, forming, as it does, a vast basin in the midst of surrounding higher ground; or perhaps from Holh, 'a ditch, (another form of the same word), an epithet equally appropriate.

These divisions are of great antiquity; they are also characterized by distinct natural features. The insular character of Lindsey has been noticed; the Wolds, or chalk hills, form the nucleus of it. Kesteven is distinguished by the steep slope of the Cliffe Row, which overlooks the valley of the Witham; and Holland, like its continental namesake, is distinguished by its fens.

Lincolnshire is further divided into wapentakes, hundreds, and sokes. These, with their situation in the county, their chief town, area, and population in 1831, are as follows:—

I. Parts of Lindsey.			Acres.	Pop. 1831.
Aslacoe, wapentake	Central	(no town)	43,240	4,839
Bolingbroke, soke	Central	Spilsby	59,980	11,119
Bradley Haverstoe, wapentake	N.E.	Grimsby	66,450	11,919
Calceworth, hundred	E.	Alford	58,670	10,266
Candleshoe, wapentake	E.	Wainfleet	52,040	8,516
Corringham, wapentake	N.W.	Gainsboro'	46,250	13,183
Gartree, wapentake	Central	Tattershall	54,050	6,963
Hill, hundred	Central	(no town)	24,980	3,420
Horncastle, soke	Central	Horncastle	24,780	8,656
Lawress, wapentake	E.	(no town)	46,570	7,243
Louth Eske, hundred	N.E.	Louth	70,190	14,027
Ludborough, wapentake	N.E.	(no town)	12,610	1,430
Manley, wapentake	N.	Epworth	131,560	23,046
Walshcroft, wapentake	Central	Market-Rasen	57,230	7,615
Well, wapentake	E.	(no town)	19,540	3,194
Wraggoe, wapentake	Central	Wragby	58,900	6,322
Yarborough, wapentake	N.	Barton	117,370	19,487
Lincoln, city and liberty	Central		17,560	11,843
Total of parts of Lindsey			961,970	173,088
II. Parts of Kesteven.				
Aswardhurn, wapentake	Central	(no town)	45,280	6,407
Aveland, wapentake	S.	Bourn	53.220	9,978
Beltisloe, wapentake	S.	Corby	53,470	6,430
Boothby Graffo, wapen.	W.	(no town)	56,250	7,843
Flaxwell, wapentake	Central	Sleaford	37,420	6,015
Langoe, wapentake	Central	(no town)	54,070	7,556
Loveden, wapentake	W.	(no town)	47,340	7,965
Ness, wapentake	S.	Stamford	31,650	12,707
Winnibriggs and Threo, wapentake	S.W.	(no town)	41,460	6,149
Grantham, borough and soke	S.W.	Grantham	25,400	10,780
Total of the parts of Kesteven			445,560	81,830
III. Parts of Holland.				
Elloe, wapentake	S.	Spalding	148,560	29,314
Kirton, wapentake	S.E.	Swineshead	71,660	14,777
Skirbeck, wapentake	S.E.	Boston	36,100	18,456
Total of the parts of Holland			256,320	62,547
Total of the county			1,663,850	317,465

The county contains the city of Lincoln, the boroughs and market-towns of Boston, Grantham, Grimsby, and Stamford; and the market-towns of Alford, Barton-upon-Humber, Bolingbroke, Bourne, Caistor, Corby, Crowle, Deeping, Donington, Epworth, Falkingham or Folkingham, Gainsborough, Glanford Bridge or Brigg, Holbeach, Horncastle, Kirton, Louth, Market Rasen, Sleaford, Spalding, Spilsby, Swineshead, Tattershall, Wainfleet, and Wragby. To these may be added the now disused market-towns of Binbrook, Burton-upon-Stather, Crowland or Croyland, Navenby, and Saltfleet. Of some of these an account is given elsewhere. [AXHOLME; BARTON-UPON-HUMBER; BOSTON; GAINSBOROUGH; GRANTHAM; STAMFORD.]

Lincoln is on the north bank of the Witham, just at the place where it passes through an opening in the stonebrash hills, 134 miles from London, through Ware, Biggleswade, and Peterborough. It was a place of considerable importance under the Romans. In the time of the Saxons it was also a place of consequence; and notice of it occurs in the struggles of the Saxons and Danes. At the time of the Conquest it was one of the most important places in the kingdom, and the emporium of a considerable trade. William the Conqueror ordered the erection of a strong castle here A.D. 1086. The erection of this castle is said to have caused the demolition of two hundred and forty houses. At the time of the Domesday survey there were in Lincoln 1070 houses and 900 burgesses. The prosperity of the place appears to have been further promoted in the time of Henry I. by clearing out the Foss Dyke, and making it again available for navigation. This inland communication, with the advantage of the navigation (probably a tideway navigation for sea-borne vessels) of the Witham, rendered the situation of Lincoln peculiarly favourable for commerce. In the reign of Stephen the empress Maud was besieged here by the king, who took the city, but the empress escaped. The castle was shortly after surprised by some of her partisans, and being besieged by the king, who had the townsmen in his interest (A.D. 1141), was relieved by the approach of Robert earl of Gloucester, natural brother to the empress. Stephen, upon the approach of the relieving force, gave battle to it; but, by the desertion of Alan earl of Richmond, he was defeated and taken after fighting with the greatest intrepidity.

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* Variously written by the Saxons, Lincol, Lincolla, Lincolne, Lindcylne (all in 'Sax. Chron.'), Lindcolene (Bede), Lyndcollan, Lyndcylene, and Lincylne

In the civil wars of the reign of John the town was taken by Gilbert de Gaunt, one of the barons in the interest of Louis, Dauphin of France, who had created him earl of Lincoln. The castle however held out for the king and was besieged by Gilbert, who hearing that John was approaching from Norfolk, retreated from the place. John however having lost his baggage in the Wash, and died of grief, Gilbert retook the town and reinvested the castle. The earl of Pembroke, regent during the minority of Henry III., advanced to relieve it, and Fulk de Brent, a chieftain of the king's party, threw himself with a reinforcement into the castle. The besiegers, who were supported by a body of French, were attacked on both sides; and the town, in which they attempted to defend themselves, was stormed by the earl of Pembroke. The count of Perche, commander of the French, was slain; many of the insurgent barons and other prisoners of rank were taken, and the party of the Dauphin was crushed. The battle was fought June 4, 1218. At a subsequent period the castle was in the hands of John of Gaunt, son of Edward III., who greatly improved it.

In the civil war of Charles I. the inhabitants promised to support the king, but in A.D. 1643 the city was in the hands of the parliamentatians, who had a garrison here. The royalists attempted by treachery to possess themselves of the place; but the plot was discovered, and the cavaliers who had broken in were repulsed. They got possession of the city however soon after; and in 1644 the parliamentary army under the earl of Manchester attacked the city and took the lower part of it. The royalists retreated to the cathedral and the castle, which were stormed, in spite of a gallant resistance, on the night of May 5th, two days after the earl's arrival before the place.

The city is built on the southern slope and at the foot of a hill, on the summit of which is the cathedral. It contains twelve parishes, and part of a thirteenth, the remainder of which, with two others, are locally within the limits, though not in the jurisdiction of the city. There are four parishes in the liberty of the city, on the opposite side of the river: the area of the city cannot be given separately: the city and liberty, and the included parishes, contain altogether 17,560 acres. The town is irregularly laid out; the principal street is along the road from London to Barton-on-Humber, which extends right through the place, crossing the Witham by a bridge, and running up the hill on which the cathedral stands. This street also extends a considerable length south of the Witham. The streets are paved, lighted with gas, and supplied with water from public conduits or fountains. There are several small bridges over the Witham or over the drains or dykes near the city. The high bridge over the Witham has one arch of nearly 22 feet span, and 11 feet high; it is considered to be at least five hundred years old. There are market-places or market-houses for corn, cattle, meat, and butter, in different parts of the city; the fish-market is held near the high bridge.

The most interesting of the public buildings is the cathedral, which is advantageously situated on the summit of the hill, and may be seen for many miles across the flat country to the south-east or south-west; its three towers have at a distance a very fine effect. It has been erected at different periods, and combines, in consequence, various styles of architecture: the predominant style is the early English, of a remarkably rich and beautiful character. The cathedral may vie with any, and has been by some judges preferred even to York. It is much enclosed by buildings on the north, south, and west sides; but is more open on the east. The nave is very fine, and the piers in this part are peculiarly rich; and though the side aisles are unusually narrow, the effect of the whole is excellent. The western front, which embraces the width of the nave and aisles with the side chapels (or, as some term them, transepts) at the west end, is partly Norman, partly early English: it has two towers whose height from the ground is 180 feet. There were formerly spires upon these, of the height of 101 feet, but these were taken down thirty years ago; there are still pinnacles at the corners of the towers. At each angle of the west front are octagonal staircase turrets crowned with pinnacles. There are three west doorways, the centre one opening into the nave, the side ones into the two side aisles. There is much sculpture and tracery on this front in excellent preservation; and over the central doorway are several statues of the kings of England, from the Conquest to Edward III., under decorated canopies. The central or great transepts are chiefly in the early English style; they have aisles on the eastern side, which are divided into rooms, used as vestries or chapels. There are at the ends of the transepts circular windows; that at the end of the south transept is one of the finest circles in the early English style remaining. The 'Galilee court,' or porch attached to the west side of the south transept, and the chapels on the east aisle of the same, are particularly deserving of attention for the intricacy and beauty of their mouldings, and the singularity and excellence of their general composition. At the intersection of these transepts with the nave and choir is the central tower, 53 feet square, with pinnacles at the corners. The windows of this tower are rather small, which circumstance renders the lantern obscure. The height of this tower from the ground to the summit of the pinnacles is about 300 feet. The choir is of richer and more elaborate composition than the nave and transepts; though, like them, it is of early English character. It is separated from the nave by a rich stone screen.

The eastern end of the choir, with the Lady Chapel, is of a transition style between the early and decorated English, of peculiar beauty and interest. The east window, of eight lights, is a fine composition. The cathedral is at this end less encompassed with buildings; a better view of it can consequently be obtained. There are two transepts to the eastward of the principal transepts, and there are several chapels in different parts. The dimensions of the cathedral are as follows:—Exterior length of the church within its buttresses 524 feet; interior length 482 feet; width of the cathedral (interior width, we believe, of the nave and choir with their respective aisles) 80 feet; height of the vaulting of the nave 80 feet; width of the western front 174 feet. Exterior length of the principal transept 250 feet, interior 222 feet; width 66 feet. Smaller or eastern transept—length 170 feet; width, including the side chapels, 44 feet. The dimensions are, we believe, when not otherwise specified, interior dimensions.

The old bell, called the Tom of Lincoln, which was cast in 1610, and hung in the northernmost of the west towers, became cracked in 1827, and being broken up in 1834, with six other bells, was recast into the present large bell and two quarter bells by Mr. Thomas Mears of London, and placed in the Rood (or central) tower in 1835. The new bell, which is larger and heavier than the old one, is 6 feet 10½ inches in diameter at the mouth, and weighs 5 tons 8 cwt.: the old one weighed nearly a ton less, viz. 4 tons 14 cwt. The new bell is more musical than the old one, but not nearly so loud and sonorous. It is the third bell for size in the kingdom; being exceeded only by 'Mighty Tom' of Oxford (7 tons 15 cwt.) and 'Great Tom' of Exeter (6 tons).

On the north side of the cathedral are the cloisters with the chapter-house. The cloisters enclose a quadrangle of 118 feet by 91: three sides remain in their original state, and are of good decorated work; over the fourth (the north) side is a library built by Dean Honeywood in the latter part of the seventeenth century. The library contains a collection of books, with some curious specimens of Roman antiquities. In the enclosure of the cloisters, some feet below the surface, is a handsome tessellated pavement.

From the eastern side of the cloisters is the entrance to the chapter-house, a lofty and elegant decagon, with a groined roof supported by a central pillar. Though not equal to the chapter-house of Salisbury, it is very fine. Its interior diameter is 60 feet 6 inches.

The cathedral contains numerous monuments; but many more, which formerly existed, have been removed or totally destroyed. Many were defaced or pulled down at the Reformation, or by the parliamentary soldiers in the great civil war; and many were disarranged when the floor of the cathedral was newly paved in A.D. 1783, or when subsequent alterations were made in the nave and choir. Among other tombs are those of Catherine Swinford, duchess of Lancaster, wife of John of Gaunt; of Joan, countess of Westmoreland, their daughter; and of several bishops and deans of the cathedral.

The officers of the cathedral are the bishop, dean, precentor, chancellor, subdean, six archdeacons, fifty-two prebendaries, four priest-vicars, five lay-clerks or singing-men, an organist, seven poor clerks, four choristers, and six burghist chanters. The net yearly revenue of the bishopric is 4542*l.*; the net yearly income of the cathedral, divided between the dean, precentor, chancellor, and subdean, is 6986*l.*; these dignitaries have residences. On the south side of the cathedral are the ruins of the bishop's palace, which was demolished during the civil wars. The shell of the magnificent hall, eighty-four feet by fifty feet, supported by two rows of pillars, a gateway, and part of the kitchen wall, remain. A modern house has been built on part of the site, in which the bishop resides when at Lincoln. The deanery is an antient building; and near it is another antient building, called 'the Works Chantry,' formerly the residence of the chancellor of the diocese. The vicar's college once formed a quadrangle, of which at present there remain only four houses inhabited by the vicars. There is an antient gateway yet standing.

The see of Lincoln was originally at Dorchester on the bank of the Thames. The see of Dorchester is said to have been founded A.D. 625 or 636. The dioceses of Leicester and Sidnacester (probably Stow, between Lincoln and Gainsborough), the latter of which comprehended the parts of Lindsey, were added to it; and in the eleventh century (A.D. 1057, or 1072, or 1088, for accounts vary) the seat of the bishopric was removed to Lincoln. Although the dioceses of Ely (in the twelfth century), Oxford and Peterborough (in the sixteenth century, at the Reformation), were taken out of it, it is still the most extensive diocese in the kingdom. It is divided into six archdeaconries: 1, Lincoln; and, 2, Stow, which two comprehend the county of Lincoln; 3, Leicester, which includes Leicestershire; 4, Bedford, which includes Bedfordshire; 5, Huntingdon, which includes Huntingdonshire and part of Hertfordshire; and, 6, Buckingham, which includes Buckinghamshire. Considerable alterations are however to be made, in conformity with the act 6 and 7 Will. IV., c. 77. The counties of Huntingdon and Bedford are to be transferred to the diocese of Ely; the county of Buckingham is to be transferred to the diocese of Oxford; the county of Leicester to the diocese of Peterborough; and the part of Hertfordshire to that of Rochester. Of the present diocese only the county of Lincoln is to remain, but to this is to be added the county of Nottingham, transferred from the diocese of York. A fit residence is to be erected for the bishop, whose average income is to be from 4000*l.* to 5000*l.*

The parish churches of Lincoln are twelve in number; formerly there are said to have been fifty or more, most of which were standing at the time of the Reformation. The present churches are mostly small and much mutilated. Four of five churches south of the Witham have Norman towers. An additional church is about to be built by subscription.

The remains of the castle stand on the hill, west of the cathedral: they consist chiefly of the outer walls and the gateway tower. The site of the castle is occupied by the county gaol and court-house, which were rebuilt a few years ago in a handsome style by Sir R. Smirke. In one corner of the area is a small building, 'Cob's Hall,' supposed to have been a chapel; and in one part of the outer wall, on the north side, are the remains of a turret in the line of the Roman wall of Lindum, in which is a gateway apparently Roman, and supposed to have been one of the gates of that station, or to have belonged to a building more antient than the castle.

Lincoln abounds in monastic and other remains of antient architecture. There are several antient gateways, as the Chequer or Exchequer Gate in the Cathedral Close, and the Stonebow in the High-street; the remains of a fort called 'Lucy Tower;' a tower of three stories, incorporated in a modern house called 'the Priory,' and several other buildings. 'The Grey Friars' is a large oblong building, the lower story of which is occupied as a spinning-school, and lies some feet below the surface of the ground; part of the upper story, formerly the chapel, is now used for a free-school, and the remaining part as a library. The remains of John of Gaunt's Palace and of a building called John of Gaunt's Stables present some interesting Norman and early English features. In the gable of the palace is a beautiful oriel window.

The population of the city and liberty, in 1831, was 11,843, to which may be added that of the three parishes locally included, 1360; together, 13,203. The chief trade is in flour, which is sent to Manchester and London, and there are some extensive breweries noted for their ale. There are now eight or ten steam-engines in the city: a few years ago there was not one. The county assizes and the election for the northern division of the county, and quarter-sessions for the city and liberty, are held here. There are a race-course, a theatre, and assembly-rooms.

There are several dissenting places of worship, several public libraries, two news-rooms, a flourishing mechanics' institute, and several book-societies. There are a general dispensary, a lunatic asylum, a county hospital, a lying-in-hospital, and several other charitable institutions.

Lincoln was incorporated by charter of Henry II., but the governing charter was that of Charles I. By the Municipal Reform Act the city is divided into three wards, and has a mayor, six aldermen, and eighteen councillors. The guildhall is an antient Gothic building; the court-house for the city is modern; the gaol is not large enough to admit of the proper classification of prisoners.

The city returns two members to parliament: it first exercised this privilege in the reign of Henry III. The parliamentary constituency, in 1833, consisted of 603 freemen and 521 ten-pound householders: total, 1124. The parliamentary borough comprehends the city and a small portion of the liberty.

There were in the city, in 1833, two infant-schools, with 323 children; five dame-schools, with 67 children; thirty-two day-schools (including two endowed schools, with 86 children), with 776 children; four boarding and day schools, with 150 to 180 children; one national school, with 474 children; and seven Sunday-schools, with about 700 children. There were at the same time in the liberty, one boarding-school, with 30 to 40 children; six day-schools (three of them partly or wholly supported by subscription), containing 246 children; and five Sunday-schools, with 320 children.

Grimsby is in the wapentake of Bradley Haverstoe, in the parts of Lindsey, on the south bank of the Humber, near its mouth. In the time of Edward III. Grimsby was of sufficient importance to furnish the king with eleven vessels and 170 mariners for his armament against Calais. The gradual blocking up of the harbour by the accumulation of mud and sand led to the decay of the port, until it was renovated by the spirited exertions of some of the neighbouring landed proprietors about the beginning of the present century. The landing at low water is however still very bad, and a jetty is now erecting to remedy this inconvenience. The parish of Grimsby, the township of Clee, and the hamlet of Weelsby, comprehend 2110 acres, and had in 1831 a population of 4225, of which a small proportion is agricultural. The town consists of two parts: the older part of the town is irregularly laid out, and is at the head of the harbour, about a mile from the sea; the new part, commonly called 'the Marsh,' consists of three streets parallel to the harbour, on the east side. The harbour, which is a tide-harbour, with a lock, &c., is at one of the mouths of the Laceby Beck, extending inland about a mile southward from the sea: vessels drawing sixteen feet can enter it with high-water at neap tides. There are large warehouses and timber-yards attached to the harbour. The town formerly consisted of two parishes now united. The church of St. James, now the only one, is a large cross church, with a tower in the centre; the architecture is in a great degree early English; the west door is Norman. There are in the church some antient monuments and inscriptions, and a large font of early English character. There is a small ill-managed borough gaol. There are a tan-yard, two bone-mills, some corn-mills, and a large ropery for making patent cordage of phormium tenax, which has not been very successful. The market is on Friday.

Grimsby is a borough by prescription; the council under the Municipal Reform Act consists of four aldermen and twelve councillors. The parliamentary borough, which was considerably enlarged by the Boundary Act, includes, besides the municipal borough, the rest of the parish of Grimsby, and the parishes of Great Coates, Little Coates, Bradley, Laceby, Waltham, Scartho, and Clee, with the township of Cleethorpe, containing an additional population of 2364; making in all 6589. Clee has an antient church, with some fine Norman piers and arches.

The living of Grimsby is a vicarage, in the archdeaconry of Lincoln, of the clear yearly value of 532*l.* There are several dissenting places of worship.

There were in the parish, in 1833, one infant school, with 20 children, partly supported by the corporation; a grammar-school, with 60 boys and 20 girls; a school preparatory to the grammar-school, with 54 boys and 19 girls; and a school for dissenters, with 22 children: the first two of these schools were wholly and the third partly supported by the corporation: four other day-schools, with 114 children; one boarding-school, with 23 children; and one Sunday-school, with 110 children.

Alford is in the hundred of Calceworth, in the parts of Lindsey, 140 miles from London by Boston and Spilsby, and near the head of a small stream which flows into the sea. The parish contains 1410 acres, with a population, in 1831, of 1784, about one-fourth agricultural. The town consists chiefly of one street. The church is an insignificant building. There are one or two dissenting meeting-houses. The market is on Tuesday. The living is a vicarage, united with the chapelry of Rigsby, in the archdeaconry of Lincoln, of the clear yearly value of 122*l.* There were, in 1833, an endowed grammar-school, with 24 boys; a national school, with 128 children; and five other day and boarding schools, with 190 children.

Bolingbroke is in the soke of Bolingbroke, in the parts of Lindsey, 133 miles from London, by Boston. There was here an antient castle, built by William de Romara, earl of Lincoln, which afterwards came into the hands of the Lacy family, and subsequently into those of John of Gaunt. Henry IV., son of John, was born in this castle, and took from it his surname of Henry of Bolingbroke. There are a few remains, consisting chiefly of the tower at the south-western angle of the castle, which was quadrangular. The parish comprehends an area of 2570 acres, with a population of 725. There is a small manufactory of earthenware. The market is on Tuesday. The church, which is antient, was partly destroyed in the civil wars of Charles I. The living is a rectory, united with the chapelry of Hareby, both in the archdeaconry of Lincoln, of the clear yearly value of 373*l.* There were in the parish, in 1833, one endowed and one other day-school, with 46 children, and one Sunday-school, with 40 children.

Bourn is in Aveland wapentake, in the parts of Kesteven, on the road from London to Lincoln, 97 miles from the former, and 36 from the latter. There was formerly a castle here, which was the seat of a lordship of some note in the Saxon times. Hereward, the Anglo-Saxon chieftain who opposed the most protracted resistance to the Norman conquerors, was the son of the lord of Bourn, or Brunne. The parish comprehends 8190 acres, with a population of 2569: it is divided into three hamlets, of which that of Bourne, with Tongue-End, contains a population of 2355, nearly one-half agricultural. The town consists chiefly of one long street of modern well-built houses. In the centre of the market-place is an antient town-hall, said to have been built by the great Lord Burghley, a native of the town; the lower part is used as a market-house. The church is large, but appears to be only part of a more extensive plan. The piers and arches of the nave are of Norman, the clerestory of perpendicular date. At the west end, portions in the perpendicular style have been ingrafted upon others of an early English character. There are two towers at this end. Wool-stapling and tanning are carried on, and the the town has some trade in leather and wool: there is a navigable canal communicating with the river Glen. A tesselated pavement and some Roman coins have been dug up in the neighbourhood, and there are the traces of the site of an Augustinian priory, the revenue of which at the Dissolution was 197*l.* 17*s.* 5*d.* gross, or 167*l.* 14*s.* 6*d.* clear. There are some dissenting places of worship. The living is a vicarage, in the archdeaconry of Lincoln, of the clear yearly value of 320*l.*, with a glebe-house. There were, in the year 1833, in the parish, one dame-school, with 20 children; an endowed school, with 18 boys; a national school, with 125 children; nine other day-schools, with 167 children; and two Sunday-schools, with 169 children.

Caistor, or Castor, is in the wapentake of Yarborough, in the parts of Lindsey. Its name indicates it to have been a Roman station: by the Saxons it was called Thong Castor. Some Roman and Saxon antiquities have been discovered here. The whole parish, which extends into the wapentake of Walshcroft, contains 4470 acres, with a population of 1525: the chapelry of Holton-le-Moor contains 1750 acres, with a population of 150, leaving for the part of the parish which contains the town 2720 acres and 1375 inhabitants, of whom about a sixth are engaged in agriculture. The church is partly of Norman, partly of early English character. The town has a market on Saturday. The living is a rectory, united with the chapelries of Houghton and Clixby, exempt from the archdeacon's jurisdiction, of the clear yearly value of 215*l.*, with a glebe-house. There were in the parish (exclusive of Holton chapelry), in 1833, an endowed day-school, with 74 children; eight other day-schools, with 194 children; a national Sunday-school, with 144 children; and another Sunday-school, with 70 children.

Corby is in the wapentake of Beltisloe, parts of Kesteven, 105 miles from London by Bourne. The parish comprehends 3790 acres, with a population of 654, above half agricultural. The market, which has almost fallen into disuse, is on Thursday. The living is a vicarage, united with the rectory of Irnham and the chapelry of Bulby, all in the archdeaconry of Lincoln, and of the joint yearly value of 608*l.*, with a glebe-house. There were in Corby parish, in 1833, an endowed free-school, with from 10 to 25 scholars; two other day-schools, with 38 children; and one Sunday-school, with 82 children.

Deeping, distinguished from some neighbouring places of the same name as Market Deeping, is in the wapentake of Ness, in the parts of Kesteven. It is 90 miles from London, on the road to Lincoln. The parish comprehends 1290 acres, and had in 1831 a population of 1091. The houses are mostly old and ill built. The market is on Thursday. Some trade is carried on by the Welland. The church contains some traces of Norman and some portions of early English architecture; the tower and other parts are of perpendicular character. The living is a rectory of the clear yearly value of 579*l*, with a glebe-house. There were in 1833 an endowed day-school with 70 scholars; six other day-schools with 173 children; and one Sunday-school, supported out of the poor-rates, with 80 children.

Deeping St. James is a village so near to Market Deeping as almost to constitute one town with it. The parish has an area of 6470 acres, with a population of 1587. The church, originally a chapel, built by the monks of Croyland, is large and curious, chiefly in the Norman and early English styles: it contains a curious Norman font. There is an antient stone cross in this village. The living is a vicarage of the clear yearly value of 191*l.*, with a glebe-house. There were in 1833 three day-schools with 85 children; a national school with 100 children; and a Sunday-school with 64 children.

Donington is in the wapentake of Kirton, in the parts of Holland. It is 110½ miles from London, on the left of the road to Boston. The parish comprehends an area of 6180 acres, with a population in 1831 of 1759, more than half agricultural. Hemp is grown in the neighbourhood to a great extent; and much hemp-seed is sold. The church is dedicated to St. Mary and the Holy Rood; there are one or two Dissenting places of worship. There is a market on Saturday. The living is a vicarage in the archdeaconry of Lincoln, of the clear yearly value of 126*l.*, with a glebe-house. There were in the parish in 1833 four dame-schools with 28 children; four endowed day-schools with 315 children; and one Sunday-school with 20 children.

Falkingham, or Folkingham, is in the wapentake of Aveland, in the parts of Kesteven, 106 miles from London on the road to Lincoln. Here was antiently a castle on the eastern side of the town, but only the moats and mounds remain. The parish comprehends 1700 acres, and had in 1831 a population of 744, above half agricultural. The streets are clean and well paved. The church is large and handsome, chiefly of perpendicular character; the tower has eight pinnacles and a rich battlement. A small gaol was erected thirty years ago on the site of the antient castle, and has been since enlarged. The market is on Thursday. The living is a rectory united with the vicarage of Laughton, both in the archdeaconry of Lincoln, of the clear yearly value of 511*l.* There were in the parish in 1833 an endowed day-school with 30 children; four other day-schools with 66 children; one boarding and day school with 36 children; and one Sunday-school with 131 children.

Glanford-Brigg, or Glanford-Bridges, or by familiar abbreviation Brigg, is in the wapentake of Yarborough, in the parts of Lindsey, 23 miles from Lincoln, and 156 miles from London on the road to Barton-upon-Humber. The chapelry of Glanford-Brigg is in the parish of Wrawby with Kettleby, which comprehends 5070 acres, and had in 1831 a population of 2418, of whom 1780 were in Glanford chapelry. The town is advantageously situated a short distance to the east of the Ancholme navigation, by means of which a considerable trade is carried on in corn, coal, and timber. Besides the Episcopal chapel there are Dissenting and Catholic places of worship. The market is on Thursday. The chapelry is annexed to the vicarage of Wrawby, which is in the archdeaconry of Lincoln, of the clear yearly value of 220*l.*, with a glebe-house. There were in 1833 in the chapelry three dame schools, with about 50 children; an endowed day-school with 21 children; four other day-schools with 125 children; one boarding and day school with 54 children; and three Sunday-schools with 387 children.

Holbeach is in the wapentake of Elloe, in the parts of Holland, 109 miles from London, a few miles to the right of the road to Boston. The parish comprehends an area of 20,240 acres, with a population in 1831 of 3890, chiefly agricultural. The town is indifferently built and is in a low marshy district. The church is a large and handsome building, consisting of a nave, chancel, aisles, and square tower, surmounted with an ornamented octangular spire. The market is held on Thursday. The living is a vicarage in the archdeaconry of Lincoln, of the clear yearly value of 702*l.* There were in 1833 an endowed day-school with 101 children; a day-school, partly supported by subscription, with 40 children; nine other day-schools with 349 children; and three Sunday-schools with 275 children.

Horncastle is in the soke of Horncastle, in the parts of Lindsey, 136 miles from London by Sleaford and Tattershall. It is supposed to have been a Roman station; some think that it was the Bannovallum of Ravennas. There are traces of a fortification yet visible, which was a parallelogram enclosing an area of twenty acres, and comprehending a considerable part of the modern town. Roman coins and other antiquities have been discovered, and at the point formed by the junction of the Waring and the Bain is an intricate circle or labyrinth called Julian's Bower. The name Horncastle is derived from the Saxon word *hyrn*, a corner, and is descriptive of the situation of the place in the angle formed by the junction of the above-mentioned rivers. The town, which is pleasantly situated at the foot of the Wolds, has been much improved, and consists of respectable well-built houses. The church has been in great part rebuilt of late years. Part of it is as antient as the time of Henry VII. There are several Dissenting meeting-houses. Corn and wool are the principal articles of commerce, which has been much promoted by the opening of the Horncastle navigation from this town to the Witham. The market is held on Saturday, and there are three fairs in the year, one of them probably the largest horse-fair in the kingdom. The area of the parish is 2510 acres; the population in 1831 was 3988, about one-tenth agricultural. The living is a vicarage in the archdeaconry of Lincoln, of the clear yearly value of 612*l.*, with a glebe-house. There were in 1833 three dame-schools with 58 children; a Lancasterian school with 145 children; one national day and Sunday school with 225 day scholars, and 189 on Sundays; thirteen other day-schools with 331 children; two boarding and day schools with 84 children; and two Sunday-schools with 186 children. There were two endowed schools (one a grammar-school) from which no return was made. There are two public libraries, a subscription library of 1000 volumes, and a clerical library.

Kirton (distinguished as Kirton in Lindsey from another place of the same name in the parts of Holland) is in the wapentake of Corringham, in the parts of Lindsey, about 150 miles from London to the left of the Barton road. It is situated on the slope of that range of hills which extends from Lincoln to Barton-upon-Humber and overlooks the valley of the Trent. The parish comprehends 4210 acres; with a population in 1831 of 1542, more than one-third agricultural. The quarter-sessions for the parts of Lindsey are held here by adjournment; and there are a court-house and house of correction. There is a market on Saturday. The church is large and has a considerable portion of good early English work; there are meeting-houses for Methodists and Baptists. The living is a vicarage in the archdeaconry of Stow, of the clear yearly value of 249*l.* There were in the parish in 1833 an infant-school with 58 children; an endowed national day and Sunday school, with 105 children in the week, and 100 on Sundays; nine other day-schools with 150 children; and one Sunday-school with 99 children.

Louth is in the hundred of Louth Eske, in the parts of Lindsey, 148 miles from London by Boston and Spilsby. There were antiently three religious establishments (two 'guilds' and a 'chantry'), the funds of which are now appropriated to the grammar-school. The parish comprehends an area of 3620 acres, with a population in 1831 of 6976, about one-eighth agricultural. The town is in a pleasant situation at the eastern foot of the Wolds, and on the bank of the little river Ludd, over which there is a bridge. It is well built; the houses are of brick, and the streets are well paved and lighted. The church is one of the finest in the county: it consists of a nave, chancel, and two aisles, with a lofty and elegant tower, surmounted by a rich octangular crocketed spire, at the west end. The exterior presents a fine specimen of perpendicular architecture: the east window is remarkable for its beautiful tracery. The angles of the tower are supported by rich buttresses which terminate in octangular crocketed pinnacles; there are flying buttresses from the spire to these pinnacles. The height of the spire is 288 feet. The grounds of the vicarage-house are curiously laid out as if attached to a hermitage, and are interspersed with seats, cloisters, and other appropriate buildings. There are a sessions-house and a house of correction for the division; a modern guildhall; an assembly-room; a small theatre; and a public subscription library and news-room. There are some manufactories of worsted, carpets, rugs, and blankets, which give employment to about 100 people; a soap manufactory, a paper-mill, and breweries. Trade is carried on in wool and corn. The Louth navigation extends from the town to the ocean just at the mouth of the Humber. The markets are on Wednesday and Saturday, and there is a weekly market for cattle on Friday during the spring. The quarter-sessions for the division are held alternately here and at Spilsby. The town was incorporated by Edward VI.: by the late Municipal Reform Act it was divided into two wards, and has 6 aldermen and 18 councillors. The borough is coextensive with the parish. The living is a vicarage in the archdeaconry of Lincoln, of the clear yearly value of 300*l.*, with a glebe-house. There are several Dissenting places of worship. There were in 1833 an infant-school with 130 children, a dame-school with 20; a free grammar-school, with a large endowment, with 80 children; another endowed day-school with 25 children; thirteen other day-schools with 322 children; a national day and Sunday school with 284 scholars during the week, and 59 on Sundays; and three Sunday-schools, with 580 children.

Market-Rasen, or Raisin, is in the hundred of Walshcroft, in the parts of Lindsey, on a little brook, the Rase or Raisin, which joins the Ancholme, nearly 148 miles from London by Lincoln. The parish comprehends 1220 acres, and had in 1831 a population of 1428, about one-sixth agricultural. The parish-church is commodious. The Roman Catholics and Methodists have meeting-houses: there is an hospital or almshouse for four poor men. The market, which is on Tuesday, is well frequented. The Ancholme navigation begins here. The living is a vicarage in the archdeaconry of Lincoln, of the clear yearly value of 223*l.*, with a glebe-house. There were in 1833 ten day-schools (one of them with a small endowment) with 201 children; one boarding-school with 4 children; and two Sunday-schools with 282 children.

Sleaford is in the wapentake of Flaxwell, in the parts of Kesteven, 115½ miles from London on the road to Lincoln. It is on the little river Slea, or Sleaford, which flows into the Witham, and is called New Sleaford to distinguish it from the adjacent village of Old Sleaford. Stukely conjectured, but on insufficient grounds, that the Romans had a station here. Roman coins have been dug up. The bishops of Lincoln had a castle here, which is now quite levelled with the ground. The parish comprehends 1800 acres, with a population in 1831 of 2430, scarcely any of it agricultural, beside the hamlet of Holdingham, 1360 acres, and 137 inhabitants, chiefly agricultural. The town has been much improved of late years: the streets are paved and lighted. The church consists of a nave with side aisles, and a large chapel or transept on the south side, and another transept on the north, and a chancel without aisles: there is a tower surmounted with a spire rising to the height of 144 feet. The steeple is the most antient part of the church, and is of early English character, the upper part and the spire being of somewhat later date than the rest: the aisles and the north transept are of decorated character, and the piers and arches of the nave, the clerestory, and the chancel chiefly of perpendicular date. The west front is very fine: and the design and execution of most parts of the church are excellent. There are some Dissenting places of worship; and a town-hall of modern architecture. The market is on Monday.. The Sleaford canal is cut from this town to the Witham. The living is a vicarage, exempt from the archdeacon's visitation, of the clear yearly value of 170*l.*, with a glebe-house. There were in 1833, in the parish, an endowed day-school with 40 children; seven other day-schools with 388 children; and three Sunday-schools with 311 children.

Spalding is in the wapentake of Elloe, in the parts of Holland, 101 miles from London on the road to Boston. It was a place of some consequence even in the Saxon times. There was a monastic establishment here, which underwent many changes. Its revenue at the dissolution was 878*l.* 18*s.* 3*d.* gross, or 767*l.* 8*s.* 11*d.* clear. The parish comprehends 12,070 acres, with a population in 1831 of 6497, about one-third agricultural. The town is situated on the banks of the Welland, in a fenny district, but well drained; the streets are clean and well paved, and the houses neat. The church, which is mostly of perpendicular character, has a fine tower and crocketed spire. There is a town-hall or court-house, a substantial brick building, in the market-place. There are assembly-rooms and a small theatre. The town derives its principal support from being the emporium for the neighbouring agricultural district. The Welland is navigable for vessels of 40 or 50, or even 70 tons, up to the town, and there is a considerable coasting and carrying trade. The market is on Tuesday, and is very prosperous. Long wool is sent from this neighbourhood for the supply of Norwich and the manufacturing towns of Yorkshire. The living is a perpetual curacy, in the archdeaconry of Lincoln, of the clear annual value of 950*l.*, with a glebe-house. There were in 1823 a free grammar-school with 5 scholars; another endowed free-school for 60 boys; a free-school called 'The Bluecoat-school,' with 50 free and 24 pay scholars; twenty-four other day-schools with 614 children; and five Sunday-schools with 705 scholars.

Spilsby is in the soke of Bolingbroke, in the parts of Lindsey, 133½ miles from London through Boston. The parish comprehends 2340 acres, with a population in 1831 of 1384, of which a very small portion was agricultural. The town consists of four streets meeting in a spacious market-place. The town-hall, a plain brick building on arches, stands at one end of a row of houses in the centre of the market-place, and the market-cross, a plain octangular shaft rising from a quadrangular base and terminating in a vane, at the other end. The church is an irregular pile, having at the west end a handsome tower of later date than the rest of the building: it contains several antient monuments. There is a weekly market on Monday. The living is a perpetual curacy, in the archdeaconry of Lincoln, of the clear yearly value of 109*l.* There were in 1833 three dame-schools with 50 children; one day-school, partially endowed, with 60 scholars; a national day and Sunday school, with 75 children in the week and 70 on Sundays; another national school with thirty scholars; three other day-schools with 52 scholars; and one Sunday-school with 110 children.

Swineshead, is in the wapentake of Kirton, in the parts of Holland, 113½ miles from London, and 7 from Boston. There was formerly a Cistertian abbey here, founded A.D. 1134, by Robert de Greslei; the yearly revenues at the dissolution were 175*l.* 19*s.* 10*d.* gross, or 167*l.* 15*s.* 3*d.* clear. Leland reduces them to 80*l.* In this monastery King John appears to have rested after his escape with his life in crossing the Wash, where he lost his baggage. His death, which occurred at Newark shortly after, was by some ascribed to poison administered by a monk of Swineshead. The parish comprehends 6100 acres, and had in 1831 a population of 1994, about half agricultural. Swineshead was formerly a port, and the sea flowed up to the market-place, where there was a harbour. The market is on Thursday, but it is almost disused. The church is a handsome spacious building with a lofty spire. The living is a vicarage, in the archdeaconry of Lincoln, of the clear yearly value of 240*l.* There were in the parish in 1833 an endowed day-school with 90 scholars; six other day-schools with 154 scholars; and one Sunday-school with 75 children. There is in the town a circular Danish encampment, sixty yards in diameter, surrounded by a double fosse.

Tattershall is in the wapentake of Gartree, in the parts of Lindsey, 127 miles from London through Sleaford. It is on the little river Bain, just above its junction with the Witham. Here was formerly a strong castle built by the Fitz-Eudos, barons of Tattershall, and improved by Cromwell, Treasurer of the Exchequer to King Henry VI. The site is marked by two fosses, the outer one of earth, the inner one ten feet deep, faced with brick, and occasionally filled with water from the river. The principal gateway was standing till of late years: a square brick tower built by Treasurer Cromwell is still remaining: it is flanked by octangular turrets which were crowned with spires covered with lead; three of these spires yet remain. The main walls rise to the top of the fourth story, where a capacious machicolation encompasses the tower, on which rises a parapet wall of vast thickness, with arches for the protection of those employed at the machicolations; above this is a second platform with a parapet and embrasures. The tower is in tolerable preservation.. The parish comprehends 3840 acres, with a population in 1831 of 599, two-fifths agricultural. The town is much decayed. The church is a beautiful and spacious edifice, in the form of a cross. It has however suffered much from dilapidations. The windows of the choir were glazed with beautiful stained glass, which was removed by a former marquis of Exeter on condition of replacing it with plain glass; but the condition was never fulfilled, and the interior has suffered much from the exposure: a rich carved wooden screen and stalls are nearly rotten. The Horncastle navigation passes through the town; but there is little trade. The market is now held on Thursday. The living is a donative exempt from the archdeacon's visitation, of the clear yearly value of 110*l.* There were in 1833 a boarding and day school with 25 children; two day schools with 10 or 12 children in each; a national school attended by 104 children in the week and 62 on Sundays; and one Sunday-school with 18 or 20 children. Mineral waters have lately been discovered at Woodhall between Tattershall and Horncastle, which are coming into repute: handsome baths are built, and an hotel is in course of erection.

Wainfleet is in the wapentake of Candleshoe, parts of Lindsey, 133 miles from London through Boston. If is supposed to have been a Roman station, the Vainonas of the geographer Ravennas. The haven was antiently frequented by ships, but it was going to decay in Leland's time. The waters have been so lowered by a drain, that it is now used only for small craft. The town is supposed to have stood formerly higher up the creek, where the old church of All Saints stands. The parish of Wainfleet All Saints comprehends 1830 acres, with a population in 1831 of 1135, about one-fourth or one-fifth agricultural; that of Wainfleet St. Mary comprehends 6440 acres, with a population of 660, almost entirely agricultural: together 8270 acres, with a population of 1795. All Saints church is a handsome building fast going to decay: it has a brick tower of modern date. St. Mary's church is also much decayed. There is a school-house for the free grammar-school, founded by William of Waynflete, bishop of Winchester, in the fifteenth century. The market is held on Saturday, but is almost disused. The living of All Saints is a rectory, of the clear yearly value of 322*l.*; that of St. Mary is a vicarage, of the clear yearly value of 201*l.*, with a glebe-house; both are in the archdeaconry of Lincoln. There were in 1833, in the two parishes, a dame-school with 16 children; William of Waynflete's free grammar-school, with 42 children; an endowed free-school, supported by the governors of Bethlehem Hospital, with 133 children; nine other day-schools with 222 children; and three Sunday-schools with 387 children: one of the Sunday-schools, with 105 children, was supported by the governors of Bethlehem Hospital. "William of Waynflete was of this town; his name was William Partin. He founded Magdalen College, Oxford.

Wragby is in the wapentake of Wraggoe, parts of Lindsey, 144 miles from London through Lincoln. The parish comprehends 1710 acres, with a population in 1831 of 601, more than a fourth agricultural. The town is neatly built and pleasantly situated. A handsome new church was built in 1837, by Mr. Turner, the proprietor of the town. There is a Methodist meeting-house; also an almshouse for six clergymen's widows and six other persons, with a chapel. The market is on Thursday. The living is a vicarage united with the rectory of East Torrington, both in the archdeaconry of Lincoln, and of the joint yearly value of 327*l.*, with a glebe-house. There were in 1833 an endowed day-school with 20 children; another day-school with 25 children; and a Sunday-school with 28 children.

The following places had markets, now disused.—Binbrook is in Walshcroft hundred, parts of Lindsey. It lies in the Wolds between Caistor and Louth, out of any great road. It consists of two parishes, St. Gabriel and St. Mary, having a joint area of 6070 acres, with a population in 1831 of 1030, more than two-thirds agricultural. There are extensive rabbit-warrens in the neighbourhood, and considerable business is done in dressing skins for furriers. The living of St. Gabriel is a vicarage, of the clear yearly value of 75*l.*, exempt from the archdeacon's visitation; that of St. Mary is a rectory, in the archdeaconry of Lincoln, of the clear yearly value of 291*l.* There were in 1823, in the two parishes, four day-schools with 75 children, and two Sunday-schools with 184 children.

Burton, distinguished from other places of the same name as Burton-upon-Stather, is in the wapentake of Manley, parts of Lindsey, 169 miles from London through Newark and Gainsborough. The parish comprehends an area of 3860 acres, with a population in 1831 of 760, three-fifths agricultural. The town was formerly more extensive, but different calamities that have happened to it have combined with the rise of Gainsborough to reduce it; its market has consequently been given up of late years. It is on a hill overlooking the Trent, upon the bank of which there is a wharf. The living is a vicarage united with the rectory of Flixborough, both in the archdeaconry of Stow, and of the joint yearly value of 752*l.*, with a glebe-house. There were, in 1833, five day-schools (one partly supported by a yearly donation), with 130 children; and two Sunday-schools, with 107 children.

Crowland or Croyland is in the wapentake of Elloe, parts of Holland, near the old channel of the Welland, and near the south border of the county, 87 miles from London, through Huntingdon, Ramsey, and Thorney. It is a place of considerable antiquity and interest. It has been conjectured to have been a Roman station; but though various Roman antiquities have been discovered in the neighbourhood, they are not sufficient to support the conjecture. In the time of the Anglo-Saxon kingdoms, a monastery was founded here by Ethelbald, king of Mercia, about the beginning of the eighth century. The first building is said to have been of timber; and, from the marshy character of the soil, was founded upon piles. In or about A.D. 870, in the reign of Ethelred I., this monastery, with several others, was destroyed by the Danes. In the latter part of the eleventh century, the monastery, which had been restored, was again destroyed by fire, but was rebuilt a few years afterwards, with funds partly, if not wholly, raised by the sale of indulgences. Five thousand persons are said to have been present at the laying of the first stone; and the abbey, thus restored, increased rapidly in wealth and reputation. At the dissolution, its yearly revenues were estimated at 1217*l.* 5*s.* 11*d.* gross, or 1083*l.* 15*s.* 10*d.* clear. The buildings of the abbey were much injured during the siege of Croyland, which the royalists had fortified, by the parliamentary forces under Cromwell: there are yet standing however considerable remains of the church. This building was originally cruciform, with a central tower, which probably rose little above the roof of the church: there was a campanile tower at the eastern end of the church. After the dissolution the transepts and choir were pulled down; the nave with its side aisles was left for use as the parish church; but the damage sustained in the civil war led to the church being transferred to the north aisle of the nave; and the centre and south aisle were abandoned to decay, in which state they now remain. The architecture of the building varies; part is of Norman, part of Early English, and part of Perpendicular architecture. At the west end of the present church is a massive tower of Perpendicular character: the western entrance to what was the central part of the nave is one of the most beautiful specimens of rich Early English in the kingdom. The groining of the roof of the present church is very good, and the original windows have been fine ones. There are some antient screen-work and an antient font. The very foundations of the other conventual buildings have been destroyed.

On the west side of the church is the triangular bridge at the confluence of two streams. There is no record of its erection, but from its style, which is Decorated English, it may be ascribed to the fourteenth century. It consists of three semi-arches meeting in a common centre, and forming by their junction as many pointed arches. The bridge is too steep for carriages, and is little used even for horses. It is supposed to have been designed as a symbol of the Trinity. At one angle of the bridge is the statue of some king much decayed.

The parish comprehends 12,780 acres, with a population in 1831 of 2268, nearly two-thirds agricultural. The village is surrounded by fens, and the inhabitants are engaged in grazing, in the dairy, or in the breeding or taking of geese and wild-fowl. The market has been removed to Thorney. The living is a rectory, in the archdeaconry of Lincoln, of the clear yearly value of 115*l.*, with a glebe-house. There were in 1833 nine dame-schools, with about 100 children; eight day-schools, with 225 children; and two Sunday-schools, with 206 children.

Navenby is in the hundred of Boothby Graffo, parts of Kesteven, on the road from Grantham to Lincoln, 124 miles from London. The church is partly of Early English and partly of Decorated English architecture. The windows of the chancel are very fine specimens of Decorated character, particularly the east window, the mullions and tracery of which are remarkably graceful. The parish comprehends 2110 acres, with a population, in 1831, of 778, above half agricultural. The market, formerly held on Thursday, has fallen into disuse. The living is a rectory, in the archdeaconry of Lincoln, of the clear yearly value of 588*l.*, with a glebe-house. There were in 1833 two dame-schools, with 18 children; two day-schools, with 25 children; and one endowed day and Sunday school, with 109 children in the week and 166 on Sunday.

Saltfleet is in the hundred of Louth Eske, parts of Lindsey, 159 miles from London by Sleaford, Horncastle, and Louth. Saltfleet, half a century ago, was a place of some consequence, but is now decayed and is a mere hamlet to the parish of Skidbrooke. Some of the inhabitants are engaged in the oyster fishery; there is a bank of good oysters off the coast. The parish of Skidbrooke contains 2420 acres, with a population of 362, about half agricultural. The living is a vicarage, in the archdeaconry of Lincoln, of the clear yearly value of 271*l.* There were in 1833 two day-schools, with 52 children, and one Sunday-school, with 58 children.

Divisions for Ecclesiastical and Legal Purposes.—This county, as noticed above, is in the diocese of Lincoln, and constitutes the two archdeaconries of Lincoln and Stow. The intended changes in the diocese have been also given. The archdeaconry of Lincoln is subdivided into the following rural deaneries:—1, Lincoln; 2, Aswardburn, or Aswardburn-cum-Lafford; 3, Aveland; 4, Beltisloe or Beltislaw; 5, Bolingbroke or Bullingbrook; 6, Candleshoe; 7, Calceworth or Calcewarth; 8, Gartree; 9, Grantham; 10, Graffo or Graffoe; 11, Grimsby Hill; 12, Horncastle; 13, Longobovey; 14, Loveden; 15, Lowth-cum-Ludbrook; 16, Ness, or Nesse; 17, Stamford; 18, Walshcroft or Walscroft; 19, Wraggoe or Wraghoe; and 20, Yarborough or Yarburgh. The archdeaconry of Stow is divided into the following rural deaneries:—1, Aslacoe or Aslacko; 2, Corringham; 3, Lawress; and 4, Manley or Manlake. The number of parishes is given by Camden at 630. In Lewis's 'Topographical Dictionary' they are given at 609, of which 305 are rectories, 244 vicarages, and the remainder perpetual curacies, chapelries, or donatives. The diocese of Lincoln is in the ecclesiastical province of Canterbury.

Lincolnshire is in the midland circuit. The assizes are held at Lincoln, where is the county gaol. The quarter-sessions are held as follows: for the county of the city of Lincoln, at Lincoln; for the parts of Kesteven and Holland, the Epiphany, Easter, and Midsummer sessions, at Bourn; the Michaelmas sessions at Boston: for the parts of Lindsey, for one division, at Kirton in Lindsey; and for the other division, the Epiphany and Midsummer sessions at Spilsby, and the Easter and Michaelmas sessions at Louth.

Before the passing of the Reform Act the county returned two members, who were elected and the poll taken at Lincoln. Two members each were returned for the city of Lincoln, and for the boroughs of Boston, Grantham, Grimsby, and Stamford.

By the Reform and Boundary Acts the county was divided into two parts, each to return two members. The northern division comprehends the parts of Lindsey: the election takes place at Lincoln, and the polling stations are Lincoln, Gainsborough, Epworth, Barton, Glanford Brigg, Market-Rasen, Grimsby, Louth, Spilsby, and Horncastle. The southern division comprehends the parts of Kesteven and Holland: the election takes place at Sleaford, and the polling-stations are Sleaford, Boston, Holbeach, Bourn, Donington, Navenby, Spalding, and Grantham.

History and Antiquities—At the time of the Roman conquest Lincolnshire constituted part of the territory of the Coritani (Κοριτανοι), who occupied several of the midland counties, and whose dominion stretched through Lincolnshire to the German Ocean and the Humber. In the division which the Romans made of Britain Lincolnshire was included in the province of Flavia Cæsariensis.

The principal British roads or trackways which passed through Lincolnshire, were Ermine-street, which had two branches; the Foss-way; and what has been termed the Upper Salt-way. Ermine-street, after passing over an angle of the county near Stamford, re-entered it in the neighbourhood of South Witham, between Stamford and Grantham. It immediately divided into two branches, of which the most easterly ran north by Ancaster and Lincoln to Wintringham on the Humber. The other main branch ran north-north-west into Nottinghamshire. The Foss-way commenced on the coast at Grimsby or Saltfleet, or somewhere between them, and ran south-west by Lincoln through Nottinghamshire to Leicester. The Upper Salt-way appears to have been the communication between the coast of Lincolnshire and the salt-works of Worcestershire. Two of these lines of road, the eastern branch of Ermine-street and the Foss, were adopted by the Romans. There were subordinate branches from these roads, and Dr. Stukely considered that there were traces of other Roman roads.

Lindum, the modern Lincoln, was a British town before it was made a Roman station: it is at the intersection of the two great roads, the eastern branch of Ermine-street and the Foss. Ptolemy calls it Λινδον, and mentions it as one of the two chief towns of the Coritani. It was made a Roman station, and according to Richard a Roman colony, whence the latter syllable of its modern name. The station was on the hill now occupied by the cathedral and the castle: its form was that of a parallelogram, the sides nearly facing the four cardinal points; on each side was a gate. The enclosed area was 1200 feet by 1300. The walls have been almost entirely levelled with the ground, and the gates, with one exception, have been long since demolished. The remaining gate, now called 'Newport Gate,' is one of the most remarkable Roman remains in the kingdom. It consists of a central arch nearly sixteen feet wide, and formed with large stones put together apparently without mortar; the height, according to Stukely, was originally above twenty-two feet, but it is now, from the elevation of the causeway, scarcely more than half that height. On each side of the great arch are two lateral arches or posterns, now nearly closed up by the elevation of the soil; these small arches were each seven feet and a half wide by fifteen high. Adjacent to this gate is a mass of the Roman wall; a Roman arch and part of the wall are incorporated with the Norman castle; and another portion of wall parallel to that of the station, and now called 'the Mint Wall,' is supposed to have been part of a granary or of some other Roman building. A fortified wall with towers at the corners appears to have run down to the bank of the Witham, and then along the bank; if any part of this remains, it has been so mingled with later Saxon or Norman workmanship, that it cannot be discriminated. Coins of the emperors Nero, Vespasian, and Julian have been found here, and especially of Carausius, who, as some have supposed, resided for a time at Lincoln. A tessellated pavement and a hypocaust beneath it were discovered in A.D. 1739: the pavement was thirteen feet below the present surface. Another hypocaust and several antiquities have been also discovered, especially a sarcophagus and some stone coffins, earthen and glass urns, and other funereal utensils. Part of a set of glazed earthen conduit-pipes and other specimens of pottery have been also found.

The only other Roman station in the county mentioned in the Antonine Itinerary was Causennæ. Ad Abum, mentioned by Richard of Cirencester, was on Ermine-street, at Winteringham or Winterton, near the south bank of the Humber. The Bannovallum and the Vainonas of the anonymous geographer Ravennas have been fixed at Horncastle and Wainneet. Causennæ was probably Ancaster on Ermine-street, fifteen miles south of Lincoln. Roman coins have been found here. The remains of the station at Winterton, supposed to be Ad Abum, were ploughed up not more than six years before Stukely wrote the account of it, and 'great pavements, chimney-stones,' and other antiquities were found, but not preserved. Three curious tessellated pavements were found here A.D. 1747. At Roxby, Hibbaldstow, Appleby, Sandton, and Broughton, all in the same part of the county, various Roman antiquities have been discovered. At Horkstow also, near Winterton, several Roman remains, chiefly tessellated pavements and the foundations of buildings, have been found. At Torksey, at the junction of the Foss Dyke with the Trent, between Lincoln and Gainsborough, there was probably a Roman settlement. The foundations of the antient Norman castle appear to have been Roman. At Scampton, about six miles north of Lincoln, were discovered in 1795 the foundations of a Roman villa, occupying a site 200 feet square, and having upwards of forty apartments on the ground-plan, with painted and stuccoed walls, and no less than thirteen Roman pavements, only one of which was perfect. Some of the walls were of great thickness. Various Roman antiquities were found scattered over the spot. Upon the banks of the Trent, three miles west of Stow, in the same part of the county, two Roman altars and other antiquities have been discovered. Horsley was inclined to fix the station Segelocum here, on the Lincolnshire side of the stream, instead of placing it at Littleborough on the Nottinghamshire side, where he admits that the town attached to the station stood. Stow is supposed to have been the Sidnaccaster of the Saxons, the seat of a bishopric afterwards transferred to Lincoln. Near Gainsborough and at Aukborough, both on the Trent, are Roman camps: the latter was, in Stukely's time, very perfect, and formed a square of 300 feet; near it was one of those labyrinths, formed of banks, called here and elsewhere Julian's bower. Camps, probably Roman, have been found at Gedney Hill, near Holbeach, and at Honnington, not far from Grantham; a mosaic pavement at Denton, in the same neighbourhood; and Roman coins and pipes of baked earthenware in other places.

Under the Saxons, Lindsey, a name which perhaps extended nearly or quite over the modern county of Lincoln, appears to have been a subordinate state dependent upon the kingdom of Mercia. It was included among the conquests of Edwin of Northumberland, under whose influence Christianity was introduced by the missionary Paulinus. Bede has recorded that Blecca, the governor of Lincoln, was, with his household, among the first converts, A.D. 628.

When the Danes, or Northmen, were carrying on their ravages in England in the time of Ethelred I., Lincolnshire, which then had several monastic establishments, suffered greatly. The narrative of their ravages, given in the pages of the apocryphal Ingulphus, is interesting; and if its authenticity could be depended on, would afford considerable light amid the historic darkness of the period. Early in the year 870 the Northmen landed at Humberstan (Humberstone), near Grimsby, ravaged Lindissy (Lindsey), and marched to Bardeney on the Witham, where was a famous monastery, the monks of which they massacred in the church. About Michaelmas they penetrated into Kesteven, bloodshed and devastation marking their course. Here however they were met by a force thus described by Ingulphus:—'Count Algar (Comes Algarus) and two knights (milites) his seneschals (scheneschalli sui), called Wibert and Leofric (from whose names the aged men and rustics thereabout have since given appellations to the villages where they lived, calling them Wiberton and Lefrinkton), drew together all the youth of Holland (Hoylandia), with a band (cohors) of two hundred men from the monastery of Croyland, stout warriors, inasmuch as most of them were exiles (fugitivi), who were commanded by brother Toly

(Tolius), who had become a monk in that monastery, having been before that the most renowned for military skill in all Mercia, but who had then, from the desire of a heavenly country, given up secular for spiritual warfare at Croyland. They gathered together also about three hundred brave and warlike men from Deping, Langtoft, and Baston (Boston), with whom they joined Morcard (Morcardus), lord of Brunne (Bourne), with his retainers (familia), who were very stout and numerous; they were moreover aided by Osgot, deputy (vicedominus) of Lincoln, a brave veteran, with a band of 500 Lincoln men.' In the first engagement the natives had the advantage; but the reinforcements which joined the invaders in the night struck such terror into the Christians that many fled. The rest having received the sacrament, and 'being fully prepared to die for the faith of Christ and the defence of their country,' marched to the battle. The Northmen, enraged at the loss of three of their kings (who were buried at a place previously called Laundon, but subsequently Trekyngham), fought with the utmost ferocity; but the Christians, though far inferior in number, maintained the combat till nightfall, and were then overcome only by stratagem. Algar and his seneschals and Toly fell; and of the whole body only a few young men of Sutton and Gedeney escaped, who carried the mournful tidings to the monks of Croyland. To that monastery the Northmen soon proceeded, murdered the abbot, and those other inmates who were too old or too young to fly (except one boy of ten years old, whom the compassion of one of the Danish chieftains preserved), and burned the monastery. From Croyland they marched to the monastery of Medeshamsted, now Peterborough, which they also entirely destroyed, having put the inmates, without exception, to the sword.

Lincolnshire passed permanently into Danish hands about A.D. 877; it constituted part of the territory of the Danish burghs of Lincoln and Stamford; and was included within the boundary of the Danelagh, or Danelage (the 'Danish law,' or Danish 'jurisdiction'), as settled by the treaty between Alfred and Guthrun the Dane. The conquest of this part of the island by the Danes appears to have been complete; but the similarity of the laws and institutions of the Anglo-Saxons and the Danes diminished the violence of the changes effected by it. Danish names however supplanted the previous Anglo-Saxon ones; and if we may judge by the prevalence of the Danish termination 'by' (as in Grimsby, Saltfleetby, Normanby, Willoughby, &c.), the change must have been made in a great many cases. The denominations of the popular assemblies and tribunals appear to have been changed; the name 'wapentake' superseded that of 'hundred.' In time however the Danish and Anglo-Saxon population became amalgamated, and the whole district came under the supremacy of the Anglo-Saxon crown.

In the civil war between Stephen and the empress Maud Lincolnshire was the scene of contest. The siege and battle of Lincoln, A.D. 1141, have been already noticed. In the broils in which Henry II. was involved with his children, one of the Mowbrays, who had a castle in the Isle of Axholme, and was an adherent of the insurgent Prince Henry, was compelled to submit by the zeal and loyalty of the Lincolnshire men, who crossed over to the island in boats, obliged the garrison to surrender, and razed the castle to the ground. In the civil war of the barons with John and his son Henry III., Lincoln was signalized by a second battle, which seated Henry III., yet a boy, securely on his throne. At the latter part of his reign, when troubles had again broken out, Axholme became once more the refuge of the disaffected. In the civil war of the Roses Lincolnshire appears not to have suffered much. Sir Robert Wells, out of revenge for his father's death, whom Edward IV. had beheaded, raised a rebellion against that prince, and gathered an army of 30,000 Lincolnshire men. He was defeated with dreadful loss near Stamford, and put to death by the king's command. This battle is sometimes called the battle of 'Lose-coat-field' from the vanquished having cast off their coats in order to run away the faster. At the time of the Reformation the Lincolnshire men broke out into open rebellion upon the suppression of the monasteries, A.D. 1536. The rebellion began at Louth, where the ecclesiastical commissioners were to hold a visitation. It was excited by Dr. Makerel, prior of Barlings, or Oxney, between Lincoln and Wragby, and by one Melton, who assumed the name of 'Captain Cobler.' (*State Papers*, published by the Record Commissioners.) The rebellion spread into Yorkshire, where Robert Aske took the command of the insurgents. The Lincolnshire rebels sent in petitions to the king, specifying what they deemed their grievances; and the king gave an answer (*State Papers*, 'Henry VIII.,' part ii., No. xlviii.), in which he designates the shire 'one of the most brute and beestelie of the whole realm.' The earls of Shrewsbury, Rutland, and Huntingdon, and the duke of Suffolk, were sent into Lincolnshire with all the force that could be collected; and the rebels dispersed without coming to an engagement, delivering up their leaders to the king's officers. Dr. Makerel, with the vicar of Louth and thirteen others, were afterwards executed at Tyburn.

Of the ecclesiastical and baronial edifices which were erected between the Conquest and the Reformation, Lincolnshire contains many admirable specimens, especially churches. The cathedral of Lincoln and the churches of Louth, Sleaford, Spalding, and other places, have been already noticed. On the hill which runs from Lincoln towards Grantham is a line of churches, presenting a number of interesting features. Beckingham, Normanton, and Ancaster have considerable portions of Norman character. Caythorpe church is chiefly of Decorated English character, and presents several singularities in its arrangement. Leadenham has a tower and spire of Early Perpendicular date, and of good design; the rest of the church is an excellent example of Decorated English. The churches on and near the road from London to Lincoln exhibit as much, if not more variety and excellence of composition than is to be met with in any part of the kingdom in the same distance: among them are Sleaford, Folkingham, Bourne, and Market Deeping churches. Kelby, Threckingham, Kirby Laythorpe, Howel, Horbling, Sempringham, and Morton have portions of Norman character. Sempringham church appears to be the remains of a much larger building; it has a tower of plain Perpendicular character. Silk Willoughby church is of fine Decorated English character, with a tower and spire of good composition. Walcot has a tower and fine crocketed spire, which are of Decorated English character, as well as the rest of the church; the east window is very fine. Heckington church is one of the most beautiful models of a church in the kingdom, having almost every feature of a fine church. It is a large cross church, having a nave and aisles, spacious transepts, a large chancel with a vestry attached to the north side, and at the west end a tower crowned with four pentagonal pinnacles and a lofty spire.

The finest churches in the Fens are for the most part of Perpendicular character; they have lofty spires, some of them crocketed. The churches already noticed are chiefly in Kesteven and Holland; those of Lindsey are of inferior architecture, except in the flat marshy tract between the Wolds and the Ocean or the Humber, where there are some fine ones. The churches in this district vary but little in their form and character; they have a nave with north and south aisles, a chancel, south porch, and western tower. They are commonly built with good materials. The churches amid the Wolds have little claim to architectural beauty. In the western parts of Lindsey some of the churches are of great antiquity and of considerable architectural beauty. Stow church, in this part, is of considerable size, and chiefly of Norman character.

Of monastic edifices there are several remains. Of Barling's Abbey part of a wall and some fragments of columns remain. Of Thornton Abbey, not far from Barton-upon-Humber, the remains are more important and interesting. It was founded by William Le Gras, or Le Gros, earl of Albemarle, A.D. 1139, as a priory for Black Canons, and was afterwards made an abbey. Its revenues at the dissolution were 730*l.* 17*s.* 2*d.* gross, or 594*l.* 17*s.* 10*d.* clear; after the suppression, Henry VIII. reserved the revenues for the endowment of a college, consisting of a dean and a considerable number of prebendaries; but this also was suppressed in the reign of Edward VI. The buildings were originally extensive, forming a quadrangle surrounded with a moat, and having lofty ramparts for occasional defence. The gate-house, which formed the western entrance, is yet tolerably entire; four handsome hexagonal towers form the four angles of this gate-house. A spacious room, probably the refectory, and an adjoining room with recesses in both ends, the abbey church, and a portion of the octagonal chapter-house, are also standing. The abbot's lodge, which stood to the south, is occupied as a farm-house.

Of Bardney Abbey there are some remains, also of Kirkstead Abbey; both these are on the left bank of the Witham, between Lincoln and Boston. The abbot's lodge of Revesby Abbey, on the north border of the fen country, formed part of an antient house, since used for the offices of the mansion of the late Sir Joseph Banks. Croyland has been described before.

Of Temple Bruer, a preceptory first of Knights Templars, afterwards of Hospitallers, a few vaults and the tower of the church are left; the latter is a massy, quadrangular, stone building, accessible to the top by a winding staircase. The remains of Haverholme Priory, near Sleaford, have been incorporated into a modern mansion.

In the civil war of Charles I. this county was the scene of several important events. In March, 1642, Colonel Cavendish, on the part of the king, took possession of Grantham, and captured 360 prisoners, with a quantity of arms and ammunition, and demolished the works which had been erected. Oliver Cromwell shortly afterwards gained a victory near Grantham with his own regiment of horse over twenty-four troops of royalist cavalry. In May of the same year Colonel Cavendish defeated the parliamentary forces at Ancaster. In the same year Gainsborough was taken by the parliamentarians under Lord Willoughby of Parham. The earl of Kingston, the royalist governor, was taken, and being sent to Hull was shot by the royalists in mistake as he was crossing the Humber. In 1643 Cromwell gained a victory near Gainsborough over the royalists under General Cavendish, who lost his life in the engagement. In autumn the same year the royalists were again defeated at Horncastle; and in 1644 Lincoln castle and minster were stormed by the earl of Manchester, who killed or captured about 800 men. The loss of the assailants did not exceed 50 killed and wounded.

(*Beauties of England and Wales*; Allen's *History of Lincolnshire*; Browne Willis's *Cathedrals*; *Parliamentary Papers*; Rickman's *Gothic Architecture*, &c.)

STATISTICS.

Population.—Lincolnshire is almost entirely an agricultural county, ranking in this respect the fifth in the list of English counties. Of 79,535 males twenty years of age and upwards, only 167 are employed in manufactures, or in making manufacturing machinery, while 45,272 are engaged in agricultural pursuits, 32,167 of which number are labourers. Of the few engaged in manufactures 28 men are employed at Louth in making carpets, blankets, and worsted. At Owston and West Butterwick 43 men are employed in making sacking, tarpaulins, and wool-sheets; at Haney about 20 in similar occupations. There is a small manufacture of silk shag at Stamford; of mill-machinery at Barton and at Boston; of dressing-machines at Skirbeck; and a few weavers are scattered about the county.

The following summary of the population taken at the last census (1831) shows the number of inhabitants and their occupations in each hundred of the county.

The following Table is a Summary of the Population, &c., of every Hundred, &c., as taken in 1831.

HUNDREDS, CITIES, OR BOROUGHS.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other Families not comprised in the two preceding classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Parts of Holland.											
Elloe, . wapentake	5,723	5,939	44	70	3,540	1,452	947	15,193	14,121	29,314	7,909
Kirton . . „ .	2,873	3,113	5	65	2,101	594	418	7,469	7,308	14,777	3,636
Skirbeck . . „ .	1,372	1,464	8	39	1,011	191	262	3,666	3,550	7,216	1,709
Boston, . . borough	2,437	2,487	5	184	149	1,234	1,104	5,094	6,146	11,240	2,552
Parts of Kesteven.											
Aswardhurn, wapentake	1,256	1,337	1	36	946	281	110	3,279	3,128	6,407	1,639
Aveland . . „ .	1,885	2,049	7	47	1,302	502	245	4,958	5,020	9,978	2,487
Beltisloe . . „ .	1,176	1,273	16	20	865	293	115	3,403	3,027	6,430	1,649
Boothby-Graffo „ .	1,458	1,571	2	35	1,098	295	178	4,000	3,843	7,843	1,982
Flaxwell . . „ .	1,137	1,181	0	47	523	377	281	3,033	2,982	6,015	1,471
Langoe . . „ .	1,533	1,654	7	7	1,263	299	92	3,872	3,684	7,556	1,900
Loveden . . „ .	1,534	1,694	2	41	1,106	370	218	3,957	4,008	7,965	2,004
Ness . . . „ .	1,359	1,464	4	53	878	380	206	3,489	3,381	6,870	1,732
Winnibriggs and Threo „ .	1,166	1,285	12	20	777	299	209	3,041	3,108	6,149	1,513
Grantham, borough and soke . . .	2,072	2,223	10	59	590	919	714	5,216	5,564	10,780	2,697
Stamford, borough .	1,078	1,204	25	27	64	711	429	2,691	3,146	5,837	1,390
Parts of Lindsey.											
Aslacoe, . wapentake	880	947	1	4	712	169	66	2,486	2,353	4,839	1,274
Bolingbroke . soke	2,114	2,214	5	54	1,444	436	334	5,659	5,460	11,119	2,703
Bradley Haverstoe wapenta.	2,314	2,456	8	106	1,210	636	610	5,953	5,966	11,919	2,973
Calceworth, hundred .	1,961	2,100	0	47	1,404	408	288	5,118	5,148	10,266	2,438
Candleshoe, wapentake	1,639	1,737	8	39	1,152	352	233	4,299	4,217	8,516	2,072
Corringham . „ .	2,846	2,917	17	204	911	921	1,085	6,465	6,718	13,183	3,331
Gartree . . „ .	1,242	1,343	5	24	965	214	164	3,605	3,358	6,963	1,679
Hill, hundred . .	606	696	1	9	498	127	71	1,722	1,698	3,420	847
Horncastle, soke . .	1,677	1,788	4	45	712	558	518	4,261	4,395	8,656	2,148
Lawress, wapentake .	1,327	1,426	12	36	835	337	254	3,660	3,583	7,243	1,869
Louth-Eske, hundred	2,800	2,937	15	123	1,352	875	710	6,904	7,123	14,027	3,363
Ludborough, wapentake	249	290	1	2	240	34	16	741	689	1,430	346
Manley . . „ .	4,467	5,012	11	136	3,099	1,051	862	11,520	11,526	23,046	5,834
Walshcroft . „ .	1,370	1,561	3	56	961	380	220	3,871	3,744	7,615	1,920
Well . . . „ .	619	661	2	24	466	137	58	1,658	1,536	3,194	891
Wraggoe . . „ .	1,125	1,250	0	19	924	222	104	3,263	3,059	6,322	1,641
Yarborough . „ .	3,903	4,138	11	162	2,181	1,122	835	9,668	9,819	19,487	5,033
Lincoln, city . . .	2,417	2,492	16	128	470	1,108	914	5,644	6,199	11,843	2,898
Totals .	61,615	65,903	268	1,968	35,749	17,284	12,870	158,858	158,607	317,465	79,535

The population of Lincolnshire at each of the four following dates was as under:—

	Males.	Females.	Total.	Increase per cent.
1801	102,445	106,112	208,557	..
1811	117,022	120,869	237,891	14·65
1821	141,570	141,488	283,058	18·98
1831	158,958	158,607	317,465	12·07

showing an increase between the first and last periods of 108,908, or about 52¼ per cent., which is 4¾ per cent. below the whole rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

		£.		s.	d.	
1801	were	95,575,	being	9	2	for each inhabitant.
1811	..	129,343	„	10	10	„
1821	..	168,786	„	11	11	„
1831	..	174,055	„	10	11	„

The expenditure for the same purpose in the year ending March, 1837, was 111,242*l.* If we assume that the population has increased since 1831 in the same ratio as in the ten preceding years, the above sum gives an average of about 6*s.* 6*d.* for each inhabitant. All these averages are above those for the whole of England and Wales.

The sum raised in Lincolnshire for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1833, was 225,005*l.*, and was levied upon the various descriptions of property as follows:—

On land	£188,927	8*s.*
Dwelling-houses	30,760	18
Mills, factories, &c.	3,355	9
Manorial profits, navigation, &c.	1,961	16
Total	225,005	11

The amount expended was—

For the relief of the poor	£169,073	10*s.*
In suits of law, removal of paupers, &c.	6,750	3
For other purposes	49,073	1
Total	224,896	14

In the returns made up for the subsequent years the descriptions of property assessed are not specified. In the years ending March, 1834, there was raised 228,238*l.*; 1835, 207,367*l.*; 1836, 188,264*l.*; 1837, 133,767*l.*; and the expenditure for each year was as follows:—

	1834.		1835.		1836.		1837.
	£.	s.	£.	s.	£.	s.	£.
For the relief of the poor	161,074	0	146,058	0	131,685	0	111,242
In suits of law, removals, &c.	8,674	0	7,749	0	7,646	0	5,414
Payments towards the county-rate	62,055	0	26,749	0	23 279	0	..
For all other purposes			25,856	0	23,857	0	17,111
Total money expended	£231,803	0	206,412	0	186,467	0	133,767

The saving effected in the expenditure of the poor in 1837, as compared with the sum expended in 1834, was therefore about 31 per cent.; and the saving effected, comparing the same periods of time, in the whole sum expended, was about 42¼ per cent.

The number of turnpike trusts in Lincolnshire, as ascertained in 1835, is 29; the number of miles of road under their charge is 538. The annual income and expenditure in 1835 were as follows:—

Revenue received from tolls	£28,449	17	0
Parish composition in lieu of statute duty	2,269	11	0
Estimated value of statute duty performed	3,745	3	0
Revenue from fines	12	0	0
Revenue from incidental receipts	1,101	19	0
Amount of money borrowed on the security of the tolls	1	4	0
Total income	35,579	14	0

	£.	s.	d.
Manual labour	8,229	17	0
Team labour and carriage of materials	3,000	12	0
Materials for surface repairs	4,416	12	0
Land purchased	42	4	0
Damage done in obtaining materials	245	17	0
Tradesmen's bills	1,191	9	0
Salary of treasurer	215	13	0
„ of clerk	473	4	0
„ of surveyor	1,673	19	0
Law charges	256	12	0
Interest of debt	5,482	17	0
Improvements	1,580	1	0
Debts paid off	1,669	0	0
Incidental expenses	675	13	0
Estimated value of statute duty performed	3,745	3	0
Total expenditure	32,898	13	0

The county expenditure in 1834, exclusive of that for the relief of the poor, was 25,941*l.*, disbursed as follows:—

	£	s.	d.
Bridges, building and repairs, &c.	703	4	0
Gaols, houses of correction, and maintaining prisoners, &c.	8,594	0	0
Shire-halls and courts of justice, building, repairing, &c.	283	9	0
Lunatic Asylums	36	8	0
Prosecutions	2,980	17	0
Clerk of the peace	1,612	9	0
Conveyance of prisoners before trial	516	5	0
Conveyance of transports	37	19	0
Vagrants, apprehending and conveying	338	3	0
Constables, high and special	401	17	0
Coroner	405	4	0
Debt, payment of, principal and interest	7,941	9	0
Miscellaneous	2,089	16	0

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 1296, 1563, and 2237 respectively; making an average of annually 185 in the first period, of 223 in the second period, and of 319 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect of whom any costs were paid out of the county-rate, was 197, 210, and 244 respectively.

Among the persons charged with offences there were committed for

	1831.	1832.	1833.
Felonies	161	164	214
Misdemeanors	36	46	30

The total number of committals in each of the same years was 225, 243, and 301 respectively.

	1831.	1832.	1833.
Convicted	157	195	244
Acquitted	31	28	31
Discharged by proclamation	34	20	23

At the assizes and sessions in 1837 there were 412 persons charged with criminal offences in this county. Of these 33 were charged with offences against the person, 13 of which were for common assaults; 29 persons were charged with offences against property committed with violence, 325 with offences against property committed without violence; 1 for destroying trees; 1 for uttering counterfeit coin; 16 for riot; 4 for poaching; 1 for perjury; and 2 for minor misdemeanors. Of the whole number committed, 291 were convicted, 83 were acquitted, and against 38 there were no bills found, or no prosecution. Of the whole number of persons convicted, 12 were sentenced to death, but none were executed; the sentences of 9 of them were commuted into transportation for life; of 2 others for periods of 15 and of 7 years; and of 1 into imprisonment for 1 year, or more than 6 months: 13 criminals were sentenced to transportation for life, and 41 for various periods; 9 were sentenced to imprisonment for 2 years, or more than 1; 35 for 1 year or more than six months; and 169 for 6 months or under; 12 were sentenced to be whipped or fined, or were discharged on sureties. Of the whole number of offenders, 345 were males and 67 were females; 136 could not read nor write; 232 could read and write imperfectly; 37 could read and write well; 2 had received superior instruction, and the degree of instruction of the remaining 5 could not be ascertained.

The number of persons qualified to vote for the county members of Lincolnshire is 18,241, being 1 in 17 of the whole population, and 1 in 4 of the male population twenty years and upwards, as taken in 1831. The expenses of the last election of county members to parliament were, to the inhabitants of the county, 1371*l.* 15*s.*, and were paid out of the general county-rate.

This county contains 16 savings' banks; the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.	1836.	1837.
Number of Depositors	7,482	7,801	8,528	9,315	10,216	11,150
Amount of Deposits	£224,983	£233,117	£249,387	£267,247	£291,099	£313,388

The various sums placed in the savings' banks in 1835, 1836, and 1837, were distributed as under:—

	1835.		1836.		1837.	
	Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	5,031	£36,516	5,472	£39,715	6,104	£44,336
" 50	2,692	81,777	3,031	92,530	3,139	95,851
" 100	1,087	75,353	1,167	80,431	1,325	90,905
" 150	301	36,435	341	40,800	367	43,685
" 200	153	25,179	157	26,353	170	28,290
Above 200	51	11,987	48	11,370	45	10,321

Education.—The following particulars are obtained from the Parliamentary Inquiry on Education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	71		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		631	
Females		639	
Sex not specified		501	
			1,771
Daily schools	1,344		
Number of children at such schools; ages from 4 to 15 years:—			
Males		16,075	
Females		13,603	
Sex not specified		6,675	
			36,353
Schools	1,415		
Total of children under daily instruction			38,124
Sunday schools	543		
Number of children at such schools; ages from 4 to 15 years:—			
Males		12,765	
Females		12,315	
Sex not specified		6,799	
			31,881

Assuming that the population between two and fifteen years increased in the same ratio as the whole of the population between 1821 and 1831, and has continued to increase in the same ratio since, we find that there must have been living in Lincolnshire (in 1834) 109,656 persons between those ages. A very large number of the scholars attend both daily and Sunday schools. Forty-five Sunday-schools are returned from places where no other schools exist, and the children, 1221 in number, who are instructed therein cannot be supposed to attend any other school. At all other places Sunday-school children have an opportunity of resorting to other schools also; but in what number, or in what proportion duplicate entry of the same children is thus produced must remain uncertain. Forty-three schools, containing 2680 children, which are both daily and Sunday schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. Making allowance for this cause for over-statement, we may perhaps fairly conclude that not as many as two-thirds of the whole number of children between the ages of 2 and 15, were receiving instruction at the time this return was made.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	1	112	4	186	59	792	7	691
Daily Schools	157	5,247	70	3,152	1,049	24,571	68	3,383
Sunday Schools	12	715	505	29,825	1	79	25	1,252
Total.....	170	6,074	579	33,163	1,109	25,442	100	5,326

The schools established by Dissenters, included in the above statements, are—

	Schools.	Scholars.
Infant schools	—	—
Daily schools	15	413
Sunday-schools	147	12,149

The schools established since 1818 are—

		Scholars.
Infant and other daily schools	706, containing	20,909
Sunday-schools	417	26,913

Twenty-five boarding-schools are included in the number of daily-schools as given above. No school in this county appears to be confined to the children of parents of the Established church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents. Lending libraries of books are attached to 34 schools in this county.

LINDESNAES, CAPE. [TRONDHEIM.]

LINE. The definition of a line, as given by Euclid, will be discussed, with other matters relating to it, in the article SOLID, SURFACE, LINE, POINT (Definitions of).

LINE. The French used to divide their inch into twelve lines, and the line into twelve points, which measures are out of date, since in all scientific investigations the metrical system is adopted. Sometimes, but rarely, the line has been divided into ten points, thus giving 1440 points to the foot: the French metrological writers, particularly the older ones, frequently give the measures of other countries in 1440ths of their own foot. Some English writers have divided the inch into lines. The French line is ·0888 of an English inch, and is also two millimetres and a quarter.

LINEAR (Algebra). As all equations connected with straight lines are of the first degree, the continental writers frequently call equations of the first degree linear equations.

LINEAR DIMENSIONS. [SOLID, SUPERFICIAL, AND LINEAR DIMENSIONS.]

LINEN (French, *Tissue de Lin*; Spanish, *Tela de Lino*; German, *Linnen*; Dutch, *Lynwaat*; Italian, *Tela*; Russian, *Polotno*), cloth woven with the fibres of the flax-plant (*Linum usitatissimum*), a manufacture of so antient a date that its origin is unknown. Linen cloths were made at a very early period in Egypt, as we see from the cloth wrappings of the mummies, which are all linen. It appears also that linen was, in the time of Herodotus, an article of export from Egypt. (ii. 105.)

Until a very recent time little machinery was used in the production of linen cloth. After the separation of the ligneous fibres of the plant [FLAX], the distaff and common spinning-wheel were employed for the preparation of the thread or yarn, and the hand-loom generally, in its simplest form, was used for weaving the cloth. Within the present century the first attempts were made at Leeds to adapt the inventions of Hargreaves and Arkwright to the spinning of flax—attempts which cannot be said to have been generally successful until the last few years, although the coarser qualities of yarns have from the first attempt been so produced in the mills of Messrs. Marshall at Leeds. Mill-spun yarn is now universally employed by the linen-weavers of this kingdom for the production of the very finest lawn, as well as of the coarsest linen; and still more recently the use of the power-loom has been adopted for weaving all but the very finest and most costly fabrics. The consequences of these improvements have been to render this country independent of all others for the supply of linen yarn of every quality, and to diminish in a most important degree the cost of linen fabrics; so that British yarns and cloths are now profitably exported to countries with which the manufacturers of Great Britain and Ireland were formerly unable to compete, and against which they were 'protected' in the home market by high duties on importation.

The growth of the linen manufacture in Ireland is ascribed to the legislative obstruction raised in the reign of William III. to the prosecution in that part of the kingdom of the woollen manufacture, which it was alleged interfered prejudicially with the clothiers of England, the linen weavers being at the same time encouraged by premiums of various kinds distributed by public boards authorised by parliament, and by bounties paid on the exportation of linen to foreign countries.

We have no certain means for ascertaining the growth of the linen manufacture in Ireland. The only facts by which we can approximate to its amount are afforded by custom-house records, which do not reach back to an early date, and are wanting for the years subsequent to 1825, when the intercourse between Great Britain and Ireland was put upon the footing of a coasting trade; and in order to save the salaries of two or three junior clerks, no further record was attempted to be made of its amount or direction. The average quantity of linen exported annually from Ireland, principally to England, in the three years to March, 1790, was 34,191,754 yards. In the three years ending March, 1800, the yearly average was 36,112,369 yards, and the average annual exports in the last three years of each of the next two decennary periods was 40,751,889 yards and 48,265,711 yards respectively. In the six years from 1820 to 1825 the quantity sent from Ireland to Great Britain was—

1820	42,665,928 yards.
1821	46,518,719 „
1822	48,226,710 „
1823	48,066,591 „
1824	46,466,950 „
1825	52,560,926 „

An attempt was lately made by the commissioners appointed to consider and report concerning railway communications in Ireland to ascertain the extent of these exports, and they have stated, as the result of their inquiries, that in 1835 there were shipped from Ireland 70,209,572 yards of linen, the value of which was 3,730,854*l.*

The linen manufacture was introduced into Scotland early in the last century, and in 1727 a board of trustees was appointed for its superintendence and encouragement. Notwithstanding this and the further stimulus afforded by premiums and bounties, the progress of the manufacture in that part of the kingdom was for a long time comparatively unimportant. At Dundee, the great seat of the Scotch linen trade, it is stated that the whole quantity of flax imported in 1745 was only 74 tons, and the quantity of linen sent away did not exceed 1,000,000 yards. In less than half a century after that time the annual importation of flax was 2500 tons, and there were exported 8,000,000 yards of linen beyond the quantity used at home. At this rate the manufacture continued nearly stationary until after the peace in 1815, when a new impulse was given to it; and in 1837 there were imported into Dundee 30,740 tons of flax, besides 3409 tons of hemp, and there were exported from that place 641,938 pieces of different qualities of linen, sail-cloth, and bagging, besides a quantity, computed to be as great, retained for home use.

The bounties allowed on the shipment of linens were graduated according to their quality and value, and ranged from a halfpenny to a penny halfpenny per yard. In 1825 the rates were diminished one-tenth by an act then passed, and an equal proportion was to have been taken off in each subsequent year; so that the whole would have ceased in 1834: but by the act 9 Geo. IV., c. 76 (July, 1828), when one-half the bounties had been removed, this course was modified by continuing for three years the rates of allowance payable in 1829, and thereafter repealing the bounty altogether; so that the payments ceased on the 5th January, 1832. Judging from the extent of our exports before and since the diminution and repeal of the bounties, it does not appear that the manufacture has thence experienced any disadvantage, while the country has saved from 300,000*l.* to 400,000*l.* per annum, formerly paid to enable foreigners to purchase our linen at prices below the cost of production.

The quality of linen yarn is denoted by numbers describing the number of leas (a measure of 300 yards) contained in each pound weight. Thus a pound of No. 60 yarn measures 60 leas, or 18,000 yards, the present price of which is 2*s.* 9*d.* per lb. The following table exhibits the length and value at present (December, 1838) per lb. of yarn of various qualities:—

	Yards.	per lb. *s.*	*d.*		Yards.	per lb. *s.*	*d.*
No. 5	1,500		4	No. 45	13,500	1	11
10	3,000		5½	50	15,000	2	1
16	4,800		8½	60	18,000	2	9
20	6,000		9¾	80	24,000	3	7½
25	7,500	1	1	100	30,000	5	0
30	9,000	1	4¼	150	45,000	8	2
35	10,500	1	6½	200	60,000	13	6
40	12,000	1	8¾				

Linen yarn is seldom spun of greater fineness than No. 200, which is fitted for making cambric of good quality. The production of mill-spun yarn was for a long time confined to Yorkshire, but is now extended to Dorsetshire, Lancashire, Somersetshire, and to Scotland; and recently nineteen mills for the purpose have been erected in and near to Belfast in Ireland. The improvements realized in this branch of the manufacture will be sufficiently indicated by the fact that the *average* fineness of mill-spun yarn made in 1814 was 11·1 leas (3330 yards) per lb., and in 1833 had reached 37·1 leas (11,130 yards) per lb., while the cost had diminished in the proportion of 63¼ per cent. More recent improvements have carried the average degree of fineness to a much higher point, and have still further economized the cost of manufacture. To show the effect which these improvements in the spinning process have had upon finished cloths, it may be mentioned that the price of No. 37 canvas, the quality and dimensions of which are always the same, which in 1814 was 30*s.* per piece, had fallen in 1833 to 18*s.*

The number of flax factories at work in different parts of the kingdom, according to returns made by the inspectors of factories in 1835 was 347, of which 152 were in England, 170 in Scotland, and 25 in Ireland. The number and ages of the persons employed in these mills were—

	Between 8 and 12 Years.		Between 12 and 18 Years.		Above 18 Years.		Total.	
	Males.	Fem.	Males.	Fem.	Males.	Fem.	Males.	Females.
England .	487	434	2,977	5,365	2,551	4,379	6,015	10,178
Scotland .	104	175	1,788	3,982	1,550	5,860	3,392	10,017
Ireland . .	1	15	524	1,507	463	1,171	988	2,693
Total .	592	624	5,289	10,854	4,564	11,410	10,395	22,888
							33,283	

The quantity and value of linen and linen-yarn exported from this kingdom in each of the ten years from 1828 to 1837 have been as under:—

	Linen, yards.	Yarn, lbs.	Declared Value. £.	Exported to the United States of America. Yards.
1828	60,287,814	..	2,120,276	17,832,424
1829	57,698,872	..	1,953,607	18,367,599
1830	61,919,963	..	2,017,776	20,634,766
1831	69,233,892	..	2,400,043	26,501,689
1832	49,531,057	110,188	1,724,789	8,654,423
1833	63,482,509	935,682	2,169,979	21,887,307
1834	67,834,305	1,533,425	2,494,803	25,810,656
1835	77,977,089	2,611,215	3,109,774	37,978,974
1836	82,088,760	4,574,504	3,556,898	39,987,689
1837	58,426,333	8,373,100	2,542,722	13,495,453

It will be seen from the last column in the foregoing table that the fluctuations experienced in the amount of our exports have been occasioned by interruptions that have arisen in the prosecution of our trade with the United States of America. Next in importance to the quantity taken by those States are the exports made to our own American and West India colonies, the foreign West Indies, and Brazil. Our shipments of linen and linen-yarn to different European countries are still of comparatively little moment, if we except the exports made within the last few years to France, and which are almost wholly the consequence of improvements in our spinning and weaving processes. The total value of these exports in 1828 amounted to no more than 7,228*l.*, the value of 64,212 yards of linen; whereas in 1837 that country took from us 3,368,388 yards of linen, and 7,010,988 lbs. of yarn, valued together at 543,819*l.*

LINES, in Music, are the five parallel lines forming, together with the intermediate spaces, the staff on which the notes and other characters are placed. [STAFF; LEGER.]

LINES OF INTRENCHMENT. In the article ENCAMPMENT it has been stated that armies in the field are not now, as formerly, surrounded by fortifications consisting of a continuous line of works; and that, in general, a few breastworks or redoubts merely are constructed at intervals for the defence of the position. It will be sufficient therefore, leaving out the consideration of those means of defence which are afforded by the natural obstacles of the country, as escarpments, rivers, marshes, &c., to describe briefly the nature of those intrenchments which were once, in all circumstances, considered indispensable, and which are still, to a certain extent, necessary when an army is to remain strictly on the defensive.

In the first place it may be said that a continuous breastwork would be advantageous for the protection of a frontier, when the absence of natural obstacles might favour the enemy's marauding parties in making inroads for the purpose of levying contributions or laying waste the country; and here a parapet A B, broken by the redans C, C, from whence the defenders might annoy the enemy in flank, on his approach, would suffice. The distances of the redans from one another may be about 150 yards, or not exceeding the range of musket-shot: and such was the construction recommended by Vauban, which, since his time, has been modified by giving to the curtains the form indicated by the lines *a c*, *b c*, in order that the ditch might be more effectually defended from the faces of the redans. These faces should be so disposed that, if produced to an extent equal to the range of artillery, the lines of direction might fall on ground where the enemy could not establish batteries for the purpose of enfilading them; since, in the event of such enfilading taking place, the defenders would be compelled to abandon the parapets; artillery, if placed there, would be dismounted; the palisades in the ditch would be destroyed; and thus little resistance could be made, should the enemy subsequently assault the line. In general the redans may have the form of equilateral triangles, and the lengths of their sides may be about 50 yards. The entrances are usually in the middle of the curtains.

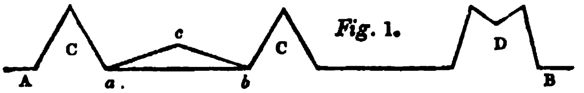
Fig. 1.

Instead of simple redans the advanced parts of the line have occasionally been formed of works resembling two united together, as D; which by the French engineers are called *queues d'hyrondes*.

Again, when the nature of the ground does not permit the intrenchment to be formed with points so far advanced as the vertices of the redans C, C; when, for example, it is required to follow a bank of a river or one side of a road, it is proposed, in preference to a simple straight or curved line, to form the parapet with a series of branches in the positions indicated by *a b*, *c d*, &c., to P. A line of this kind is said to be à *crémaillières;* and in such situations a succession of fires from the branches *a b*, *c d*, &c., may be directed against the enemy during his advance; on a level plain however the longer branches would be subject to the serious defect of being easily enfiladed. The distances between the salient points *b*, *d*, &c., should not exceed 100 yards, and the lengths of the short branches may be about 18 or 20 yards. The re-entering angles *c*, *e*, &c., should contain about 100 degrees; and the entrances are usually placed at those points.

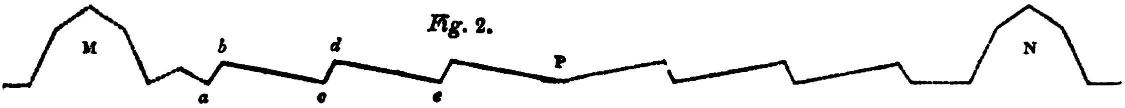
Fig. 2.

A like construction may be adopted when it is required to connect two points, as M and N, by a line along a narrow and elevated ridge of ground; and in this case the directions of the branches *b c*, *d e*, &c., may change in the middle of the line, as shown in the figure, in order that the fire from the short branches may be directed to the front of the nearest works, as M and N, in which it is to be supposed that artillery would be placed for the purpose of defending the ground before the intermediate line.

It may be added also, that the line à *crémaillères* (indented line) would be convenient when the slope of a hill is in its direction, as from M to P; for then, the enemy being supposed to occupy the ground in front of M, the short branches could be easily raised high enough to defilade those which, as *b c*, *d e*, &c., tend towards the foot of the hill.

The most perfect fortification for defending a line of country presenting few natural obstacles to the advance of an enemy, should the importance of the position render it advisable to incur the labour of the construction, would be a series of bastions connected by curtains, either straight or broken. The principles on which the several *fronts of fortification* should be formed correspond to those adopted for regular fortresses, which are described in the article FORTIFICATION, col. 2; the only difference being in the lengths of the several parts. These depend upon the whole length of the front, which here should not exceed 180 yards, that the ditches of the bastions may be well defended by common muskets from the collateral flanks. Neither ravelin nor covered-way would of course be necessary.

Lines of intrenchment composed of works placed at intervals from one another, provided the distances be not so great as to prevent the troops in them from mutually assisting each other, have great advantages over those formed of continuous lines of parapet. In the latter case it is scarcely possible for the army to make a movement for the purpose of attacking the enemy however favourable the opportunity, since much time would be lost in issuing from the line through the narrow passages; and these are the objects against which the fires from the enemy's batteries would then be incessantly directed. Detached works, on the other hand, constitute a number of strong points by which the position of the army is secured; while through the spacious intervals an advance or retreat may take place with all necessary facility. Their artillery is conveniently situated for putting the enemy's line in disorder previously to the attack, and for protecting the retiring columns in the event of their quitting the field. It may be added that detached works are capable of being easily adapted to any kind of ground; for it is merely necessary to place them on the more elevated spots in such situations that the enemy may not be able to penetrate between them without being exposed to their fire.

On level ground the intrenchment may consist of a number of redans, as A, B, C, with or without flanks, disposed on a right line or curve, and at distances from one another equal to about 300 yards, that the fire of musketry from them may defend the intervals. In the rear, and opposite the intervals between the works in the first time, a second line of works, as D, E, should be formed; and the faces of these should be disposed so as to flank the approaches to the others. The gorges of the exterior works should be open, as in the figure, or only protected by a line of palisades, which, in the event of the enemy gaining possession of those works, might be destroyed by the artillery in the second line.

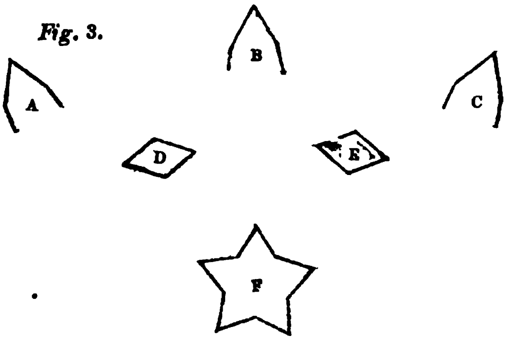
Fig. 3.

Instead of a series of redoubts forming an interior line, it may suffice, should the works A, B, C, &c. be disposed on a convex arc, to have one large central redoubt as F, so situated as by its artillery to defend both the intervals between the redans and the ground within their line.

All the works which have been described consist of parapets formed of earth obtained by cutting a ditch in front; and the profile of any one work with its ditch is shown in the subjoined figure (4).

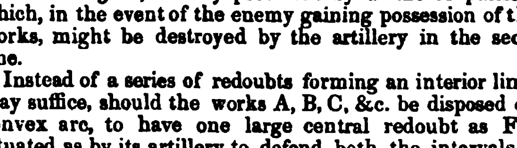
Fig. 4.

The elevation of the crest A above the natural ground is about 7½ feet, unless the vicinity of a commanding height in front should render a greater relief necessary, and the depth of the ditch may be the same. The thickness A *a* of the upper part of the parapet is variable, and depends upon the importance of the work, or rather, upon the arm which may be employed in the attack: if it were required only to resist a fire of musketry, 3 feet would suffice; but from 8 feet to 12 feet would be necessary in the event of artillery being brought against it. (Twelve-pounder shot is the heaviest which the French have ever yet employed in the field.) The form of the parapet is the same as in permanent fortification; when time permits, the exterior and interior slopes should be revêted with sods, and a line of palisades should be planted along the foot of the counterscarp.

LINGUELLA. [INFEROBRANCHIATA, vol. xii.]

LI'NGULA. [BRACHIOPODA, vol. v., p. 313.] Dr. Fitton, in his Stratigraphical Table of Fossils in the strata below the chalk, records three species (one indistinct) from the lower green-sand: two from Kent, and the indistinct one from the Isle of Wight (1836). Mr. Murchison describes and figures several fossil species: one from the old red sandstone, one from the upper Ludlow rock, one from the Aymestry limestone, one from the lower Ludlow rock, one (doubtful) from the same rock, one from the Wenlock shale, and one from the Llandeilo flags. (*Silurian System*, 1839.)

LINGULI'NA. [FORAMINIFERA, vol. x., p. 347.]

LI'NKIA. Nardo has proposed this name for a group of Stellerida included in Asterias by Lamarck. (Agassiz, on Echinodermata, 'Ann. of Nat. Hist.,' vol. i.)

LINKOPING. [SWEDEN.]

LINLEY, THOMAS, a composer who ranks high in what the English have a clear right to call their school of music, though slow in defending it, was born at Wells, about the year 1725. He was first the pupil of Chilcot, organist of the abbey, Bath, and finished his studies under Paradies, an eminent Venetian, who had become a resident in this country. Mr. Linley established himself in the latter city, where he was much sought after as a master, and carried on the concerts in that place, then the resort of all the fashionable world during a part of every year. To the attraction of these, his two daughters, Eliza and Mary, afterwards Mrs. Sheridan and Mrs. Tickell, by their admirable singing, particularly that of the former, which we are told has never been surpassed, contributed very largely.

On the retirement of Christopher Smith, who had been Handel's amanuensis, and succeeded him in the management of the London oratorios, Mr. Linley, by the advice of his son-in-law Mr. Sheridan, united with Mr. Stanley, the blind composer, in continuing those performances; and on the death of the latter, Dr. Arnold joined Linley in the same, an undertaking by no means unprofitable in its results. In 1775 he set the music to Sheridan's opera *The Duenna*, which had a run unparalleled in dramatic annals; it was performed seventy-five times during that season. This led to his entering into a treaty to purchase Mr. Garrick's moiety of Drury-lane theatre; and in 1776 he, conjointly with Mr. Sheridan, bought two-sevenths of it, for which they paid 20,000*l.*, Dr. Ford taking the other three-fourteenths, and the chief management was entrusted to Sheridan, while to Linley was assigned the direction of the musical department. He now devoted his time to the theatre, and, among other pieces, produced his *Carnival of Venice; Selima and Azor*, from the French; and *The Camp*, Sheridan's second production. He also added those charming accompaniments to the airs in *The Beggars' Opera*, which are still in use, and it is to be hoped will long remain unaltered. His Six Elegies, written in the early part of his life, contributed in no small degree to his immediate fame and future fortune; they were sung by all who could sing, and will never cease to be admired by those who, uninfluenced by fashion, have taste enough to appreciate what is at once original, simple, and beautiful. His Twelve Ballads are lovely melodies, but being in the style of 'the days that are gone,' have fallen into the neglected state of many other excellent English compositions; to be however as surely revived as were the works of Purcell, after they had slumbered long years in damp closets or on dusty shelves. His madrigal 'Let me careless and unthoughtful lying' (one of Cowley's Fragments), a work which certainly has no superior, if a single equal, of the sort, is still heard at the Antient Concerts, the Catch and Glee Clubs, and wherever really fine vocal harmony—music of the enduring kind—is cultivated or promoted.

Mr. Sheridan's political and social engagements having occupied a large portion of the time which, in prudence, ought to have been devoted to the theatre, the management of its details fell much on Mr. Linley; and herein he derived great assistance from his wife, a lady of strong mind and active habits, by whose care the pecuniary affairs of that vast concern were well regulated, so long as she had any control over them.

Mr. Linley survived his two accomplished daughters and several of his other children. But some years previous to their decease he suffered a shock by the loss of his eldest son Thomas, who was drowned by the upsetting of a boat while on a visit to the duke of Ancaster, in Lincolnshire, from which and his subsequent bereavements his mind never entirely recovered. This young man, who had just reached his twenty-second year, possessed genius of a superior order. His musical education was as perfect as his father's and Dr. Boyce's instructions and those of the best masters of Italy and Germany could render it, and he had given decided proofs of its efficiency when the fatal accident occurred. None out of his own family more lamented the event than his friend the celebrated Mozart, with whom he had lived on the Continent in the closest intimacy, and who always continued to mention him in terms of affection and admiration. Mr. Linley died in 1795, leaving a widow, a daughter, and two sons, of whom

LINLEY, WILLIAM, born about the year 1767, and educated at Harrow and St. Paul's schools, was the younger. Mr. Fox appointed him to a writership at Madras, and he soon rose to the responsible situations of paymaster at Vellore and sub-treasurer at Fort St. George. He returned from India early, with an easy independence, and devoted the remainder of his life partly to literary pursuits, but chiefly to music, of which he was passionately fond, a talent for the art coming to him as it were by inheritance. He produced a considerable number of glees, all of them evincing great originality of thought and refined taste, some of which will make him known to posterity, along with others who have most distinguished themselves in this charming and truly national kind of music. Mr. W. Linley also published, at various periods, a set of Songs, two sets of Canzonets, together with many detached pieces. He was likewise the compiler of the 'Dramatic Songs of Shakspeare,' in two folio volumes, a work of much research and great judgment, in which are several of his own elegant and sensible compositions. Early in life he wrote two comic operas, which were performed at Drury-lane theatre; also two novels, and several short pieces of poetry. He likewise produced an elegy on the death of his sister Mrs. Sheridan, part of which is printed in Moore's 'Life of Richard Brinsley Sheridan.' This last survivor of the Linley family died in 1835.

LINLITHGOW, or WEST LOTHIAN, is a small county of Scotland, bounded on the north by the Frith of Forth, on the west, south-west, and north-west by the shires of Stirling and Lanark, and on the south and south-east by Edinburghshire, from which it is separated by the rivers Breich and Amond. Its greatest length, from the mouth of the Amond to the borders of Stirling and Lanarkshire, is nearly 21 miles; and its greatest breadth, from the north-west extremity of the county to the village of Livingston, on the south-east, somewhat exceeds 10 miles: it is comprised between 55° 51′ and 56° 1′ N. lat., and 3° 17′ and 3° 50′ W. long.

In 1794 Mr. Trotter estimated the area of the county and the distribution of the soil as under:—

	Scotch Acres.
Good clay lands . . .	14,000
Loam . . .	7,000
Light gravel and sand . .	7,000
Clay, cold, wet and hard bottom .	18,000
High rocky land . . .	10,000
Moss . . .	1,008
	57,008

or about 71,260 English statute acres, which is probably rather less than the true area. Mr. M'Culloch estimates it at 76,800 statute acres, or 112 square miles.

The surface is pleasantly diversified by hills and valleys, and intersected by numerous rivulets or burns, but there are no streams which merit the appellation of rivers, excepting the Avon and Amond, and even these are small, and belong as much to the shires of Stirling and Edinburgh as to that of Linlithgow. No fish, beyond a few fresh-water trout, are found in them; but the two lochs in the vicinity of the town of Linlithgow are well stocked with pike. The Union

Canal, which connects the city of Edinburgh with the Forth and Clyde Canal, crosses the county, passing a little to the south of the town of Linlithgow. The high-roads are kept in good repair by means of tolls; the cross-roads are less complete.

Coal is abundant and extensively worked, more particularly at Borrowstounness, where the mines extend nearly a mile beneath the bed of the Frith, so as almost to meet those of Culross on the opposite bank, which extend in a southerly direction to the distance of two miles. There is also an abundance of limestone and freestone, besides several quarries of excellent granite, and among the Bathgate Hills lead-mines were formerly wrought with great advantage, but they are now supposed to be exhausted.

The system of agriculture is nearly the same as that of the adjoining county of Edinburgh, with the exception that more attention is paid to the cultivation of turnips. The rotation of crops most frequently adopted upon clay soils is: 1st year, summer fallow; 2nd, wheat; 3rd, beans and pease; 4th, barley; 5th, clover and rye-grass for hay; 6th, oats; 7th, summer fallow, &c. The dung of the farm-yard constitutes the chief manure; but lime, which is very plentiful in several parts of the county, is also much used. Due attention is paid to the thorough draining of the soil, and most of the arable lands are enclosed with substantial fences, and the greater part of the waste lands are planted with several kinds of timber. The climate, though cold, is considerably tempered by the winds which prevail from the south-west, and the county suffers much less from the severity of the weather than from sudden changes. The hay harvest usually commences about the second week in July, and in ordinary years the corn is all in by the end of October. The farms are of a medium size, and the leases are mostly granted for terms of 19 or 21 years, though in some instances they extend to 24, 38, and even 57 years. Formerly it was the custom not to renew a lease till within a few months of the time of giving up possession, which in many instances induced the tenant to take every advantage of the farm for the sake of immediate profit; and we are not sure that this practice, so obviously prejudicial to the interest of the proprietor, has yet been altogether discontinued. The average rent of land in 1810 was 21*s.* 7*d.* the imperial acre, and in 1815 the annual value of the real property of the county, which is less divided than in other parts of Scotland, was 97,597*l.* The cotton manufactures employ from 700 to 800 hands.

The county is divided into thirteen parishes, the united population of which, in 1831, was 23,291, namely, 10,995 males and 12,296 females, which were distributed among 5014 families, of whom 1093 were engaged in agriculture, and 1891 in trade, manufactures, and handicraft. The county returns one member to parliament.

The following table, exhibiting the state of the several parochial schools in the year 1825, is compiled from parliamentary papers relative to the parochial education of Scotland. It does not include the private schools, which are numerous and tolerably well supported: —

Parish.	Salary and Emolument of Schoolmaster in the Year 1825.	School Fees per Quarter in the Year 1825, and the Branches of Education then taught.	Average Number of Scholars.
Abercorn . .	£56 10 2	English, writing, arithmetic, Latin, and Greek, 8*s.* . .	70
Bathgate . . .	102 0 0	Greek, Latin, French, geography, English grammar, and mathematics. Fees unknown	460
Borrowstounness	82 0 0	Ditto, ditto. Fees 13*s.* . .	80
Carriden . . .	11 4 11	English, writing, and arithmetic, 5*s.*	28
Dalmeny . . .	60 14 10	Ditto, ditto, and Latin, 5*s.* 6*d.* .	70
Ecclesmachan .	£16—£20	Reading, writing, and arithmetic, 3*s.*	40—50
Kirkliston . .	400 merks Scotch, with £50—£60	English, writing, arithmetic, and Latin, 5*s.* 6*d.* . .	60—70
Linlithgow . .	Unknown.	English, writing, arithmetic, French, and Latin, 9*s.* . .	90—100
Livingston . .	£42 4 5	English grammar, writing, and arithmetic, 5*s.* . . .	50
Queensferry . .	76 14 10	English, French, Latin, Greek, and mathematics, 14*s.* . .	129
Torphichen . .	38 0 0	English, writing, and arithmetic, 3*s.*	76
Uphall . . .	400 merks Scotch, and £25	Ditto, ditto	70
Whitburn . .	£38—£40	English and writing, 2*s.* . .	50

The principal towns are Linlithgow, Bathgate, and Borrowstounness. [BATHGATE.]

LINLITHGOW, the county town, and a royal burgh of considerable antiquity, is sixteen miles west by north from Edinburgh. The earliest charter upon record is that of Robert II., dated 23rd October, 1389. To this succeeded the charters of James II. (1451-4), James III. (1465), James V. (1540), James VI. (1580, 1591, and 1593), and Charles I. (11 July, 1633), whereby various privileges were conferred upon the town. The magistracy is composed of a provost, 4 baillies, dean of guild and treasurer, who are elected from the 27 common-councillors, in conformity with 3 and 4 Will. IV., c. 76. The debt of the burgh is considerable, though less than in former years. In 1692 the magistrates reported that they owed 18,235*l.* Scots, or about 1520*l.* sterling; but in 1835 it had increased to 8141*l.* sterling. The revenue, derived principally from landed property and town-dues, amounted in the last-mentioned year to 710*l.*, which was exceeded by the expenditure.

The town is paved, well lighted with gas, and tolerably clean. It is likewise well supplied with water, but not protected by an efficient police. The population in 1831 was 4874.

The burgh school is said to be ably conducted. The two teachers are appointed by the town-council, after undergoing an examination by the professor of Latin or the rector of the high school of Edinburgh. Linlithgow unites with Lanark, Peebles, and Selkirk, in returning one member to parliament. The chief antiquity in this place is the palace of Linlithgow, which, after being a royal residence for several centuries, was accidentally set on fire in the year 1746, and is now a magnificent ruin. In the palace chapel is still shown the aisle where an apparition is said to have warned James IV. of the impending issue of the battle of Flodden.

Borrowstounness is an incorporated seaport-town, 17 miles west by north from Edinburgh. Here are extensive salt-works, the produce of which is supposed to exceed 30,000 bushels annually. There is also a little ship-building carried on, and some trade with the Baltic in tallow, hemp, &c.; but during the season a considerable portion of the inhabitants are engaged in the herring-fishery. The harbour is considered safe and commodious, and, with a view to effect its improvement, an act was passed in 1744 (17 Geo. II.), whereby an impost of 2*d.* Scots is levied on every Scotch pint of ale or beer brought into the town. The depth of water in spring-tides is about 18 feet. The revenue, consisting principally of harbour-dues, amounted in 1836 to 216*l.*, which was insufficient to defray the ordinary disbursements for keeping the harbour and town in repair, and paying the interest of a debt which had then accumulated to 2030*l.* The population in 1831 was 2809.

(Trotter's *General View of the Agriculture of West Lothian*, 4to., 1794; M'Culloch's *Statistical Account of the British Empire; Local Reports from Commissioners on Scotch Corporations*, 1835-36; *Beauties of Scotland*; Sinclair's *Statistical Account of Scotland.*)

LINNÆUS, or VON LINNE', CARL, was born at Råshult, in the province of Smaland, in Sweden, May 13, 1707 (O.S.). His father, Nicholas Linnæus, was the assistant clergyman of a small village called Stendrohult, of which Råshult was a hamlet, and is related to have resided in a 'delightful spot, on the banks of a fine lake, surrounded by hills and valleys, woods and cultivated ground,' where it is believed that the son imbibed in his earliest youth a fondness for the objects of animated nature. His maternal uncle too, who educated him, is said to have been conversant in plants and horticulture; and thus, according to the declaration of Linnæus himself, he was at once transferred from his cradle to a garden. The father seems to have himself had some acquaintance with botany, and to have instructed his boy at a very early age in the names of the natural objects which surrounded them. Linnæus however is said to have had little taste for remembering names, and his father found it no easy matter to overcome this inaptitude; he however at last succeeded, and the consequence was sufficiently conspicuous in the decided turn for nomenclature which the mind of the pupil eventually took. Whether in the next stages of learning Linnæus was ill-managed, as he himself thought, or whether the nature of his education at home had rendered him indisposed for drier and severer studies, it is certain that his preceptors found great cause to complain of him, and pronounced him, at the age of nineteen, if not a positive blockhead, at all events unfit for the church, for which he was intended: they in fact recommended him to be apprenticed to some handicraft trade. The schoolmaster at Wexio, who pronounced this unfortunate judgment, although designated by one of Linnæus's biographers as an 'iniquus doctor,' does not appear to have been so blameable for his opinion, however erroneous it afterwards proved; for Bishop Agardh admits that when, at the age of twenty, Linnæus arrived at the university of Lund, for the purpose of studying medicine, the profession finally determined upon for him, he was less known for his acquaintance with natural history than for his ignorance of everything else.

Matriculated at Lund, Linnæus was so fortunate as to be received into the house of Dr. Stobæus, a physician possessing a fine library and a considerable knowledge of natural history. This amiable man was not slow to discover the signs of future greatness in his lodger; he gave him unrestrained access to his books, his collections, his table, and above all to his society, and would at last have adopted him for his son and heir. It was at this time that Linnæus first began to acquire a knowledge of what had been already written upon natural history, to gain an insight into the value of collections, to extend his ideas by the study of the comparatively rich Flora of his alma mater, and above all things to enjoy the inestimable advantage of having an experienced friend upon whose judgment he could rely. The year 1727-8, and the house of Stobæus, were beyond all doubt the time and place when Linnæus first formed that fixed determination of devoting himself to the study of natural history, which neither poverty nor misery was afterwards able to shake. In the year 1728 he passed the vacation at home, and there formed the resolution of prosecuting his future studies at Upsal—a measure which for the time lost him the good-will of his patron Stobæus. For the purpose of meeting the expenses of his academical education, his father was unable to allow him a larger annual sum than 8*l.* sterling; and with this miserable stipend he had the courage to plunge into the world. Nothing less than the most biting poverty could be the immediate result of such a measure; and we accordingly find Linnæus, for some time after this, in a state of miserable destitution, mending his shoes with folds of paper, trusting to chance for a meal, and in vain endeavouring to increase his income by procuring private pupils. No succour could be obtained from home, and it is difficult to conceive how he should have struggled with his penury without the slender aid afforded by a royal scholarship, awarded him on the 16th of Dec. 1728. Nevertheless he diligently persevered in attendance upon the courses of lectures connected with his future profession—the more diligently perhaps because of his poverty; and by the end of 1729 the clouds of adversity began to disperse. By this time he had become known to Dr. Olaus Celsius, the professor of divinity at Upsal, who was glad to avail himself of the assistance of Linnæus in preparing a work illustrating the plants mentioned in the Holy Scriptures. His new friend procured him private pupils, and introduced him to the acquaintance of Rudbeck, the professor of botany, then growing old, who appointed him his deputy lecturer, took him into his house as tutor to his younger children, and gave him free access to a very fine library and collection of drawings.

Here the published writings of Linnæus were commenced; it was in the midst of the library of Rudbeck that he began to sketch those works, which were afterwards published under the titles of 'Bibliotheca Botanica,' 'Classes Plantarum,' 'Critica Botanica,' and 'Genera Plantarum;' and to perceive the importance of reducing into brevity and order the unmethodical, barbarous, confused, and prolix writings with which he was surrounded. If, in the prosecution of a task of such imminent necessity, he fell into the opposite errors of attempting to make the language of natural history more precise than is possible from the nature of things, of reducing the technical characters of species and genera to a brevity which often proved a nullity, and of reforming the terminology till it became pedantic, there is no candid person who will not be ready to acknowledge that such errors were of no importance whatever when compared with the great good which the writings of Linnæus upon the whole effected. In the year 1731 Linnæus quitted the house of Rudbeck, and on the 12th of May, 1732, proceeded, under royal authority and at the expense of the university of Upsal, upon his celebrated journey into Lapland. On horseback and on foot he accomplished his object by the 10th of October following, when he returned to Upsal, after travelling, alone and slenderly provided, over nearly 4000 miles. The result of this expedition has been given in his excellent 'Flora Lapponica,' and in the Swedish account of his tour, of which an English translation was published some years since. For some time after his return we find him occupied in teaching mineralogy, particularly the art of assaying, persecuted by the miserable jealousy of a certain Dr. Rosen, on whom he is said to have drawn his sword, and travelling in Dalecarlia at the expense of the governor. In the beginning of 1735 he had scraped together 15*l.*, with which he set out upon his travels in search of some university where he could obtain the degree of doctor in medicine the cheapest, in order that he might be able to practise physic for a livelihood. At Harderwijk, in Holland, he accomplished his purpose, June 23, 1735, on which occasion he defended the hypothesis that 'intermittent fevers are owing to fine particles of clay taken in with the food, and lodged in the terminations of the arterial system.'

In Holland Linnæus formed a friendship with Dr. John Burmann, professor of botany at Amsterdam, and it was during his stay of some months with that botanist that he printed his 'Fundamenta Botanica,' a small octavo of thirty-six pages, which is one of the most philosophical of his writings. At that time he was introduced to Mr. George Cliffort, a wealthy Dutch banker, possessing a fine garden and library at a place called Hartecamp. This gentleman embraced the opportunity of putting it under the charge of Linnæus, who continued to hold the appointment till the end of 1737, during which time he is said to have been treated with princely munificence by his new patron. His scientific occupations consisted in putting in order the objects of natural history contained in Mr. Cliffort's museum, in examining and arranging the plants in his garden and herbarium, in passing through the press the 'Flora Lapponica,' 'Genera Plantarum,' 'Critica Botanica,' and some other works, and in the publication of the 'Hortus Cliffortianus,' a fine book in folio, full of the learning of the day, ornamented with plates, and executed at the cost of Mr. Cliffort, who gave it away to his friends. Some idea may be formed of the energy and industry of Linnæus, and of his very intimate acquaintance with botany at this period of his life, by the fact that the book just mentioned, consisting to a great extent of synonyms, all the references to which had to be verified, was prepared at the rate of four sheets a week, a prodigious effort considering the nature of the work, which Linnæus might well call 'res ponderosa.' He however seems to have possessed powers of application quite beyond those of ordinary men; and to have worked day and night at his favourite pursuits. In May, 1737, he speaks of his occupations as consisting of keeping two works going at Amsterdam, one of which was the 'Hortus Cliffortianus,' already mentioned; another at Leyden, a fourth in preparation; the daily engagement of arranging the garden, describing plants, and superintending the artists employed in making drawings, which alone he calls 'labor immensus et inexhaustus.' (Van Hall, p. 12.) Linnæus however seems to have been weary of the life he led at Hartecamp, and towards the end of 1737 he quitted Mr. Cliffort under the plea of ill health, and an unwillingness to expose himself again to the autumnal air of Holland. These however seem to have been only excuses, for he did not really quit the country before the spring of 1738, and in fact he was evidently tired of his drudgery; good Mr. Cliffort would scarcely allow him to leave the house, where Linnæus complains of being 'incarceratus monachi instar cum duabus nunnis.' It was during his engagement at Hartecamp that he visited England, where he seems to have been disappointed both at his reception and the collections of natural history which he found here. He was ill received by Dillenius, at that time professor of botany at Oxford, who was offended at the liberties Linnæus had taken with some of his genera; and although the quarrel was made up before his return to Holland, it seems to have discomposed the Swedish naturalist not a little. He describes the celebrated collection of plants formed by Sherard at Eltham as being unrivalled in European species, but of little moment in exotics; he found the Oxford garden in a like condition, but with the greenhouses and stoves empty; and the great collection of Sir Hans Sloane in a state of deplorable confusion and neglect. Dr. Shaw, the traveller in the Levant, seems to have pleased him most, and he, together with Philip Miller, the celebrated gardener to the Society of Apothecaries, Mr. Peter Collinson, and Professor Martyn the elder, were apparently the only acquaintances Linnæus succeeded in forming. By this means he acquired a considerable addition to his collections of plants and books. While in Holland he also induced Professor Burmann, in conjunction with five printers, to undertake the publication of Rumphius's important 'Herbarium Amboinense,' at an estimated cost of 30,000 florins.

Upon his return to Sweden he commenced practice in Stockholm as a physician, and with the aid of a pension of 200 ducats from the government, on condition of lecturing publicly in botany and mineralogy, his prospects for the future became so satisfactory as to enable him to marry at Midsummer, 1739. By this time his botanical fame had spread over all Europe; the importance of the critical improvements he had introduced into this and other departments of natural history had become generally acknowledged, and his new method of arranging plants by the differences in their stamens and pistils had been adopted in many countries, but not in Sweden. Impatient at receiving less honour in his own country than elsewhere, he wrote a book called 'Hortus Agerumensis,' arranged according to his system, which hepassed off upon Rudbeck, at that time professor of botany at Upsal, as the production of his friend Rothmann, who however had no further hand in it than that of writing the preface, which was an eulogium of Linnæus and his new system of botany. The book was eventually published under the name of Ferber, and accomplished the object of the contrivers, for afterwards no other botanical arrangement was received in Sweden.

From this time forwards the life of Linnæus was one of increasing fame and prosperity. Every branch of natural history was revised or remodelled by him; books and collections were sent to him from all parts of the world; his pupils Hasselquist, Osbeck, Sparmann, Thunberg, Kalm, Lofling, and others, communicated to him the result of their travels in Europe, Asia, Africa, and America. He was named professor of medicine at Upsal in 1740, and afterwards of botany; in 1746 he received the rank and title of archiater; in 1757 he was raised to the nobility, and took the title of Von Linné, and by the year 1758 he was able to purchase the estates of Hammarley and Söfja for 80,000 Swedish dollars, above 2330*l*. sterling.

During these eighteen years his life was one of incessant labour; besides his practice as a physician, which was extensive and lucrative, and his duties as professor, he published a most extraordinary number of works on various branches of natural history. His works upon other branches of natural history were less important than those on botany, but they all evinced the same ingenuity in classification, and that logical precision which has rendered the writings of Linnæus so generally admired. In addition to a large number of dissertations, bearing the names of his pupils, and now collected under the title of 'Amœnitates Academicæ,' the 'Flora,' and 'Fauna Suecica,' 'Materia Medica,' edition after edition of the 'Systema Naturæ,' and numerous miscellaneous works, some of great importance, he produced his 'Philosophia Botanica,' and 'Species Plantarum.' The former, dictated from a sick bed, was the best introduction to botany that had been written, and is far superior to the numerous dilutions of it which subsequently appeared from the pens of his followers. The latter contributed more than any work which had before been seen to place the existing knowledge of plants in a clear and intelligible form; the invention of generic and specific names, by which every known plant could be spoken of in two words, was in itself a great step towards securing order and perspicuity in future botanical writings, and the methodical and concise arrangement of references rendered it invaluable, notwithstanding its omissions, as a catalogue of the plants at that time known. Viewed with reference to the existing state of knowledge, this book deserves all the praise which has been given it; and botanists have, as if by common consent, taken the second edition, which appeared in 1762, as the point of departure for systematic nomenclature. So great is the importance still attached to it, that an edition, chiefly consisting of it and the 'Genera Plantarum,' incorporated in the state in which they were left by Linnæus, has nearly passed through the press under the name of 'Codex Botanicus Linnæanus,' collated by Dr. Hermann Eberhard Richter. Towards the latter part of his life Linnæus suffered severely in health. Apoplexy succeeded repeated attacks of gout and gravel, and was followed in its turn by paralysis, which impaired his faculties, and at last he was carried off by an ulceration of the bladder, on the 10th of January, 1778, in the 71st year of his age. 'His remains were deposited in a vault near the west end of the cathedral at Upsal, where a monument of Swedish porphyry was erected by his pupils. His obsequies were performed in the most respectful manner by the whole university, the pall being supported by sixteen doctors of physic, all of whom had been his pupils.' A general mourning took place on the occasion at Upsal, and king Gustavus III. not only caused a medal to be struck expressive of the public loss, but introduced the subject into a speech from the throne, regarding the death of Linnæus as a national calamity.

In the article BOTANY we have already adverted to the effect produced by Linnæus upon that branch of science. His merit as a systematist is unquestionable; the clearness of his ideas, his love of science, his skill in abridging, abstracting, and recombining the undigested matter contained in the bulky tomes of his predecessors, and the tact with which he seized the prominent facts relating to all the subjects he investigated, enabled him to produce a complete revolution in botany, and to place it at a height from which it would never have descended had he been able to leave his genius and his knowledge to his followers. We by no means agree with those who look upon Linnæus as a mere namer of plants, for there is ample evidence in his writings that his mind soared far above the anility of verbal triflers· but he regarded exactness in language as a most important means to an end, especially in sciences of observation; and who is there to say that he was wrong? His systems of classification were excellent for the time when they were invented, although now worthless; and it is never to be forgotten that Linnæus regarded them merely as temporary contrivances for reducing into order the confusion he found in all branches of natural history. Perhaps he believed his sexual system of botany a near approach to perfection, and so it was as an artificial mode (and its great author regarded it as nothing more) of arranging the 6000 or 7000 species he was acquainted with; although it cannot be usefully applied to the vast multitudes of plants with which botanists are overwhelmed by the discoveries of modern travellers. He never attached the importance to it which has been insisted upon by his followers, who, unable to distinguish between the good and the evil of his works, have claimed unbounded respect for everything that bears the stamp of Linnæus. Neither are we disposed to admit the fairness of those critics who complain of the absence of physiological knowledge from the writings of Linnæus; it should be remembered that in his time very little was known upon the subject, and that of what did appear in the books of the day a great deal was not likely to attract the attention of a mind which valued exactness and precision above all other things. The most serious charge that Linnæus is open to is that of indecency in his language; some of his descriptions, it is asserted, 'would make the most abandoned person blush.' One of his greatest admires and panegyrists has added, 'None but the most abandoned.' We have no disposition to open up such a question as this, which is certainly not very fit for public discussion: but we are bound to say that there is truth in the allegation, and that the language of Linnæus is sometimes disgusting for its pruriency and coarseness.

The domestic life of Linnæus does not bear examination, for it is well known that he joined his wife, a profligate woman, in a cruel persecution of his eldest son, an amiable young man, who afterwards succeeded to his botanical chair. We may smile at the vanity which so often breaks out in the writings of Linnæus, and at the fidgetty anxiety for fame which induced him to make use of Rothmann as his trumpeter in the trick of the 'Hortus Agerumensis,' but such an act as that we have mentioned forms a stain upon his escutcheon which no talent, however exalted, can wipe out.

After the death of the younger Linnæus his library and herbarium were purchased for the sum of 1000*l*. by the late Sir James Edward (then Dr.) Smith, and are now in the possession of the Linnæan Society of London. The herbarium, contained in three small cases, is in good condition, and forms a most curious botanical antiquity, of great value as the means of ascertaining with certainty the synonyms of the writings of Linnæus. It has been very much used for this purpose by its late possessor, but we warn botanists against supposing that the identifications which have been published are to be depended upon.

(Pulteney's *Life of Linnæus;* Smith, in Rees's *Cyclopædia;* Van Hall's *Epistolæ Linnæi;* Agardh, *Antiquitates Linnæanæ.*)

LINNET, the name of a hard-billed singing bird, which though well known under one or the other of its various appellations to every English bird-catcher, has, in consequence of the changes of its plumage and the names applied to it when it appears under those changes, given rise to much confusion in our systems and catalogues, and considerable error among the learned as well as the unlearned. In endeavouring to place before the reader the state of the question, we shall, we fear, occupy more space than the title would, at first view, seem to warrant.

Mr. Selby, in his 'British Ornithology,' says of the 'common or brown linnet—*Fringilla cannabina*, Linn.': 'This bird has been considered by most of our authors as two distinct species, under the titles of the common or brown Linnet and the greater Redpole. This error has evidently arisen from the altered appearance it bears at particular ages, and during the different seasons of the year.[*] These changes in all probability had not been suspected, as they certainly had not been traced by the earlier naturalists; and, on the authority of their reputation, succeeding writers sanctioned such mistakes, without giving themselves the trouble of further investigation, till Montagu, who united practical research with scientific knowledge, professed (in the 'Ornithological Dictionary') his conviction of their forming one species; and my own observation and experiments tend to confirm his opinion.' Giving all due praise to Montagu and Mr. Selby for their diligence and acuteness in rectifying an error which seems to have been going on from the time of Willughby to the time of the publication of Bewick's 'Supplement,' we must say a word in favour of one of the fathers of Natural History at the revival of letters. A little investigation would have proved that of Bélon, at least, it cannot be said that the changes of plumage had not been suspected nor traced by him. That acute observer, in his *Histoire de la Nature des Oyseaux* (Paris, 1555), says, in his description of *La Linote*, or *Linotte*, 'Les Linotes ont la poictrine, et le dessus de la teste, grande partie de l'année, de couleur entre rouge et orengée: car elles ont lors la couleur si vive, qu'elle resemble à du sang: mais cela est seulement sur la fin du printemps;'—having previously described the more sombre state of plumage.

Willughby, whose 'Ornithology' was edited by Ray, and contains many observations by the latter, devotes a chapter (xi.) to the subject 'Of the Linnet.' The first section of the chapter is headed 'Of the Linnet in general,' and is as follows: 'The characteristic notes of this kind are, 1, a size of body something less than a chaffinch; 2, a testaceous or earthy colour, mixt of cinereous and dusky or brown; 3, a tail a little forked; 4, a peculiar colour of the outmost feathers of the tail, viz. brown, with white borders or edges; 5, a sweet note. Of linnets we have observed four sorts in England: 1. The common; 2. The greater red; 3. The lesser red; 4. The mountain linnet.' Here is probably the principal origin of the subsequent confusion. These four linnets are afterwards described and distinguished at length in the same chapter under the names of '*The common Linnet;* Linaria vulgaris.' '*The greater red-headed Linnet;* Linaria rubra major.' '*The lesser red-headed Linnet;* Linaria rubra minor.' '*The mountain Linnet;* Linaria montana.'

Bechstein, under his description of the common Linnet (*Fringilla cannabina*, Linn, *La Linotte*, Buff., *Der Hänfling*, Bechst.), states that, instructed by long experience and the observations of many years, he hopes to show in his description that the common Linnet (*Fringilla Linota*, Linn.[†]), the greater Redpole (*Fringilla cannabina*, Linn.), and, according to all appearance, the mountain Linnet (*Fringilla montana*, Linn.), are one and the same species. With regard to the identity of the two first-named species, ornithologists are now generally agreed; with regard to the last, the better opinion is against Bechstein, and in favour of the mountain Linnet being a distinct species.

M. Temminck, who observes (*Manuel d'Ornithologie*) that *Fringilla cannabina* and *Fringilla montium* have been often confounded, and that he has endeavoured to distinguish them by a small number of characters placed at the head of the short descriptions and of the synonyms, applies the same mode of distinction to *Fringillæ linaria* and *montium*, which he remarks have also been confounded. The short character given by him to his *Gros-bec Linotte* (*Fringilla cannabina*, Linn.), is, 'Bill short, of the width of the front, blackish; throat whitish, marked in the middle by some brown spots;' and he thus describes the various states of plumage, and the synonyms of the bird under each.

Old Male in the Spring.—Feathers of the front, of the breast, and of the lateral parts of the latter, of a crimson-red, terminated by a narrow border of rosy-red; throat and front of the neck whitish, with longitudinal brown markings; top of the head, nape, and sides of the neck, of a pure ash; back, scapulars, and wing-coverts, chesnut-brown; flanks, reddish-brown; middle of the belly and abdomen, white; some of the quills black, bordered externally with white; tail forked, black; the feathers edged externally with white and bordered internally by a large white space; iris, brown; bill, deep bluish; feet, ruddy-brown, more or less pale. Length, 5 inches.

Male, after the autumnal moult at the age of a full year.—On the top of the head large black spots; the back reddish, with spots of chesnut-brown, bordered with whitish-brown; breast, red ash-brown, or red-brown, with borders of whitish-red; brown spots well marked on the flanks, upper tail-coverts black, bordered internally with white and externally with greyish-red. (On raising the feathers of the front and those of the breast, the traces of the red colours which ornament the bird in the spring may be seen.)

In this state M. Temminck considers it to be *Fringilla Linota*, Gmelin; Latham, *Ind.*, v. 1, p. 457, sp. 81; *La Linotte ordinaire*, Buffon, *Ois.*, v. 4, p. 58, t. 1; Id., *Pl. Enl.* 151, f. 1; Gérard, *Tab. Elém.*, v. 1, p. 188; *Common Linnet*, Lath., *Syn.*, v. 3, p. 302.

The Female, which does not change colour after arriving at the adult state, is smaller than the male; all the upper parts are of an ashy-yellowish, sprinkled with blackish-brown spots; wing-coverts of a tarnished red-brown; lower parts bright reddish, but whitish on the middle of the belly, and sprinkled on the flanks with numerous blackish-brown spots.

Young males till the spring have the top of the head and the back reddish-brown, marked with deep brown lanceolate spots; cheeks and nape ashy; all the lower parts of a slightly reddish-white, marked on the middle of the throat and on the breast with longitudinal spots of a deep brown; large reddish-brown spots on the sides; and large lanceolate blackish spots on the coverts of the tail; feet flesh-colour; base of the bill livid-blue: it is then the bird given by Meyer, *Vög. Deutschl*, and by Frisch., *Vög.*, t. 9, f. A and B.

For the Old Birds, Male and Female, M. Temminck brings together the following synonyms and references:—*Fringilla cannabina*, Gmel., *Syst.* 1, p. 916, sp. 28; Lath., *Ind.*, v. 1, p. 458, sp. 82; Retz., *Faun. Suec.*, p. 247, No. 226; *La Grande Linotte de Vignes*, Buff., *Ois.*, v. 4, p. 58; Id., *Pl. Enl.* 485, f. 1 (the male putting on its plumage) and *Pl. Enl.* 151, f. 2 (the very old male, under the false name of *Petite Linotte de Vignes*); Id., *Pl. Enl.* 151, f. 1 (either a female, or, perhaps, a male in autumn); Gérard, *Tab. Elém*, v. 1, p. 190; *Greater Red-headed Linnet or Redpole*, Lath., *Syn.*, v. 3, p. 304; Id., *Supp.*, p. 176; *Bluthanfling*, Bechst., *Naturg. Deut.*, v. 3, p. 141; Id., *Tasschenb.*, p. 121; Meyer, *Tasschenb.*, v. 1, p. 163; Id., *Vög. Deut.*, v. 1, t., f. 1 and 2; Frisch., *Vög.*, t. 9, f. 1 and 2; Naum., *Vög.*, t. 5, f. 10 (old male), and f. 11 (female); Vlasvink, *Sepp. Nederl. Vög.*, v. 2, t., p. 157; *Montanello Maggiore*, *Stor. degl. Ucc.*, v. 3, pl. 357, f. 1.

In the third part of his 'Manuel' (1835) M. Temminck adds the following references and synonyms:—*Atlas du Manuel*, pl. lithog. (male); Vieill., *Faun. Franç.*, p. 77, pl. 38, *figs.* 2 and 3; Roux, *Ornit. Provenç.*, v. i., p. 148, tab. 91 (old male in the spring), and 92 (male in autumn); *Fichten und Busch Bluthänfling*, Brehm., *Vög. Deut.* p. 276; *La petite Linotte de Vignes*, Buff., *Pl. Enl.* 151, *fig.* 2 (male in moult); Naum., *Neue Ausg.*, tab. 121.

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[*] In the work itself the passage stands as follows; but, as there is an evident transposition of a line, we have given it as above. Original passage: 'This bird has been considered by most of our authors as Linnet and the Greater Redpole. This error has evidently two distinct species, under the titles of the Common or Brown, arisen from the altered appearance it bears at particular ages,' &c.

[†] It should be 'Gmelin.'

Returning to the two first parts of M. Temminck's 'Manuel' (2nd edit., 1820), we find him observing that the varieties of the young described by Meyer under the letter *c* and that under the letter *e* ought to be arranged under *Fringilla montium.*

M. Temminck remarks that this bird moults but once a year—in the autumn; but nevertheless the spring or nuptial plumage is of a beautiful red tint on the head and breast. He ascribes this to friction and the action of the air, which wear away the sombre and ashy borders of the feathers, and cause the red colour, partially hidden in winter under the ashy edges with which these feathers are terminated, to appear in the spring. He adds that one may conceive that age and the more or less distant time of moulting may vary this plumage greatly.

The reader however should not forget the changes of colour that Yarrell and others have shown to take place in the plumage of birds without change of feather, and where friction could hardly have been the agent.

Mr. Selby (1825), after the remarks already quoted, proceeds thus:—'Mr. Bewick however, in the Supplement to his work on British Birds, still continues to believe in the existence of two distinct species; for so we must understand him (although he has brought the synonyms of the two supposed species together), since in a note following the description and figure of his greater redpole, or brown linnet, he says that "it loses the red breast in autumn, and regains it in spring; in this it differs from the grey linnet, whose plumage remains the same at all seasons."' From his description of the Grey Linnet (the usual Northumbrian name of this bird), as given in the first volume of his work, it can be no other than the common or brown linnet of a particular age, although he has attached to it the Linnean synonymes of the lesser redpole. 'If,' continues Mr. Selby, 'Mr. Bewick's observations on the plumage of the linnet were made upon caged birds, I am not surprised at his assertion of its always retaining the same appearance; for I have repeatedly verified the fact of its never acquiring, under confinement, those brilliant tints which distinguish it at a particular period of the year when in a state of liberty. I will adduce one instance strikingly to the point in question. For some particular purpose of observation, a linnet was shot more than two years ago, towards the close of summer, when the plumage showed its most perfect nuptial tint; and, happening to be only winged, it was put into a cage, where it soon became familiarized to its situation, and still continues. About the usual time, in the autumn of that year, it moulted, and acquired the winter dress of the common linnet, which it has retained ever since, without displaying at the accustomed season any of the brilliant red that adorned it in the wild state.'

Mr. Selby, who gives in his great work the figures of a male bird in summer plumage, and of the nat. size (pl. 55, *fig.* 3), and of a female, nat. size (Ibid., *fig.* 4), collects the following synonyms for this species:—

Fringilla cannabina, Linn., *Syst.* i., p. 322, sp. 28.
Gros-bec Linotte, Temm., *Man. d'Ornith.*, v. i., p. 364.
Greater Redpole, or Brown Linnet, Mont., *Ornith. Dict.*
The Linnet, Low's *Faun. Orcad.*, p. 63.
Greater Redpole Finch, Shaw's *Zool.*, v. 9, p. 516.

Syn. of young male after 1st autumnal moult.	Fringilla Linota, Gmel., *Syst.* i., p. 916; Lath., *Ind. Ornith.*, v. 1, p. 457, sp. 81. Linaria, Raii, *Syn.*, p. 80, A. 1; Will., p. 190; Id. (Ang.), 258; Briss., 3, p. 131, 29. La Linotte ordinaire, Buff., *Ois.*, v. 4, p. 58, t. 1; Id., *Pl. Enl.*, 151, f. 1. Common Linnet, *Br. Zool.*, No. 130; Lewin's *Br. Birds*, 2, t. 83; Lath., *Syn.* 3, p. 402, 73; Pult., *Cat. Dorset.*, p. 12; Walc., *Syn.*, t. 221. Grey Linnet, Bewick's *Br. Birds.*, 1, p. 171

Syn. of adult male in summer plumage.	Fringilla cannabina, Gmel., *Syst.* 1, p. 916, sp. 28; Lath., *Ind. Ornith.*, v. 1, p. 458, sp. 82. Linaria rubra major, Briss., 3, p. 135, 30; Raii *Syn.*, p. 91, A. 2; Will., p. 191, t. 46. Le Grand Linotte des Vignes, Buff., *Ois.*, v. 4, p. 58; Id., *Pl. Enl.*, 485, f. 2, old male under the title of Petite Linotte des vignes.
Syn. of adult male in summer plumage.	Bluthanfling, Bechst., *Naturg. Deut.*, v. 3, p. 141; Id., *Tasschenb. Deut.*, v. 3, p. 141; Id., *Tasschenb. Deut.*, p. 121; Meyer, *Tasschenb. Deut.*, v. 1, p. 163; Id., *Vög. Deut.*, v. 1, f 1 and 2; Frisch., *Vög.*, t. 9, f. 1 and 2. Greater Redpole or Red-headed Linnet, *Br. Zool.*, 1, No. 131, t. 54; *Arct. Zool.*, 2, No. 161; Will. (Ang.), 260; Lewin's *Br. Birds*, 2, t. 84; Lath., *Syn.* 3, p. 304; Id., *Sup.*, p. 167; Walc., *Syn.* 2, t. 222; Pult., *Cat. Dorset.*, p. 12; Bewick's *Br Birds.*, v. 1, t., p. 173; Id., *Sup.*, p., t. 22.

Mr. Gould, in his beautiful work on the Birds of Europe, figures a male in the spring or nuptial plumage, and a female of the nat. size, under the name of *Linaria cannabina, Le Gros-bec Linotte, Common or Brown Linnet*, and refers to Mr. Selby principally for the account of the changes of plumage. He also notices the confusion which formerly obtained about this species.

Varieties.—M. Temminck states that the bird varies accidentally to pure white; whitish, with the wings and tail as they are ordinarily; the colours feebly traced on the plumage; a part of the body white, or variegated with white feathers. All the plumage blackish, or more sombre than ordinary; the feet often red. He says that it is then *Fringilla Argentoratensis*, Gmel., *Syst.*, 1, p. 918, sp. 69; Lath., *Ind.*, v. 1, p. 460, sp. 87; *Le Gentyl de Strasbourg*, Buff., *Ois.*, v. 4, p. 73; Gérard, *Tab. élém*, v. 1, p. 194.

Geographical Distribution.—Very abundant in Holland. (Temm.) Very common throughout Britain, extending as far as to the Orkneys, where it is abundant. (Selby.) Indigenous to the British Islands, over the whole of which, and Europe generally, it is plentifully dispersed. (Gould.) Erzeroum in Persia. (Keith, Abbott.)

Habits, Food, Propagation.—In Britain resorting to waste lands and commons in the upper parts of the country, where it breeds. Assembling in winter in very large flocks, and descending to the sea-coasts, where these birds remain till pairing time stimulates them to seek the uplands. The food of the linnet consists of small seeds generally; those of the cruciform plants are favourites. The *nest* is built in a low bush, most frequently in furze, of moss and stalks of grass interwoven with wool, and lined with hair and feathers: *eggs*, 4 or 5, bluish-white dotted with purplish-red. (Selby principally.)

The bird is provincially termed Greater Redpole, Rose Linnet, Grey Linnet, Lintwhite, and Lintie. Bélon is of opinion that this species is the bird named *Salus* by the Latins, and Αἰγίθως (Ægithus) by Aristotle, in the fifteenth chapter of his nineteenth book ('Hist. Anim.'). The French and German names have been given above. It is the *Fanello* of the modern Italians, and *Llinos* and *Llinos bengoch* of the antient British.

The common Linnet is prized for its sweet song, and has been taught to imitate the human voice. The Hon. Daines Barrington mentions the celebrated talking Linnet at Kensington. He heard it repeat the words 'Pretty boy.'

Our limits will only permit a cursory notice of the other species generally considered as Linnets.

The Rev. Leonard Jenyns, in his 'Manual of British Vertebrata' (1835), makes the genus *Linaria* (Steph.) consist of *F. Linaria*, Linn. (Lesser Redpole); *F. cannabina*, Linn. (*Common Linnet;* Common or Brown Linnet of Selby, and Greater Redpole and Linnet of Montagu's 'Ornith. Dict.'); and *F. Montium*, Gmel. (*Mountain Linnet*).

Mr. Gould, in his 'Birds of Europe,' gives the following species of the genus *Linaria* of authors, in addition to the Common or Brown Linnet above noticed: *Linaria montana, Mountain Linnet*, or *Twite; Linaria canescens, Mealy Redpole;* and *Linaria minor, Lesser Redpole.*

The *Mountain Linnet* occurs in the catalogue given by M. Temminck, on the authority of Dr. Von Siebold and M. Burger, of European species of birds found in Japan, where it is known by the name of *Zuzume*. This is the *Gros-bec à gorge rouge, ou de montagne* of M. Temminck, and *Llinos fynydd* of the antient British.

The *Green Grosbeak* or *Greenfinch* (*Y Gegid, Llinos werdd* of the antient British) is sometimes called the *Green Linnet.* (FRINGILLIDÆ, vol. x.; GREENFINCH, vol. xi.)

LINSEED (*Graine de Lin*, French; *Leinsaat*, German; *Lynzaad*, Dutch; *Linaza*, Spanish; *Linhaca*, Portuguese; *Linseme*, Italian; *Semjalenjanve*, Russian), the seed of the Lin, Linum, or flax plant, is a valuable product derived from the capsules of Linum usitatissimum, and consisting of small greyish-brown lenticular bodies, containing a mealy albumen, of so oleaginous a nature, that it yields by pressure in great abundance the oil of linseed. The seed of the flax-plant is harvested not merely with a view to the reproduction of the plant, but also because of the oil which it yields by compression. For both these purposes, of sowing and crushing, linseed is largely imported into the United Kingdom. Linseed is also much used as food for small birds. The importations during each of the last ten years have been:—

1828	1,996,414 bushels.	1833	2,179,135 bushels.
1829	2,052,258 „	1834	2,210,237 „
1830	1,990,971 „	1835	2,206,748 „
1831	2,759,103 „	1836	3,339,215 „
1832	1,995,072 „	1837	3,321,089 „

The principal part of these importations is from Russia; the quantities brought from that country in each of the last three years were 1,534,073, 2,109,530, and 2,432,654 bushels respectively, being very nearly seven-tenths of the whole importations. The remainder is received from other countries in the north of Europe, and principally from Prussia and Holland; from Italy, Turkey, and the United States of America; and within the last three years some shipments have been received from the territories of the East India Company. About one-fifth of the whole importation goes to Ireland, and is chiefly used for sowing. The best seed for this purpose is brought from Holland. The residuum of linseed from which the oil has been expressed is used, under the name of oil-cake, for fattening cattle. The duty paid on the importation of linseed into this country is 1½*d.* per bushel, and the price in our markets is usually from 46*s.* to 55*s.* per quarter of eight bushels. [FLAX.]

LINSEED-OIL may be procured by cold expression of the seeds, a process which makes the oil clearer; or the bruised seeds are roasted in the oil-mills, in which case it is brownish-yellow, and easily becomes rancid, probably from attracting oxygen. Linseed-oil is pellucid, with a faint but peculiar odour and taste, generally disagreeable, from being subrancid. Specific gravity 0·93. It easily dries: by reduction of temperature it merely becomes cloudy, but scarcely freezes.

It may easily be purified by repeated agitation with water, by bleaching in the sun, or, better, by filtering it through newly prepared charcoal.

By long boiling it becomes dark-brown, tenacious, and thickened, but dries more easily, and in this state is used for printers' ink; by still longer boiling it becomes black, almost solid, and elastically tenacious, like caoutchouc, and in this state it serves for bird-lime.

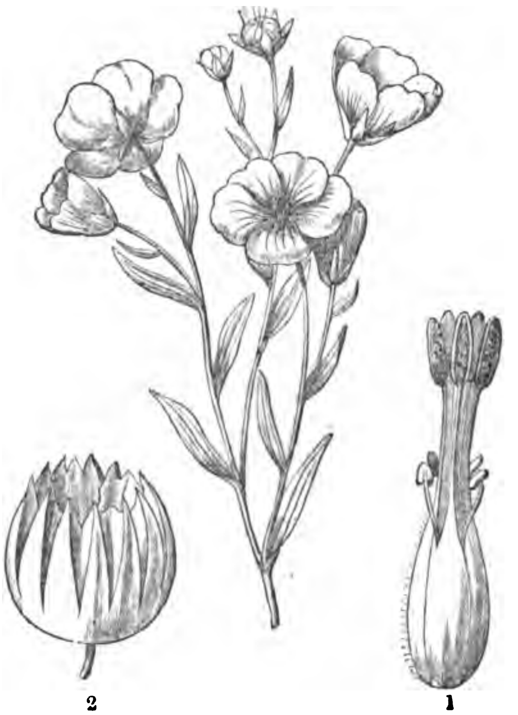
By the addition of nitrous acid it becomes thick and red, then dark reddish-brown, like tincture of iodine, but does not become solid. It is frequently adulterated with rape-oil, which may be detected by this test. Neither does it form elaidin, as rape-oil does. But a simpler test is, that if wood be besmeared with oil which has been adulterated, it does not become dry.

Linseed-oil is used to form liniments, of which the most common is that with lime-water, as an application to burns. But it is much more extensively used in the arts, particularly for painting.

LI'NTHURIS. [FORAMINIFERA, vol. x., p. 348.]

LINU'CHIA. Eschscholtz gave this generic name to certain forms of the Linnæan genus Medusa. ('Actinologie,' p. 289.)

LINUM, a genus of plants which gives its name to the small family of *Linaceæ*, and is characterized by having five distinct sepals, five petals, five stamens, and from three to five styles, which are either distinct from the base, or united as far as the middle, or even the apex. Capsule globular, divided into ten cells, each containing a single seed. Herbs or small shrubs; leaves entire, without stipules; flowers having the petals falling off shortly after flowering. The species are chiefly found in Europe and the north of Africa, but a few likewise in other parts of the world. Few however are of any importance, except that which has been an object of culture from the earliest times of which we have any record, that is *Linum usitatissimum*, or the flax-plant, which is valuable as well for its seed, as for the ligneous fibre of its cortical layer, which forms the tow spun into yarn and woven into linen cloth. [FLAX; LINEN.] It has been sometimes said that cotton is the substance from which cloth was made in Egypt in antient times. Cotton was no doubt known to the Hindus at very early periods, and may have formed an article of commerce to Egypt from India, but that it was not much used is proved by none of the mummy cloth, which has been examined by the best microscopes, being found to be composed of cotton. The seed is valuable for the condensed mucilage contained in its seed-coats, while the almond contains a fixed oil, valuable for burning, and in the arts as a drying oil; the oil-cake is used for fattening cattle. Linseed is extensively imported from Russia, Italy, and Egypt, for crushing, but of late years it has been imported in large quantities from India for the same purpose; this is found to yield a larger proportion of oil than Russian linseed, and the commerce will no doubt continue to increase. Seed is also imported from Holland, America, and other places for the purpose of sowing, as it is found to yield a finer and more abundant crop than the British seed. It is curious that the Hindus make no use of the ligneous fibre; but the plants, though they there produce fine seed rich in oil, are very dwarfish, and may not therefore be found profitable culture for a people who have cotton in such abundance, and who wove it into cloth in ages when even linen was unknown in Europe.



Linum usitatissimum.

1, the monadelphous stamens, highly magnified; 2, the ripe capsule, split at its end into valves.

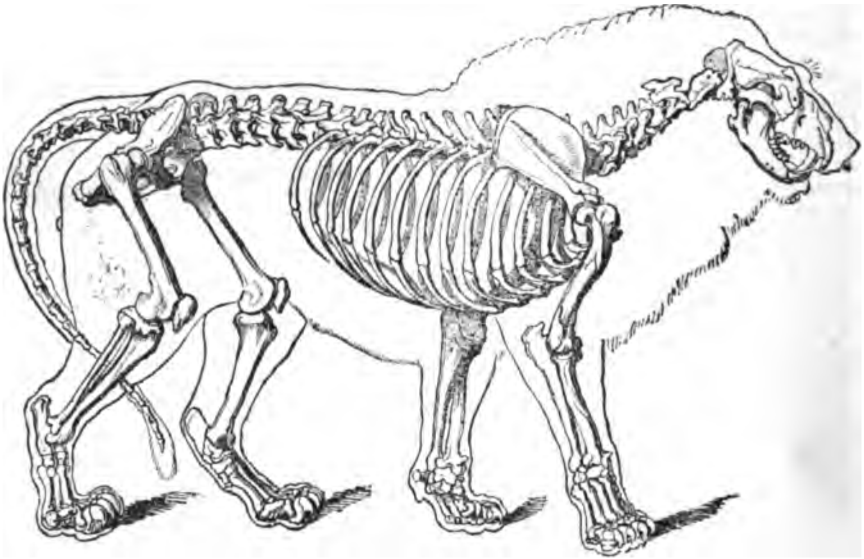
LINUM USITATI'SSIMUM, *Medical Properties of.* The seeds of this plant yield several articles useful in medicine and surgery. The testa, or husk of the seeds, is very mucilaginous, the kernel contains much oil, and the farina or meal, procured by grinding or bruising the seeds, after the oil has been expressed, furnishes an excellent material for poultices. [CATAPLASMS.] The seeds are oblongo-ovate, acute, compressed, brown, shining, very smooth, the skin thin, the kernel white and oily. They are devoid of odour, but have an unpleasant mucilaginous oily taste. Old, rancid, and corroded seeds should be rejected. One part of seeds and two parts of water yield a strong mucilage. It is much better to obtain the mucilage by merely pouring cold water on the entire seeds, than to bruise them and pour boiling water on them, as generally directed. The mucilage is analogous to that of the quince seed [CYDONIA], and differs in its chemical habitudes, in several respects, from common gum. The compound infusion of linseed is demulcent, and the unpleasant taste may be much lessened by using cold water to form it, as stated above. The farina of the seeds, ground before the oil has been expressed, furnishes the best material for poultices, but does not keep well. The cake remaining after the expression of the oil is much used to fatten cattle, but gives a peculiar taste to the meat.

The lint, or charpie, used by surgeons to dress ulcers, &c., should always be prepared from linen-cloth and never from cotton, as an essential difference exists in the nature of their fibres, which causes that of cotton to prove extremely irritating.

LINZ, the capital of Upper Austria, in 48° 19′ N. lat. and 14° 17′ E. long., is agreeably situated at the junction of the Traun and the Danube, over which latter river there is a wooden bridge 864 feet long. It is divided into four sections, viz. the town and the three suburbs. The old town consists of one long street, and is of much less extent than the suburbs. There are four gates and three squares, in the largest of which there is 'the Pillar of the Trinity,' erected by the Emperor Charles VI. in 1723, and also two fountains. It is on the whole well built, for which it is not a little indebted to several fires, after which the parts destroyed have been always much improved; this was especially the case after a very great fire in 1800, which consumed the county hall, the castle, and many other buildings. There are seven churches, the largest of which is the cathedral, formerly belonging to the Jesuits. Other remarkable buildings are the government-house, the new county hall, where the provincial estates meet, a very magnificent edifice; the town-hall, built in 1414; the city brewery, the custom-house, the gymnasium, the handsome theatre, and the great imperial manufactory of woollen cloths and carpets, which in its most flourishing period gave employment, directly or indirectly, as it is stated, to 25,000 workmen, and used 5000 cwt. of wool annually. At present the number of workmen is only 10,600, exclusive of the numerous mechanics and artisans in Linz to whom it affords employment. It suffered severely by the French invasions. Linz is a bishop's see, and has a lyceum, with a library of 25,000 volumes, several public schools, a deaf and dumb asylum, and many charitable institutions. There are considerable manufactures of calico, dimity, leather, gunpowder, &c. The population of the town and suburbs, including some adjacent villages, is 23,500. It is a place of considerable trade, which the iron railroad to Budweis in Bohemia and the lately established steam-navigation of the Danube to the Black Sea must greatly increase. In order to defend Austria on the west, Linz was chosen for the execution of a new system of fortification invented by the Archduke Maximilian of Este.

LION, the English name for the form in which carnivorous development is generally considered to be the most perfect: Λέων (Leon) of the Greeks (Λέαινα, Lioness); *Leo* of the Romans (*Lea* and *Leæna*, Lioness); *Leone* of the Italians (*Leonessa*, Lioness); *Leon* of the Spanish; *Lion* of the French (*Lionne*, Lioness, *Linceau*, whelp); *Löwe* of the Germans (*Löwinn*, Lioness). The male is, as a general rule, ornamented with a mane; the female has no such ornament.

ORGANIZATION.



Skeleton of Lion.

The organization of the lion is treated of in the article FELIS, vol. x., and the reader is requested to bear in mind that the short descriptions under the figures of the claws (p. 218) are misplaced; *fig.* 1 being from the forefoot, and *fig.* 2 from the hind foot. In addition to the points there stated we must draw attention to the following. There are, it appears, distinguishing characteristics marking the differences between the skulls of the *Lion* and *Tiger;* and Mr. Owen explained these to a meeting of the Zoological Society of London (1834), when several crania of these two species were exhibited. He adverted to the distinctions pointed out by Cuvier in the 'Ossemens Fossiles,' and remarked on the first of them, viz. the straightness of the outline in the lion from the midspace of the postorbital processes to the end of the nasal bones in one direction, and to the occiput in the other, as not being in all cases available; but he regarded the second distinction—the flattening of the interorbital space in the lion and its convexity in the tiger—as being more constant and appreciable. He pointed out however a distinction which had never, according to his belief, been published, which is, he observed, well marked, and which appears to be constant; for he found it to prevail throughout the whole of the skulls of these animals which he had examined, including ten of the lion, and upwards of twenty of the tiger. It consists in the prolongation backwards in the cranium of the lion, of the nasal processes of the maxillary bones to the same transverse line which is attained by the coronal or superior ends of the nasal bones; in the tiger the nasal processes of the maxillary bones never extend nearer to the transverse plane attained by the nasal bones than one-third of an inch, and sometimes fall short of it by two-thirds, terminating also broadly in a straight or angular outline, just as though the rounded and somewhat pointed ends which these processes have in the lion had been cut off. Mr. Owen noticed also minor differences in the form of the nasal aperture, which in the tiger is disposed to narrow downwards and become somewhat triangular, while in the lion its tendency is towards a square shape; in the deeper sinking in a longitudinal depression of the coronal extremities of the nasal bones in the tiger than in the lion; in the bounding of this depression above in most of the tigers' crania by a small but distinct semilunar ridge, which is not found in those of the lion; and in the larger comparative size, chiefly in their transverse diameter of the infraorbital *foramina* in the lion. Mr. Owen remarked that it was curious that these foramina were double either on one or both sides in the only four skulls examined of lions which were known to be Asiatic, whilst in all the others the *foramen* was single on each side. (*Zool. Proc.*, 1834.)

Another communication to the same Society becomes interesting from its being associated with the popular belief that the lion lashes his sides with his tail to stimulate himself into rage. There was exhibited at one of the meetings (1832) a claw obtained from the tip of the tail of a young Barbary lion presented to the Society's menagerie by Sir Thomas Reade, then his majesty's consul at Tripoli. It was detected on the living animal by Mr. Bennett, and pointed out to the keeper, in whose hands it came off whilst he was examining it. The specimen having been submitted to Mr. Woods for description, that gentleman commenced by referring to the antient writers quoted by Blumenbach. Homer (*Il.*, xx.), Lucan (*Pharsal.*, i. 208), Pliny (*Hist.*, viii.), among others, who had described the lion (erroneously) as lashing himself with his tail when angry, or to provoke himself to rage. None of those writers however, he remarked, advert to any peculiarity in the Lion's tail to which so extraordinary a function might, however incorrectly, be attributed; but Didymus Alexandrinus, a commentator on the 'Iliad,' cited by Blumenbach, having found a black prickle like horn among the hair of the tail, immediately conjectured that he had ascertained the true cause of the stimulus when the animal flourishes his tail in defiance of his enemies, remarking that when punctured by this prickle, the Lion becomes more irritable from the pain which it occasions. Mr. Woods then noticed the oblivion into which the subject fell for centuries till Blumenbach, who observes also that the later commentators, Heyne for instance, had noticed the opinion above stated, revived it (now about twenty-six years since), Blumenbach having verified the accuracy of Didymus Alexandrinus as to the fact, though he did not admit the commentator's induction. Blumenbach described the prickle as small, dark-coloured, hard as horn, placed in the very tip of the Lion's tail, surrounded at its base by an annular fold of the skin, and adhering firmly to a singular follicle of a glandular appearance. But Blumenbach remarked that these parts were so minute, and the small horny apex so buried in the tuft of hair, that the use attributed to it by the antient scholiast can only be regarded as imaginary. Again, according to Mr. Woods, the subject appears to have slumbered till 1829, when M. Deshayes announced (*Ann. des Sci. Nat.*, vol. vii.) that he had found the prickle both of a Lion and Lioness which died in the French menagerie, and described it as a little nail or horny production, about two lines in length, presenting the form of a small cone, a little recurved upon itself, and adhering by its base only to the skin and not to the last caudal *vertebra*, from which it was separated by a space of two or three lines. From that period Mr. Woods suffered no opportunity to escape him of examining the tails of every Lion, living or dead, to which he could gain access; but in no instance had he succeeded in finding the prickle till the specimen which was then before the committee was placed in his hands, within half an hour after its removal from the living animal, and while yet soft at its base where it had been attached to the skin. He described it as formed of corneous matter like an ordinary nail, and solid throughout the greater part of its length towards the *apex*, where it is sharp; and at the other extremity as hollow, and a little expanded. Its shape was rather singular, being nearly straight for one-third of its length, then slightly constricted (forming a very obtuse angle at the point of constriction), and afterwards swelling out like the bulb of a bristle to its termination. It was laterally flattened throughout its entire length, which did not amount to quite three-eighths of an inch. It was of a horn-colour, but became darker, nearly to blackness, at the tip. Its appearance, Mr. Woods observed, would lead to the belief that it was deeply inserted into the skin, with which however, from the readiness with which it became detached, its connexion must have been very slight. It is to this slightness of adhesion that M. Deshayes attributes its usual absence in stuffed specimens; and the same cause will account for its absence in by far the greater number of living individuals; for, as Mr. Woods remarked, its presence or absence does not depend upon age, because the Paris lions in which it was found were of considerable size, while that belonging to the Society was very small and young; nor upon sex, for although wanting in the female cub of the same litter at the Society's Gardens, it existed in the Lioness at the Jardin du Roi.

Mr. Woods, thinking it probable that these prickles might exist in other species of *Felis*, had previously examined the tails of nearly the whole of the stuffed skins in the Society's museum, but failed in detecting it in every instance but one. This was an adult Asiatic leopard, in which the nail was evident, although extremely small. It was short and straight, and perfectly conical, with a broad base. Mr. Woods observed that it was stated in a note in the 'Edinburgh Philosophical Journal,' where a translation of Blumenbach's paper had been given, that a claw or prickle had also been observed by the editor of that work on the tail of a leopard. No such structure however was detected by Mr. Woods on a living individual in the Society's menagerie. In the leopard therefore, as in the lion, it appears to be only occasionally present. In both it is seated at the extreme tip of the tail, and is altogether unconnected with the terminal caudal vertebra. From the narrowness and shape of its base, the circumference of which is by far too small to allow of its being fitted like a cap upon the end of the tail, it appeared to Mr. Woods rather to be inserted into the skin, like the bulb of a bristle or *vibrissa*, than to adhere to it by the margin, as described by M. Deshayes. Neither the published observations of that zoologist nor the discovery then communicated to the Society could, it was observed, throw any light on the existence or structure of the supposed glandular follicle noticed by Blumenbach.

Mr. Woods concluded by remarking that it is difficult to conjecture the use of these prickles, their application as a stimulus to anger being of course out of the question; but he observed that it could not be very important, for, to say nothing of their small size and envelopment in the fur, the majority of individuals, in consequence of the readiness with which the part is detached, are deprived of it for the remainder of their lives. (*Zool. Proc.*, 1832.)*

Prickle at the end of Lion's tail. (Blumenbach.)

Emasculation, it is stated, prevents the development of the mane; and the Lion so mutilated is said never to roar.

Geographical Distribution.

The true Lions belong to the Old World exclusively, and they were formerly widely and plentifully diffused; but at present they are confined to Asia and Africa, and they are becoming every day more and more scarce in those quarters of the globe. That Lions were once found in Europe there can be no doubt. Thus it is recorded by Herodotus that the baggage camels of the army of Xerxes were attacked by Lions in the country of the Pæonians and Crestonæi, on their march from Acanthus (near the peninsula of Mount Athos) to Therme, afterwards Thessalonica (now Saloniki): the camels alone, it is stated, were attacked, other beasts remaining untouched as well as men. The same historian also observes that the limits in Europe within which Lions were then found were the Nessus or Nestus, a Thracian river running through Abdera, and the Achelous, which waters Acarnania. (Herod., vii., c. 125-126, Schweighæuser; and see the article Athos, p. 23.) Aristotle (vi. 31) says that the Lion is in fact an animal but little known. 'In the whole of Europe, for example, there are no Lions, except between the Achelous and the Nessus.' Again, the same author (viii., xxviii., 33 of Scaliger's division) mentions Europe as abundant in Lions, and especially in that part which is between the Achelous and Nessus; apparently copying the statement of Herodotus. Pliny (viii. 16) does the same, and adds that the Lions of Europe are stronger than those of Africa and Syria. Pausanias copies the same story as to the attack of the Lions on the camels of Xerxes; and he states moreover that Lions often descended into the plains at the foot of Olympus, which separates Macedonia from Thessaly, and that Polydamas, a celebrated athlete, a contemporary of Darius Nothus, slew one of them, although he was unarmed. The passage in Oppian (*Cyneg.*, iii. 22) which some have considered as indicating the existence of Lions up to the banks of the Danube, fails as an authority for placing the Lion in that locality, because, as Cuvier observes, the context shows plainly that the name of Ister is there applied to an Armenian river, either by an error of the author or of the transcribers.

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* And see post, description of the Maneless Lion of Guzerat, p. 33.

Nor is Europe the only part of the world from which the form of the Lion has disappeared. Lions are no longer to be found in Egypt, Palestine, or Syria, where they once were evidently far from uncommon. The frequent allusions to the Lion in the Holy Scriptures and the various Hebrew terms there used to distinguish the different ages and sex of the animal (see particularly *Jer.*, li., 38; *Ezek.*, xix., 2; *Nah.*, ii., 13, גור, *Gor*, a little Lion or Lion's whelp: *Ezek.*, xix., 2, 3; *Psalm* xci., 13; *Prov.*, xix., 12, &c.; כפיר, *Chephir*, a weaned Lion, that is able to leave the mother and hunt prey for itself: *Nah.*, ii., 12, &c.; ארי, *Ari*, a full-grown strong Lion, the most general name: *Job.*, iv., 10; x., 16; *Psalm* xci. 13; *Prov.*, xxvi., 13; *Hosea*, v. 14; xiii. 7; שחל, *Shacal*, a Lion in his prime, a black Lion: *Job*, iv., 10; *Prov.*, xxx., 30; ליש, *Laish*, a ferocious or angry Lion; compare the Greek *lis*, λῖς: see also *Job*, iv. 10, 11, &c.), prove a familiarity with the habits of the race. Even in Asia generally, with the exception of some countries between India and Persia and some districts of Arabia, these magnificent beasts have, as Cuvier observes, become comparatively rare, and this is not to be wondered at. To say nothing of the immense draughts on the race for the Roman arena,—and they were not inconsiderable, for, as Zimmerman has shown, there were a thousand Lions killed at Rome in the space of forty years,[*]—population and civilization have gradually driven them within narrower limits, and their destruction has been rapidly worked in modern times when fire-arms have been used against them instead of the bow and the spear. The African Lion is annually retiring before the persecution of man farther and farther from the Cape. Mr. Bennett (*Tower Menagerie*) says of the Lion: 'His true country is Africa, in the vast and untrodden wilds of which, from the immense deserts of the north to the trackless forests of the south, he reigns supreme and uncontrolled. In the sandy deserts of Arabia, in some of the wild districts of Persia, and in the vast jungles of Hindostan, he still maintains a precarious footing; but from the classic soil of Greece, as well as from the whole of Asia Minor, both of which were once exposed to his ravages, he has been utterly dislodged and extirpated.'

Lions of the Old World.

Zoologists generally distinguish the Lion by its uniform yellow colour, the tuft of hair at the end of the tail, and the mane covering the head and shoulders of the male. This last ornament, as we shall presently see, is very much reduced in one variety, with which we have lately been made well acquainted by Captain Smee; indeed so scanty is it that it hardly deserves the name of a mane at all.

If we go back to an early period, we shall find varieties of this great cat, usually considered as the strongest of the family, depending on the greater or less intensity of colour for the most part, mentioned by antient writers on natural history. Thus Aristotle (ix. 44) distinguishes two kinds of Lions, one rounder than the other (στρογγυλώτερον), and which has the mane more curled (οὐλοτριχώτερον), which he states to be the most timid (δειλότερον); the other longer and with a well-developed mane (εὔτριχον), which he says is more courageous (ἀνδρειότερον). Pliny (viii. 16) remarks that the Lion is most noble when a mane covers his neck and shoulders; and he also (loc. cit.) alludes to a maneless Lion, the offspring of a monstrous connexion. ('Leoni præcipua generositas, tunc cum colla armosque vestiunt jubæ. Id enim ætate contingit e leone conceptis. Quos vero pardi generavere, insigni hoc carent.') In Africa, he goes on to remark, such connexions are frequent: 'Multiformes ibi animalium partus, varie fœminis cujusque generis mares aut vi aut voluptate miscente;' whence, he adds, the Greek vulgar saying, that Africa is always producing something new. In the same chapter Pliny, after alluding to the European Lions and their comparative boldness, as above stated, repeats the observation of Aristotle, that there are two kinds of Lions, one compact and short with curled mane, which are more timid than those with a long and simple one ('longo simplicique villo'); which last despise the wounds inflicted on them. In the 17th chapter of the same book, Syria is stated to be the locality of a black Lion (see opposite column): 'cæteris unus cujusque generis color est. Leonum tantum in Syria niger.' Ælian (xvii. 26) distinguishes the Lions which come from India from other Lions, stating that the skin of the Indian Lions is black. Oppian (iii.), towards the beginning of that book, notices the differences between the Lions of Armenia, Arabia (Ἐρεμβῶν ἄρουρα), Libya, and Ethiopia.

These distinctions are altogether rejected by Buffon, who denies that there are different kinds of Lions. He denies, also, that any Lion has a curled mane, which, by the way, Aristotle does not assert, for he only says that one kind has the mane *more curly* than the other. Buffon further affirms, that the Lions of Africa and Asia entirely resemble each other; and declares that if the Lions of the mountains differ from those of the plains, the difference is less in the colour of the skin than in the size of the respective animals.

Linnæus, in his last edition of the 'Syst. Nat.,' notices no varieties: he places *Felis Leo* at the head of his genus *Felis*, with Africa only as the *habitat*. Neither does Gmelin distinguish any varieties, but he much increases the distribution; for he speaks of the Lion as inhabiting Africa, especially in the interior, as being rarer in the deserts of Persia, India, and Japan, and as having formerly occurred in other warmer parts of Asia, in Palestine, in Armenia, and in Thrace.

Pennant ('Hist. Quadr.,' 3rd edition) appears to coincide in opinion with Buffon, Linnæus, and Gmelin; for he mentions no distinctions, and describes the Lion as 'an inhabitant of most parts of Africa, and rarely of the hot parts of Asia, such as India and Persia; and a few are still met with in the deserts between Bagdat and Bassorah, on the banks of the Euphrates. Mr. Niebuhr also places them among the animals of Arabia; but their proper country is Africa, where their size is the largest, their numbers greatest, and their rage more tremendous, being inflamed by the influence of a burning sun upon a most arid soil. Doctor Fryer says that those of India are feeble and cowardly. In the interior parts, amidst the scorched and desolate deserts of Zaara, or Biledulgerid, they reign sole masters; they lord it over every beast, and their courage never meets with a check, where the climate keeps mankind at a distance; the nearer they approach the inhabitants of the human race, the less their rage, or rather the greater is their timidity; they have often experienced the unequal combat, and finding that there exists a being superior to them, commit their ravages with more caution; a cooler climate again has the same effect; but in the burning deserts, where rivers and fountains are denied, they live in a perpetual fever, a sort of madness fatal to every animal they meet with.'

Dr. Leach raised the form to the rank of a genus under the name of *Leo*.

M. Lesson, in his 'Manuel' (1827), gives four varieties, viz. the Lion of Barbary, the Lion of Senegal, the Lion of Persia or Arabia, and the Lion of the Cape.

Cuvier ('Règne Animal,' his last edit., 1829) places at the head of the great genus Felis '*Le Lion* (*Felis Leo*, Linn.)' and describes it as distinguished by its uniform yellow colour, the tuft of hair at the end of the tail and the mane which covers the head, neck, and shoulders of the male. 'It is,' continues Cuvier, 'the strongest and the most courageous of the animals of prey. Spread, at one time, over all the parts of the antient world, it would appear at the present day nearly confined to Africa and some neighbouring parts of Asia.'

M. Temminck, in his 'Monograph,' includes three varieties under *Felis Leo*, namely the Lions of Barbary, Senegal, and Persia, and these are retained in Dr. Fischer's Synopsis.

Mr. Bennett ('Tower Menagerie,' 1829) notices the Bengal Lion, the Cape Lion, and the Barbary variety (figuring the two former), and observes upon their distinctions.

Sir William Jardine (*Naturalists' Library*, 'Mammalia,' vol. ii., *Felinæ*, 1834), in addition to other plates, has given a figure of the Asiatic variety from a specimen in the Surrey Zoological Gardens, and after noticing that the Lions of Africa and India have been described as varieties, states his strong suspicions that future observations will prove these animals to be in reality distinct species, and notices them separately under the names of *Leo Africanus* and *Leo Asiaticus;* he also alludes to the *Maneless Lion*, a notice of which had just appeared in the proceedings of the Zoological Society of London, with a promise of further details in the Transactions of that Society, in a paper which has since been published, and to which we shall presently call the reader's attention.

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[*] Sylla gave a combat of one hundred lions at once in his ædileship; but this bloody exhibition is insignificant when compared with those of Pompey and Cæsar, the former of whom exhibited a fight of six hundred, and the latter of four hundred. In Pompey's show, three hundred and fifteen of the six hundred were males. The early emperors consumed great numbers, frequently a hundred at a time, to gratify the people.

Mr. Swainson (*Classification of Quadrupeds*, 1835) places 'the African Lion (*Leo Africanus*, Sw.) at the head of the *Felidæ*. In his arrangement at the end of the volume he notices the form under the designation of 'Leo Antiquorum, *Lions*. Head and neck furnished with a mane of long hair; tail tufted.' The next genus, 'Felis, L., Cats,' he characterizes thus: 'No mane; tail long, not tufted.' In his 'Animals in Menageries,' 1838, the Lion does not appear to be noticed.

African Lions.—Temminck notices two varieties of the *African Lion*—that of *Barbary* and that of *Senegal*. M. Lesson adopts these two varieties, and adds the *Lion of the Cape*, of which he gives two varieties.

The Lion of Barbary.—This Lion is described as having a deep yellowish-brown fur, and the mane of the male is stated to be very much developed.

The Lion of Senegal is characterized by a fur of a more yellow tint, the mane in the male being less thick, and nearly wanting upon the breast and insides of the legs.

The Lion of the Cape presents two varieties, one yellowish and the other brown, the latter is regarded as the most ferocious and formidable. The Dutch colonists speak of the 'Blue and the Black' kinds, and it seems indeed that there is a 'black-maned' Lion, one of which, accompanied by his Lioness, Mr. Burchell appears to have encountered in his travels in Africa. (See post.)

Habits, Chace, &c.—Mr. Burchell well observes, that 'King of the Forest' is a title not very applicable to an animal which he, at least, never met but on the plains; nor did he ever meet with one in any of the forests where he had been. The low cover that creeps along the sides of streams, the patches that mark the springs or the rank grass of the valley, seem to be the shelter which the African Lion for the most part seeks. Of the strength of this variety we have most extraordinary examples on record. To carry off a man,—and there are dismal accounts of this horrible fact, which there is no reason to doubt,—appears to be a feat of no difficulty to this powerful brute. Indeed when we find that a Cape Lion seized a heifer in his mouth, and, though the legs dragged upon the ground, seemed to carry her off with the same ease as a cat does a rat, leaping over a broad dike with her without the least difficulty,—that another, and a young one too, conveyed a horse about a mile from the spot where he had killed it—and that a third, which had carried off a two-year old heifer, was followed on the spoor, or track, for five hours by horsemen, when it appeared that throughout the whole distance the carcass of the heifer was only once or twice discovered to have touched the ground,[*]—the asportation of a man shrinks into insignificance as a demonstration of strengh. There seems to be an idea that the Lion prefers a human prey; but be this as it may, the inhabitants of certain districts have, it appears, been under the necessity of resorting to a curious expedient to get out of their reach. Messrs. Schoon and M'Luckie, in 1829, penetrated to the eastward of Kurrichaine, situated about 200 miles to the north-east of Litakou. They discovered, east of Kurrichaine, or Chuan, as it is more properly named, the river Moriqua, which rises in the south between the 25th and 26th degrees of latitude, and 29th and 30th degrees of longitude, taking a north-easterly course, and about 100 miles from the ford enters a high ridge of mountains. From hence, according to the natives, it flows into the sea, through the country of the Mantatees. About 70 miles to the eastward, the range of mountains takes a direction north and south. At the distance of 14 miles to the south, along the base of the mountains, is a place called 'Ongorutcie-Fountain,' where there is a large tree containing seventeen conical huts. These are used as dormitories, being beyond the reach of the Lions, which, since the incursion of the Mantatees, when so many thousands of persons were massacred, have become very numerous in the neighbourhood and destructive to human life.[†] The branches of these trees are supported by forked sticks or poles, and there are three tiers or platforms on which the huts are constructed. The lowest is nine feet from the ground, and holds ten huts; the second, about eight feet high, has three huts; and the upper story, if it may be so called, contains four. The ascent to these is made by notches cut in the supporting poles, and the huts are built with twigs thatched with straw, and will contain two persons conveniently. The travellers had previously visited several deserted villages similarly built between the Moriqua and Leutlecan rivers, as well as in other places. But these were erected on stakes about eight feet above the ground and about forty feet square, larger in some places, and containing about seventy or eighty huts. The inhabitants sit, it is stated, under the shade of these platforms during the day, and retire to the elevated huts at night.[*]

The general prey of the African Lion consists of the larger herbivorous quadrupeds, very few of which it is unable to master, and it is a severe scourge to the farmer, who is consequently ever on the look-out for lions, and generally a most imperturbable and unerring shot. Though mortal accidents frequently happen in these huntings, the cool sportsman seldom fails of using his rifle with effect. Lions when roused, it seems, walk off quietly at first, and if no cover is near, and they are not pursued, they gradually mend their pace to a trot, till they have reached a good distance, and then they bound away. Their demeanour upon these occasions has been described to us by eye-witnesses to be of a careless description, as if they did not want a fray, but if pressed, were ready to fight it out. If they are pursued closely, they turn and couch, generally with their faces to the adversary; then the nerves of the sportsman are tried. If he is collected and master of his craft, the well directed rifle ends the scene at once; but if, in the flutter of the moment, the vital parts are missed, or the ball passes by, leaving the lion unhurt, the infuriated beast frequently charges on his enemies, dealing destruction around him. This however is not always the case, and a steady unshrinking deportment has, in more instances than one, saved the life of the hunter. Mr. Burchell gives an interesting account in his African travels of his confronting one of these animals. 'The day was exceedingly pleasant, and there was not a cloud to be seen. For a mile or two, we travelled along the banks of the river, which, in this part, abounded in tall mat-rushes. The dogs seemed much to enjoy prowling about, and examining every bushy place, and at last met with some object among the rushes which caused them to set up a most vehement and determined barking. We explored the spot with caution, as we suspected, from the peculiar tone of their bark, that it was what we suspected it to be,—lions. Having encouraged the dogs to drive them out, a task which they performed with great willingness, we had a full view of an enormous black-maned lion and lioness. The latter was seen only for a minute, as she made her escape up the river, under the concealment of the rushes; but the lion came steadily forward and stood still to look at us. At this moment we felt our situation not free from danger, as the animal seemed preparing to spring upon us, and we were standing on the bank, at the distance of only a few yards from him, most of us being on foot and unarmed, without any visible possibility of escaping. I had given up my horse to the hunters, and was on foot myself; but there was no time for fear, and it was useless to attempt avoiding him. . . . I stood well upon my guard, holding my pistols in my hand, with my finger upon the trigger; and those who had muskets kept themselves prepared in the same manner. But at this instant the dogs boldly flew in between us and the lion, and surrounding him, kept him at bay by their violent and resolute barking. The courage of those faithful animals was most admirable: they advanced up to the side of the huge beast, and stood making the greatest clamour in his face, without the least appearance of fear. The lion, conscious of his strength, remained unmoved at their noisy attempts, and kept his head turned towards us. At one moment, the dogs perceiving his eye thus engaged, had advanced close to his feet, and seemed as if they would actually seize hold of him; but they paid dearly for their imprudence, for, without discomposing the majestic and steady attitude in which he stood fixed, he merely moved his paw, and, at the next instant, I beheld two lying dead. In doing this he made so little exertion, that it was scarcely perceptible by what means they had been killed. Of the time which we gained by the interference of the dogs, not a moment was lost: we fired upon him; one of the balls went through his side, just between the short ribs, and the blood began to flow, but the animal still remained standing in the same position. We had now no doubt that he would spring upon us: every gun was instantly reloaded; but happily we were mistaken, and were not sorry to see him move quietly away, though I had hoped in a few minutes to have been enabled to take hold of his paw without danger.' Even where the hunter has been seized with a panic and pursued, a timely recovery of self-possession has saved him. Sparrman relates that Jacob Kok of Zee-koe-rivier, one day walking over his lands with his loaded gun, unexpectedly met a lion. Being an excellent shot, he thought himself pretty certain, from the position in which he was, of killing it, and therefore fired his piece. Unfortunately he did not recollect that the charge had been in it for some time, and consequently was damp; so that his piece hung fire, and the ball falling short, entered the ground close to the lion. In consequence of this he was seized with a panic and took directly to his heels; but being soon out of breath and closely pursued by the lion, he jumped up on a little heap of stones, and there made a stand, presenting the butt end of his gun to his adversary, fully resolved to defend his life as well as he could to the utmost. This deportment had such an effect on his pursuer, that he also made a stand, and lay down at the distance of a few paces from the heap of stones, seemingly quite unconcerned. Jacob, in the mean time, did not stir from the spot; besides he had in his flight unfortunately dropped his powder-horn. At length, after waiting a good half-hour, the lion rose up, and at first went very slowly, and step by step only, as if he had a mind to steal off; but as soon as he got to a greater distance, he began to bound away at a great rate. There is hardly a book of African travels which does not teem with the dangers and hair-breadth escapes of the lion-hunters, and hardly one that does not include a fatal issue to some engaged in this hazardous sport; but our limits will not allow us to enter into further details on this part of the subject, and we must refer to such works for accounts—and they are very interesting—of the different modes of destruction employed against this powerful beast, from the poisoned arrow of the Bushman to the rifle of the colonist.

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[*] Sparrman; Thompson.

[†] Ælian (xvii. 27) records the extinction of a Libyan people by an invasion of Lions.

[*] See 'South African Journal,' September, 1830; and Steedman's 'Wanderings and Adventures in the interior of Southern Africa,' where the reader will find a drawing of the inhabited tree above described, taken by Mr. Moffat of Litakou, who also visited this spot.

, African Lion. (Barbary.)

Asiatic Lions.—Of these, three kinds are mentioned:—The *Bengal Lion*, the *Persian* or *Arabian Lion*, and the *Maneless Lion* of Guzerat.

The Bengal Lion.—Mr. Bennett points out the characteristics by which the Asiatic race is distinguished from that of Southern Africa, as consisting principally in the larger size, the more regular and graceful form, the generally darker colour, and the less extensive mane of the African. He gives a beautiful cut of the Bengal Lion, executed by Harvey, in the 'Tower Menagerie,' from a very fine specimen little more than five years old, then in that collection, but called by the keepers 'The Old Lion.' The magnificent development of the mane is very striking in this figure.

Lion (mane not quite fully developed) from Eastern Asia, with Lioness.

The Persian or Arabian Lion.—This is stated to be distinguishable by the pale Isabella colour of the fur, and those which have been exhibited in England as Persian Lions certainly bear out this remark; but Captain Smee, to whose interesting paper we shall presently have to call attention, observes that the *Persian Lion* exhibited at the Surrey Zoological Gardens seemed to him to differ but little from individuals known to be brought from Africa. (See the next section.)

Persian Lion.

The Maneless Lion of Guzerat.—The reader will bear in mind the passage above quoted from Pliny (viii. 16), touching Lions which have no mane, and of the origin attributed to them. Cuvier notices the statement, that maneless lions had been found on the confines of Arabia, and merely refers to Olivier, observing that there is no detailed description given of them. A zoological description is doubtless not to be found in Olivier; but he enters somewhat minutely into the subject, as the reader will here see. 'The Lion,' says Olivier (*Voyage dans l'Empire Othoman, l'Egypte, et la Perse*, tom. iv.), 'which inhabits the part of Arabia and Persia near the river of the Arabs, from the Persian Gulf to the environs of Helle and of Bagdad, is probably the species of Lion of which Aristotle and Pliny have spoken, and which they regarded as a different species from that which is spread over the interior of Africa. The Lion of Arabia has neither the courage, nor the stature, nor even the beauty of the other. When he would seize his prey he has recourse to cunning rather than force: he crouches among the reeds which border the Tigris and Euphrates, and springs upon all the feeble animals which come there to quench their thirst, but he dares not to attack the boar which is very common there, and flies as soon as he perceives a man, a woman, or even a child. If he catches a sheep, he makes off with his prey; but he abandons it to save himself, when an Arab runs after him. If he is hunted by horsemen, which often happens, he does not defend himself, unless he is wounded and has no hope of safety by flight. In such a case he will fly on a man and tear him to pieces with his claws; for it is courage more than strength that he wants. Achmed, pacha of Bagdad from 1724 to 1747, would have been torn by one, after breaking his lance, in a hunt, if his slave Suleiman, who succeeded him in the pachalik, had not come promptly to his succour, and pierced with a blow of his yataghan the lion already wounded by his master.'

'We saw,' continues Olivier, 'five individuals of this race in the menagerie of the pacha of Bagdad; they had been there five years and had been taken young in the environs of Bassora: there were three males and two females; the former were a little larger than the latter; and all much resembled the African species, excepting that they were smaller and had no mane. We were assured that they never had any, and that no lion of these countries had one. We have often regretted that we did not ask the pacha for two of them, in order to a close comparison with the African species, and to satisfy ourselves whether the lion of Arabia ought to be regarded as a species distinct from the other, or as a degenerated race.'

In Griffith's Cuvier's 'Règne Animal' there is a notice that a maneless and brownish coloured species of *Felis*, larger than a *Lion*, had been expected to be forwarded from Nubia to the Frankfort Museum.

In December 1833, Captain Walter Smee exhibited to a meeting of the Zoological Society of London the skins of a Lion and Lioness killed by him in Guzerat, and selected from eleven obtained there by him, eight of which he had brought to this country. This Lion, he stated, is distinguished from those previously known by the absence of a mane (that is, it is maneless as compared with other Lions), from the sides of the neck and shoulders, the middle line of the back of the neck being alone furnished with longer hairs, which are erect, like those in the same situation in the *Cheetah* (*Felis jubata*). The under surface of the neck has long loose silky hairs, and there is a tuft at the angle of the anterior legs. Besides the absence of the extensive mane, the tail is shorter than that of ordinary Lions, and is furnished at its tip with a much larger brush or tuft. In this tuft there existed in the oldest of Captain Smee's Lions, subsequently to the arrival of the skin in England, a short horny claw or nail, similar in form to, but somewhat larger in size than, that described by Mr. Woods, and above alluded to.

Captain Smee, who, in the Transactions of the Zoological Society, enters into a very minute description of the arrangement of the hair in this variety, both in the male and the female, observes that both the *African* and *Guzerat Lion* are subject to considerable variations in intensity of colouring. In both the colour is fulvous; but in some individuals, he says, this is much paler than in others, and in the darker specimens there occurs a tinge of red. The middle of the back is the most deeply coloured part, and the under surface is much paler and almost white. Among the hairs there is an intermixture of some which are entirely black, and the greater or less proportion which these bear to the paler ones is the principal cause of the variations in depth of colour that occur in different individuals. Of the *Guzerat Lions* the oldest individual is the lightest in colour. The tail becomes gradually paler towards its extremity, passing into greyish white; its terminal brush consisting of black hairs slightly tinged with brown. Above each eye is a pale space, in which is included a darker coloured spot for the implantation of the supraciliary *vibrissæ*, from twelve to fifteen in number, and of which the longest reaches nearly to the ears. In the *African Lion* these *vibrissæ* are implanted in a darker spot, but this spot is less defined, and is only partially bounded by a paler space. In both the points of insertion of the moustaches are darker than the surrounding parts. Captain Smee does not speak with certainty of the comparative form of these two varieties: but he states his impression to be that the *Lion of Guzerat* is comparatively more rounded and bulky in its body, and rather shorter in its limbs; and that its head especially is shorter, has less of the square form which distinguishes the open face of the male African Lion, and is more rounded on the forehead. But, as he observes, this difference may be chiefly owing to the long hairs which conceal the forehead in the one, while that feature is defined and visible in the other. The *cranium* of the Lion of Guzerat generally resembles that of the African race. Mr. Owen had remarked that the infra-orbital foramina were double in the only lions known to be Asiatic examined by him: in one, killed in North Guzerat, this occurs on both sides; in the other, killed near Assund, it is found on one side only. Captain Smee states that in a young skull of the *Maneless Lion* there exists on one side a double infra-orbital *foramen*, and that the existence of the same structure in another skull contained in one of the skins had been ascertained A male maneless Lion killed by Captain Smee measured, including the tail, 8 feet 9½ inches in length, and his total weight, exclusive of the entrails, was 35 stone (14 lbs. to the stone): the impression of his paw on the sand measured 6½ inches across, and his height was 3 feet 6 inches. A female killed at the same time was 8 feet 7 inches long and 3 feet 4 inches high.

Locality and Habits of the Guzerat Lion.—These maneless Lions are, according to the author last above quoted, found in Guzerat along the banks of the Sombermuttee near Ahmedabad. During the hot months they inhabit the low bushy wooded plains that skirt the Bhardar and Sombermuttee rivers from Ahmedabad to the borders of Cutch, being driven out of the large adjoining tracts of high grass jungle (called Bheers) by the practice annually resorted to by the natives of setting fire to the grass, in order to clear it and ensure a succession of young shoots for the food of the cattle upon the first fall of the rains. They extend through a range of country about 40 miles in length, including various villages, and among others those of Booroo and Goliana, near which Captain Smee killed his finest specimens. They were so common in this district that he killed no fewer than eleven during a residence of about a month; yet scarcely any of the natives, except the cattle-keepers, had seen them previously to his coming among them. The cattle were frequently carried off or destroyed, but this they attributed to *Tigers:* Captain Smee however observes, that the Tiger does not exist in that part of the country. Those natives to whom the Lions were known gave them the name of *Ontiah Baug*, or *Camel Tiger*, an appellation derived from their resemblance in colour to the Camel. They appear to be very destructive to the domesticated cattle, and the remains of a considerable number of carcasses of bullocks were found near the place where Captain Smee's specimens were killed; about ten days previously, four donkeys had been destroyed at the village of Cashwah. Captain Smee could not learn that men had been attacked by them. When struck by a ball, they exhibited great boldness, standing as if preparing to resist their pursuers, and then going off slowly and in a very sullen manner; unlike the Tiger, which on such occasions retreats springing and snarling. Captain Smee states that these Lions are also found on the Rhun near Rhunpor, and near Puttun in Guzerat, and that some persons who saw them in Bombay said that they also occur in Sind and in Persia; he further observes, that should subsequent inquiries prove that Olivier was correctly informed as to the locality from which the *Maneless Lions* seen by him at Bagdad were obtained, and prove also their identity with those of Guzerat, a more extensive geographical range will be established for this curious race than Captain Smee is at present disposed to regard as probable.

Captain Smee remarks that he is aware that the existence of these maneless Lions in Guzerat had been previously although by no means generally known, and quotes Lieut. Col. Sykes as having this knowledge. Sir Charles Malet had also seen Lions on the banks of the Sombermuttee, and though he makes no mention of the absence of the mane, Captain Smee thinks that they in all probability belonged to this maneless race, and indeed Sir Charles attributes to his Lion the native name noticed by Captain Smee above.

Our author makes the following remarks on the passages to be found in the antient writers bearing on this subject: 'Having alluded in the commencement of this communication, to the opinion that a *maneless Lion* was known to the antients, it might be expected that I should here bring forward and discuss the several passages which have been looked upon as supporting this view. Where however the critics are at fault, it would be presumptuous in me to attempt to decide. I own that I do not find in the passages usually referred to any evidence at all satisfactory as regards the existence of Lions destitute of mane; and I am even far from willing to admit that the crisped hairs noticed by Aristotle as distinguishing one race of Lions from another, in which the hairs were either dense or straight, must of necessity be considered as those of the mane rather than of any other part of the body. The language of Oppian is equally obscure, and even the expressions used by him are warmly contested by the critics. Another Greek writer, Agatharchides, the peripatetic, speaks of the Arabian, and especially the Babylonish Lions, in terms that recall Olivier's description of those of Bagdad, but still with no definite application to the want of a mane. Pliny alone, so far as I am aware, mentions the absence of mane as a distinctive mark of one race of Lions; but to this race he attributes a monstrous generation, and he was probably altogether misled with respect to it.'

We may here remark that a maneless Lion is said to be represented on the monuments of Upper Egypt.

Captain Smee thus characterizes his Maneless Lion:—

Felis Leo, Linn., var. *Goojratensis*.—Mane of the male short, erect; tuft at the apex of the tail very large, black. (See *Zool. Proc.*, 1833; and also *Zool. Trans.*, vol. i., where an excellent figure is given.)

Maneless Lion of Guzerat.

Habits of the Asiatic varieties generally, Chace, &c.—The habits of the Asiatic Lions do not differ much from those of Africa, excepting that the former, from the state of the country, frequent the jungles. In India the elephant is generally employed in the chace, which is even now conducted with more pomp and circumstance than in Africa. The grand Asiatic huntings of former times, those of Genghis Khan for instance, will occur to many of our readers. The accounts of most Asiatic modern sportsmen give a most courageous bearing to the Lions in these encounters. One of these states that the Lions in India, instead of running away when pursued through a jungle, seldom take to cover as a refuge at all. On the approach of their enemies, they spring out to meet them openmouthed in the plain. They are thus easily shot; but if they are missed or only slightly wounded, they are most formidable adversaries. They are even said to have sprung on the heads of the largest elephants, and to have fairly pulled them to the ground, riders and all.

Reproduction of the Lion, &c.—The Lioness is said to go with young five months, and produces generally from two to three or four,* at a litter, which are born blind. Three, two males and a female, were whelped in the Tower on the 20th October, 1827, the day of the battle of Navarino; but the number seems generally to be two. In captivity the Lioness usually becomes very savage as soon as she becomes a mother; and in a state of nature both parents guard their young with the greatest jealousy. Mr. Bennett relates that in the commencement of the year 1823, General Watson, then on service in Bengal, being out one morning on horseback armed with a double-barrelled rifle, was suddenly surprised by a large male Lion, which bounded out upon him from the thick jungle at the distance of only a few yards. He instantly fired, and the shot taking complete effect, the animal fell dead almost at his feet. No sooner had the Lion fallen than the Lioness rushed out, which the General also shot at, and wounded severely, so that she retired into the thicket. Thinking that the den could not be far distant, he traced her to her retreat, and there dispatched her, and in the den were found two beautiful cubs, a male and a female, apparently not more than three days old. These the General brought away; they were suckled by a goat, and sent to England, where they arrived in September, 1823, as a present to George IV., and were lodged in the Tower. The male was the animal from which Mr. Bennett gives his figure and description of the Bengal Lion, and the female was the mother of the cubs whelped in the Tower, above alluded to. (*Tower Menagerie.*) The young are at first obscurely striped, or brindled, and somewhat tiger-like in the coat. There is generally a blackish stripe extending along the back, from which numerous other bands of the same colour branch off, nearly parallel to each other on the sides and tail. The head and limbs are generally obscurely spotted. When young they mew like a cat; as they advance, the uniform colour is gradually assumed, and at the age of ten or twelve months the mane begins to appear in the males; at the age of 18 months this appendage is considerably developed, and they begin to roar. (Bennett.) M. F. Cuvier states that it is nearly the third year before the mane and the tuft on the tail appear, and that they are not fully developed before the seventh or eighth year. It should however be borne in mind that the Bengal Lion mentioned by Mr. Bennett, and figured by him, was magnificently maned, and he was little more than five years old. The period of shedding the milk-teeth is very often fatal to the young animals in a state of captivity. The natural period of a Lion's life is generally supposed to be 20 or 22 years. Such is Buffon's limitation, but the animal will, it seems, live much longer. Pompey, the great Lion which died in 1760, was said to have been in the Tower above seventy years; and one from the river Gambia is stated to have since died there at the age of sixty-three.

The Lion, from its power and supposed generosity of disposition, has been popularly hailed as the king of beasts. and considered as the emblem of majesty and might. It is the symbol of the British nation, and is borne in the royal arms,† of which it forms one of the supporters, and which it surmounts as the crest.

The generosity of disposition so liberally accorded to this powerful beast has been much and eloquently praised. It seems almost sacrilegious to dissipate the glowing vision which Buffon has raised; but if there is any dependence to be placed on the observations of those travellers who have had the best opportunities of judging, and have the highest character for veracity, we must be compelled to acknowledge that Buffon's lion is the lion of poetry and prejudice, and very unlike the cautious lurking savage that steals on its comparatively weak prey by surprise, overwhelms it at once by the terror, the weight, and the violence of the attack, and is intent only on the gratification of its appetites. 'At the time,' says Mr. Burchell, 'when men first adopted the lion as the emblem of courage, it would seem that they regarded great size and strength as indicating it; but they were greatly mistaken in the character they had given of this indolent animal.' The fact of the Lion sparing the dog that was thrown to him, and making a friend of the little animal that was destined for his prey, has been much dwelt on; but these and other such acts of mercy, as they have been called, may be very easily accounted for. If not pressed by hunger, the Lion will seldom be at the trouble of killing prey; and the desire for a companion has created much stronger friendships between animals in confinement than that between a lion and a little dog.

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* Cuvier quotes Philostratus for the fact that Apollonius of Tyana saw near Babylon a Lioness that was killed and carried eight young ones; there were, it appears, in the time of Apollonius a great many Lions between the Hyphasis and the Ganges. This testimony, however, is of little or no value.

† Captain Smee remarks, in allusion to the hybrid mentioned by Pliny, that it is by no means improbable that the maneless feline beast which occurs in the older armorial bearings may have been intended to represent a Lion leoparded. This term, he observes, is still in use among the heralds of France, but is employed by them with reference only to the position of the head; if the full face is shown, the animal, whether maned or maneless, is in their language a leopard; if the side face alone is seen, it is a lion. Hence with them the lions passant and gardant of the arms of the kings of England would be either lions leoparded or leopards maned. The Captain goes on to state that the omission of the mane, in rude tricking, would indeed reduce them to leopards, and as such they were originally regarded. The emperor Frederic II., in choosing his present of three leopards to our Henry III., was actuated, according to Matthew Paris, by the bearing in the royal shield of England, 'in quo tres leopardi transeuntes figurantur.' ('Zool, Trans.')

The Lion is easily tamed, and capable of attachment to man. The story of Androdus, frequently called Androcles, is too well known to need more than allusion, and we learn from Bell's 'Travels' that the monarch of Persia had on days of audience two great Lions chained on each side of the passage to the state-room, led there by keepers in golden chains. Every wild-beast show almost has its tame Lion, with which the keeper takes the greatest liberties; liberties which the beast will suffer, generally speaking, from none but him. All these exhibitions have however been entirely eclipsed by the feats of Mr. Van Amburgh, who exercises a complete control over the Lions and other great *Felidæ* which he has subjected to his will.

HYBRIDS.

The Lion and Tigress will, under certain circumstances, produce young. This has happened twice in England. Sir William Jardine gives the figure of one of a litter so bred, and exhibited in Atkins's collection, where they were whelped, in 1827: they died young. Sir William Jardine correctly describes the colour of the whelps as brighter than that of the Lion, and the bands as better marked than they generally are in the true-bred young lion. The specimen figured by Sir William is in the Edinburgh museum. Another litter from similar parents was whelped at Windsor; but these also died before they came to maturity. There does not seem to be much difficulty in promoting this union.

Lion-Tiger Cubs.

PUMA, OR AMERICAN LION.

The uniformity of colour in this great cat, combined with considerable ferocity, were probably the reasons which induced early travellers in America, who heard of it perhaps with circumstances of exaggeration, or caught hasty glimpses of it not unaccompanied with terror, to state that there were Lions in America. Thus, John de Laet (1633) says, that Lions are found in Peru, though they be few, and not so ferocious as they are in Africa, and that they are called in the native tongue *Puma*. In an old tract (1649), entitled 'A Perfect Description of Virginia,' we find among the 'Beasts great and small,' 'Lyons, Beares, Leopards, Elkes,' &c; and Garcilasso tells us of the Puma, or Lion of Peru. In Hernandez (Romæ, 1651) there is a long account of the animal under the name of '*Puma*, seu *Leo Americanus*;' and reasons are given to show that it is not a true lion.[*] In Piso the animal is noticed as the *Cuguacuara*, and by Marcgrave as the *Cuguacurana* of the Brazilians; hence the French name *Couguar*. Charlevoix describes it clearly enough under the name of *Carcajou*, or *Quincajou*; this name Pennant thinks that Charlevoix gives by mistake. In D'Azara's *Gouazouara* of Paraguay we again trace the French name of this animal. Lawson and Catesby both describe it under the name of the *Panther*, by which designation it is known to the Anglo-Americans up to this day. It is the *Felis concolor* of Schreber and of zoologists generally, and though Linnæus is often quoted as the author of the name, it will not be found in his last edition of the *Systema Naturæ*. In Gmelin's edition it appears as *Felis conclor* (an error for *concolor*), with Schreber's description. It is the *Felis Puma* of Traill.

The reader will find in the 'Proceedings of the Zoological Society of London' (1833) a detailed account of the dissection of a Puma that had died at the Society's garden. The whole paper will well repay perusal, but our limits will only permit us to notice that point in which, it is allowed, one of the greatest differences obtains among the cats. This point is that part of the structure which is connected with the organs of voice, and, as Mr. Martin observes, some according modification must necessarily produce the deep-toned roar of the *Lion*, the snarl of the *Jaguar*, and the hissing cry of the *Puma*. 'The distance between the tongue and the *larynx* in the *Lion*,' says Mr. Martin, 'has been brought more than once under the notice of the Society; in the *Jaguar* this distance, comparatively speaking, is nearly as great; but in the *Puma*, an animal equal, or nearly so, in size to the *Jaguar*, the distance is reduced to an inconsiderable space, an inch, or an inch and a half, according as the tongue is more or less protruded. In addition to this it is worthy of observation that the circumference of the *larynx* in the *Puma* is also very inconsiderable; compare, for example, the *larynx* of the *Jaguar* with that of the present animal, both natives of the wilds of the American continent. In the *Jaguar* we find a larynx indicating, from its general magnitude, considerable depth in the intonations of the voice; whereas in the *Puma*, if we take either its diameter, or its distance from the termination of the palate and base of the tongue, we are led to expect neither the roar of the *Lion* nor the growl of the *Jaguar*, but the shrill tones of an animal, ferocious indeed, but of all others of the genus perhaps the most stealthy and insidious.' Mr. Martin stated that he thought that he had observed a kind of mutual correspondence between the voice and the habits of animals, and expressed his intention of offering a few observations on that point on a future occasion.

Description.—Adult Male. No mane. Silvery fawn *above*, sometimes reddish, the tawny hairs of the upper parts whitish at the tips; nearly white *beneath*, and on the inside of the limbs, whitish on the throat, chin, and upper lip. Head black and gray irregularly mixed; ears on the outside, and particularly at their base, sides of the muzzle whence the whiskers spring, and end of the tail (which has no tuft) black. Length from nose to tail about four feet; tail rather more than two.

Female coloured like the male. Head small when compared with his.

Young.—Back marked with three chains of spots, which are generally of a blackish brown; dispersed spots or markings on the neck, shoulders, and sides. N.B. As the animal advances in age these markings become more and more obscure, till they are at last lost in the uniform colour.

A specimen of a young *Puma* exhibited at a meeting of the Zoological Society in 1831 was, like the young of the other species of *Felis*, variously spotted and striped, the depth of its markings approaching nearly to black, and being more intense than that observed in the Lion. The muzzle was nearly black, as was also the greater part of the tail. This young one had been recently brought forth at the Society's garden, but died immediately; it was strongly contrasted with a specimen of the adult placed on the table for comparison.

Geographical Distribution.—North and South America. There is reason to think that it was formerly to be found from Canada to Patagonia, with an extensive range to the east and west, but its geographical area has been very much diminished, and is daily becoming more and more contracted before that civilization which is in our own time obliterating more species than one. Mr. Washington Irving ('Astoria') mentions it as being about the mouth of the Columbia River.

Habits, Chace, &c.—Lawson (*Carolina*) gives the following characteristic account of the Puma. 'The *Panther* is of the cat's kind; about the height of a very large greyhound, of a reddish colour, the same as a Lion. He climbs trees with the greatest agility imaginable, is very strong limbed, catching a piece of meat from any creature he strikes at. His tail is exceeding long, his eyes look very fierce and lively, are large, and of a greyish colour; his prey is swine's flesh, deer, or any thing he can take; no creature is so nice and clean as this in his food. When he has got his prey he fills his belly with the slaughter, and carefully lays up the remainder, covering it very neatly with leaves, which if any thing touches he never eats any more of it. He purrs as cats do; if taken young, is never to be reclaimed from his wild nature. He hollows like a man in the woods when killed, which is by making him take a tree, as the least cur will presently do; then the huntsmen shoot him; if they do not kill him outright he is a dangerous enemy when wounded, especially to the dogs that approach him. This beast is the greatest enemy to the planter of any vermin in Carolina. His flesh looks as well as any shamble's-meat whatsoever; a great many people eat him as choice food, but I never tasted of a panther, so cannot commend the meat by my own experience. His skin is a warm covering for the Indians in winter, though not esteemed among the choice furs. This skin dressed makes fine women's shoes or men's gloves.'

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[*] It seems to be the Miztli of Fernandez in the catalogue at the end of the work. The names Tlatlauhqui, Ocelotl, and Tlalocelotl evidently refer to the Jaguar.

We may here observe, without throwing doubt on other parts of Lawson's description, which is, generally speaking, confirmed by others, that, like many other writers, he has been too hasty in speaking of the irreclaimable nature of his animal. We can testify to the amiable qualities of the late Mr. Edmund Kean's 'Tom.' The Puma, so called, which belonged to this extraordinary actor was perfectly tame, and followed him about like a dog. Nor is this the only instance of the docility of this species. Mr. Bennett observe that in captivity the Puma readily becomes tame, and that his manners closely resemble those of the domestic cat; 'like it,' continues Mr. Bennett, 'he is extremely fond of being noticed, raises his back and stretches his limbs beneath the hand that caresses him, and expresses his pleasure by the same quiet and complacent purring. They soon become attached to those with whom they are familiar; and numerous instances might be mentioned in which they have been suffered to roam almost at large about the house without any injurious results.' (*Tower Menagerie.*)

Charlevoix ('Journal,' vol. i.) gives a rather curious account of the Carcajou[*] going a hunting with three foxes; and of his lying in wait on a tree for the elk and leaping down upon him as he passes under.

It seems to be generally agreed that the Puma is a most destructive species; for when it meets with a herd of animals it will slay in all directions, sucking only a small portion of blood from each victim. To sheep, fifty of which, it is said, to have been known to kill in one night, it is most destructive, and the squatter well knows the ravages that it will make among his hogs. Though an expert climber, it is said to haunt in South America the marshy meadow lands bordering on the rivers rather than the forest. In the Pampas it must affect the comparatively open country; for there, as we shall presently see, it[†] is commonly taken by the lasso. In the northern districts the swamps and prairies are its principal haunts; and its prey, where flocks and herds are not, deer principally, upon which it is said to drop in the manner described by Charlevoix with regard to the elk.

The chace of this animal is conducted, in different parts of the American continent, according to the prevailing manners of the people who go forth to hunt it. Thus Captain Head relates that as soon as the dogs unkennel a Lion[‡] or Tiger[§] they pursue him until he stops to defend himself. If the dogs fly upon him, the Guacho jumps off his horse, and, whilst he is engaged with the dogs, knocks him on the head with the balls; but if the dogs bay and do not go boldly in, the Guacho throws his lasso over him, and gallops off, dragging him along the ground, while the hounds rush upon him and tear him. In the north, he generally falls by the rifle, after he is 'treed' by the hunting party. Audubon gives a most lively account of an expedition of this kind, headed by a squatter on the banks of the Coldwater River, which ended in the Puma's death. The 'cougar,' or 'panther,' as Audubon terms him, was driven 'to tree' twice, and each time received balls in that situation. Several go in company generally, for when the infuriated animal has had to deal with one hunter only the consequences have been sometimes fatal to the latter.

Cuvier remarks, that as it would appear that this animal extends, or did extend, from California to Patagonia, he has been careful in his researches to discover whether there were not many species, or at least varieties, in this great extent of country; the conclusion at which he arrived was, that one species only existed.

The reader must bear in mind that there is another cat of a uniform colour, *Felis unicolor*, Traill, which is said to inhabit the forests of Demerara and is one half less than the Puma. The *Black Couguar, Felis discolor*, is allowed by some zoologists and rejected by others.

Puma. (Felis concolor.)

Sir William Jardine describes as the Black Puma an animal about 33½ inches long, without including the tail, which is about 13, and of which he gives a figure taken from a specimen brought in a merchant vessel to Greenock. He gives as synonyms *El Negro* of D'Azara and *The Black Cat of America* (Griffith's 'Synopsis'), both with a note of interrogation. Sir William adopts *Puma* as a genus, and gives the following species:—*P. concolor; P. nigra; P. Eyra; P. Pujeros; and P. Pujeros chalybeata.*

Fossil Lions.

Remains of the *Felis Spelæa* of Goldfuss, *Höhlenlöwe*, or Lion of the caves, have been found in the caverns of Franconia, &c. For an account of the four great fossil cats, some as large as the Lion, enumerated by Professor Kaup from the Epplesheim sand, see Felidæ, vol. x., p. 224, and for a detailed list of fossil cats see that article and Tigers.

LIP. [Hare Lip.]

LI'PARI ISLANDS, the antient Æoliæ Insulæ, or Liparæan Islands, are a group of small islands, situated between Calabria and the northern coast of Sicily, and between 38° 20′ and 38° 50′ N. lat. and 14° 10′ and 15° 13′ E. long. They are mentioned by the antient geographers as seven in number. Strongyle (now Stromboli), so called from its round form; Lipara, now Lipari; Hiera, or Vulcania, now Vulcano; Didyme, now Saline; Phœnicodes, now Felicudi; Ericodes, now Alicudi; and lastly Euonymos, which some think is the present uninhabited rock called Liscabianca, while others suppose it to be the inhabited island of Panaria. There are several other smaller islands, or rather rocks, such as Liscanera, Basiluzza, &c., which belong to the same group, but are uninhabited and barren. The principal islands are ranged as follows:—1, Stromboli, the most northern and the nearest to Calabria, is about 40 miles west of the Gulf of Sant' Eufemia: it consists of a conical mountain nearly 3000 feet high, which is a constantly burning volcano and has very frequent eruptions. It rises abruptly from the sea on all sides, except on the north-east, where the declivity of the mountain is more gradual, and allows of a cultivated space between it and the sea, which produces cotton and some wine, and is inhabited by about 300 people. The island is about 12 miles in circuit. The flames of the crater are a constant light to the sailors in that sea. 2. Panaria, about 10 miles south-west of Stromboli, is an extinct volcano, the crater of which slopes on one side to the sea-shore; the bottom or funnel of it is cultivated by a few individuals who are also fishermen. 3. Lipari, about five miles south-west of Panaria, the largest and most important island in the group, is a bishop's see, and the residence of a military governor; it is above 20 miles in circumference, and contains about 12,500 inhabitants. It has several mountains with volanic craters now extinct, though they emitted flames in the time of Strabo: it also contains mineral springs, and abundance of pumice stone, brimstone, lava, obsidian, and other volanic products. The land, which is very fertile, produces cotton, olives, and grapes, from which a luscious sweet muscat wine is made, called 'Malvasia di Lipari,' which, as well as dried raisins, forms an article of export. The inhabitants of Lipari are industrious. The town of Lipari, which has a harbour, is on the eastern coast of the island; it contains a castle, several churches, and some remains of antiquity. Lipari is said to have been colonized by Greeks from Cnidus; it was afterwards occupied by the Carthaginians, and became an important station for their fleets during their occupation of Sicily. During the first Punic war it came into possession of the Romans. It was ravaged by Khair Eddin Barbarossa in the year 1544, who took the town and carried all the inhabitants into slavery. 4. Two miles south of Lipari is Vulcano, with a crater, not quite extinct, which emits smoke; the island is barren and deserted. Strabo mentions three volcanic vents which might be considered as so many different craters; and he adds that the largest ejected lava. 5. Four miles north-west of Lipari is the island of Saline, 16 miles in circumference, with several villages, and about 4000 inhabitants. It consists of two mountains separated by a deep valley which runs from north to south, and being seen in that direction at a distance from the sea, it has the appearance of being divided into two islands, which is the origin of its name Didyme, or double. The valley is extremely fertile in wine, fruit, pulse, &c. 6. Ten miles west of Saline is Felicudi, or Felicuri, about 10 miles in circumference, with a few hundred inhabitants; it produces corn, fruits, and wine. 7. About eight miles west of Felicudi is the small island Alicudi, the most western of the Lipari group; it is hilly and not very productive, has some pastures, and about 200 inhabitants. In these two last-mentioned islands there is no appearance of any volcano. The best description of the Lipari Islands is that by Dolomieu, *Voyage aux Isles de Lipari*, in 1783; see also Ortolani, *Dizionario Geografico della Sicilia*, 1819; Houel, *Voyage Pittoresque de Lipari, Sicile, et Malte*, fol., 1782; Neigebaur, *Gemälde Italiens;* Strabo, p. 275; Pliny, *Nat. Hist.*, iii., 9.

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[*] Dr. Richardson observes that Charlevoix applies the appellation of *Carcajou* to the Canada Lynx, the name of *Carcajou* being proper to the Wolvereue, which mistake, the Doctor adds, has produced some confusion of synonyms among subsequent writers. Pennant refers to the passage given in the text, and says that Charlevoix by mistake calls the Puma *Carcajou*. See the articles Gulo, Lynx.

[†] *P. Pajeros?* See post, opposite column.

[‡] Puma.

[§] The Jaguar is often called the *Tigre*. See also Hernandez, where it is named *Tigris Mexicana*.

The Islands of Lipari form part of the Intendenza, or administrative province, of Messina.

LIPPE, River. [RHINE.]

LIPPE. This principality probably derived its name from the river Lippe, on which the town of Lippe was built in the twelfth century. The ancestors of the family now reigning were reckoned in the twelfth and thirteenth centuries among the 'Primates Westphalorum,' and were the hereditary possessors of extensive countries. Bernhard von der Lippe obtained in 1127 the town of Lemgo from the emperor Lotharius; and he and his brother Hermann are mentioned for the first time with the title Von der Lippe in a document of the year 1129. Bernhard II., his son, a friend of Henry the Lion, appeared with a numerous retinue of well armed knights at the diet held at Mainz by the emperor Frederic I. In 1184 Bernhard III., obtained the lordship of Rheda by marriage in 1230. His grandson Simon I. inherited part of the county of Schwalenberg, and established in 1368 the *Pactum Pacis*, by which the eldest son only was to reign. Bernhard VIII., who died in 1563, was the first who took the title of Count von der Lippe. His son Simon VI. is the immediate founder of the present line. He divided his possessions among his three sons, of whom Simon VII., founded the line of Detmold, Otto (Otho) that of Brake, and Philip that of Bückeburg, or Schaumburg. The line of Brake becoming extinct in 1709, on the death of Louis Ferdinand, Count Adolphus of Lippe Detmold took possession of the country, without regarding the rights of Bückeburg, but the imperial Aulic council, by judgments passed in 1734 and 1737, assigned half of the country to Schaumburg Lippe, and the two houses concluded a convention in 1748.

LIPPE DETMOLD, consisting of the counties of Lippe and Sternberg, and part of that of Schwalenberg, forms a compact territory situated between 51° 45′ and 52° 10′ N. lat., and 8° 34′ and 9° 20′ E. long. It is bounded on the north-east by Schaumburg (more properly Schauenburg), belonging to Hesse Cassel; on the east by Calenberg (Hanover) and the county of Pyrmont; and on the north-east, south-east, south, and west by the Prussian province of Westphalia. The small bailiwick of Lipperode, with the town of Lippstadt (half only of which belongs to Lippe Detmold, and the other half to Prussia), lies detached, being entirely surrounded by Westphalia. The area of the principality is 435 square miles, and the population 80,000.

The country is mountainous but well wooded, and rich in the usual German products. The wooded chain Osning, commonly called by geographers the Teutobergerwald, commencing from the left bank of the Dimel near Stadtbergen in Westphalia, crosses the circle of Paderborn under the name of the Egge, and enters Lippe Detmold at Horn, whence it extends into the county of Ravensberg. The Osning, here called the Lippescher Wald (*i.e.* forest of Lippe), forms in the country three chains running parallel to each other from south-east to north-west, of which the first bounds the tract called the Senner Heath; the central one, which is the highest, contains the celebrated Extersteine, which are grotesque groups of sandstone rocks, where it is supposed that the antient German priests performed their ceremonies by moonlight; and the third is turned towards the valley of the Werra. The Osning divides the valleys of the Rhine and the Weser, the streams on the right running into the latter, and those on the left, for the most part, into the former river. The Weser, the only navigable river, just touches the northern frontier of the principality for a short distance, and receives the Emmer, the Exter, the Werra, the Bega, and some other small streams. The Ems rises at the foot of the Stapelagerberg, a branch of the Osning, crosses the Sennerheath, and soon enters the province of Westphalia. The Lippe merely touches the bailiwick of Lipperode and the town of Lippstadt. Vast forests of oak, beech, and other timber clothe the higher parts of the mountains, while on the slopes there is the finest arable land. The climate is temperate but not pleasant; the atmosphere is frequently loaded with fogs and vapours; the winter is cold and wet; the summer, especially in the Heath, very hot. The natural productions are corn, flax, hemp, potatoes, rapeseed, garden vegetables, and timber. The inhabitants have the common domestic animals, small four-footed game, poultry, feathered game, fish, and bees. The mineral products are plaster of Paris, lime, clay, marble, and freestone; and there is a salt-spring from which 36,000 bushels of salt are annually obtained. The staple productions are flax and timber, of which large quantities are exported. The breed of horned cattle is good, and sufficient for home consumption; that of sheep has been very much increased and improved of late years. Swine and goats are numerous. The horses bred on the Senner Heath are hardy and spirited, and are esteemed some of the best saddle-horses in Germany. There are no manufactures of any importance. Thread, coarse yarn, and linen are made in some parts, chiefly by the peasantry after their labours in the field are concluded; there are likewise several tanneries and brandy distilleries, two glass-houses, five paper-mills, and many oil-mills and saw-mills. The exports, besides flax and timber, are some cattle, linen, and Meerschaum tobacco-pipes manufactured at Lemgo.

The religion of the prince and the great majority of the inhabitants is Calvinism; but the inhabitants of Lemgo and Lippstadt, and a small portion of those of Detmold, in all about 5400, are Lutherans, and there are in the principality about 1600 Roman Catholics. The government is monarchical, with an assembly of estates consisting of 21 members, which, according to the constitution of 1819, introduced by the Princess Pauline as regent during her son's minority, has much more extensive powers than any other representative assembly in Germany. The public revenue is 490,000 florins. The contingent to the army of the German confederation is 690 men, and to the common treasury 250 florins per annum. Lippe-Detmold, with Schaumburg-Lippe, Reuss, Hohenzollern, Liechtenstein, and Waldeck, has the sixteenth vote in the diet, and in the full council one vote of its own.

Detmold, the capital, situated on the Werra, consists of the old and new town, of which the latter is very pleasant, and has some delightful public walks and gardens. The chief buildings are the palace, the gymnasium, and the theatre. There are a gymnasium, a seminary for schoolmasters, a school of industry, a Bible society, a society for the promotion of Christianity among the Jews, an hospital, &c. The number of the inhabitants is 2500. Lemgo on the Bega, a walled town with seven gates, has 4000 inhabitants, who carry on various manufactures, especially of woollen, linen, leather, and tobacco-pipes, of which the last is very considerable. The town has one Lutheran and two Calvinist churches, and a good gymnasium. Among the public buildings are two houses belonging to the prince, called the Lippenhof and the Annenhof, the nuns' convent built in the fourteenth century, and the orphan-house.

SCHAUENBURG-LIPPE consists of four bailiwicks in the county of Schauenburg and three in the county of Lippe, which are surrounded by Hanover, the Hessian part of Schauenberg, Lippe-Detmold, and Westphalia. It is 210 square miles in extent. The population is 25,000, who profess the Lutheran religion, except 3500 Calvinists in Alverdessen and Blomberg, and 100 Roman Catholics. The country, which is in general mountainous, has no rivers except small affluents of the Weser: the Stein-hude lake is about 5 miles long, 2½ broad, and at most 6 feet deep. The country produces corn, pulse, potatoes, turnips, rape seed, flax, fruit, timber, horned cattle, sheep, swine, goats, horses, poultry, game, and fish. Its mineral products are coals, stone, and lime. There are no manufactures, except some of thread and linen carried on by the peasantry. The revenue is 215,000 florins (about 21,000*l.* sterling). The country has had ever since 1816 an assembly of estates, which consists of 13 members, and meets annually. The chief town and residence of the prince is Bückeburg on the Aa, which has a population of 2427 inhabitants. There are a Lutheran and a Calvinist church, a gymnasium, an orphan-house, &c., but no remarkable buildings. Stadthagen, a walled town with three gates, has 1485 inhabitants. There are in the town a palace, which is the usual residence of the princesses dowager, a Latin school, and other public institutions; and the church, with the splendid mausoleum erected by Prince Ernest. In the neighbourhood there are coal-mines and considerable stone-quarries. Schauenberg-Lippe, as a member of the German confederation, has one vote in the general council and part of the sixteenth vote with Lippe-Detmold, &c. Its contingent is 240 men, and its payment to the treasury 250 florins.

(Von Donop, *Hist. Geog. Beschreibung der Lippeschen Lande;* Stein, *Geogr. Lexicon;* Hassel, *Handbuch der Erdbeschreibung*.)

LI'PSIUS, JUSTUS, was born at Isque, a village between Brussels and Louvain, the 18th of October, 1547. He was educated at Brussels, Cologne, and Louvain, and at the age of nineteen published 'Variæ Lectiones' of some of the principal Roman authors; this work was so highly esteemed by his learned contemporaries, that he was received with distinguished honour at Rome, whither he went in the same year, by the Cardinal Granvelle and Pope Pius V. After remaining two years at Rome he was appointed professor of history at Jena, where he resided till 1574. In 1579 he was appointed professor of history at Leyden, and took an active part in the ecclesiastical disputes of the times. During his residence at this place he professed the Reformed religion, but on quitting Leyden in 1591 he returned to the Roman Catholic church, in which he had been brought up, and published two treatises in defence of the worship of saints and their miraculous powers (*Diva Virgo Hallensis*, 1604; *Diva Virgo Sichemiensis*, 1605). He was afterwards professor of history at Louvain, where he remained till his death, March 24, 1606.

The works of Lipsius, which are very numerous, were collected and published at Antwerp in 1637; and also at Wesel in 1675; they consist of notes on the Latin authors, of which the commentary on Tacitus is the best, and is very useful; treatises on moral and political philosophy, and dissertations on Roman antiquities and historical subjects.

LIPU'RA, Illiger's name for the *Tailless Marmot* of Pennant. [HYRAX, vol. xii., p. 417.] Note, the species is marked as doubtful by Dr. Fischer, as far as regards *Hyrax*.

LIPU'RUS, a generic name given by Goldfuss to a species? of Wombat (*Phascolarctos*), marked as doubtful by Dr. Fischer.

LIQUATION, or ELIQUATION, a process by which silver is sometimes separated from copper; it is an old method, which has fallen considerably into disuse on account of the trouble and expense attending it. When copper contains silver in the proportion proper for this operation, it is at a certain stage of the process of reduction mixed with lead, which has little affinity for the copper, but combines easily with the silver; the lead holding the silver is then worked off on a cupel in the usual way, and the silver is obtained separate. (Aikin's *Dictionary of Chemistry*, vol. ii., p. 367.)

LIQUIDAMBAR, a genus of plants of the natural family of Balsamifluæ of Blume, which has been altered to *Balsamaceæ* by Dr. Lindley. The name is derived from *liquidum*, fluid, and *ambar*, the Arabic name of amber. The genus is closely allied to the willow and plane tribes, but distinguished from both by its two-lobed, two-celled, many-seeded capsules, and their albuminous embryo. The species are only three in number, all forming fine trees, and occurring in Java, the Levant, and North America. *Liquidambar styraciflua* is the species found in Mexico and the United States, in the latter of which it is called *sweet gum*, and forms a large and fine tree, bearing some resemblance to the lesser maple (acer campestre): the wood is of a hard texture and fine grain, and makes handsome furniture, but the tree is more noted for the fragrant liquid resin which exudes from incisions in the stem, though not very copiously. This is called *liquidambar*, oil of liquidambar, and *copalm* balsam, which has a pleasant balsamic odour, and an aromatic bitter taste. This becoming dry and opaque, forms what is called *soft* or *white* liquidambar, which resembles very thick turpentine, has a feebler odour than the liquid balsam, and contains less volatile oil, but more benzoic acid. *L. orientalis* is a small tree, a native of Cyprus and other parts of the East Indies; was introduced into the Jardin des Plantes from Smyrna, and is said to occur along the Red Sea. Dr. Pocock, as quoted by Dr. Lindley, states that it is called Xylon Effendi (the wood of our Lord), in Cyprus, where it produces an excellent white turpentine, especially by incisions made in the bark. It is this substance perhaps which is alluded to in many works by the name *Rosa malla*, or *mallos*, described as a balsamic fluid produced upon the island of Cabross, at the upper end of the Red Sea near Cadess, which is three days' journey from Suez. But there are no recent accounts of this substance, which is thought by some authors to be procured from the following species.—*L. altingia* of Blume is a native of the forests of Java, at elevations of 2000 to 3000 feet above the level of the sea. It forms a gigantic tree, with bark having a hot and bitterish taste, yielding a fragrant balsam, or liquid storax, the *rasamola* of the Malayan Archipelago, though there is no proof that the liquid storax known in Europe is obtained from it, and it does not grow near the localities whence liquid storax has so long been obtained. It is therefore probable that some portion is obtained by boiling the branches of styrax officinale, or acting upon them with oil, spirit, or naphtha. [STYRAX.]

The subject is interesting as connected with antient commerce, inasmuch as old writers mention a *liquid* with the *solid* storax. By the Arabs the former is described under the name *mia-saileh*, liquid storax; and the latter, *mia-yabseh*, solid storax. Both are described by Serapion under the head *Miha;* by Avicenna under the several heads of *Lubnee*, *Astaruk*, and *Miha*. The name *mia-saileh*, with the affix *rus* (juice), would appear to be the origin of the Malayan *Rasamola*, and thus one which has been variously corrupted.

LIQUORICE. [GLYCYRRHIZA.]

LIRIODENDRON. [TULIP TREE.]

LIRIS. [CAMPANIA.]

LISBON (LISBO'A, in Portuguese), the capital of the kingdom of Portugal, is situated on the northern bank of the Tagus, about nine miles above the bar or entrance of the river, in 38° 42′ N. lat. and 9° 5′ W. long. It rises in the form of an amphitheatre from the bank of the river, being built on a succession of hills, the highest of which are the hill of Buenos Ayres, or Estrella, to the west, and the castle-hill to the east. Most of the streets are steep, irregular, and tortuous, besides being ill paved and dirty. One part of the city however, which has been entirely rebuilt since the great earthquake of 1755, is regular and handsome; it lies on even ground in a valley which runs in a direction at right angles to the river, between the castle-hill to the east, and the hills of S. Francisco and Do Carmo on the west. This space contains about eight or nine well-built parallel streets, some of them, such as the Rua

Augusta, tolerably wide, and nearly half a mile in length, containing the best shops in Lisbon, especially those of the goldsmiths, silversmiths, and jewellers. These streets are crossed at right angles by other streets, and they terminate on the river side in a handsome square called Praça de Commercio, one side of which is formed by the Tagus, and the other sides by the arsenal, the custom-house, the exchange, royal library, and other public buildings. This square is adorned with a bronze statue of king Joseph I. At the opposite or north end of the above-mentioned streets are two squares, the Praça da Figueira, or market-place, and the Praça do Rocio, the latter of which is bounded on one side by the convent of S. Dominic and the massive buildings formerly occupied by the Inquisition. Farther north going towards the country is the Passeio Publico, or promenade, which however is small, and very inferior to the public gardens of other capitals.

The eastern part of the town, which lies at the foot of and beyond the castle, consists of narrow, irregular, ill-paved streets, with a neat house here and there. This is the oldest part of Lisbon, and the houses are high and old fashioned. It is remarkable that while the earthquake destroyed all the buildings in the valley, it spared the houses built on the steep declivity of the hill.

To the westward of the new streets the town rises on the steep declivity of a succession of hills, with a few good streets and open places here and there, especially along the river side, the rest of the streets being crooked, narrow, and filthy. Here and there are massive buildings, chiefly convents and churches, which crown the summits of the hills, and tower above all the rest. Lisbon being an open town like London, aud its suburbs very long and straggling in various directions, it is not easy to define its limits. Its western boundary however is generally fixed at the stream of Alcantara, which falls into the Tagus, and from thence to the eastern extremity of the town the length in a straight line is between three and four miles, not reckoning the sinuosities of the ground; the depth of the town from the Tagus inland varies from one mile to a mile and a half, not including the long straggling lines of houses which extend along the approaches to the town. The whole of the area thus described is however far from being thickly covered with buildings; many parts are occupied by extensive gardens, plantations, the naked steep declivities of the hills, and by ruins and rubbish. The district of Buenos Ayres, along the slope of the western hill, is the least densely built, and contains many pleasant and healthy residences with gardens, which are mostly occupied by foreigners. West of the bridge of Alcantara a line of streets parallel to the Tagus connects Lisbon with the market-town and royal residence of Belem, or Bethlehem. [BELEM.]

The Tagus from Belem up to the western end of Lisbon is little more than one mile in width, but opposite the centre of Lisbon it widens considerably, the left or southern bank turning suddenly to the south near the town of Almada, and forming a wide bay or reach about five or six miles in breadth, and extending far to the north-east. This bay gives to the river in front of Lisbon a sea-like appearance, which adds to the effect of the scenery. The southern bank, which is hilly about Almada, becomes low higher up the river, and is swampy at low water; it is however studded with small towns and villages, such as Aldea Gallego, Mouta, Alhosvedos, Lavradio, Barreiro, Coina, Seixal, Casilhas, Montella, and Almada. These places keep up a constant traffic with Lisbon, which they supply with fruits, vegetables, wine, &c., besides being the medium of intercourse between the capital and the southern provinces of the kingdom, and also with Spain by the post-road of Badajos.

The broad Tagus gives to Lisbon a most splendid and safe harbour, which might contain all the fleets of Europe. The largest men of war can anchor close to Lisbon. The entrance of the river is defended by two forts, St. Julian on the north bank, and Bugio on a small island opposite, which is joined to the southern bank at low water.

The most striking and imposing buildings of Lisbon are its vast and massive convents, which crown the hills, and look like palaces and fortresses; before the late suppression of the monasteries they gave to Lisbon a monkish appearance. The wealth of these convents and the number of their inmates have been much exaggerated by party writers ever since the time of Pombal. Those who wish to hear the other side of the question, or a reasonable defence of the monks, will find it in a well written work published at Lisbon in the early part of the present century, by a graduate of the university of Coimbra, styled *Os Frades julgados no Tribunal da Razao*, ('The Friars brought to Judgment before the Court of Reason'), which gives the statistics of Portuguese monasteries. But the late suppression, like all those effected since the French revolution, has been executed in a hasty unfeeling manner, and instead of relieving the public distress has added to it, by throwing thousands of individuals destitute upon society. By forbidding the admittance of novices, by opening the doors of the convents to all those who wished to leave them, and by uniting the remaining inmates of several convents of the same order into one, the suppression would have been gradual, beneficial, and effectual, and no injustice would have been perpetrated; but this process appears too slow to those who wish to coin money by the summary process of confiscation, a process however which history has proved to be ruinous to states, although it may enrich unprincipled individuals.

The population of Lisbon is very mixed, consisting of people from every province of Portugal, who resort thither in quest of employment, of a great number of blacks and men of colour from the colonies, and of numerous Gallegos, or porters and water-carriers from Galicia, and other foreigners. The lower classes live poorly, and are dirty in their appearance. The crowds of beggars and vagrants, who display their sores and other infirmities, are troublesome, disgusting, and dangerous. The police is still very imperfect, and the streets are but partially and imperfectly lighted at night. Lisbon is not provided with conduits or sewers, and all the filth is thrown into the streets, from which it is washed off by the rain into the river. (Kinsey, *Portugal Illustrated*, 1828; Captain Alexander, *Sketches of Portugal*, 1834.)

The climate of Lisbon is healthy and genial; it is very hot and dry in the summer months, when the heat is often 96° of Fahrenheit, but is relieved by north-west winds: heavy rains fall in November and December; cold clear weather prevails in January, but in February the weather becomes mild again, and the spring begins. Snow is a very rare occurrence.

A fine aqueduct, Os Arcos das Agoas Livres, supplies Lisbon with good water, brought from several springs situated near the village of Bellas, three leagues north-west of Lisbon. The aqueduct is in part conducted under ground; but on approaching Lisbon it passes across a deep valley, and the water is carried over a number of bold arches for a length of about 2400 feet. The water enters the town on the north-west at a place called Amoreira, where is the reservoir, from which the water is distributed to the several fountains about the town. The Gallegos draw water in small barrels from the fountains, and sell it from house to house, or cry it about the streets.

Olive and orange trees, cypresses and judas-trees, and some elms and poplars, are the trees seen in the neighbourhood of Lisbon. Orange-trees abound both in the quintas, or gardens, and also in open spots: they require much water, which is distributed by small troughs or channels which are supplied by water-wheels. The earth is heaped up at the roots, and the water is conducted between these heaps. The fruit is perfectly ripe in May, and continues till August. Oranges for exportation are gathered in February, before they are ripe.

The greater part of the country round Lisbon, particularly on the east and north sides, is covered with large gardens surrounded by high walls, which bound the view on every side. These gardens, called 'Quintas,' are often of considerable extent, and laid out rather for use than pleasure, generally containing plantations of orange and olive trees, and sometimes vineyards and even corn-fields. A pretty large house is attached to them, in which the families of the owners spend part of the summer. To the west of Lisbon the country is not so well cultivated; the hills are more rocky and naked; the soil consists of basalt, covered here and there with limestone: the basalt on which Lisbon is built extends to the north-west towards the market-town of Bellas already mentioned, and thence to the north as far as the Cabeça da Montachique, and to the south as far as the Tagus near Belem. (Link, *Travels in Portugal.*) Beyond Bellas, running north-east to south-west and terminating on the sea at Cabo de Rocca, rises a high range of mountains full of peaks, consisting of granite, partly covered with limestone. The south declivity of these mountains towards Lisbon is naked, and it is on the opposite or northern declivity that the delightful quintas and shady groves are situated which afford a summer residence to the wealthy inhabitants of Lisbon. [CINTRA.]

Leaving Lisbon for the north towards Torres Vedras there is a succession of suburbs or villages, such as Campo Grande, Carnide, Lumiar, Loures, &c., extending for several miles almost without interruption. The same occurs in a north-east direction along the banks of the Tagus towards Sacavem.

The population of Lisbon is reckoned at 260,000 inhabitants. Its trade, though much diminished since the loss of Brazil, is still considerable. It exports wine, fruits, and oil; and it imports corn, salt fish, salt butter, cheese, timber, iron, lead, tin, copper, coals, tar, and all sorts of foreign manufactures, with which it supplies the whole southern part of the kingdom. Lisbon has some manufactories of silks, paper, soap, and leather; its goldsmiths and jewellers are very expert; and there are also sugar refineries and potteries. We ought to observe here that the laziness and want of industry of the Portuguese have been much exaggerated by travellers.

The scientific and literary institutions are:—1. The Royal Academy of Sciences, founded during the reign of Queen Maria in the latter part of the last century. It is a most respectable association, and has published very interesting memoirs on the history, laws, and economy of Portugal, as well as upon its natural history and that of its colonies. 2. The College of the Nobles, a very handsome building, founded in 1761. 3. The Royal Academy of Marine, founded in 1779, or School of Navigation and Ship-building, with the observatory attached to it. 4. The Royal Academy of Artillery and Engineers, founded in 1790. 5. The Royal Military College. 6. The School of Music. 7. The Botanical Garden and Cabinet of Natural History at the royal residence of Ajuda, near Belem. 8. The Royal Library and that of the Necessidades. 9. The Royal Schools of Vicente de Fora, where philosophy, geometry, physics, and the antient languages are taught. 10. The Royal School of Drawing and Civil Architecture. There are also primary or elementary schools in the various districts of the city.

Society at Lisbon is rather dull: families live much among themselves; the Portuguese are not very fond of exercise, and their chief relaxation is going to their quintas in the summer. Carriages are scarce and old fashioned. The Italian Opera, or De Carlos, is a handsome house and much frequented. The Portuguese play-houses are small, and the performances not very choice. The best inns in Lisbon are kept by foreigners. There are some tolerable coffee-houses, and a number of tavernas, or wine-shops, and eating-houses, generally dirty and ill-provided.

The inhabitants of Lisbon, though mostly inclined to bigotry, are very tolerant towards foreigners, owing to their constant intercourse with the English and other Protestants, and have not that horror of heretics which is exhibited by the inhabitants of the inland parts of Spain.

(Kinsey, *Portugal Illustrated;* Miñano, *Diccion. Geog.;* Link, *Travels in Portugal,* a good work of the end of the last century; and other tourists. See also *Map of Lisbon,* by the Society for the Diffusion of Useful Knowledge.)

LISBURN, a parliamentary borough town, not corporate, situated partly in the barony of Upper Massereene and county of Antrim, and partly in the barony of Upper Castlereagh and county of Down, in Ireland. The parish, called likewise Blaris, extends also into the barony of Lower Iveagh, in the county of Down. The town is 73 Irish or 93 statute miles from Dublin, and 7 Irish or 9 statute miles from Belfast. The boundaries of the borough, as settled by 2 and 3 Will. IV., c. 89, comprise 1325 statute acres.

This town took its origin from the erection of a fortified mansion, about 1610, by Lord Fulk Conway, to whom a large part of the territory of Kilultagh had been granted by James I. These grants were enlarged and confirmed to Viscount Conway in the succeeding reign, during which the number of English and Welsh settlers in the town and neighbourhood greatly increased. The town was at this time called Lisnegarvey, and soon became a considerable place, as appears by the gallant and successful defence which it made against the Irish under O'Neill on the 28th November, 1641. The town and castle continued in the hands of the Royalists until 1650, when Sir Charles Coote took possession of the place for the parliament. On the Restoration, King Charles II., in consideration of the loyalty and services of the inhabitants, granted them a patent, dated 27th October, 1662, by which the church of Lisburn was erected into a cathedral for the united diocese of Down and Connor, and the inhabitants of the borough were empowered to return two members to the Irish parliament. On the revocation of the Edict of Nantes, Lisburn became the residence of a number of French refugees, who introduced the linen and damask manufacture, from which much of the succeeding prosperity of the place has arisen. A fire which occurred in 1707 burned down the castle and the chief part of the town. The castle gardens were then turned into a public promenade, and the town rebuilt in a more substantial and handsome manner. During the prosperous period which intervened between the time of the Irish volunteers and the rebellion of 1798 Lisburn increased rapidly. Since that time the town has rather declined, owing probably to the superior facilities for carrying on the linen and cotton-spinning trades possessed by the neighbouring seaport of Belfast.

The seneschal of the manor of Kilultagh is the returning-officer in elections for the borough, which, since the Union, is represented in the imperial parliament by one member. The number of electors in March, 1836, was 134. The right of election by act 2 and 3 Will. IV., c. 88, is vested in the 5*l.* householders.

The appearance of Lisburn is very pleasing. It is situated on a gently rising ground, on the north-western or Antrim side of the Lagan. The market-house occupies an open space in the centre of the town, where the three principal streets meet. It is a handsome building, with a cupola. Near the market-house is the church, an elegant edifice with a lofty spire, on each side of which the two streets leading towards Belfast and the old bridge over the Lagan diverge. The castle gardens are included between the former of these and the river, over which the walks and terrace command a fine prospect. The houses in the main street are chiefly built of English brick, and have a very elegant appearance. Those in the opposite or western end of the town are of an inferior description, and the suburb towards Moira is mean. Of 992 houses within the borough, 675 are roofed with slate, which is an unusually large proportion of that class of houses in an Irish inland town. The manor-court-house, formerly a chapel for the French Huguenots, and the linen-hall, are substantial and commodious buildings. There are also three Presbyterian meeting-houses, one Methodist ditto, and one Roman Catholic chapel.

Lisburn is well paved, and is amply supplied with water by conduits to the houses. The provisions of the Lighting Act have not been applied. The constabulary force quartered in the town discharge the duties of municipal police. On an island in the Lagan, in the eastern suburbs, are extensive vitriol-works. Some of the largest bleach-greens for linen in Ireland are in the vicinity; and in the town are print-works for muslins, and a diaper and damask factory, much celebrated for the beauty of its fabrics. A navigation extends from the town by the river Lagan to the sea at Belfast, and by the river and a canal to Loch Neagh. A railroad is now nearly completed between Belfast and Lisburn, which is intended as the commencement of a line through Armagh to Dublin. This is the second work of the kind hitherto undertaken in Ireland.

In 1812 the number of houses in the borough was about 800, and the estimated number of inhabitants 4812. In 1831 the number of houses was 992, and of inhabitants 5745. In 1824 there were in the parish of Lisburn seven day-schools, educating 756 males and 548 females. Of these schools two were supported by the Association for Discountenancing Vice, and two others were partly supported by subscribers. The county infirmary is at Lisburn, and there are almshouses for fourteen females, supported by bequests, amounting in all to 2750*l.*

(*Survey of the County of Antrim,* Dublin, 1812; *Parliamentary Reports and Papers,* &c.)

LISCOV, CHRISTIAN LUDWIG, born at Wittenberg, 1701, although very little known in this country, still ranks high in Germany for his satirical writings, which, in their caustic irony, show their author to have had a congenial turn of mind with Swift. Very few particulars of his life have been recorded, further than that about the year 1739 he was private tutor at Lübeck, where a pedant named Sievers was the first who fell under the castigation of his pen. After this he became private secretary to

Geheimenrath von Blome, from which time nothing can be traced respecting him till he entered the service of Von Heinecker at Dresden. Under this accomplished and generous patron he might have passed his days in tranquillity, had not his love of ridicule prevailed over his prudence. Having offended the English minister at that court by some sarcasms, he drew upon himself the resentment of the all-powerful Count Bruhl, who caused him to be sent as a state prisoner to Eilenburg, where he died shortly after, October 30, 1760. Some however have questioned the truth of his having been in confinement.

Posterity has been more just to Liscov's merits than were his contemporaries. His satire was directed only against presumption and folly, and was besides far more general than personal, certainly impartial, and without any respect to persons, for a powerful offender was in his eyes no more than the meanest. That he possessed no ordinary ability for politics may well be conceived when we find Pott, the editor of a posthumous work of his, saying that had Count Bruhl listened to Liscov's advice, Germany would have been spared the Seven Years' War. The first complete edition of his works was published by Kriegrath Müchler, in 3 vols. 8vo., Berlin, 1806. Of several of these pieces the titles will convey some notion of the subjects: 'On the Excellence and Usefulness of Bad Writers;' 'On the Uselessness of Good Works towards Salvation;' and the 'Inaugural Discourse of the learned J. E. P., &c. at the Academy of Small Wits; together with the Reply of that eminent Society.' Liscov's own Apology for his satirical attacks is most admirable; and it may be remarked, that although satire seldom reforms those who are the immediate objects, it is nevertheless highly beneficial with respect to many who would else commit the same follies.

LISIEUX, a town in France, capital of an arrondissement in the department of Calvados, 93 miles west by north of Paris in a straight line, or 106 miles by the road through Evreux. This town existed at the time of the Roman Conquest, when it was called Noviomagus, or Nœomagus: it subsequently took the name of Lexovii, from the people to whom it belonged; and from this name the modern Lisieux is derived. It was pillaged by the Normans in A.D. 877; burned by the Bretons in A.D. 1130; and taken and retaken several times in the wars of the English in France, and in the religious dissensions of the sixteenth century. It was before the Revolution the seat of a bishopric; the bishop was a suffragan of the archbishop of Rouen.

The town stands on the right or east bank of the Toucques at the junction of the Orbec. The old walls have been lately replaced by some tolerably handsome buildings and a promenade. The streets of the town are tolerably wide; the houses are mostly of wood. The chief public buildings are the ex-cathedral, an antient edifice; the episcopal palace with its gardens, the seminary for the priesthood, and the great hospital. The population in 1831 was 10,257; in 1836 it was 11,473, showing an increase in five years of 1216, or above 10 per cent. The manufactures of the place are chiefly of broad-cloth, flannel, and other woollen fabrics; woollen and cotton yarn, and cotton goods; horse-cloths of wool and hair; leather, and brandy. There are bleaching and dyeing establishments. The trade, which is chiefly in the manufactures of the town, is promoted by the navigation of the Toucques, which commences at Lisieux. There are six yearly fairs. Besides the public institutions already noticed, there are several others, judicial or fiscal; also a high school and a theatre.

The arrondissement of Lisieux comprehends 348 square miles, and had in 1831 a population of 68,716, in 1836 of 69,844. It is subdivided into six cantons and 131 communes.

Among the former bishops of Lisieux, Jean Hennuyer deserves honourable mention: at the time of the massacre of St. Bartholomew he preserved the Protestants of his diocese. His kindness won over many of them to the Catholic faith.

LISKEARD, LESKEARD, or LESKERET, a parish, corporate town, and parliamentary borough, in the hundred of West and county of Cornwall, distant 218 miles west-south-west from London. The assessionable Duchy Manor of Liskeard includes the whole parish and borough. The charters of the borough are numerous, commencing with that of Richard, king of the Romans and earl of Cornwall, brother of Henry III., granted in the year 1240; the latest is of the 29th Elizabeth, and dated 26th July, 1587 The council consists of 4 aldermen, one of whom is the mayor, and 12 councillors. The revenue of the corporation for the year ending October, 1832, was 442*l.*, and its expenditure during the same period was 242*l.*; but in previous years the expenditure had considerably exceeded the revenue.

The town, which is meanly built, stands partly in a hollow and partly upon rocky heights, which give to the streets an appearance of great irregularity. Of late years the town has been much improved, and several persons, possessed of large properties, have decorated the immediate environs with excellent houses. The chief public building is the town-hall, erected about the beginning of the last century, at the expense of one of the members for the borough; it is a handsome structure, supported on granite columns. Liskeard still continues a place of considerable trade, and has an excellent market. It has been greatly benefited by the recent improvement of the roads in that part of Cornwall. The living is a vicarage, in the diocese of Exeter, possessing an average net income of 303*l.*, the rectory having been appropriated to the priory of Launceston. In 1304 the bishop of Exeter excommunicated the inhabitants of Liskeard, and put their church under an interdict, for refusing to pay tithes in kind on the ground of a composition between Earl Richard and the prior. (1 *Par. Roll*, 312.) An attempt was afterwards made to appropriate the vicarage also. (3 *P. R.* 505.) The population of the borough in 1831 was 2853 and that of the entire parish 4042; the parochial assessments for the year ending 25th March, 1829, amounted to 873*l.* Before the passing of the Reform Act, the corporation of Liskeard had returned two members to parliament continuously from the reign of Edward I. The borough, which consists of the parish of Liskeard and such parts of the old borough of Liskeard as are without the parish, now returns one member. For the history of Liskeard, as part of the duchy of Cornwall, see Manning's *Exchequer Practice*, 2nd ed., 374, 380; 1, 2, 3, and 4 Mann. & Ryl. *Rep.*, 141-2, 153, 177, 471-7; 2 Ventris' *Rep.*, 343. (*Parliamentary Papers;* Gilbert's *Parochial History of Cornwall.*)

LISLE, or L'ISLE. [VAUCLUSE.]

LISLE, WILLIAM DE, born at Paris 28th February, 1675, was the eldest son of Claude Delisle, a geographer and historian, under whose instruction he gave early proofs of a decided predilection for geographical pursuits.

Before the time of Delisle, the principal maps of authority were those of Nicholas Sanson, to whom geography is under many obligations; but these maps were exceedingly erroneous from the want of astronomical observations, although it does not appear that the author had fully availed himself of the few observations which really existed. After the death of Sanson, his sons continued to reproduce his maps with little or no alteration, notwithstanding that the more recent accounts of travellers and the observations of astronomers were greatly at variance with many of their positions. For this they were repeatedly censured both by La Hire and Dominic Cassini, to which however they seem to have paid little regard. At length, in 1696, Cassini drew a planisphere upon the pavement of the hall of the Paris Observatory, whereon he marked the position of 39 places according to their observed latitude and longitude, and thus exhibited the magnitude of the errors which vitiated the existing maps, and at the same time pointed out the means of effecting their improvement. Still however the geographical positions of by far the greater number of places could only be inferred from antient itineraries, and from the varied and often conflicting accounts of modern travellers, while the coast-lines had for the most part to be determined from a tedious comparison of the log-books of seamen. It is obvious that for a task of this description, in addition to the requisite scientific knowledge, which is comparatively of easy attainment, a person should be familiar with languages, and his reading must be sufficiently extensive to enable him to avail himself of all historical resources; he must be able to appreciate the changes which have taken place, either through accident or fraud, in the measures of different nations, a problem of very considerable difficulty; but above all he must exercise a highly critical judgment in according to each statement a degree of confidence duly proportioned to its merits. With many of these qualifications Delisle was eminently endowed, and although he left ample room for the display of perhaps greater abilities in his successor M. d'Anville, there is no doubt that his own labours contributed powerfully to the improvement and extension of geographical knowledge. Four years after Cassini had exposed the enormous inaccuracies of the then existing maps, Delisle published (1670) four maps of Europe, Asia, Africa, and America, together with two globes about one foot in diameter, the one of the terrestrial, the other of the celestial sphere. In these the extent of several countries was so materially altered as to give to the earth an appearance altogether new. The length of the Mediterranean from the Straits of Gibraltar to the coast of Syria, instead of being 1160 leagues (3225 miles), was now limited to 860 leagues (2391 miles), or to less than three-fourths of its former length; the difference of longitude between the eastern and western boundaries of Asia was in like manner lessened by 25 degrees; and many other important corrections, which it is not necessary to enumerate, were introduced for the first time in these maps.

The reputation and profit which Delisle derived from these publications excited the cupidity of a man named Nolin, who, though distinguished by the title of geographer royal, did not hesitate to publish pirated copies of Delisle's maps, in which he purposely introduced a few slight errors, in the hope of thereby evading detection; and when taxed with the fraud, he retorted by ascribing the plagiarism wholly to Delisle. The latter was in consequence obliged to institute legal proceedings, less with a view to protect his interest than to clear his character of an unjust imputation. The result of the prosecution, protracted during six years, was in favour of Delisle, authorising him to seize and destroy the maps and plates of the defendant, a permission of which he partially availed himself.

In 1702 he was elected a member of the Royal Academy, and shortly afterwards was appointed geographical tutor to Louis XV., who conferred upon him the title of chief (premier) geographer royal, a title which did not previously exist, and which has since been conferred only upon M. d'Anville.

The maps of Delisle, in illustration of particular countries and of particular periods of history, now succeeded each other in rapid succession. Among them, the edition of his planisphere, published in 1724, is deserving of particular mention, as it shows the progress which had been made in geography before D'Anville had contributed considerably to its improvement. The latest edition of his maps, we believe, is that of 1789, published by Dezanche, in 2 vols. fol., and comprising 158 sheets. Besides these he has left an atlas of antient geography and an atlas of France divided into provinces. Such was his fame that most authors of respectability who wrote upon history or subjects connected with it, were desirous of having their works illustrated by his maps. The czar of Russia, the king of Sicily, and other European sovereigns are said to have made munificent offers in the expectation of inducing him to enter their service and to reside permanently in their dominions, but his attachment to his own country would not permit him to accept them. Peter the Great in particular was in the habit of paying him frequent visits during his sojourn at Paris, partly to give and partly to derive information respecting his own territories.

Delisle died at Paris, 25th of January, 1726. In the Transactions of the Royal Academy are printed the following memoirs bearing his name:—

'Observations on the Variation of the Needle with reference to Halley's Map,' 1710; 'Justification of the Antients in matters of Geography,' 1714; 'On the Longitude of the Straits of Magellan,' 1716; 'Geographical Determination of the Situation and Extent of the different parts of the Earth,' 1720; 'Geographical Determination of the Situation and Extent of the Countries traversed by Cyrus in his Expedition against his brother Artaxerxes, and of those traversed by the ten thousand Greeks in their retreat,' 1721; 'Remarks upon the Map of the Caspian Sea, sent to the Academy by the Empress of Russia,' 1721; 'Comparison of the extent of London and Paris, and some other cities both antient and modern,' 1725; 'On the Longitude of the mouth of the River Mississippi,' 1726. Besides the foregoing he had contemplated a work to be entitled 'An Introduction to Geography,' wherein he purposed giving an account of the alterations which he had introduced; but he died before its completion. The plan of the work was however made known by M. Fleret, in a small volume published by that gentleman in 1731.

(Fontenelle, *Oeuvres Diverses*, la Haye, 1729, tom. iii.; *Biographie Univers.*; Quérard's *Dictionnaire Bibliographique.*)

LISMORE, a bishop's see, late in the archiepiscopal province of Cashel, and now in that of Dublin, in Ireland. It includes portions of the counties of Waterford and Tipperary, and extends 37 statute miles by 38. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, and 8 prebendaries. In 1792 the diocese was divided into 73 parishes, constituting 35 benefices, and having 22 churches. In 1834 the numbers were: parishes, 75; benefices, 43; churches of the Establishment, 36; other places of Protestant worship in connection with the Establishment, 1; and Roman Catholic churches, 65. In the latter year the total population of the diocese was 216,236, of whom there were 5970 members of the Established Church, 164 Presbyterians, 382 other Protestant Dissenters, and 209,720 Roman Catholics; being in the proportion of about 32 Roman Catholics to 1 Protestant. In the same year there were, in this diocese, 236 daily schools, educating 17,609 young persons, being in the proportion of 8·14 per cent. of the entire population under daily instruction; in which respect Lismore stands thirteenth among the 32 dioceses of Ireland. Of the above schools, 12 were, in 1834, in connection with the National Board of Education.

St. Carthag, commonly called Mochuda, of Ratheny in Westmeath, where he had a famous school, was the founder of the cathedral and school of Lismore, in A.D. 631. Cathaldus, afterwards bishop of Tarentum in Italy, succeeded. During his time and that of his predecessor, the school of Lismore was greatly celebrated for the number of its students; and the town or city is said to have been almost exclusively inhabited by ecclesiastics. Soon after the arrival of the English, the antient see of Ardmore was annexed to the diocese; and in the bishopric of Thomas de Reeve, who succeeded A.D. 1358, the see, so increased, was added to that of Waterford. By the 3 and 4 Wm. IV., c. 39, the see of Waterford and Lismore, being void, has become annexed to the united see of Cashel and Emly, and the temporalities are now vested in the Ecclesiastical Commissioners.

The town of Lismore is situated in the barony of Coshmore and Coshbride, and county of Waterford, on the southern bank of the Blackwater, three miles from the point where that river changes its course from east to south near Cappoquin. The Blackwater, opposite Lismore, is joined by the Owenshad, a rapid stream descending from the Knockmeledown mountains, which form a prominent object in the surrounding country. A handsome bridge, the centre arch of which has a span of 100 feet, crosses the main river a little above the point of junction, and leads to the town, which occupies the summit of the southern bank. At the eastern extremity of the town is the cathedral, a plain handsome building, with a tower and spire, boldly situated on the crest of the hill. It is in the later English style, and was chiefly built by the Earl of Cork in 1663. The castle, a magnificent pile, originally erected by King John in A.D. 1185, and greatly enlarged and strengthened by the first Earl of Cork, stands on the summit of a rocky bank, which rises to the height of nearly 100 feet above the Blackwater, at the opposite or western end of the town. Lismore is the property of the Duke of Devonshire, by whom it has been greatly improved of late. The town is also much indebted to the late duke, who built the bridge at a cost of 9000*l.*, and restored the castle, which had been reduced almost to a ruin during the civil wars of the seventeenth century.

Lismore was erected into a borough by charter of James I., and was represented in the Irish parliament by two members. The franchise was abolished at the time of the Union, and the compensation, amounting to 15,000*l.*, was paid to the trustees of the late Earl of Cork and Burlington. By the same charter, granted in 1613, the borough was incorporated; but the corporation is now defunct. The Blackwater is naturally navigable to within a mile of the town, and a canal has been constructed by the late Duke of Devonshire, by which lighters can now come up as far as the bridge. There is a small export of grain and flour; the imports are trifling, consisting chiefly of coal and timber brought by lighters from Youghall.

In 1831 there were in the town 366 houses and 2998 inhabitants. In 1834 there were in the parish of Lismore 22 day-schools, educating 705 males and 498 females. Of these schools two were chiefly supported by the dean and chapter, one by an annual grant from the Duke of Devonshire, one by an endowment by Lord Cork, and one by a grant from Sir Richard Musgrave

(Smith's *History of the County of Waterford*; Ware's *Bishops*; Beaufort's *Memoir of a Map of Ireland*; *Parliamentary Reports*, &c.)

LISSA, or *Polish Lissa* (in Polish, *Leszno*), a handsome town in the Prussian province of Posen, in 51° 52′ N. lat. and 16° 36′ E. long., belongs to Prince Sulkowsky, who has a palace there. It has two Calvinist, one Lutheran, and one Roman Catholic church, a large synagogue, a Calvinist Gymnasium Illustre, a Lutheran and a Roman Catholic school, and two hospitals and a theatre. Lissa is one of the most important manufacturing towns in the province. The principal manufactures are woollen cloths, linen, leather, hats, carriages, tobacco. The inhabitants, 8667 in number, of whom 3470 are Jews, carry on a very active trade.

LISSA, a village in Prussian Silesia and the government of Breslau, is celebrated on account of the victory gained in the vicinity, on the 5th of December, 1757, by Frederic II., at the head of 36,000 men, over an army of 90,000 Austrians and Imperialists, of whom 24,000 were made prisoners on the field of battle, 17,000 were taken in Breslau, which was forced to surrender after a short siege, and 15,000 were captured on the retreat of the remains of the army into the mountains. This battle is likewise called the battle of Breslau.

LISSA. [Maiidæ.]

LIST, CIVIL. [Civil List.]

LISTING. [Enlistment.]

LITANY, a collection of prayers and supplications. The term is derived from the Greek (λιτανεία), and was adopted by Christian writers at a very early period. St. Basil tells us that Litanies were read in the church of Neocæsarea, between Gregory Thaumaturgus's time and his own: and St. Ambrose has left a form of Litany which bears his name, agreeing in many things with that in use in the Church of England.

In the Common Prayer Book of 1549 (the first book of King Edward), the Litany was placed between the Communion Office and the Office for Baptism, under the title of 'The Letany and Suffrages;' which book also directed it to be said or sung on Wednesdays and Fridays. In the review of the Common Prayer in 1552, the Litany was placed where it now stands, with the direction that it shall be used on Sundays, Wednesdays, and Fridays, and at other times when it shall be commanded by the ordinary. Till the last review, in 1661, the Litany was used as a distinct service, and followed the Morning Prayer; it was then directed and has ever since continued to be read as one office with the Morning Prayer, after the third Collect for Grace.

(Wheatley's *Rational Illustr. of the Book of Common Prayer of the Church of England*, 8vo., Oxford, 1810, pp. 163, 164.)

LI-TCHI, or LEECHEE, a fruit commonly sold in the markets of China, and occasionally brought to England, is the produce of the Euphoria Litchi of botanists, a tree belonging to the natural order Sapindaceæ. The eatable part is a pulpy flesh, which covers a stone enclosed in a hard, dry, tessellated, prickly pericarp. Another fruit, called the Long-yen or Longan, is yielded by another species of the same genus. The Chinese cultivate many varieties of each.

LITHARGE. [Lead.]

LITHIC ACID. [Uric Acid.]

LITHIUM, a metal, the oxide of which was discovered by Arfwedson in 1817, and called *lithia* (from λίθος, a stone), from its occurring only in the mineral kingdom. It was first found in petalite and spodumene, minerals which occur in the iron-mine of Uto in Sweden, and it has since been discovered in amblygonite and lepidolite. These substances contain from about five to nearly ten per cent. of lithia in combination with silica, from which it is best separated by the following process of Berzelius: One part of petalite, or other mineral containing lithia, is to be mixed with two parts of fluor spar, both substances being finely powdered; the mixture is to be heated with three or four times its weight of sulphuric acid, as long as vapours are disengaged; the silica is expelled with the fluorine, and the alumina and lithia remain in combination with sulphuric acid; these salts are to be dissolved in water, ammonia is added to precipitate the alumina, the filtered solution is to be evaporated, and heated to redness, to expel the sulphate of ammonia, and sulphate of lithia remains, which, being treated with barytes, water is decomposed, sulphate of barytes is formed and separated, and pure lithia remains in solution, which, being evaporated, hydrate of lithia is left. Lithium is but little known. Davy obtained it from the above described hydrate by means of voltaic electricity, in the same way as he had previously procured potassium and sodium from their respective hydrates. Lithium was found to resemble sodium in its whiteness, but it was oxidized and reconverted to lithia with such rapidity, that its properties could not be minutely examined.

Oxygen and Lithium, it is evident from what has just been stated, combine with great readiness, and are separable with difficulty. Only one compound of these bodies is known, and that is the alkaline oxide *lithia*, which exists, as has been mentioned, in certain minerals, and also in the waters of Carlsbad, but in combination. Lithia, in its alkaline properties, in forming a hydrate with water, and in its chemical relations, is closely allied to potash and soda, and, unlike these alkalis, is not very soluble in water, but the solution resembles theirs in being caustic. It has not yet been obtained in the anhydrous state, so that when the solution is evaporated, hydrate of lithia is procured, which fuses at a low red heat, and on cooling concretes into a mass, which has a crystalline fracture: it does not attract moisture from the air.

The hydrate of lithia has not been analyzed, but from indirect experiments the oxide is concluded to consist of

One equivalent of oxygen . .	8
One equivalent of lithium . .	6
Equivalent	14

Chlorine and Lithium readily combine when the alkali is dissolved in hydrochloric acid; the solution, when evaporated to dryness and fused out of the contact of air, leaves chloride of lithium, which is a white semitransparent substance, very deliquescent, and soluble both in water and in alcohol. By evaporation cubic crystals are obtained, the alcoholic solution of which burns with a peculiar red flame. When strongly heated in the air, chlorine is expelled and oxygen absorbed, and the alkali lithia remains. It is probably composed of—

One equivalent of chlorine . . .	36
One equivalent of lithium . . .	6
Equivalent	42

Sulphur and Lithium, when obtained in combination by decomposing the sulphate of lithia with excess of charcoal, form an extremely pyrophoric substance.

Iodine and Lithium.—No compound of these is yet known.

Fluorine and Lithium form a fusible compound, prepared by dissolving lithia in hydrofluoric acid; it is difficultly soluble in water; the solution deposits small opaque crystals.

Acids and Lithia combine to form salts:—

Nitrate of Lithia is obtained by adding lithia to the acid. This salt is very deliquescent; when the solution is gently evaporated, crystals are obtained, which are sometimes needleform and sometimes regular rhombic prisms. Its taste is like that of nitre, it is extremely fusible, and becomes by heat as liquid as water. It is probably composed of—

One equivalent of nitric acid . .	54
One equivalent of lithia	14
Equivalent	68

Carbonate of Lithia.—When a strong solution of carbonate of ammonia is added to one of sulphate of lithia, a white precipitate of carbonate of lithia is formed. This salt is very slightly soluble in cold water; it is alkaline to test-papers, is decomposed by acids with effervescence, and has an alkaline taste. It is decomposed by lime and barytes, which separate the carbonic acid. It consists of—

One equivalent of carbonic acid .	22
One equivalent of lithia . . .	14
Equivalent	36

The waters of Carlsbad in Bohemia are stated to contain bi-carbonate of lithia in solution; and by spontaneous evaporation the carbonate separates in the state of a crystalline crust.

Sulphate of Lithia.—This salt is very soluble in water; it has a saline taste without bitterness, and crystallizes only in irregular masses. The air does not act upon it, and, unlike most of the salts of lithia, it is very difficult of fusion. It is composed of—

One equivalent of sulphuric acid .	40
One equivalent of lithia	14
	—
Equivalent	54

Phosphate of Lithia may be obtained by adding phosphoric acid to sulphate of lithia; no precipitate is at first formed, but on adding excess of ammonia an insoluble phosphate of lithia is thrown down: this property enables us to separate lithia from potash and soda.

Characters of Lithia and its Salts.—Lithia acts so readily upon platinum, that, according to Berzelius, this property will serve to detect a small quantity in any substance; for when it is heated with soda on platinum foil, the soda displaces the lithia, and the platinum round the fused mass assumes a colour more or less deep according to the quantity of lithia set free. Lithia is distinguished from soda and potash by its greater saturating power, as shown by its lower equivalent number; chloride of lithium is distinguishable from the chlorides of sodium and potassium by its solubility in alcohol, and the solution burns with a red flame. Its salts are not precipitated by chloride of platinum, as those of potash are; and, unlike both potash and soda, it forms a difficultly soluble carbonate and phosphate.

LITHODENDRON, a generic name of some Zoophyta, proposed by Goldfuss to include Caryophyllia and Oculina of Lamarck, and adopted by many geological writers in a rather vague sense. Blainville rejects the term. ('Actinologie,' p. 347.) The species ranked by Dr. Goldfuss in the group of Lithodendra offer many diversities of structure, and lie in strata of various antiquity ('Petrefacta Europæ'), especially in the transition and carboniferous limestones.

LITHO'DOMUS. [Mytilidæ.]

LITHOGRAPHY, the art by which impressions or prints are obtained by a chemical process from designs made with a greasy material upon stone. It has therefore been properly termed chemical printing, to distinguish it from all other modes of obtaining impressions, which are mechanical. In printing from an engraving on a copper or steel plate, the ink is delivered from the incisions made therein with the graver or etching-needle. An engraving on wood, on the contrary, gives its results from the projecting surface of the block, or those parts which are not cut away by the graver. The lithographic process differs from both these modes, the impressions being obtained (by strict attention to chemical affinity) from a level surface.

There are various styles of lithography, as will presently be seen; but the principle of the art is uniformly the same, being, as we have said, based upon those of chemical affinity.

The stone best calculated for lithographic purposes is a sort of calcareous slate, found in large quantities on the banks of the Danube in Bavaria. Stones much resembling the German have been found in some parts of Devonshire and Somersetshire, and also in Ireland; but we believe that on all the trials hitherto made, the stones found in this kingdom have been proved to want some of the most essential qualities of those brought from Germany, which are therefore almost exclusively used. Even these vary much in quality, all the strata not being equally good: some are too soft, and others are rendered unfit for use by the presence of chalk, flaws and veins, and fossil remains. A good stone is porous yet brittle, of a pale yellowish-drab, and sometimes of a grey neutral tint. The stones split into slabs varying from 1½ to 2½ inches in thickness, which are then cut or squared into the different sizes necessary for use, and the face or upper surface of each is made level. In this state the stones are sent from the quarry; but further preparation is yet necessary to fit them for the immediate use of the artist, and they are either grained or polished, according to the nature of the work they are intended to receive. The mode of preparing a grained stone, as it is called, is this:—A stone, being laid flat on a table, has its surface wetted, and some sand sifted over it through a very fine wire sieve. Another stone is laid with its face downwards upon this, and the two are rubbed together with a circular motion, to produce the requisite granulation, which is made finer or coarser, to suit the taste or intention of the artist. The stones thus prepared are used for drawings in the chalk manner, or for imitations of those produced with the black-lead pencil. Great care is requisite in this mode of preparation, to keep the granulation uniform and the surface free from scratches, the presence of which would otherwise much disfigure the future work. Writings, imitations of etchings, pen and ink sketches, &c. require the face of the stone to be polished, which is effected by rubbing it with pumice-stone and water, or pumice-stone dust and water, applied with rags: no sand is used, as it would produce a grain.

The two principal agents used for making designs, writings, &c., on stone, are called lithographic chalk and lithographic ink. They are composed of tallow, virgin-wax, soap, shell-lac, and enough lampblack to impart a colour to the mass. These are incorporated by a peculiar process of burning in a closely-covered saucepan over a fire, and the whole is ultimately cast into a mould, and receives the form calculated to fit it for use. The ingredients are the same in the chalk and the ink, but the proportions are varied. The chalk is used as it comes from the mould in a dry state, but the ink is dissolved by rubbing, like Indian ink, in water, and is used in a pen or camel-hair pencil. It will be perceived that it is the presence of the soap in this greasy material which renders it soluble in water.

To render the lithographic process intelligible, let it be supposed that the artist now completes a drawing with the chemical chalk just described, upon a grained stone. If, while in this state, a sponge filled with water were passed over the face of the stone, the drawing would wash out, the chalk with which it is made being, as we have seen, soluble in water, by reason of the soap which it contains. Before therefore it is capable of yielding impressions, a weak solution of nitrous acid is poured over it, which unites with and neutralizes the alkali or soap contained in the chalk, and renders it insoluble in water. After this the usual course is to float a solution of gum over the whole face of the stone, and when this is removed, if a sponge and water be applied to its surface, as before supposed, the drawing is found to be no longer removable, because the chalk with which it is executed is now no longer soluble in water. In this state the work is ready for the printer, who obtains impressions by the following process.

Having thrown with the ends of his fingers a few drops of water on the stone, and spread them with a sponge, so as to wet, or rather damp, the whole surface equally, the printer finds that the water has been imbibed by the stone only on those parts not occupied by the drawing, which being greasy repels the water and remains dry. A roller properly covered with printing-ink is now passed over the whole stone, which will not even be soiled where it is wet, from the antipathy of oil and water. But the parts occupied by the drawing being, as we have seen, dry and greasy, have an affinity for the printing-ink, which therefore passes from the roller and attaches itself to the drawing. In this state it is said to be charged, or rolled in. Damped paper is then put over it, and the whole being passed through a press, the printing-ink is transferred from the stone to the paper, and this constitutes the impression. By repeating in this manner the operations of damping the stone and rolling in the drawing, an almost unlimited number of impressions may be obtained.

Now, as we have said, the modes of lithography are various, but the illustration just given will explain the principle of them all. It consists in the mutual antipathy of oil and water, and the affinity which the stone has for both, *i.e.* in its power of imbibing either with equal avidity.

It will be inferred that, to ensure complete success, great nicety is requisite in the preparation of all the agents employed in this art. Our limits will not allow us to go into details on the modes of manipulation, or the precise composition of the several materials used in making the design and taking therefrom the impressions. All the necessary materials for drawing, &c., on stone, in any style, are supplied by the different lithographic printers. Those who wish to study or practise the art in its full extent will do well to consult 'A Complete Course of Lithography,' by its discoverer, M. Senefelder, or 'A Manual of Lithography,' by M. Raucourt, both translated into English.

Imitations of etchings or pen and ink drawings, writings, &c., executed with the chemical ink upon a *polished* stone, are prepared and printed in precisely the same manner.

Transfer lithography, from the facility of its execution and its great utility, claims especial notice. A paper called '*transfer-paper*' is used to receive the writing in this mode of lithography. This paper has previously had a liquid gummy preparation washed over one side of it, which, when dry, constitutes its face, and the writing being performed with the chemical ink already described, rests upon this gummy surface, and does not penetrate to the paper beneath. When the writing or drawing done on the transfer-paper is dry, the back of it is wetted slightly but equally with a sponge and water; and the paper being very thin, the gum preparation on the front of it becomes at once partially dissolved. In this state the paper is laid, with its face downwards, on a *polished* stone, and being passed through a press, the transfer-paper is found strongly and closely adhering to it. The back of the transfer-paper is now well wetted, and, one corner being first raised, it will readily peel off, leaving the gum preparation, and of course also the writing which was above it, attached to the stone. The gum is then washed off with water, and the preparation and printing proceed in the manner already explained. This mode of lithography being eminently calculated to facilitate the despatch of business, its great utility has been sensibly felt in the commercial departments of the country, and in several of our government offices, as by its means one written despatch can be multiplied at pleasure, without delay or the risk of typographical errors.

Another style of lithography is commonly called '*etching*' or '*engraving on stone*,' although it must by no means be inferred that in this process the stone is incised, but that the results correspond with the clean-cut lines of the graver or etching-needle. A coat of gum-water, with some lampblack or vermillion mixed with it, to give it colour and render the work visible, is thinly but evenly rubbed over a *polished* stone, and, when dry, effectually protects it from any application of grease. On this gum ground the design is executed with an etching-needle, precisely the same as in etching upon copper; and wherever the needle passes, of course the stone is laid bare, and it is best to cleanly remove the gum ground without cutting into the stone. After this some oil is rubbed over the whole surface, and is imbibed by the stone wherever the needle has passed and exposed its surface by removing the ground. The gum is then washed off, and the work may be at once rolled in and printed, without any previous acidulation.

Thus we see that grease anyhow applied to the stone will yield impressions, but that the character of the impression depends, 1st, on the *quality* of the grease; 2dly, on the *quantity* of grease; and 3dly, on the manner in which the grease is *applied*. As illustrations, we refer to the modes already enumerated, in which the application of the chemical preparation in the shape of a *solid chalk*, of *fluid ink*, and of *pure oil*, directly applied to the stone, have been pointed out, and the effects arising from each explained. It is the grease therefore which prints, and the lampblack introduced into the lithographic materials is of no other use than to enable the artist to judge of the quantity of grease imparted to the stone. That it does not in the slightest degree contribute to produce greater darkness in the impression, is proved by a very curious phenomenon. The design may be (and often is, in the progress of printing) washed out with turpentine, so as to become quite invisible; and a looker-on, unacquainted with the subject, would suppose the work to be completely destroyed; but it is the *black* only which has disappeared; the *grease* remains, and on being rolled in again, the drawing re-appears uninjured.

The variation in the quality of the tints, arising from the mode in which the grease is applied, may be further illustrated by reference to the *dabber*, which is an instrument by which tints of exceeding delicacy may be produced. It is made of very smooth leather, being somewhat round on its face, and stuffed with cotton wool. On the face of the dabber a lithographic preparation, softer than the chalk, is evenly and thinly applied with a hard brush, and afterwards imparted to the stone by repeated blows with the instrument. The dabber was formerly much in use, particularly for delicate skies; but as lithography has been longer cultivated among us, our artists have acquired greater manual dexterity, and produce tints of the greatest delicacy with the hand alone, which have the recommendation of standing better than those produced with the dabber.

The printing from two or more stones, although not a new discovery (since it was practised in Germany long since by Senefelder and others), has lately been more extensively practised in this country than heretofore. In this style the drawing is first made in the usual way, with chalk on a grained stone, but more slight, the sky and other delicate tints being omitted, and these are superadded from the '*tint stone*.' The tint is executed with facility by the printer on another stone (polished), with a modified preparation of chemical ink, and thus much labour is saved to the artist.

The extreme lights are then scraped out on this tint-stone, and the printer superadds the impressions from it to those already taken from the drawing on the other stone; of course taking great care that the two fit well, or '*register*,' as it is technically called.

Transfer lithography has been applied in other ways than the one already explained: indeed it would be difficult to fix limits to its capabilities, improvable as they may be in the hands of able chemists. Among the transfer modes, that of *printing copper-plate engravings from stone* is worthy of notice. An impression is taken on unsized paper from the copper-plate, and without delay transferred, by passing through a press, to a polished stone; it is then acidulated, and the printing proceeds in the usual way. The impressions thus obtained are scarcely distinguishable from those printed direct from the copper. The advantage which this application of lithography holds out is most apparent where economy or great despatch are important. These objects are both obtained by transferring impressions to several stones, or several impressions to one stone if the design be small, when the numbers can be multiplied with great rapidity, and without the original engraving being at all worn.

Plates of zinc have lately been much used as substitutes for the German stones, in chemical printing, and the practice is then called *zincography;* but excepting the difference of the material on which the work is performed, it is precisely the same art as lithography. Zinc plates have the advantages of greater portability, and of being less liable to break from the pressure in printing, but we have not seen any specimen which would warrant our saying that we think them equal to stone, for the best class of productions.

The purity of the *paper* used for lithographic printing is of very great importance, for however beautiful it may appear to the eye, if either acids or alkalis enter into its composition, or are used in the process of its manufacture, a circumstance of very frequent occurrence, they will certainly prove destructive to the lithographic drawing in the progress of printing. Hence arose a great obstacle during the early practice of lithography in this country. The increased demand for the article however has induced manufacturers to turn their attention to the subject, and papers are now produced for the express purposes of this art, which are free from the objections alluded to.

'Aloys Senefelder,' says Mons. Raucourt, 'an actor of one of the theatres at Munich, was the first to observe that calcareous stones had the property of receiving greasy lines and transmitting them to paper. He remarked that, by wetting the stone, it was possible to charge it again with ink, and obtain a series of impressions: he thus became the inventor of lithography.' Although it was long a practice to decry this art, it is hoped that its merits and advantages are now sufficiently felt to make it unnecessary for us to say much in its behalf. If, as a general principle, an original drawing is better than a copy, then is lithography entitled to the respect of all who desire the general improvement of the public taste; which must surely be consequent upon a process by which original drawings are multiplied almost without limits; for all lithographic impressions are original drawings, if they be not altered or spoiled in the progress of the printing. The excellence of lithography depends of course, like that of all other arts, upon the skill with which it is performed; and the facility with which drawings are executed upon stone, and impressions of some sort obtained from them, has led to a glut of worthless productions, and a consequent feeling of disgust towards the art in the public mind. It must be admitted that considerable uncertainty attends the result, even when the work is conducted by the best hands; for a variation in the quality of the stone, or any of the materials employed, or even in the temperature of the weather, produces considerable changes in the impressions. But with all these drawbacks, the fine specimens which have been produced are sufficient evidence that, even as a branch of the fine arts, it is every way worthy of esteem; while the commercial advantages of its lower departments, such as the transfer mode, have never been denied or questioned. Our object has not been to enter into minute details, but to explain the *principles* upon which lithography is founded, and to show broadly their application to the different modes or styles; beyond this we have deemed it sufficient to refer to works from which more copious information may be obtained. For an account of the construction of lithographic presses see PRESS.

LITHO'LELAPS. [CIRRIPEDA, vol. vii., p. 208.]

LITHONTRIPTICS (λίθος, a stone, and τρίβω, to rub or bruise), medicines or other means which are thought to possess the power of dissolving stone or calculus in the urinary organs. The calculous concretions which are apt to form in the kidneys or bladder are of very different kinds, originating in different constitutions or in different habits of life or locality of abode. They are also different, not only according to the time of life when their formation began, but they often become varied in the progress of their increase, and are different in the strata of which they are composed.

It requires therefore not only very close investigation into the characters of the urine of a person supposed to be affected with calculous concretion, but also no slight acquaintance with the chemistry and physiology of that fluid, and the great influence of the nature of the food and drink on its composition, to be able to direct the use of medicines which are regarded as lithontriptic. With few exceptions, their employment has been nearly empirical; and aggravation of the case has as frequently resulted as benefit from their employment. The researches of recent chemists and pathologists have given something approaching to a scientific explanation of the circumstances under which calculi form, as well as of their varied characters; so that more good may reasonably be expected from the use of lithontriptics than has hitherto been realised. [CALCULUS.]

Of the twelve or thirteen varieties of calculous concretions which have been discovered in the bladder or kidneys of the human subject, some are of very rare occurrence, while the more common ones may be classed under two distinct heads—those which form under the prevalence of the uric or lithic acid state of constitution, and those which form under the prevalence of the phosphatic state of constitution. These sometimes alternate, and indeed the concretions which belong to the last class have almost invariably a nucleus or centre of the first kind, which shows how very important it is to avoid the causes of the lithic acid formations.

Independent of constitutional peculiarities, the leading causes of the formation of calculous concretions are errors in diet or regimen. The kidney is the great channel for the expulsion from the system of the azotized or nitrogenous principles of the blood, as well as of many saline particles, which were once an integral part of the body, but now effete; and to keep these in suspension, so as to ensure their elimination from the body, a due quantity of an aqueous menstruum is required. Hence whatever reduces the quantity of urine below the proper standard predisposes to the formation of calculi. Now an excess of animal food, particularly if exercise be neglected, and strong wines—in a word, rich living, with indolent habits—are the frequent origin of calculous complaints. Crude vegetables, with bad clothing and exposure to cold and damp, which interfere with the healthy action of the skin, equally predispose to the formation of stone, and thus the poor suffer from it as well as the wealthy. The causes being so widely different, the mode of treatment must also be different. A specific cannot therefore exist, and all unskilful tampering with a case must lead to most hurtful results. Medicines taken by the mouth have been hitherto more successful in relieving the distressing symptoms (and such alone can be used where the stone is in the kidney) than solvents thrown into the bladder. There is however ground for believing that in certain cases, under competent direction, chemical agents and perhaps galvanism may be made available to dissolve the concretions in the bladder. (See Brodie, *Lectures on Diseases of the Urinary Organs*, 2nd ed., and particularly the very excellent work of Dr. Willis, *Urinary Diseases and their Treatment*, 1838.)

LITHOPHA'GIDÆ, a name applicable to all marine *Conchifera*, *Mollusca*, *Radiata*, &c., that penetrate stones, masses of madrepore, and other hard corals, forming therein a nidus for themselves; but more particularly applied to the *Conchifera*. Whether the perforation be effected by chemical erosion or mechanical action is at present undetermined. Some observations on this part of the economy will be found in the articles CLAVAGELLA (vol. viii., p. 263), and GASTROCHÆNA (vol. xi., p. 94): others will occur in giving the natural history of *Lithodomus*, *Pholas*, &c., as well as in treating of the species noticed in this article. The erosion is not confined to the *Conchifera* only; for *Patella* has the power of perforating certain rocks to a limited extent: nor to the *Mollusca* generally; for some of the *Echinidæ* (*Radiata*), for instance, are known to make shallow basin-like lodgements in the rocks whereon they dwell. We shall here only refer to one of the last discussions on this subject which took place at a meeting of the Zoological Society in October, 1837. At that meeting Mr. Gray called the attention of the Fellows to some pieces of chalk which he had recently found in the cliffs at Brighton, exhibiting perforations made by the *Patella* and *Pholas*, and presenting appearances which he considered to have been produced in the case of the latter genus by the rotatory action of the valves. His remarks elicited much discussion as to the manner in which certain molluscous genera penetrate limestone rocks and other hard substances, a phenomenon which Mr. Owen thought could not be explained upon the supposition of its being exclusively caused by the rotation of the valves, but that it was chiefly due to the mechanical influence of the currents of water produced by the vibratile *cilia* of the animal, as noticed by Mr. Garner in a communication 'On the anatomy of the *Lamellibranchiate conchiferous* animals,' made to the Society in 1838. (*Zool. Proc.*, 1833, 1837.) This very interesting paper, beautifully illustrated, is published in its perfect state in the 'Transactions' of the Society, vol. ii., and the observations alluded to by Mr. Owen are well worthy the attention of the practical as well as the Zoological reader, for the subject is of high importance practically; as those who are interested in such great public works as the Plymouth Breakwater well know. If this paper should meet the eye of any one so situated as to be able to make a course of experiments relating to the perforations of the marine *Lithophagidæ* and *Xylophagidæ*, and the mode of protection from their attacks, we hope that the inquiry will be patiently followed out. Should the experimentalist succeed, he would be a public benefactor generally, and to this country, where so many submarine works are carried on, both in wood and stone, especially.

Besides the species above alluded to, and others noticed in Mr. Garner's memoir, to whose observations we shall advert in the proper place, certain crustaceans [LIMNORIA] possess the power of perforating wood at least. Excavation is also apparently carried on by the following marine animals. 'Certain *Annelides*,' says Mr. Garner, in the concluding paragraph of his observations on this part of the subject, 'apparently possess this power of excavation. The rocks on our coast are pierced by a minute worm, probably of the genus *Diplotis* of Montagu; it is strongly ciliated, but its mouth does not appear adapted for making its way into such hard substances. By the currents excited by *Vorticellæ*, &c., it is that the erosion noticed at the beaks of fresh-water bivalves takes place; the laminæ at that part being soft and more distant from each other. We find the valves of the *Oyster*, *Pecten*, *Lutraria*, &c., perforated by small circular apertures leading into internal cavities. Dr. Buckland showed this to depend upon the action of a *zoophyte*, which Professor Grant has particularly examined, and named *Cliona celata*. Dr. Buckland considers the holes to be formed by little borers, which the *polypes* possess; these however do not exist, and I believe the phenomenon to be caused by the action of the *cilia* of the animal.' We have introduced this paragraph, that those who may be led to make the inquiry above alluded to may be aware that there are minute animal agents constantly at work to aid in the work of destruction, though their operations are feeble when compared with the ravages made by the *Lamellibranchiate conchifera* in stone and wood, and by *Limnoria* in the latter substance.

We proceed in this article to the examination of those excavating lamellibranchiate conchifers to which a reference has been given from CONCHACEA, as well as to the consideration of *Saxicava*.

Venerupis.

This form is placed by Mr. Garner in that section of the *Dimyaria* (with two adductor muscles) which is distinguished by having the *branchiæ* united medianly; and the characteristic of *Venerupis*, as given by the same author, is to have the *tubes* large, and the *foot* short and prominent behind.

Generic Character.—*Animal* oblong, rather thick, having the borders of the mantle simple, slightly open before for the passage of a compressed and elongated foot; tubes two in number, rather long, united in a considerable portion of their length, and having their orifices radiated; branchiæ little and unequal; labial appendages very small.

Shell solid, striated, or radiated, a little elongated, gaping posteriorly, more or less irregular, equilateral, very inequivalve, the anterior side being always shorter than the posterior side, which is generally truncated as it were, the other being more or less rounded; umbones marked, nearly contiguous; hinge composed of slender, approximated, and nearly parallel teeth, two in the right valve, and three in the left, or three in each; posterior ligament a little elongated, and in great part external; muscular impressions oval, the posterior one the most rounded, both united by a pallial impression deeply excavated posteriorly.

Such is the character given by M. Rang, who apparently restricts the generic name to those species which excavate stones, &c. 'The shells,' says M. Rang, 'which compose this genus are lithophagous, and excavate in stones and madrepores cavities more or less proportioned to their form and to their volume, wherein they lodge themselves, and out of which when adult they cannot go, the aperture of the excavation being too small to admit of their egress. They are without an epidermis, and generally of a dirty white.'

M. de Blainville, who knew not the animal when he published his 'Malacologie,' divides the genus into three sections: the first exemplified by *Venerupis Irus;* the second by *V. Rupellaria* (genus *Rupellaria*, Fl. de Bell.); third, by *V. lamellosa** (genus *Petricola*, Lam.); and he remarks that if the system of 'engrenage' of the species of excavating *Veneres* be regarded rigorously, we should be compelled to establish as many genera as there are species. He adds that he has chosen *Venerupis* from among the denominations proposed for some of these genera, because it well indicates that the species composing it are *Veneres* of the rock.

Mr. G. B. Sowerby (*Genera*, No. xxviii.) notices the difficulty of ascertaining any distinguishing character between the Lamarckian *Venerupis* and the *Veneres Pullastra, decussata*, and others, except in the apparent habits of the animals; a difficulty which had prevented him from endeavouring previously to clear up a point to which his attention had been frequently directed, but which he thinks he has at last overcome. 'It is well known,' continues Mr. Sowerby, 'that *Venus perforans*, Mont., *Venerupis perforans*, Lam., and some of its congeners, live in cavities perforated in chalk and limestone rocks, and that the *Veneres Pullastra, decussata*, and several other species that resemble them in general form and appearance, are found buried in the sand; an apparently well marked difference therefore exists in the habits of their respective animals; we think however that we have evidence to prove that there exists in reality very little difference, and that the cavities in which Lamarck's *Venerupes* live are rather the natural consequence of the action of the sea-water in conjunction with some of the excretions of the animal upon the chalk or limestone, than of any power of the animals themselves to pierce independently of such action; so that the difference is really only in the nature of the shore on which the very young shells are accidentally deposited, those which are thrown upon a sandy bottom burying themselves in the sand, and such as are deposited upon limestone or chalk producing a cavity in which they live.' Mr. Sowerby then proposes to unite together under one appellation Lamarck's *Venerupes*, and the following of his *Veneres:—V. Malabarica, papilionacea, adspersa, punctifera, turgida, litterata, sulcaria, Textile, texturata, geographica, rariflamma, decussata, Pullastra, aurea, virginea*, and some others: and for the genus thus constituted he proposes the name of *Pullastra*, rejecting the term *Venerupis*, or *Venerirupis*, because it would convey the false idea that at least the greater number of the species were inhabitants of rocks. [VENERIDÆ.]

M. de Blainville and M. Rang, as we have above seen, restrict the genus *Venerupis* to the species that excavate rocks.

Lamarck makes his *Lithophages* consist of the genera *Saxicava, Venerupis*, and *Petricola;* and quotes the opinion of M. Fleuriau de Bellevue that boring shells generally do not pierce stones by the attrition of the shell against the stone, but by means of a softening or dissolving liquor which the animal sheds a little at a time.

Lamarck observes that it is not his intention to assemble under this family of *Lithophages* all the boring bivalves, or all that pierce stones; for, as he truly says, such an assemblage would be rather extravagant. He refers to shells equally excavating with his *Lithophages*, which cannot be separated, some from the *Veneres*, others from the *Modiolæ*, others from the *Lutrariæ*, others again from the *Carditæ*, and remarks that it is not of these that he is then treating. His *Lithophages* consist of those shells, among the boring or excavating conchifers, that gape more or less anteriorly, and have the posterior side short, rounded, or obtuse, with the ligament of the valves always external, which live habitually in stones, and for the reception of which he then knew no particular family, or any family to which they might conveniently be approximated. He observes that he nevertheless places among them some species the habits of which were not known to him. To this M. Deshayes adds in the last edition (1835) a note stating that upon the same ground that it would not be rational to establish a genus or family for the *Modiolæ*, or the *Carditæ*, which pierce stones, it would not be right to reject from the family of the *Lithophages* shells which do not perforate, but wherein we nevertheless find all the essential characters of the species which it contains. For this reason it would be convenient to approximate the *Byssomyæ* and the *Hiatellæ* to the *Saxicavæ*, and to leave in this genus species which do not perforate. M. Deshayes (loc. cit.), who does not appear to have seen the observations of Mr. Garner and Mr. Owen above alluded to, refers to the discussions relative to the means by which perforation is brought about by certain acephalous mollusks. Some authors, he remarks, have supposed that the attrition of the valves against the stone sufficed to wear it away by degrees, and that thus the animal formed a lodgement sufficient to contain it. Olivi, he observes, who was of this opinion, grounded it on the fact that he pretends to have observed that perforating mollusks can attack lavas or other rocks which are not calcareous. 'Since this assertion of the Italian author,' continues M. Deshayes, 'no well made observation has occurred to support it, whilst, on the contrary, a great number of proofs have been collected showing that perforating mollusks are never lodged except in calcareous stones.* This mode of life renders very probable the opinion of M. Fleuriau de Bellevue, who believed that the animal was provided with an acid secretion, by means of which it dissolved, in proportion to its growth, the walls of the cavity which it inhabits. An observation of my own is that the greatest number of perforating mollusks are contained in close fitting cavities by no means made to permit of rotatory motion; that they are oval when the shell is of that form; and that we almost always see rising between the umbones of the valves a calcareous crest which forbids any movement of rotation.' M. Deshayes then proceeds thus:—'Many zoologists have believed that there was but little necessity for preserving the family of the *Lithophages*. M. de Férussac places the *Saxicavæ* in the neighbourhood of the *Gastrochænæ* and the *Solens*, and he places the *Venerupes* near the *Veneres*. M. de Blainville has adopted a nearly similar opinion: we do not admit it any more than that of M. de Férussac, and we shall preserve the family of the *Lithophages* as Lamarck established it in this work. We rest our opinion on the knowledge of many animals belonging to the three genera *Saxicava, Petricola*, and *Venerupis;* they are bound by a common relationship (par des rapports communes); thus the mantle, which scarcely opens for the passage of the rudimentary foot in certain *Saxicavæ*, opens a little more in the *Petricolæ*, and more still in the *Venerupes*. The foot follows a nearly analogous development, always remaining however proportionally smaller than in other mollusks in which this organ is necessary for locomotion.'

Lamarck says of the *Venerupes*, or Venuses of the rock, that they seem in fact to have a hinge analogous to that of the *Veneres*, but that nevertheless a slight difference in the disposition of their cardinal teeth suffices to enable us to recognise the genus. They are, he adds, lithophagous or perforating shells which are very inequilateral, and which are not distinguished from *Petricola*, except in having three cardinal teeth, at least, in one valve.

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* See a note by M. Deshayes (last edit. of Lamarck) to V. Irus, pointing out error here.

* But see CLAVAGELLA, where a calcareous grit is recorded as being perforated; and the observations of Mr. Garner post (Saxicava).

'The greater part of the *Venerupes*,' observes M. Deshayes in his commentary on this genus, 'differ scarcely from the *Petricolæ*; they offer most frequently three cardinal teeth in one valve, two and rarely three in the other. When in some individuals one of these teeth is abortive, which often happens, the same species may be comprised in the two genera at once. The animals of the perforating *Venerupes* are scarcely to be distinguished from those of the *Petricolæ*; only the mantle is a little more slit and the foot a little longer. In the *Veneres* these parts are different; and this proves that it is necessary to keep separated two genera which Cuvier and M. de Blainville have thought it right to unite or approximate. We do not pretend to dispute, nevertheless, the analogy which is evidently exhibited between certain *Venerupes* and the *Veneres*. We think that the *Venerupes* only ought to be withdrawn from the genus and placed among the *Veneres*, because the animals are in fact similar; only some plunge themselves into hardened mud, whilst others live in the sand. And although they may enjoy the faculty of perforating stone, this would not be a sufficient reason to reject them from the *Veneres*, because we have seen that in a great number of genera belonging to very distant families there exist perforating species; thus we may well conceive that there may be perforating *Veneres*, but that does not hinder us from admitting a genus *Venerupis*, the characters of which appear sufficient to us.'

The number of recent species of *Venerupis* is not great; Lamarck gives seven, and M. Deshayes adds one.

Geographical Distribution.—The range of *Venerupis* is wide; we have species on the coasts of England and France, in the Mediterranean, in the South Seas, and in those of New Holland.

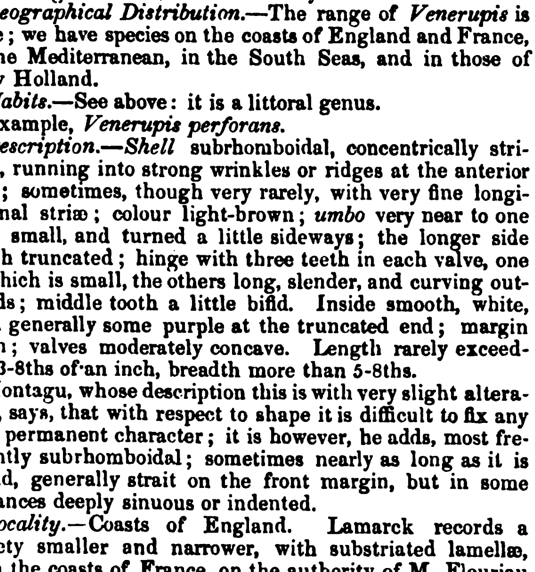
Habits.—See above: it is a littoral genus.

Example, *Venerupis perforans.*

Description.—*Shell* subrhomboidal, concentrically striated, running into strong wrinkles or ridges at the anterior side; sometimes, though very rarely, with very fine longitudinal striæ; colour light-brown; *umbo* very near to one end, small, and turned a little sideways; the longer side much truncated; hinge with three teeth in each valve, one of which is small, the others long, slender, and curving outwards; middle tooth a little bifid. Inside smooth, white, with generally some purple at the truncated end; margin plain; valves moderately concave. Length rarely exceeding 3-8ths of an inch, breadth more than 5-8ths.

Montagu, whose description this is with very slight alteration, says, that with respect to shape it is difficult to fix any as a permanent character; it is however, he adds, most frequently subrhomboidal; sometimes nearly as long as it is broad, generally strait on the front margin, but in some instances deeply sinuous or indented.

Locality.—Coasts of England. Lamarck records a variety smaller and narrower, with substriated lamellæ, from the coasts of France, on the authority of M. Fleuriau de Bellevue.



Venerupis perforans. *a*, from Montagu's figure; *b*, from the shell.

Fossil Venerupis.

M. Deshayes, in his tables (Lyell), makes the number of living species eight and of the fossil species (tertiary) six. He also quotes *Venerupis Irus* as being found both living and fossil (tertiary). He does not however note *V. Irus* as fossil in the last edition of Lamarck (1835), and only gives these two fossil species, *V. globosa* and *V. striatula.* M. de Blainville gives the number of fossil *Venerupes* as five.

Petricola (Lam.; including *Rupelleria*, Fl. de Bell.).

Generic Character.—*Animal* oval, thick, especially at the upper part; mantle with simple borders which are a little dilated in front, where they form a rather small opening for the passage of a tongue-shaped and feeble foot; tubes small, in the shape of cones, truncated at their summits, separated for two-thirds of their length, and finely radiated at their orifices; branchiæ small.

Shell rather delicate, without an epidermis, white, radiated, oval, subtrigonal, gaping anteriorly, more or less irregular, equivalve, inequilateral, the anterior side much shorter than the posterior side; umbones not projecting much, and contiguous; hinge composed of small cardinal teeth not diverging much, one of which at least is bifid, to the number of two in one valve, and one in the other, or two in each; ligament external, posterior, short, and convex; muscular impressions oval, united by a pallial impression which is often not very distinct, and has a very deep and rounded excavation posteriorly. (Rang.)

Mr. G. B. Sowerby observes ('Genera,' No. xv.) that the genus *Petricola*, as it stands at present, is composed of several shells which Lamarck thought sufficiently different to form two genera, his *Petricola* and *Rupellaria*, the first with two cardinal teeth in one valve and one in the other, the second with two teeth in each valve; but Mr. Sowerby entirely agrees with Lamarck in the propriety of uniting them. He is not so well satisfied with the place assigned by Lamarck to this and some other genera which form the hollows in stone wherein they dwell; and he thinks that a great degree of similarity in external figure and appearance as well as habit should have brought them nearer to the *Pholadariæ*.

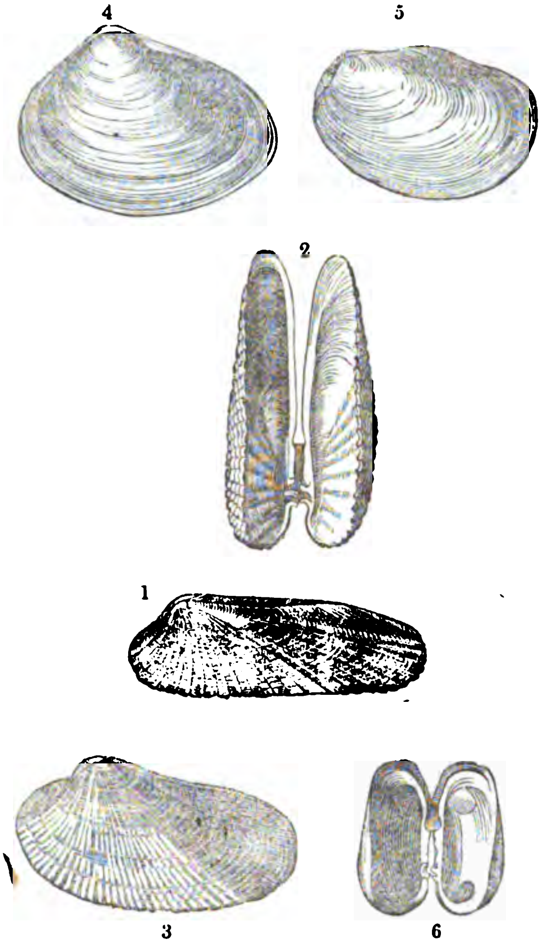
M. Deshayes, in a note to the last edition of Lamarck, is also of opinion that the latter did well in uniting *Petricola* and *Rupellaria*, which exhibit in fact so little difference, that the same species may be placed under either the one or the other genus, according to the state of development or preservation of the hinge. M. Deshayes goes further, and says that perhaps we shall be obliged hereafter to unite *Petricola* and *Venerupis*, which in reality differ but little from each other. This resemblance, he adds, exists not only in the shells but also in the inhabiting animals. Mr. Garner appears to be of the same opinion, for in his 'Anatomical Classification of the Lamellibranchiata,' we find the genus *Venerupis*, to which he evidently gives a very large extent, but no mention of *Petricola*.

Geographical Distribution.—Nearly coequal with that of *Venerupis*, as far as the localities of that genus are recorded; and rather numerous on the coasts of the warmer parts of America. (Cuming.) Also found on the Gallapagos Islands. (Cuming.)

Habits, &c.—Much the same with those of *Venerupis*, in the same rock with which, and in its close neighbourhood, *Petricola* is often found. Mr. G. B. Sowerby speaks of the cavities in which they live as being evidently of their own working, though on account of their form they cannot possibly have been produced by a rotatory motion, for they are exactly of the shape of the shell itself, and a very little larger. *Petricola* has been found at depths ranging from the surface or near it to a depth of eleven fathoms.

The species are not few. Lamarck recorded eleven recent, two of which occur also in a fossil state; and two entirely fossil. M. Deshayes does not add to the number of recent species, in fact he expresses his belief that *Petricola Linguatula*, one of Lamarck's, ought to be arranged among the *Saxicavæ;* nor does he admit Mr. G. B. Sowerby's *Petricolæ Ductylus* and *subglobosa* ('Genera') into the last edition of Lamarck. The ten new recent species brought to England by Mr. Cuming, and described by Mr. G. B. Sowerby in the 'Proceedings of the Zoological Society' for 1834, were probably not published when the 6th volume of the new edition of Lamarck went to press. M. Deshayes however adds two fossil species, *P. elegans* and *coralliophaga.*

The difference of form is so great in this genus, that we have thought it advisable to give, with permission, representations of the following species from the 'Genera,' by Mr. G. B. Sowerby, instead of the description and figure of one species.



1, and 2, Petricola Pholadiformis. 3, P. Dactylus. 4, P. Ochroleuca. 5, P. rupestris. 6, P. subglobosa. (Sowerby.)

Fossil Petricolæ.

The number of recent species given by M. Deshayes in his tables (Lyell) is 13, but some more, as we have seen, have been described since. The number of fossil (tertiary) he places at 10, and gives the species *ochrocleuca*, *lamellosa*, and *striata* as both living and fossil (tertiary). Dr. Fitton, in his 'Stratigraphical and Local Distribution' of the fossils in the strata below the chalk, records and figures two species (*canaliculata* and *nuciformis*) from Blackdown.

Coralliophaga. (*Cypricardia*, part, Lam.)

Generic Character.—Animal unknown.

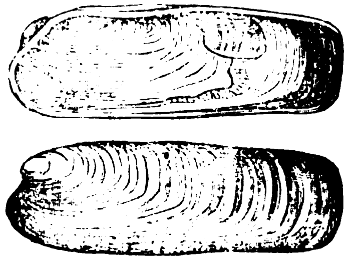
Shell oval, elongated, finely radiated from the summit to the base, cylindrical, equivalve, very inequilateral, the dorsal summits very anterior and but little developed; hinge consisting of two small cardinal teeth, one of which is subbifid, in front of a sort of lamellar tooth, under a rather weak external ligament; two muscular impressions, which are small, rounded, and distant, united by a narrow pallial impression, a good deal excavated posteriorly.

M. de Blainville established this genus for some species of living shells placed by Lamarck among his *Cypricardiæ*, and which appeared to the former to be approximated to the *Veneres*. M. de Blainville states that M. Deshayes had caused him to remark shells of the same species as that cited by M. de Blainville as the type, and which had modified their form so as to resemble a *Lithodomus* in which they had lived.

M. Rang thinks that this genus is well distinguished from the *Cypricardiæ*, because, in one part, the excavation of the muscular impression announces that the animal has tubes, whilst the other shows that it perforates.

Example, *Coralliophaga carditoidea*, Blainv.; *Cypricardia coralliophaga*, Lam.; *Cardita Dactylus*, Brug.; *Chama coralliophaga*, Gmel.

Locality and Habits.—In the masses of madrepores and other corals at St. Domingo. M. Rang observes that it is in the masses of madrepores so common at the Antilles that the species of this genus should be sought for.



Coralliophaga carditoidea.

Fossil Coralliophagæ.

The species here figured as recent is also noted by Lamarck as fossil in Italy, under the name of *Cypricardia coralliophaga.*

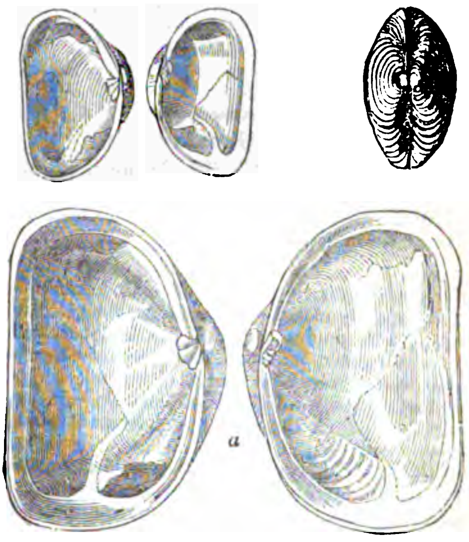
N.B. With regard to this genus the reader should bear in mind that M. Deshayes, who, in the last edition of Lamarck, gives *Coralliophaga carditoidea* of De Blainville as a synonym of *Cypricardia coralliophaga* of Lamarck, says, in a note to the succeeding species in Lamarck's 'System,' 'These three last species'—*Cypricardia rostrata*, Lam., *C. coralliophaga*, and *C. modiolaris*, the first of which M. Deshayes considers to be identical with its antecedent species *C. angulata*, Lam.—'are found fossil in the great oolite of France and England. Lamarck, who had not seen their hinge, referred them, from their form, to the genus *Cypricardia;* but I, more fortunate, possess separate valves, from the hinge of which I have cleared away the stony matter, and have remarked that these shells have all the characters of *Crassina*, the genus to which I refer them.'

Clotho. (*Fossil* only.)

Generic Character.—Animal unknown.

Shell oval, subregular, striated longitudinally, equivalve, and subequilateral; hinge formed of a bifid tooth, curved back into a hook, rather longer in one valve than in the other; ligament external.

Example, *Clotho Faujasii.*



Clotho Faujasii. *a*, magnified.

This, the only species that appears to be known, was detected by Faujas in the shells of *Cypricardiæ*, which were still lying in the stone which they had eroded when alive. M. de Blainville and M. Rang both adopt the genus; but the former says that he had not observed it himself.

Ungulina.

Generic Character.—Animal unknown.

Shell longitudinal or transverse, irregular, not gaping, equivalve, subequilateral; umbones sufficiently developed and eroded; hinge formed by a cardinal tooth, which is short and subbifid in each valve, and an oblong marginal furrow or depression, divided into two parts by a contraction; ligament subinternal, and inserting itself in these depressions; muscular impressions elongated; pallial impression not flexuous. (Rang.)

Geographical Distribution.—M. Rang notes the locality as unknown in his 'Manuel;' but the locality for *Ungu-*

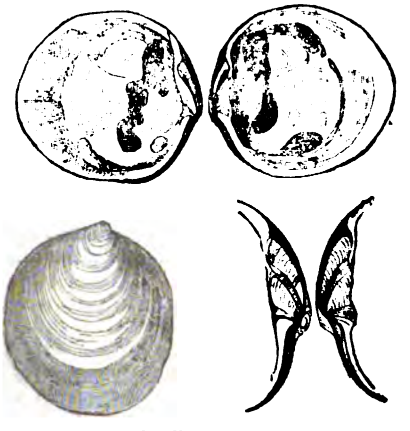
lina transversa, given in Lamarck (last edit.), is 'the seas of Senegal,' on the authority of the former. Mr. G. B. Sowerby has also received specimens from Senegal, and says he has good reason to believe that they are marine.

The latter naturalist observes upon this genus, that it was established by Daudin and adopted by Lamarck, but is at present almost unknown in this country. He states that in general form and appearance these shells very nearly resemble the *Lucinæ*, and gives it as his opinion that the two species recorded by Lamarck are only accidental varieties of the same.

M. Deshayes does not think that the characters of this genus were well appreciated by Lamarck, and remarks also on its close approximation to the *Lucinæ*. The ligament, he observes, is not internal, as Lamarck thought, but external, and received, as in many *Lucinæ* and *Cythereæ*, upon very flattened *nymphæ*, separated by a deep furrow, in which the most superficial part of this ligament inserts itself. He is also of opinion that the two species recorded by Lamarck (to which in the last edition he has not added) are varieties of one only.

Habits.—M. Deshayes states that observations recently made by M. Rang have shown that the *Ungulinæ* are perforating shells, which, he says, he had already known from a fossil species in the environs of Bordeaux.

Example, *Ungulina transversa.*



Ungulina transversa.

Fossil Ungulinæ.

M. Deshayes, in his tables, records one living species of *Ungulina*, but notices none in a fossil state. It will be seen above that he speaks of a fossil species from Bordeaux in the last edition of Lamarck.

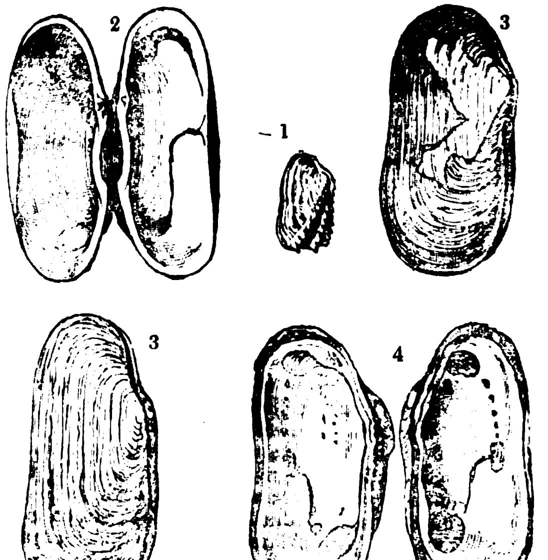
Saxicava.

Generic Character.—Animal elongated, subcylindrical, having the mantle closed on all sides, prolonged backwards by a long tube, double internally, a little divided at its summit, and pierced inferiorly and anteriorly by a rounded orifice for the passage of a small, elongated, delicate, and pointed foot; mouth moderate, labial appendages small; branchial laminæ for the most part free, and very unequal on the same side.

Shell thick, solid, covered with an epidermis, elongated, rounded in front, truncated as it were posteriorly, gaping, irregular, equivalve, very inequilateral, the posterior side being much longer than the anterior; umbones not very distinct; hinge without teeth or with two separated tuberosities more or less developed; ligament external; muscular impressions rounded and a little approximated, united by a small straight pallial impression, very narrow, and occupying the middle of the valve. (Rang, from *Saxicava rugosa*.)

Both M. de Blainville and M. Rang place the genus among the *Pylorideans*. The former is of opinion that it differs but little from *Glycimeris*.

Mr. G. B. Sowerby ('Genera,' No. xxv.) includes in the genus *Saxicava* shells which, he observes, have had, in conformity with the various views of authors, at least six different generic names. He apologises for the conclusion to which he has come in contradiction to so many great authors, but gives the following reasons for his opinion. He premises that it will not be disputed that *Solen minutus* of Chemmitz and Montagu, *Hiatella arctica* of Daudin, *Cardita arctica* of Bruguière, and the *Byssomya* of Cuvier, are one and the same species; and that Leach's *Pholeobius* includes as distinct species of the same genus the *Solen minutus* of Montagu and the *Mytilus rugosus* of Linnæus; 'now the former of these,' continues Mr. Sowerby, 'is *Hiatella arctica* of Lamarck and Turton, and the latter *Saxicava rugosa* of the same authors: thus all the six genera are reduced to one by Dr. Leach, whose authority is indisputably very great in such matters · we do not however propose to our readers to take it as conclusive, but will state that we possess, as Dr. Leach did, a series of specimens, the young ones of which are more regular in shape and more strongly spinose than the older, and are to all intents and purposes *Hiatella arctica*, or *Solen minutus*; and the older specimens, losing the strongly-marked double rows of spines, though always retaining indications of them, and assuming a much less regular form, become characteristic specimens of *Saxicava rugosa*: the hinge teeth of the younger specimens may be advanced as an argument against the identity of these shells: it is however well known that in many shells, particularly those that are irregular, the teeth become obsolete with age: thus if the hinge teeth, the general form of the shells, or the double row of spines, cannot be depended upon as generic distinctions, the Lamarckian genera *Hiatella* and *Saxicava*, and his *Solen minutus*, merge into one: to show that the shells described as distinct species under either of these generic names are identical is not important to the present work; it is therefore sufficient to observe, that in all irregular shells that are either found attached to or imbedded in rocks, corals, roots of sea-weeds, &c., the general form cannot be taken as a character; and we believe the *Mytilus præcisus* and several of the *Saxicavæ* described by Lamarck and Turton to be merely variations of *S. rugosa*, than which there is perhaps no shell more subject to variety of form.' To illustrate this exposition, Mr. G. B. Sowerby gives in his 'Genera' the following figures of *Saxicava rugosa* in different stages of its existence.



Saxicava rugosa.

1, the young shell; 2, inside, showing the teeth; 3, a full-grown specimen of the same; 4, the inside, showing the muscular impressions.

M. Deshayes observes, in the last edition of Lamarck, that the latter knew but a very small number of *Saxicavæ*, and has not mentioned any fossils, of which last there are eleven or twelve species. 'When,' continues M. Deshayes, 'we examine the shells of *Byssomya*, and compare them with those of *Saxicava*, we find no difference between them; whilst in the animals a much greater discrepancy exists, because the *Byssomyæ* do not perforate, and carry, behind a rudimentary foot, a byssus, like that of the *Mytili*; the mantle is closed for a good part of its length, and is prolonged backwards into two siphons joined together to the summit. If we appreciate these differences at their just value, we may easily perceive that they are not of so great importance as they appear to be; for a byssus is a method of living in the same spot (en un même point), as well as the faculty of penetrating stones, We must consider the character of the byssus in the *Byssomyæ* as of little value; for the greater number of zoologists have united this genus to the *Saxicavæ*.' M. Deshayes then goes on to observe that Lamarck has comprised the same species under two very different genera, and that his *Solen minutus* and *Hiatella arctica* are the same shell; to be satisfied of which, one has only to compare the synonym. 'The fact is,' he adds, 'that the shell in question is not a *Solen*, and ought not to constitute a particular genus; for it belongs to the byssiferous *Saxicavæ*, as we have satisfied ourselves that it does by an examination of the animal.'

M. Deshayes further observes, in a note to *Saxicava Australis*, that all shells which, like those of this genus and the two following (*Petricola* and *Venerupis*) are cramped in their development, put on different forms, so as to impose upon the most acute observers, especially when the observation is confined to a small number of individuals. This happened, he adds, to Lamarck, who has given to the same shell the names of *Corbula Australis*, *Saxicava Australis*, and *Saxicava veneriformis;* so that in a well executed catalogue it would be necessary to unite these three species under one name, and arrange them among the *Saxicavæ*.

Geographical Distribution.—Very extensive. The Northern Ocean, the Britannic seas, the Mediterranean, the South Seas, Australasia, and the warmer coasts of America, are recorded as localities.

Habits, &c.—Mr. G. B. Sowerby remarks that the *Saxicavæ* are frequently found upon the outside of oysters, protected by their irregularities, and in clefts of rocks or corals, roots of sea-weeds, and perforating oysters, chalk, limestone, and hardened clay. Those, he adds, which themselves perforate the hollows in which they live are more regular than others.

Mr. Garner states that the crypts of *Saxicava* are not circular: hence M. de Bellevue and Mr. Osler, in this instance, believe them to be formed by the phosphoric acid secreted by the animal, and they suppose this animal to inhabit those rocks only which are composed of carbonate of lime, which last supposition Mr. Garner declares to be not correct to his own knowledge.

Mr. G. B. Sowerby observes that the species of this genus are not numerous, and that they are not easy to distinguish from each other, as the reader may imagine from the confusion which has prevailed on this subject. Lamarck recorded five species. Of the first two of these (*Saxicava rugosa* and *S. Gallicana*), one, according to M. Deshayes, must be suppressed, being in reality only a variety of the other. *Saxicava Australis* and *S. veneriformis*, Lamarck's fourth and fifth species, are identical, as we have already seen. To these M. Deshayes adds *S. Guerini*, from the Mediterranean, and *S. rhomboides?* as recent species. Mr. G. B. Sowerby (*Zool. Proc.*, 1834) has added three recent species collected and brought home by Mr. Cuming.

FOSSIL SAXICAVÆ.

Lamarck, as we have above noticed, characterized no fossil *Saxicavæ*. M. Deshayes, in his tables, gives the number of recent species as 5; and 11 as the number of fossil species (tertiary). He notes two species, *S. minuta* and *S. Pholadis*, as both living and fossil (tertiary). We do not find *S. minuta* recorded at all in the last edition of Lamarck (1835), nor is the fossil designation added to *S. Pholadis*. Of fossil species only five are recorded, unless we regard *Saxicava rhomboides* (Desh.) as fossil only, which the synonyms (*Donax rhomboides*, Poli, *Solen minutus*, Linn., and *Hiatella arctica*, Lam.) seem to forbid. There is no recent 'habitat' given; but there can be little doubt that it is identical with the living and fossil *S. minuta* of the tables of M. Deshayes.

The reader will bear in mind that the ravages of the stone-excavating genera noticed above, though considerable when they congregate in numbers, are superficial in comparison with the destructive operations of *Pholas* and *Lithodomus*.

LITHOSTROTION, the name given by Llwyd, and adopted by Fleming, to some fossil 'madrepores,' as the lamelliferous corals are commonly termed, which appear confined to the older strata (especially mountain limestone). They are included in Cyathophyllum of Goldfuss by Professor Phillips (*Geol. of Yorkshire*, vol. ii.), and in Columnaria by Blainville (*Actinologie*, p. 350).

LITHO'TRYA. [CIRRIPEDA, vol. vii., p. 208.]

LITHO'TOMY (from *λίθος*, a stone, and *τέμνω*, to cut). Although urinary calculi may be extracted from the kidneys, urethra, or bladder, the term lithotomy is restricted to the operation of cutting into this latter viscus for the purpose of removing one or more stones. From the complex nature of the fluid secreted by the kidneys, and the quantity of saline matters which it holds in solution, deposits not unfrequently take place in one or other of the cavities to which the urine has access. Hence solid concretions, or urinary calculi, may be met with in the kidneys, ureters, bladder, or urethra; but the majority of these concretions are believed to be formed originally in the kidneys. Now, if we suppose one of these calculi to have descended into the bladder, it is easy to imagine that it would there form a nucleus, around which the addition of fresh matter would be constantly adding to its bulk. A priori reasoning would lead us to suppose such to be the result, and that this actually takes place is proved by the fact that many calculi have for their nucleus foreign bodies that have accidentally entered the bladder, as bullets, splinters of bone, bits of bougie, &c. The number and size of calculi met with in the bladder differ as much as their form and composition vary, and their magnitude is generally in an inverse ratio to their number. A case has lately been recorded in which 398 calculi, from the size of a pea to that of an olive, were found in the bladder after death; while, in a case described by the late Sir James Earle, a stone was extracted after death which weighed forty-four ounces, its long axis measuring sixteen inches, and the shorter fourteen; but the average size of vesical calculi is about that of a walnut. Their form is mostly spheroidal, or egg-shaped, and sometimes flattened on two sides like an almond.

According to their composition, they are either soft and friable, or very dense and hard, and their surface may be quite smooth or beset with numerous tubercles. These circumstances, together with their loose or fixed position in the bladder, have considerable influence in determining the comparative severity of the symptoms. Children and aged persons are more subject to the disease than those in the vigour of life, and males than females; the inhabitants of temperate climates, than those of higher or lower latitudes.

Symptoms of Stone in the Bladder.—These consist in a troublesome itching, sometimes amounting to pain, at the extremity of the penis, with a frequent desire to make water and evacuate the bowels; the urine is voided with great pain, particularly the last drops, and while flowing in a full stream is liable to be suddenly arrested, from the stone falling against the vesical orifice of the urethra. When much irritation is present, the urine on cooling becomes cloudy, and deposits a large quantity of ropy mucus, not unfrequently mixed with blood, especially after any rough exercise. All these symptoms vary in degree, according to the size of the stone and the smoothness or roughness of its surface, its fixed or loose position in the bladder, the quality of the urine, and the condition of the bladder. Instances are recorded of persons living with stone in the bladder for years, yet suffering little or no inconvenience from it, but these cases must be considered exceptions; in general the health sooner or later gives way, and, without recourse to one of the operations we are about to speak of, the patient lingers out a miserable existence till death terminates his sufferings. Nearly all the symptoms we have just described as belonging to stone in the bladder may however be simulated by other diseases of the bladder or neighbouring parts; a positive diagnosis therefore can never be made before *sounding* the patient. This consists in introducing into the bladder, through the urethra, a metallic instrument called a sound, by means of which the stone can be plainly felt, and an audible noise perceived on striking it: till this be rendered evident no surgeon would be justified in undertaking the operation. It sometimes happens that stones are forced, by the violent contractions of the bladder during fits of the complaint, between the fasciculi of the muscular coat of this viscus, so as to become what is termed encysted; or they may become adherent to some portion of the parietes of the bladder: under these circumstances the surgeon would hesitate before he undertook the operation.

Modes of performing Lithotomy.—To describe at length the various modes of operating for the stone, and the modifications which each method has undergone, would occupy too much space in a publication not strictly surgical; we shall therefore merely glance cursorily at those formerly in use, while we direct our attention more particularly to the method which is employed at the present day.

Of the Apparatus Minor, Cutting on the Gripe, or Celsus's Method.—This is the most antient kind of lithotomy, and has probably been practised from time immemorial; but Celsus having first described it, it has been called *Lithotomia Celsiana;* and from the stone, previously fixed by the pressure of the fingers in the anus, being cut directly upon, *cutting on the gripe*, a knife and a hook being the only instruments used. The appellation of the *lesser apparatus* was given to it by Marianus, in order to distinguish it from a method which he described, called the *apparatus major*, from the many instruments employed. The objections to cutting on the gripe are, - 1st. It is only applicable to children under fourteen years of age. 2nd. It is uncertain what parts are divided; this depending on the degree of force employed in making the stone project in the perineum. 3rd. The injury liable to be inflicted on parts whose integrity is essential to the success of the operation.

Apparatus Major, or Marian Method, was founded on erroneous principles, and in ignorance of the nature of the parts to be operated on. It was supposed that wounds of membranous parts would not heal, while their dilatation might be undertaken with impunity. In conformity with these notions, the precept of Celsus, 'Ut plaga paulo major quam calculus sit,' was neglected, and the object endeavoured to be attained was, to do as little as possible with the knife, and as much as possible with instruments called dilators; but the parts thus subjected to attempts at dilatation are inelastic, and consequently were lacerated. The severe injury thus produced rendered this one of the most fatal operations in surgery; but notwithstanding this, it was practised for near 200 years, till Frère Jacques, in 1697, taught at Paris the method at present in use.

High Operation—so named from the incision into the bladder being made above the pubes, was first practised in Paris in 1475, by Colot, as an experiment on a criminal, by permission of Louis XI.; but the earliest published account of this mode of operating was in 1556, by Pierre Franco. This method is most applicable to those cases in which the stone is too large to be extracted from the perineum, or where there is disease of the urethra and prostate gland; but there are several objections to it, and it is now entirely abandoned.

Operation through the Rectum.—This method was first suggested in a work published in the sixteenth century; but the proposal never received much attention till the year 1816, when it was revived by M. Sanson, of Paris, and carried into operation by him and by Dupuytren; but the unfavourable results which attended the performance of this operation prevented its being generally tried or adopted, and no one of the present day ever thinks of performing it.

Lateral Operation—so called from the prostate gland and neck of the bladder being cut laterally, in order to avoid wounding the rectum, is that adopted at the present day. It was first practised by Pierre Franco, a surgeon at Tourrières, but he never established the method as a permanent improvement in surgery; this was left for Frère Jacques, a priest, who, in 1697, came to Paris in order to make known this method, which he employed with great success at various places. Although it appears that he was not quite so successful as he had led the world to believe, the superiority of his mode of operating was immediately perceived and recognised, and, with slight modifications, was adopted by most of the surgeons of that period. Hitherto the Marian section had been used: the advantages of an operation by which a free opening was made into the bladder, over one in which it was so small as not to admit of the extraction of the stone without laceration of the parts, are too obvious to require comment. Surgeons of the present day differ somewhat as to the extent of the opening to be made into the bladder, and on the choice of instruments to be employed; some make use of a common scalpel, which cuts into the bladder from without inwards; while others prefer the bistoire caché, or gorget, which divides the prostate gland and neck of the bladder from within outwards. Having premised thus far, we will proceed to describe the operation as usually undertaken with the cutting gorget. The patient having been sounded, to ascertain that the stone is actually within the bladder (for instances have occurred of stone becoming encysted a short period before the operation), and the rectum being emptied by means of a clyster, he is placed on his back upon a table, with his buttocks projecting rather beyond its edge; he should be directed to grasp the outside of each foot with the hand of the same side, and the two pair should then be firmly bound together. A *staff*, which is an instrument shaped very much like a catheter, or sound, but somewhat longer, and grooved on its convex side, is passed through the urethra into the bladder, where it must be retained firmly by an assistant; its convexity looking towards the perineum, and the groove slightly inclined to the left side of the patient. The operator now commences his incision below the bulb of the urethra, about an inch and a quarter in front of the anus, and continues it obliquely downwards to the left of the raphé of the perineum for three inches, till it reaches midway between the tuberosity of the ischium and the anus: this should cut through the integuments and superficial fascia. The next incision, made in the same direction, divides the transversus perinei muscle, and exposes the membranous portion of the urethra, which must be opened, and the groove in the staff felt for with the finger; into this groove, which serves as a director for making the concluding section of the operation, is inserted the beak of the *gorget* (a sort of knife terminated by a beak, that fits into the groove of the staff). The operator now rises from his chair, and, taking the staff in his left hand, raises its handle from the abdomen till it forms nearly a right angle with the patient's body; the gorget is now pushed onwards, along the groove, till it enters the bladder. By raising the handle of the staff the gorget is made to enter the bladder in a direction corresponding with its axis, and the danger of wounding the rectum is thereby avoided. As soon as the gorget has been introduced the staff is withdrawn, and a pair of long forceps, expressly adapted for this operation, is passed along the gorget into the bladder, and this latter instrument withdrawn. The stone is now to be seized, and gently extracted; but it sometimes happens that a stone is too large to be removed without using a degree of force that would be perfectly unjustifiable: in this case, if the wound will not admit of further enlargement, nothing remains to be done but crushing it, and thus taking it away piecemeal. A stone should always be examined immediately after it is extracted, because its appearance conveys some information concerning the existence of others; and in every instance the cavity of the bladder should be explored with the finger, to ascertain that there is no other stone present. Encysted calculi seldom require an operation for their removal, but, should this be necessary, the cyst may be opened by a blunt-pointed bistoury, and the stone taken away. When a stone is known to be of ample size, some operators perform what is called the bilateral operation, from both sides of the prostate gland being cut; for this purpose a double-edged knife has been invented, called the *double lithotome;* but Mr. Liston is of opinion that no complicated machine is requisite to make this bilateral division, and that it is quite time enough to do it when the necessity for it has been ascertained.

Lithotomy in Women.—From the shortness, largeness, and very dilatable nature of the female urethra, the surgeon is seldom called upon to perform the operation in women. The formation of calculi is perhaps not less common in women than in men; but from the anatomical circumstances just alluded to, stones of considerable magnitude have been voided spontaneously. This fact has suggested the plan of mechanically dilating the urethra, and thus extracting them without the employment of any cutting instruments; but where the stone is very large, the degree of dilatation necessary for its extraction is liable to produce paralysis of the part, and incontinence of urine ever after. To avoid these evils, an artificial opening should be made into the bladder. The operation is simple. A strait staff, or director, is introduced through the meatus urinarius; the groove is turned obliquely downwards and outwards, in a direction parallel to the ramus of the left os pubis; and the knife is thus conducted into the bladder, and makes the necessary incision through the whole extent of the passage and neck of the bladder.

Treatment after the Operation.—The dangers to be guarded against after an operation of lithotomy are, inflammation of the bladder and peritoneum; infiltration of urine into the cellular texture of the perineum and parts adjacent; and hæmorrhage. To prevent the dangers that would arise from inflammation, the patient should be kept perfectly quiet, and on a low regimen; but supposing it to have set in, the most prompt and energetic measures must be had recourse to; copious venesection, the use of the warm bath and fomentations, with the administration of such medicines as are known to be most efficacious in such cases, afford the only chance of preserving the patient. Infiltration is to be avoided by placing the patient in such a position that the urine can flow readily from the wound, which should be left uncovered, or this end is attained more effectually by introducing an elastic gum catheter into the bladder, and suffering it to remain there for the first two or three days. Hæmorrhage is fortunately a rare occurrence; but should this take place, pressure, made by means of sponge or lint compresses, may be tried; and if this fail, the bleeding vessel must be sought for and tied.

LITHOTRITY (from λίϑος, a stone, and the root *τρι*, to pierce); *Lithotripsy* (from λίϑος, and *τρίϐω*, to break), 'the reduction of a calculus in the bladder into small pieces, by means of instruments passed into that organ through the urethra, so that the fragments may be discharged through the latter tube, and no necessity remain for the performance of lithotomy.' This operation, which must be ranked among the most brilliant achievements of modern surgery, was first seriously proposed in 1812, and Gruithuisen, a Bavarian surgeon, constructed an apparatus for performing it. But the originality of the idea was probably derived from antient writers, several of whom speak of the practicability of breaking stones within the bladder, although they make no mention of the mode of performing it. At the commencement of the nineteenth century, Rodriquez, a physician of Malaga, is said to have broken a stone in the bladder by striking it with a catheter; but the first suggestion we meet with of an apparatus constructed expressly for this purpose is by Gruithuisen. It consisted of a wide strait tube, which was introduced through the urethra into the bladder. Through the tube was passed a noose of copper wire (by which the stone was caught hold of and fixed) and a rod terminating in a circle of teeth or a spear-point; a drilling-motion was now given to the latter instrument by means of a bow, and the stone was thus perforated or broken. Since this period, the operation has undergone successive improvements in the hands of Leroy, Civiale, and Heurteloup. The following is the mode of proceeding adopted by this last gentleman. The patient is placed on an operating bed, so constructed as to admit of any inclination being given to it that the operator may think proper. At its foot is an apparatus for affording a fulcrum to the instrument which is to be passed into the bladder; and two slippers, securely fixed at a short distance on each side of the apparatus alluded to, serve for securing the feet of the patient, who is placed in a position nearly resembling that chosen for the operation of lithotomy. The bladder is now moderately distended with warm water injected through a catheter. A pair of strong sliding forceps, the opposite surfaces of which are furnished with teeth, are then introduced; and the calculus having been seized, the lower piece of the forceps is fixed to a vice at the foot of the bed serving as a fulcrum, and the upper piece is struck with a hammer and the calculus broken. Thus, neither the shock arising from the concussion is communicated to the bladder, nor is this organ liable to be injured by the fragments being forcibly projected against its internal surface. The instruments are then withdrawn, and the fragments are afterwards voided with the urine; or if any remain too large to be thus discharged, the operation is repeated from time to time till all is got rid of. It were to be desired that an operation so simple, productive of so little pain, and so entirely free from the dangers attendant on the operation of lithotomy, was more generally applicable than it is found to be, but it is subject to the following disadvantages. The patient does not obtain a cure at once, and in many instances the operation is required to be repeated several times; and as the smallest fragment which remains behind will form the nucleus of a new stone, a recurrence of the disease is more likely to take place after this operation than after lithotomy. It is unfit for calculi formed on extraneous substances which have entered the bladder, for encysted or adherent calculi, for large or very hard calculi, for patients with enlarged prostate gland or diseased bladder, and for children. The accidents liable to arise from the operation are generally less grave than those to which the operation of lithotomy is subject; two of the most serious that have taken place are perforation of the coats of the bladder and the breaking of the instrument within this viscus. But where the stone is small and not too hard, and other favourable circumstances are present, we imagine few could be found who would not give it the preference over the operation of lithotomy.

LITHUA'NIA, a large tract of country which now forms some important provinces of the Russian empire, but which once constituted an independent and powerful state, until it was united to Poland by the accession of its reigning dynasty to the throne of that country. Its history is very remarkable, and presents a most extraordinary instance of a nation which, after having remained for centuries in a state of utter insignificance, assumed, by its conquests and wise policy, in a comparatively short time, a station which rendered it for about a century the most formidable power of the north.

The early history of Lithuania is involved in much obscurity, and the several traditions contained in its chronicles are exceedingly confused. A current tradition that a Roman colony had settled on the shores of the Baltic has been shown to be a mere fable. There are some very ingenious conjectures that the Heruli, who destroyed the Western empire under Odoacer, were inhabitants of Lithuania, and that after their expulsion from Italy they returned to this country, and brought with them those words, resembling the Latin, which abound in the Lithuanian language.

The first mention of Lithuania occurs in the chronicle of Quedlinburg, A.D. 1009. (Naruszewicz, *Hist. of Poland*, vol. iv., p. 145.) From that time the name of Lithuania begins to appear more frequently in Russian chronicles, which speak of the Lithuanians as a poor and savage nation, some tribes of which were compelled by the bordering Russian princes to pay a tribute, consisting of the bark of birch trees for making oil, of ropes made of the bark of lime trees, and of brooms. The rudeness and poverty of the nation must have been very great if their conquerors were satisfied with such sylvan produce. In the twelfth century the Lithuanians began to be more known, particularly by their wars with the German knights.

Towards the year 1200, Albert, bishop of Riga, founded the order of the Knights Sword-bearers (Ensiferi), in order to conquer the pagans who inhabited the shores of the Baltic from the Curische Haff to the Gulf of Finland. The half-savage barbarians were soon subdued by the valour and military skill of those warrior monks, and reduced to a state of the most oppressive bondage. Not long after, about 1220, Conrad, duke of Mazovia, being unable to resist the predatory attacks of the Prussians, a branch of the Lithuanians, called to his assistance the Knights of St. John of Jerusalem, and granted them a large tract of land, with many castles. These knights did the same in Prussia that the Sword-bearers had done elsewhere; and the two orders acquired new strength from their union, which was effected in 1238, and became most formidable enemies to their neighbours, particularly to the unconverted Lithuanians. These priestly soldiers were certainly the bravest, the most skilful, and the best armed militia of that time; and their numbers were continually recruited by German adventurers, who flocked to their standard in order to obtain the remission of their sins and a grant of lands wrested from the native idolaters. Such were the enemies with whom the Lithuanians had to contend, they themselves being ignorant of the science of war, almost destitute of defensive armour, and having for the most part no other weapons than spears, clubs, and arrows. In spite of these disadvantages they not only resisted the German invaders but gained possession of some of those Russian principalities to which they had been obliged to pay tribute. The decline of the powerful Russian principality of Halicz, by the death of Prince Roman, who was defeated and killed by the Poles in the battle of Zarichost, 1206, delivered the Lithuanians from a formidable enemy, and their predatory incursions began to be more dangerous to the Polish and Russian principalities: some of the latter fell into the hands of Lithuanian chieftains, who generally sought to consolidate their acquisitions by embracing the creed (that of the Eastern Church) of their new subjects, although the bulk of the Lithuanian nation remained faithful to their idols.

Ryngold was the first Lithuanian ruler who, after having united under his dominion all the principalities of that nation, assumed the title of Grand-Duke of Lithuania about 1235. His son Mindog, having received from the Pope the royal diadem, embraced Christianity, and was crowned at Novogrodek in 1252 (formerly the capital, now an insignificant town), by the archbishop of Riga and another Roman Catholic prelate; but not having obtained the advantages which he expected from his conversion, he soon relapsed into paganism. At the end of the thirteenth century Witenes established a new dynasty on the throne of that country; but Lithuania's most brilliant æra began after the accession of the grand-duke Ghedymin in 1315. He made most extensive conquests in the south-western principalities of Russia, and consolidated his power by insuring the most perfect protection to the religion, language, customs, and property of the inhabitants of the conquered lands. But the most extraordinary circumstance of that conquest is, that those newly acquired provinces were intrusted only to the administration of such princes of the Lithuanian dynasty as had embraced the religion of the conquered population, whilst the sovereign still remained an idolater. This wise policy, so contrary to the spirit of intolerance displayed by other conquerors, strongly attached the Russian Christians, who were five times as numerous as the real Lithuanian population, to their new masters, under whose sway they found that repose and security of which they had been for a long time deprived by the internal feuds of their petty princes, and the incessant annoyance from the Mongols, who, possessing the north-eastern principalities of Russia, constantly attempted to extend their rule over those parts which became now a portion of the Lithuanian empire.

Two nations, of a different origin and creed, thus became soon blended together, and the Russian Christians were always the most loyal subjects of the pagan grand-dukes of Lithuania. The Russian became the official language of Lithuania, and continued so till the middle of the seventeenth century, when it was superseded by the Polish language.*

The government of Lithuania was in some degree feudal: each province was given in fief, generally to a prince of the reigning family. There was not however anything like the regular feudal organization of western Europe. After its union with Poland, Lithuania was governed by the same forms as that country.

Ghedymin was killed in 1328, at the siege of the fortress of the German knights. He divided his empire among his several sons, but after some contention, one of them, called Olgherd, assumed the sovereign power. He proved a worthy successor to his glorious father: he defeated the Tartars, and compelled those of Crimea to become his vassals, having extended the limits of Lithuania to the banks of the Don and to the shores of the Black Sea. The republics of Novogorod and Pskow acknowledged his supremacy, and he presented himself in triumph before the gates of Moscow in the years 1368, 1370, and 1373. He died in 1381, in the Christian community of the Greek church, which he embraced on his death-bed, at the solicitations of his wife, who was a Russian princess of Twer. It is even supposed that he had secretly been a Christian during his lifetime, and had early become a convert to its doctrines.

Olgherd's son and successor, Yaguellon, married, in 1385, Hedvige of Anjou, queen of Poland, and, having been baptized, ascended the throne of that country. From that time Lithuania was united with Poland.

Yaguellon, having become a Christian, strenuously exerted himself to convert his pagan subjects. The attachment of these idolaters to their religion seems to have been at that time very weak, and Yaguellon had no great difficulty in accomplishing his task. It is asserted by the chronicles that the promise of a new white woollen coat was sufficient to induce the Lithuanian pagans to desert their idols and to approach the baptismal font.

Yaguellon himself translated for the use of his subjects the Creed and the Lord's Prayer into the Lithuanian language. It was natural for the new converts to retain for a long time many heathen rites, and even in our days the common people preserve many customs evidently derived from their idolatrous forefathers. Although by the accession of Yaguellon to the throne of Poland the two countries became united, it often happened that the kings of Poland of the Yaguellonian family, who were hereditary sovereigns in Lithuania, but elective in Poland, after their accession to the crown of the latter country, gave up the government of Lithuania to a prince of their family, but still retained the sovereignty. The most celebrated of those princes was Vitold (1430). A kind of union of the two countries was effected at the diet of Lublin in 1569, composed of senators and deputies of both nations. By this transaction the rights of the Polish nobles were extended to those of Lithuania, whose throne became elective like that of Poland. The diets of the two countries were held in common, but the laws, finances, and armies remained separate. This state of things continued till the fall of Poland.

We have already said that Lithuania extended under the reign of Olgherd as far as the banks of the Don and the shores of the Black Sea. It lost a great part of its dominions under the reign of Casimir III., king of Poland and grand-duke of Lithuania, and on several subsequent occasions. But these events belong to the history of Poland, of which Lithuania then formed an integral part. At the time of the first dismemberment of Poland in 1772, Lithuania was divided into the following palatinates or counties: Vilna, Troki, Novogrodek, Brest, Vitepsk, Polock, Mstislaf, and the duchy of Samogitia.

The territory which constituted the government duchy of Lithuania at the above-mentioned time now forms the Russian governments of 1, Vilna; 2, Grodno; 3, Bialystock; 4, Minsk; 6, Mohilew; and 6, Vitepsk; and, 7, the palatinate of Augustov, in the kingdom of Poland, constituted by the treaty of Vienna, 1815. The extent and population of this province are as follows:—

Vilna .	22,970	Eng. sq. miles.	1,357,400	pop.
Grodno .	6,930	„ .	868,100	
Bialystock	3,360	„ .	224,600	
Vitepsk .	14,190	„ .	934,900	
Mohilew .	19,500	„ .	985,400	
Minsk	38,930	„ .	1,163,100	
Augustov .	19,000	„ .	335,000*	

Lithuania is generally a flat and low country, although there are some hills in the environs of Vilna. The north-western part, comprehending the duchy of Samogitia, is very fertile, and celebrated particularly on account of its flax. The banks of the Niemen are also generally fertile, and in many parts very picturesque. But the greater part of this country is covered with sand, marshes, and fens. Ferruginous ochre is found in all the peat-mosses, but the quantity of iron is very limited, and many iron-works which formerly existed are now abandoned in consequence of the cheaper rate at which iron can be got from the mines in the north of Russia and Siberia. Blocks of granite and pudding-stone are scattered over many districts. The large forests abound in fine timber, and contain a great quantity of wild animals, such as elks, wild hogs, bears, wolves, foxes, &c. An animal peculiar to Lithuania is the urochs, or bison, which was formerly found in many forests of Poland and Germany, but is now confined to a single spot in Lithuania, called the forest of Biala Vieja. [BISON.] The climate is extremely cold in winter, and very hot in summer. There are scarcely any manufactures in the country, and its exports consist chiefly of flax, hemp, corn, timber, honey, and wax.

The principal rivers which water Lithuania are the Niemen (in German, Memel), the Dnieper, Berezina, Villia, &c. The chief towns are Vilna, its antient capital, Grodno, Minsk, Mohilew, Vitepsk, &c.

It has been mentioned that the Lithuanians remained idolaters till the end of the fourteenth century. Their chief deity was Perkunas, or the god of thunder, besides some other divinities presiding over seasons, elements, and particular occupations, as was the case in almost all the idolatrous creeds of antient Europe. They possessed also sacred groves and fountains, and worshipped the fire and consecrated snakes. Some learned disquisitions have been written on the probable origin of the antient Lithuanian worship; among others, Lasicius, or Lasitski, 'De Diis Samogitorum,' in the collection of Elzevir, 'De Republicâ Polona.'

The population of Lithuania is composed of Lithuanians, Lithuano-Russians, Poles, Jews, and Tartars. The last form a population of about 100,000 individuals, and are descendants of a Tartar colony settled in Lithuania by the grand-duke Vitold, towards the end of the fourteenth century. They all profess the Mohammedan religion, but they are not distinguished in externals from the other inhabitants of the country. Those who are descended from the Tartar murzas, or nobles, were admitted into the ranks of the Polish nobility, and possessed all the privileges of that order, and they continue to possess them under the Russian government. They enjoy a high reputation for honesty, and are generally employed in various offices of trust.

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* This Russian idiom is quite different from the Muscovite, or modern Russian. It is a dialect called generally that of White Russia, and it is now spoken by the population of the present governments of Vitepsk, Mohilew, and Smolensk. It has no literature except the statute or code of laws of Lithuania, published in the sixteenth century, and the official records of that country till the middle of the seventeenth century.

* We have followed the data furnished by Hassell, 1823, and adopted by Malte Brun in his 'General Geography,' and Schnitzler in his 'Statistics of Russia.'

We have already said that the origin of the Lithuanian nation is involved in obscurity, and that all the conjectures on this subject lead to no satisfactory conclusion. We have also alluded to the tradition about a Roman colony in Lithuania. Adelung and Vater define the Lithuanians to be a Germano-Slavic nation, and say that two-thirds of their language are Slavonian. Balbi, in his 'Ethnographical Atlas,' places the Lithuanian language among the Slavonian, and states, on the authority of Mr. Watson, that it is composed of four-sixths of Slavonian, of which two-sixths are derived from the Polish and two-sixths from the Russian languages, whilst the remaining two-sixths may be traced to the Finnish, Gothic, and German. The opinion however appears to us by no means a correct one. There can be no doubt that a great number of Slavonic words became mixed with the Lithuanian language, from the circumstance of the Russian and afterwards the Polish being the official languages of that country: it is also certain that the rule of the German knights introduced many German words into the Lithuanian language, but their number is by no means so large as to warrant the conclusion above mentioned. The recent researches of some distinguished German philologists, and particularly those of Bopp and Bohlen, have proved that the Lithuanian language is closely allied to the Sanscrit, and that all the words, except those of modern introduction which are derived from the Latin, Germanic, and Slavonian languages, are so related to Sanscrit roots, in common with those above-mentioned languages, as to prove only that the Lithuanian language has a common origin with them, but not that it is derived from them. Professor Bohlen, of Königsberg, an eminent Sanscrit scholar, who is intimately acquainted with the Lithuanian language, thinks that it bears a stronger resemblance to the Sanscrit than to any other known language. The Lithuanian language may be divided into two principal dialects, the Lithuanian Proper, and the Lettonian, or Livonian, both of which may be subdivided into smaller ones. The Lithuanian Proper contains the following dialects:—1st, the old Prussian, which had been spoken in Prussia previously to the arrival of the Knights of St. John of Jerusalem, who tried by all means to extirpate it. Notwithstanding this unfavourable circumstance, it was still in general use at the time of the Reformation; but in spite of the support it derived from the Protestant authorities, it dwindled away, so that according to Hartknoch, who wrote towards the end of the seventeenth century, there were at that time only a few old people who understood it, and it is now entirely extinct as a living language. It differs from other Lithuanian dialects in having a greater admixture of German than Slavonian words, which was owing to the influence of the German knights, who took possession of the country, and whose language finally superseded that of the native population.

Simon Gruner, a Dominican monk, translated in 1521 the Lord's Prayer into that language, and collected a small vocabulary of eighty-nine words. Albert, duke of Prussia, a zealous propagator of the Reformation, ordered a catechism to be composed in that language, which was published at Königsberg, 1545. The authors of this catechism, wishing to make it intelligible to all the inhabitants of Prussia, used in its composition promiscuously all the local dialects into which this language is subdivided: the result of such an absurd plan was, that it became unintelligible to all. It was therefore remodelled, and the dialect of Samland, as being the most widely spread, was adopted. This catechism, as well as the Enchiridion, or church service (Königsberg, 1561), are the only extant monuments of that old language.

2. The Prusso-Lithuanian dialect, which is now spoken about Insterburg and Memel, is the nearest to the old Prussian, but it has received a great admixture of Polish words. A Bible, translated into that language by Quandt, was published at Königsberg, 1755, and many religious works in that same dialect are mentioned in its preface.

The Polish-Lithuanian, or Samogitian language, which is spoken in the north-western part of Lithuania, and particularly in the province of Samogitia, differs from the Prussian dialect in being more free from the admixture of German words, and it is certainly the purest of all the dialects, as the population by which it is spoken resisted the German invaders. The Russian language, which, as we have seen, became the official language of the country, from the fourteenth century, and the subsequent influence of the Polish, have introduced many words derived from both these languages. There is in that dialect a Protestant Bible translated by Chilinski, published at London in 1660, and many other works of a religious character.

The second principal dialect of the Lithuanian is the Lettonian, or the Livonian, which is sometimes called the Curonian. It is spoken in the greatest part of Livonia, in Courland, and a part of the government of Vitepsk, which was formerly called Polish Livonia. It differs from the other Lithuanian dialects in having an admixture of Finnish words, which is peculiar to this dialect. It is subdivided into several minor dialects, of which that which is spoken about Mittau and Riga is considered the best, and it has been used for the translation of the Bible, and for the composition of several religious works. There is at the University of Dorpat a chair of this language.

For a circumstantial account of the works published about the Lithuanian language, or composed in it, see *Mithridates*, by John Adelung, continued by Severin Vater, vol. ii., p. 696, &c., Berlin, 1809: as to its connexion with the Sanscrit, see Bopp's *Comparative Grammar*, and the article LANGUAGE.

LITI'OPA, a genus of pectinibranchiate mollusks, established by M. Rang, with the following characters:—

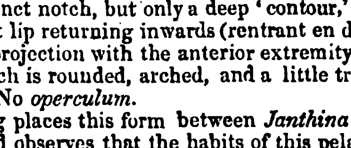
Animal transparent, spiral, furnished with a rather short and narrow *foot*, and a head provided with two elongated conical tentacles, with the eyes at their external base.

Shell not thick, horny, with a slight epidermis, slightly transparent; conoïd; the *whorls* of the spire rather rounded, the last whorl larger than all the others put together, the *apex* pointed and furrowed longitudinally; *aperture* oval, wider anteriorly than it is posteriorly, borders disunited, the right border or lip uniting itself to the left, without forming a very distinct notch, but only a deep 'contour,' in the place of one; left lip returning inwards (rentrant en dedans), so as to form a projection with the anterior extremity of the columella, which is rounded, arched, and a little truncated anteriorly. No *operculum*.

M. Rang places this form between *Janthina* and *Phasianella;* and observes that the habits of this pelagic mollusk are very curious. He states that he had many years ago observed the shell, but time had not permitted him to study the animal. M. Bellanger, captain in the French navy, was the first who recognised it, but that gentleman unfortunately had not studied its external organization; he observed however the singular fact that this animal, which lives upon floating plants, quits them sometimes, but holds itself fixed by a thread.* M. Rang dissected some specimens preserved in spirit of wine given to him by that officer, and detected some small glairy masses which appeared to M. Rang to be attached to the foot, and which were easily drawn out to considerable length. M. Rang looked in vain for an operculum, the absence of which establishes a great difference between this genus and *Phasianella*, and has described two species, different as regards the shell, but with apparently similar animals.

Geographical Distribution.—The ocean.

M. Rang observes that the genus *Litiopa*, like some others, proves that it is not possible to establish divisions founded on the presence or absence of an operculum.



Shell of Litiopa, magnified.

LITMUS, or **LACMUS**, a fine blue but fugitive colour prepared from the *Lecomora tartarea*, a lichen which grows in the Canary and Cape Verd Islands. In order to extract the colouring matter the lichen is cleaned and reduced to powder; this is then mixed with urine and lime, and in a few days the blue colour is developed. The litmus is imported in small cubical cakes of dusky-blue colour, which are light and easily reducible to powder. The colouring matter, which is supposed to be *erythrin*, existing also in archil, is soluble both in water and spirit of wine, and is of a beautiful tint.

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* See LIMNEANS, vol. xiii., p. 500.

Litmus is used as a chemical test for detecting the presence of acids, by which it is turned red, and the blue is restored by alkalis, so that when slightly reddened it may also be employed to detect alkalis. It is employed either as a tincture, or more commonly paper stained blue with it is used. The tincture is sometimes, but improperly, called tincture of turnsole, a name which was given to the colour in order to keep its true source a secret.

The blue colour of the litmus is evidently owing to the presence of an alkali, for when moistened litmus and turmeric paper are put into contact, the turmeric becomes brown, indicating the action of an alkali. To a certain extent therefore the alkali reduces the value and accuracy as a test of acids; it was nevertheless found by Mr. Watt that it detected the presence of sulphuric acid diluted with 100,000 times its weight of water.

By exposure to the sun's rays tincture of litmus becomes red even in close vessels; and there exists between its colouring matter and that of indigo a certain degree of analogy; both for example are capable of being deprived of oxygen, and when thus deoxidized lose their blue colour, which is restored by exposure to the air or other means of reoxidizement. The protosalts of iron also, which are well known to deoxidize indigo, produce the same effect upon litmus.

LITRE, the French standard measure of capacity in the metrical system. It is a cubic decimetre, or a cube whose sides are each 3·9371 English inches. It contains 61·0280 English cubic inches, for four litres and a half make, roughly speaking, an imperial GALLON. The litre is therefore a little less than our quart: more precisely, it is ·22009687 of a gallon.

LITTLETON, THOMAS, was the eldest son of Thomas Westcote, of the county of Devon, Esq., by Elizabeth, the daughter and sole heiress of Thomas Littleton, or Luttleton, Luttelton, or Lyttelton (the last being the mode in which he himself appears to have written it: see the extract from his will given below), of Frankley in Worcestershire, whose surname and arms he took. He was educated at one of the universities, and thence removed to the Inner Temple, where in due time he became one of the readers of that Society: Sir Edward Coke mentions his reading on the statute *Westm. 2, De donis conditionalibus.* He was appointed by Henry VI. steward or judge of the court of the palace or marshalsea of the king's household. On the 13th May, 1455, in the 33 Henry VI., he was made king's serjeant, and in that capacity rode the northern circuit as judge of assize. In 1454 he had a general pardon under the great seal,* and two years after was in commission with Humphrey, duke of Buckingham, and William Birmingham, Esq., to raise forces in the county of Warwick. (Collins, *Peerage*, who gives as his reference, 'Pat. 36, Hen. 6, p. 1, m. 7.) In 1462 (2 Edward IV.) he received a general pardon from the crown, and was continued in his post as king's serjeant, and also as justice of assize for the same circuit. On the 26th April, 1466 (6 Edward IV.), Littleton was appointed one of the judges of the Court of Common Pleas, and rode the Northamptonshire circuit. About the same time he obtained a writ, directed to the commissioners of the customs for the ports of London, Bristol, and Kingston-upon-Hull, for the annual payment of 110 marks, to support his dignity, with 106*s.* 11½*d.* to furnish him with a furred robe, and 6*s.* 6*d.* more for another robe, called *linura.* In the fifteenth year of the same he was created a knight of the order of the Bath. Sir Thomas Littleton married Joan, widow of Sir Philip Chetwin, of Ingestre, in the county of Stafford, one of the daughters and co-heiresses of William Burley, of Broomscroft Castle, in the county of Salop, Esq., with whom he had large possessions. By her he had three sons and two daughters. 1. William, ancestor of the Lords Lyttelton, barons of Frankley, in the county of Worcester. 2. Richard, to whom the 'Tenures' are addressed, an eminent lawyer in the reigns of Henry VII. and Henry VIII. 3. Thomas, from whom were descended the Lord-Keeper Lyttelton, baron of Mounslow, in the reign of Charles I., and Sir Thomas Lyttelton, Bart., Speaker of the House of Commons in the reign of William III. His two daughters, named Ellen and Alice, both died unmarried. (Collins's *Peerage*, vol. vii., p. 424.)

Littleton died at Frankley on the 23rd August, 1481, aged about sixty, and was buried in Worcester cathedral, where his tomb bore the following inscription:—'Hic jacet corpus Thome Littelton de Frankley, Militis de Balneo, et unus Justiciarorum de Communi Banco, qui obiit 23 Augusti, Ann. Dom. MCCCCLXXXI.'

In Collins's 'Peerage' there is a copy of Sir Thomas Littleton's will, 'faithfully copied from the original remaining in the Prerogative Office.' It contains some curious particulars; but we can only make room for the following extract from its commencement:—

'In the name of God, Amen. I, Thomas Lyttelton, Knight, oon of King's justice of the common place, make my testament, and notifie my wille, in the manner and forme that followeth. First, I bequeth my soul to Almighty God, Fader, Sonne, and Hollye Ghost, three Persons and oon God, and our Lorde, maker of heven and erth, and of all the worlde; and to our most blessed Lady and Virgin, Saynt Mary, moder of our Lord and Jesu Christ, the only begotten Sonne of our saide Lorde God, the Fader of heven, and to Saint Christopher, the which our saide Lorde did truste to bere on his shouldres, and to all the saints of heven; and my body to be berried in the tombe I lete make for me on the south side of the body of the cathedrall-church of the monastere of our said blessed lady of Worcester, under an image of St. Christopher, in caas if I die in Worcestershire. Also, I wulle, and specially desire, that immediately after my decesse, myn executors finde three gode preests for to singe iij trentals for my soule, so that everich preest, by himself, sing oon trental, and that everich such preest have right sufficiently for his labor; also, that myn executors finde another gode preest for to singe for my soule fyve masses,' &c. He then makes a provision for his two younger sons, willing that the 'feoffees to myn use' of and in certain manors and lordships should 'make some estates' unto his sons Richard and Thomas Lyttelton.

He appointed his three sons and 'Sir Xtopher Goldsmyth, parson of Bromsgrove, Sir Robert Cank, parson of Enfield, and Robert Oxclyve,' to be his executors. The will is dated at Frankley, 22nd August, 1481, being, as appears from the date of his death on his monument already quoted, the day preceding that of his death.

Sir Edward Coke has given it as his opinion that Littleton compiled his book of 'Tenures' when he was judge, after the reign of King Edward IV., but that it was not printed during his life; that the first impression was at Rouen in France, by William de Taillier, *ad instantiam Richardi Pinson*, the printer of Henry VIII., and that it was first printed about the twenty-fourth year of the reign of Henry VIII. In a note to the eleventh edition of Sir Edward Coke's 'Commentary,' it is remarked that this opinion is erroneous, because it appeared by two copies in the bookseller's custody that the 'Tenures' were printed twice in London in the year 1528, once by Richard Pinson, and again by Robert Redmayne, and that was the nineteenth year of the reign of Henry VIII. It is observed that, to determine with certainty when the Rohan or Rouen edition was published, is almost impossible; but that from the old editions above mentioned it may be collected, not only that the Rohan impression is older than the year 1528, but also, by what occurs in the beginning and end of them, that there had been other impressions of the book in question. However, it appears impossible, at this distance of time, to settle with accuracy when the first edition of Littleton's work was printed.

Littleton's work on English tenures is written in Norman French, divided into three books, and addressed to his son, for whose use it was probably intended. He says himself in the Tabula, in a note following the list of chapters in the first two books—'And these two little books I have made to thee for the better understanding of certain chapters of the "Antient Book of Tenures."' And after the Table of Contents of book iii. he thus concludes:—

'EPILOGUS.

'And know, my son, that I would not have thee believe that all which I have said in these books is law, for I will not presume to take this upon me. But of those things that are not law inquire and learn of my wise masters learned in the law. Notwithstanding, albeit that certain things which are moved and specified in the said books are not altogether law, yet such things shall make thee more apt and able to understand and apprehend the arguments and the reasons of the law, &c. For by the arguments and reasons in the law a man more sooner shall come to the certainty and knowledge of the law.

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* Collins's 'Peerage,' vol. vii., p. 423, who cites as his authority for this, 'Autographus penes Honoratissimum Dom, Dom. Geo. Lyttelton, Baronem de Frankley.'

'*Lex plus laudatur quando ratione probatur.*'

The circumstance above referred to of this treatise having been originally but a sort of introductory lesson 'for the better understanding of certain chapters of the "Antient Book of Tenures"' may in part account for what has been often remarked respecting its defect in the accurate division and logical arrangement of the subject matter. The style however in which it is written is remarkably good. It combines the qualities of clearness, plainness, and brevity, in a degree that is not only extraordinary for the rude age in which its author wrote, but renders him superior, as to purity of style, to any writer on English law who has succeeded him. It is equally free from the barbarous pedantry and quaintness of Coke, and from the occasionally somewhat rhetorical manner of Blackstone.

Littleton very seldom quotes any authority for what he advances: indeed, it was not the practice of the lawyers of his age to cite many authorities, even in arguments and opinions delivered in court. Littleton is a fair, or rather a favourable specimen of the mode in which the English lawyers, often with great acuteness and consistency, followed out all the consequences that might be logically deduced from certain principles or maxims, some of which maxims or premises being irrational and absurd, necessarily led to irrational and absurd conclusions. What with the alterations in and additions to the law since Littleton wrote, there is much of Littleton's book that is not now law; but from the absolute necessity of a knowledge of what was the state of the law with respect to property in land, in order to understand thoroughly what it now is, Littleton is still an indispensable book to the student of English law. But we are inclined to be of the following opinion given in Roger North's 'Life of the Lord-Keeper Guilford:—'Coke's comment upon Littleton ought not to be read by students, to whom it is at least unprofitable; for it is but a common-place (book), and much more obscure than the bare text without it. And, to say truth, that text needs it not; for it is so plain of itself, that a comment, properly so called, doth but obscure it.' (vol. i., p. 21.) Coke's 'Commentary on Littleton' was no other than a sort of common-place book kept by Coke as a manual, in which he jotted down all his law and references to law as they occurred.

To put this Commentary, or rather common-place book, into a student's hands to read as an institutional or elementary book is evidently futile; and the doing so is probably the cause why so many students of English law break down at the very threshold of their career. The effect is, as North, or rather the Lord-Keeper Guilford, observed, 'like reading over a dictionary, which never teacheth a language:' and therefore with him we may conclude that 'certainly it is an error for a student to peruse such.' (North's *Life of Lord-Keeper Guilford*, vol. i., p. 21.) It is much better for the student who wishes to lay well the foundations of his professional knowledge to read Littleton without the comment (which of course he will find useful afterwards, when he wishes to examine any particular point very minutely); but then he must read slowly and carefully, and a little at a time; in short, very much as he would read Euclid, if he wishes to master it.

(The authorities used in this article are chiefly Coke's Preface to his *Commentary on Littleton;* the article 'Littleton, Thomas,' in the *Biographia Britannica;* Butler's Preface to the thirteenth edition of Sir Edward Coke's *Commentary;* and Collins's *Peerage*, vol. vii., article 'Lord Lyttelton.')

LITTORI'NA. [TURBINIDÆ.]

LITUITES, a group of fossil cephalopoda, confined to the strata of the Silurian and older systems. The shell is partly straight and partly convoluted, nearly as in spirula, *Lam.*

LITURGY (from the Greek *λειτουργία*, which originally signified at Athens 'certain public functions or duties to which the citizens were personally liable') is a form of public devotion, and more particularly the Office of Common Prayer used in our own or any other church. In the Greek or Constantinopolitan church three Liturgies are in use, those of Basil, Chrysostom, and the Liturgy of the Præsanctified. In the Romish church the Liturgy is divided into several books or offices, as the breviary, the ceremoniale, or office peculiar to the pope; the missal, or office of the mass; the pontificale, directing the functions of the bishops, and the rituale, or pastorale, for the guidance of the simple priests. The Spanish is better known by the name of the Mozarabic Liturgy. The Ambrosian Liturgy is that more particularly in use in the church of Milan. In France the church of St. Martin at Tours had a breviary of its own, which was neither the Roman nor that of Tours; and the same difference obtained at St. Quintin and in other Gallican churches.

At the Reformation all the Protestant churches on the Continent, without a single exception, introduced Liturgies for the more uniform celebration of divine service.

Previous to the Reformation of the Church of England the service was performed in Latin, and different Liturgies were used with us, also, in different parts of the kingdom. The cathedrals of York, Lincoln, Hereford, and Bangor, and even Aberdeen in Scotland, had their respective uses; but no cathedral had such a variety of service books for its use as Sarum. 'Use' was another name for the Ordinale, or complete service of the church of Salisbury, instituted by bishop Osmund in 1077. It was also named the Consuetudinary; and in Knighton's and Higden's time it obtained almost all over England, Wales, and Ireland. The whole province of Canterbury adopted it, and in right of it the bishop of Salisbury was precentor in the college of bishops whenever the archbishop of Canterbury performed divine service. (Lyndwood, *Provinc. de feriis c. ult.*)

The publication of king Henry the Eighth's 'Primer' in 1535, in the vernacular tongue, was one of the first steps in the reformation of doctrine and worship in the Church of England. It was followed in 1537 by 'The Godly and Pious Institution of a Christian Man,' containing a declaration of the Lord's Prayer, the Ave Maria, the Creed, the Ten Commandments, the Seven Sacraments, &c., republished with corrections and alterations in 1540 and 1543. In 1545 a second 'Primer' came out; and in 1547, 1st Edward VI., archbishop Cranmer, bishop Ridley, with eleven other bishops and eminent divines, were commissioned by the king in council to compile a Liturgy in the English language free from the erroneous doctrines by which the Latin Liturgies of the church, while unreformed, had been distinguished. This was confirmed by parliament in 1548, and published in 1549. In 1551 it was slightly revised, and again confirmed in parliament; but both this and the former act of 1548 were repealed on the 1st of Mary, as not agreeable to the principles of the Romish Church, which she was about to restore. Upon the accession of Elizabeth the act of repeal was reversed; several learned divines, headed by archbishop Parker, were appointed to make another review of King Edward's Liturgies, when the restoration of the second book of King Edward the Sixth was determined upon, and finally confirmed by parliament. The act received the royal assent April 29th, 1559. In the 1st of James I., after the conference at Hampton Court between that prince with archbishop Whitgift and other bishops and divines on one side, and Dr. Reynolds, with some other puritans, on the other, a few slight alterations were introduced, the chief of which consisted in adding some forms of Thanksgiving at the end of the Litany, and an addition to the Catechism concerning the sacraments and in the rubric in the beginning of the office for private baptism the words 'lawful minister' were inserted to prevent midwives or laymen from presuming to baptize. In this state it continued till the time of Charles II., who, in 1661, issued a commission to empower twelve bishops and as many Presbyterian divines to consider of the objections raised against the Liturgy, and to make such reasonable and necessary alterations as they should jointly agree upon; nine assistants on each side being added to supply the place of any of the twelve principals who should happen to be absent. On the episcopal side were Dr. Fruen, archbishop of York, Dr. Sheldon, bishop of London, Dr. Cosin, bishop of Durham, Dr. Warner, bishop of Chichester, Dr. Henchman, bishop of Salisbury, Dr. Morley, bishop of Worcester, Dr. Sanderson, bishop of Lincoln, Dr. Laney, bishop of Peterborough, Dr. Walton, bishop of Chester, Dr. Stern, bishop of Carlisle, and Dr. Gauden, bishop of Exeter. On the

Presbyterian side were Dr. Reynolds, bishop of Norwich, Dr. Tuckney, Dr. Conant, Dr. Spurstow, Dr. Wallis, Dr. Manton, Mr. Calamy, Mr. Baxter, Mr. Jackson, Mr. Case, Mr. Clark, Mr. Newcomen. The coadjutors on the Episcopal side were Dr. Earles, dean of Westminster, Dr. Heylin, Dr. Hackett, Dr. Barwick, Dr. Gunning, Dr. Pearson, Dr. Pierce, Dr. Sparrow, and Mr. Thorndike. Those on the Presbyterian side, Dr. Horton, Dr. Jacomb, Mr. Bates, Mr. Rawlinson, Mr. Cooper, Dr. Lightfoot, Dr. Colins, Dr. Woodbridge, Mr. Drake. These commissioners held several meetings at the Savoy, but to little purpose. The king's commission gave them no further power than to 'compare the Common-Prayer Book with the most antient Liturgies that had been used in the church in the most primitive and purest times;' and required them 'to avoid as much as possible all unnecessary alterations of the forms and Liturgy wherewith the people were altogether acquainted, and had so long received in the Church of England.' The Presbyterians however would not allow that the Liturgy was capable of amendment, and Baxter had prepared and offered one of his own to be substituted in its room. The Conference at length broke up without anything being done, except that some particular alterations were proposed by the Episcopal divines, which in the May following were considered and agreed to by the whole clergy in convocation. The principal of them were, that several lessons in the Calendar were changed for others more proper for the days; the prayers for particular occasions were disjoined from the Liturgy, and the two prayers to be used in the Ember-week, the prayer for the parliament, that for all conditions of men, and the general Thanksgiving were added; several of the Collects were altered; the Epistles and Gospels were taken out of the last translation of the Bible, being read before according to the old translation; the office for baptism of those of riper years, and the Forms of Prayer to be used at Sea, were added. In a word, the whole Liturgy was then brought to that state in which it now stands; and was unanimously subscribed by both houses of convocation of both provinces on Friday, 20th of December, 1661; and being brought to the House of Lords the March following, both Houses passed an act for its establishment; and the earl of Clarendon, then lord chancellor, was ordered to return the thanks of the lords to the bishops and clergy of both provinces for the great care and industry shown in the review of it.

(Wheatly's *Illustr. of the Book of Common Prayer*, 8vo., Oxford, 1794, p. 20-28; Shepherd's *Critical and Practical Elucidation of the Morn. and Even. Prayer of the Ch. of Engl.*, 8vo., Lond., 1798, Introd., p. xxxv.-lxxviii.; Gough's *Brit. Top.*, ii. 319-361, &c.)

Among what are called the Additional Manuscripts in the British Museum is 'An Apparatus of Materials,' in forty-five volumes, being a collection of notes and observations on the Liturgy, and various other subjects connected with the offices of the church, by a clergyman of the Church of England, who directed them to be deposited in that institution, but that his name should remain unknown. These volumes were deposited in the British Museum in 1791.

LI'TUUS, a name given to a spiral thus described:—Let a variable circular sector always have its centre at one fixed point, and one of its terminal radii in a given direction. Let the area of the sector always remain the same; then the extremity of the other terminal radius describes the lituus. The polar equation of this spiral is $r^2\theta = a$.

LI'TUUS, a crooked staff resembling a crozier, used by the augurs among the antient Romans in making their observations on the heavens, hence called the *Augural lituus*. Dr. E. D. Clarke asserts that there was an older lituus, called the *Regal* or *Quirinal lituus*, which the antient kings of Italy held as a sceptre in their hands long before the time of Romulus or the institution of the Augurate, particularly mentioned by Donatus and Servius in their Commentaries upon Virgil. The etymology of the name is uncertain.

(Pitisci *Lexicon*, in voce; Clarke's 'Observations on the Lituus of the Antient Romans,' in the *Archæolog.*, vol. xix., p. 386-404.)

LIUTPRANDUS, or **LUITPRANDUS**, was a deacon at Pavia in the year 946, when Berengarius, marquis of Ivrea and regent of the kingdom of Italy, sent him as his ambassador to Constantinople, where he learned the Greek language. After his return he was made bishop of Cremona. Otho I., emperor and king of Italy, sent him in 962 on a mission to Pope John XII.; and in the following year Luitprand accompanied Otho to the council held at Rome, which deposed John and chose Leo VIII. in his place. On that occasion Luitprand spoke to the council in the name of the emperor, who did not understand Latin, as he says in his Chronicle. In 968 Otho sent him as ambassador to Nicephorus Phocas, emperor or usurper of Constantinople, who treated him very scurvily, and kept him as a kind of prisoner. After four months' residence in that capital Luitprand left Constantinople in the month of October to return to Italy. He died not long after at Cremona, but the precise year of his death is not ascertained.

He was a man of considerable learning for his age, and his works are valuable for the historical information which they contain. They consist, 1, of a general history of Europe from the year 862 to the year 964, 'Rerum Gestarum ab Europæ Imperatoribus et Regibus, libri vi.' Luitprand gives among other things an account of the court of Constantinople at the time of his first mission, and of Basilius and his son Leo the philosopher. The work concludes with the council of Rome and the trial and deposition of John XII. 2. 'Legatio Luitprandi Cremonensis Episcopi ad Nicephorum Phocam.' This is a narrative of his second embassy to Constantinople, in which he describes Phocas in no very flattering colours. The work is very curious. Another work has been attributed to Luitprand, namely, 'De Pontificum Romanorum Vitis,' but his authorship of it is very doubtful. The best edition of the works of Luitprand is that of Antwerp, 1640, 'Luitprandi Opera quæ extant,' with very copious notes, by Jerome de la Higuera and L. Ramirez de Prado, with a dissertation at the end on the Diptychon Toletanum.

LIVA'DIA. [Bœotia.]

LIVE STOCK. The animals necessary for the stocking and cultivation of a farm, and those which are kept on it for profit, or for the sake of their dung, are called the live stock of the farm, in contradistinction to the dead stock, which consists of the implements of husbandry and the produce stored up for use.

The live stock on a farm must vary according to circumstances. The number of horses or oxen kept for the cultivation of the land and other farming operations should be exactly proportioned to the work to be done. If they are too few, none of the operations will be performed in their proper time, and the crops will suffer in consequence. If there are too many, the surplus beyond what is strictly required is maintained out of the profits of the farm. To have the exact number of animals which will give the greatest profit is one of the most important problems which a farmer has to solve: what may be very profitable in one case may be the reverse in another; and, as a general maxim, it may be laid down, that the fewer mouths he has to feed, unless they produce an evident profit, the less loss he is likely to incur. But this rule admits of many exceptions. It is of great importance, in taking a farm, to calculate the extent of the arable land, so that it can be properly cultivated by a certain number of pairs of horses or oxen. It is an old measure of land to divide it into so many ploughs, that is, so many portions which can be tilled with one plough each. When there are several of these, it is useful to have an odd horse over the usual number required for two or three ploughs, to relieve the others occasionally. The work is thus done more regularly and with greater ease. Where there are two ploughs with two horses each, a fifth horse should be kept, and so in proportion for a greater number. The odd horse will always be found extremely useful, if not indispensable, and the expense of his keep will be amply repaid by the regularity and ease with which the whole work of the farm will be done, and the relief which occasional rest will give to the other horses.

The other part of the live stock kept on a farm must depend on various circumstances. Where there is good grazing land, the profit on the improvement of the live stock, or their produce, is evident and easily ascertained. But where animals are kept upon artificial food or fatted in stalls, it is often a difficult question to answer, whether there is a profit on their keep or not. In most cases the manure which their dung and litter afford is the chief object for which they are kept. If manure could be obtained in sufficient quantities to recruit the land, at a reasonable price, it might often be more advantageous to sell off all the hay and straw of a farm, and to keep only the cattle necessary to till the ground or supply the farmer's family. But this can only be the case in the immediate neighbourhood of large towns. In the country at a greater distance no manure can be purchased; it must consequently be produced on the farm; and for this purpose live stock must be kept, even at a loss. The management and feeding of live stock is therefore an important part of husbandry. The object of the farmer is principally to obtain manure for his land, and if he can do this, and at the same time gain something on the stock by which it is obtained, he greatly increases his profits. Hence much more skill has been displayed in the selection of profitable stock than in the improvement of tillage. Some men have made great profits by improving the breed of cattle and sheep, by selecting the animals which will fatten most readily, and by feeding them economically. It requires much experience and nice calculations to ascertain what stock is most profitable on different kinds of land and in various situations. Unless very minute accounts be kept, the result can never be exactly known. It is not always the beast which brings most money in the market that has been most profitable; and many an animal which has been praised and admired has caused a heavy loss to the feeder. Unless a man breeds the animals which are to be fatted, he must frequently buy and sell; and an accurate knowledge of the qualities of live stock and their value, both lean and fat, is indispensable. However honest may be the salesman he may employ, he cannot expect him to feel the same interest in a purchase or sale, for which he is paid his commission, as the person whose profit or loss depends on a judicious selection and a good bargain. Every farmer therefore should endeavour to acquire a thorough knowledge of stock, and carefully attend all markets within his reach to watch the fluctuation in the prices. It will generally be found that the principal profit in feeding stock is the manure, and to this the greatest attention should be directed. A little management will often greatly increase both the quantity and quality of this indispensable substance, and make all the difference between a loss and a profit in the keeping of stock. [MANURE.]

LIVER. The liver is the secreting organ or gland by which the bile is formed. Its existence has been traced very low in the scale of animals; and parts supposed to have an analogous function have been found in insects, but their nature is at present a disputed question. The differences in regard to size, form, and colour, which the liver presents in the higher animals (mammalia, birds, reptiles, amphibia, and fishes), are of no great importance.

In man the liver is a large solid viscus, of a reddish brown or mottled red and yellow colour, situated immediately beneath the diaphragm, in the right hypochondriac and partly in the epigastric region of the abdomen. [ABDOMEN.] When enlarged, it can be felt by the hand applied below the ribs on the right side. It is flattened in the vertical direction, is thinner at its anterior than at its posterior border, and its outline, when viewed from above, is irregularly ovoid. The upper surface, which is convex, is applied to the diaphragm; the lower, which is irregularly concave, lies above and in contact with the stomach, large intestine, and right kidney, has attached to it the gall-bladder, and presents two deep furrows, which divide it into several compartments, termed by anatomists lobes. Of the furrows, one running from before backwards (the longitudinal fissure) transmitted, during uterine life, the vessel which conveyed the blood from the placenta to the heart of the fœtus; it afterwards contains merely the cord-like remains of that vessel, now impervious in the greater part of its extent. The second furrow, in the under surface of the liver, is called the transverse fissure, since it crosses the former at right angles, lying however chiefly to its right side; it serves to allow the entrance of blood-vessels and nerves to the liver and the exit of the bile-ducts. Like other viscera of the abdomen, the liver receives an investment from the lining membrane of that cavity, the peritoneum, which, being reflected from it at different points, forms broad bands connecting the liver with surrounding parts.

The substance of glands generally is constituted of minute ramified or convoluted canals, closed at their radicle extremity, and communicating only with the principal duct, by which the secretion is conveyed away, and of a great number of blood-vessels which surround the above-mentioned canals in their whole extent, and afford the component matters of the secretion; these matters find their way into the interior of the glandular canals, not by distinct openings from the blood-vessels, but by transudation through their walls. In the human subject all other glands than the liver receive one kind of blood only, namely, arterial blood, from which the components of the secretion are derived, and the organ at the same time nourished, and the only veins are those which convey away the same blood after it is rendered venous by the changes it undergoes in the gland. But the liver, like the lungs in man and the kidneys also in some animals, receives two kinds of blood—arterial blood in small quantity, destined principally for the nourishment of the gland, and venous blood in much larger quantity, from which the bile is principally formed. The vessel which brings the arterial blood, the hepatic artery, is small, and comes off the aorta [AORTA], together with the arteries supplying the stomach, spleen, duodenum, and omentum. The venous blood is brought by the portal vein, a large vessel resulting from the union of all the veins returning the blood from the spleen, omentum, pancreas, and gall-bladder, and from the viscera directly engaged in the function of digestion, namely, the stomach and intestines. The hepatic artery and portal vein enter the liver at the transverse fissure or furrow of its inferior surface, where the bile-duct issues, and ramify together with the branches of that duct through the substance of the organ. After the materials for the nutrition of the liver itself, and for the secretion of the bile, have been derived from the blood of the two sets of vessels already mentioned, it is returned to the general circulation by a third set, the hepatic veins, which issue from the liver at its posterior border, and immediately enter the inferior vena cava near the heart.

The ultimate arrangement of these different blood-vessels in the liver is very peculiar: it was discovered a few years since by Mr. Kiernan. When the substance of the liver is torn, it is seen to be composed of innumerable granules of about the size of a pin's head; each of these contains the elements of a liver. They are connected most intimately with the branches of the hepatic vein, a small twig of which is contained in the interior of each, while on their exterior surface and in their interstices run branches of the portal vein, hepatic artery, and bile-duct. The mass of each granule or lobule is constituted in great part of a close network of capillary blood-vessels, which communicate on the exterior with the small branches of the portal, and on the interior with the twig of the hepatic vein. The blood brought by the portal vein therefore is poured into the capillary net-work of each granule or lobule of the liver, and after yielding in it the constituents of the bile, is received into the branches of the hepatic vein, whence it is transmitted to the general vascular system. The branches of the hepatic artery soon become very minute on the exterior of the lobules, and few can be traced into their interior; it is probable that, after having nourished the coats of the vessels and ducts, and other tissues of the liver, the blood of the hepatic artery is poured into the minute net-work formed by the ultimate division of the portal vein, and contributes with the blood of that vein to yield the constituents of the bile.

The form and disposition, in the liver, of the primitive radicles of the secreting canals or bile-ducts, have not been determined. In all other known glands the radicles of the ducts commence by isolated closed extremities; but this has not been demonstrated in the case of the liver, and some anatomists have imagined that the ducts arise by a net-work or reticular plexus in the interior of each hepatic lobule or granule: however this may be, we must suppose that they penetrate into the interior of the lobules, so as to be brought into contact with the delicate reticular terminations of the portal vein, in order to receive the components of the bile; and the yellow colour of these lobules, when not much congested with blood, is most probably owing to the presence of minute biliary canals filled with their secretion.

The biliary canals reduced in number by successive reunion to two tubes, one from the right, the other from the left lobe of the liver, issue at the transverse fissure of its under surface, there soon unite, and form one main trunk, the hepatic duct. After running a short distance together with the portal vein, hepatic artery, and nerves, in a quantity of dense cellular tissue enclosed within the fold of the peritoneum that connects the liver with the stomach, the lesser omentum [Peritoneum], the hepatic duct meets and unites with the duct of the gall-bladder, or cystic duct. The tube resulting from the junction of the hepatic with the cystic duct is called the ductus communis choledochus: it is about three and a half inches in length, and terminates by opening, together with the duct of the pancreas, into the portion of the intestine named duodenum, at the distance of a few inches from the stomach.

The gall-bladder is a pyriform membranous sac, lodged in a shallow depression at the inferior surface of the liver, which communicates, as we have stated, with the excretory duct of the liver, by means of a tube called the cystic duct. At times, when a supply of bile is not required in the intestinal canal—for instance, during fasting—the bile flowing from the liver is impeded in its progress through the ductus communis choledochus into the intestine, and is consequently obliged to regurgitate through the cystic duct into the gall-bladder, which serves as a temporary reservoir for the secretion, discharging it again when the presence of bile is required in the intestine to aid the digestive process. At the neck of the gall-bladder, close to its termination in the cystic duct, the lining membrane forms a spiral fold, which seems destined to retard the flow of the bile from the reservoir. The gall-bladder is not constantly present; the animals in which it does not exist are for the most part, though not universally, herbivorous, and such in which digestion is constantly going on, and a reservoir for bile consequently not required. But many herbivorous animals have a gall-bladder; and sometimes where it is absent the bile-duct presents a considerable dilatation of its cavity near the intestine: such is the case, for example, in the horse and elephant.

The *function of the liver* is manifold and important. The analysis of the fluid which it secretes shows that it frees the blood from an excess of matters composed of carbon and hydrogen; and by this means, and probably also by effecting some change in the matters which have been added to the blood during its circulation through the viscera of the abdomen, the liver assists in preparing that fluid for the nutrition of the body. The bile seems also to have a direct influence in the formation of the chyle, the nutritive fluid derived from the food; and some of its ingredients, serve as a natural stimulus of the peristaltic action of the intestines. [Bile.]

Development of the Liver. The liver, like other glands, is developed in the embryo as a diverticulum, or small sac protruded from the intestinal canal. The walls of this diverticulum become thickened, and in them are formed the secreting canals and other component parts of the organ, while its neck becomes narrowed and lengthened, and forms the excretory duct. Subsequently the gall-bladder is in its turn developed as a diverticulum from this duct.

LIVER, DISEASES OF. The liver is subject to all those general morbid changes which, depending on disordered actions of the blood-vessels, modification of the nutritive process, or alterations in the blood itself, may affect most organized parts of the body; such are inflammation (hepatitis), acute and chronic; hypertrophy and atrophy; induration and softening; and the different kind of tumours or transformations of tissue, carcinoma, or cancer, medullary sarcoma, fungus hæmatodes, melanosis, and scrofulous tubercle. It is occasionally infested by parasitic animals (hydatids), which may likewise affect other parts of the body.

But the liver is also liable to other diseases which appertain to it specially, and are connected with its function—secretion. The chemical changes which give rise to the formation of bile in the liver may be so deranged, that one or all of the ingredients of that fluid are increased or diminished in quantity, or vitiated in quality, and such disorder of the secreting process may manifest itself in several ways: the imperfectly formed fluid passing into the intestines may cause irritation there, and consequently diarrhœa; or being absorbed into the blood, may produce jaundice and its concomitant symptoms; or some of the ingredients of the bile may concrete into solid masses in the ducts of the liver or the gall-bladder, forming gallstones. The diseased state of the liver in which it becomes impregnated with an unnatural quantity of fatty matter may also be reckoned among the diseases appertaining to the special function of the organ, for the bile naturally contains a large proportion of fatty matter (cholesterine); though the chemical composition of this substance, and that of the oil or fat with which the liver is impregnated in disease, appears to be different.

Acute hepatitis, when it exists in a severe degree, is indicated pretty distinctly not only by the general signs of inflammation and symptomatic fever, such as thirst, heat, and dryness of the skin, increased rapidity of the pulse, &c., but also by local symptoms, which point more especially to the seat of the disease, namely, pain and tenderness on pressure beneath the ribs on the right side, difficult breathing from the liver being pressed upon by the diaphragm when air is drawn into the lungs, and a short dry cough, dependent either on the extension of the inflammation to the diaphragm, or a sympathetic affection of the parts engaged in respiration. The pain in hepatitis so frequently extends to the right shoulder, that pain in that situation has been considered characteristic of disease of the liver. Vomiting is a common attendant on hepatitis, as on inflammation of most of the abdominal viscera. Another symptom is jaundice, which in this case is a consequence of the inflammatory action having disturbed the process by which the components of the bile are formed and separated from the blood.

Inflammation of the liver may terminate in suppuration, and the formation of one or more abscesses, which sometimes attain a very large size in this organ, protrude externally, and even burst and discharge their contents through an opening in the skin.

Acute inflammation may be produced in the liver by any of the influences which give rise to it in other organs; but while the lungs are more subject to this affection in cold climates, the liver is especially liable to it in hot countries. The cause of this difference is not at present known; the mere heat of the atmosphere however, or some circumstances connected with it, seem to be influential, since even in our own climate hepatitis, and the disorders of the secreting action of the liver, which give rise to diarrhœa, are particularly frequent in the hot season of the year.

Chronic hepatitis is indicated by the presence, in a less violent degree, of many of the symptoms which attend the acute disease. Thus, a dull pain or sense of weight in the right side, with some degree of tenderness in the same situation, pain in the right shoulder, slight jaundice or sallowness of the skin, and disorder of the stomach and digestive organs generally, are the most constant signs. It is frequently difficult to distinguish mere chronic inflammation of the liver without enlargement from some disordered states of the stomach and bowels, which sympathize so much with it, and hence has arisen the popular error of designating any chronic disorder of the digestive organs 'a liver complaint.' We cannot be surprised at this sympathy between the liver, stomach, and bowels, and other viscera of the abdomen in disease, since we know that they are all engaged in one great function—digestion; and are in the healthy state associated together in their action by a natural sympathy for the purpose of co-operation in that function.

The liver is very apt to become enlarged by chronic inflammation, and then can be felt externally. Or such changes may be produced in it by hypertrophy or atrophy of one or more of the tissues composing it, or by the formation of a new tissue, that the passage of the blood through it is impeded, and dropsy of the abdomen (ascites) is the result; this effect however is sometimes a consequence of the chronic inflammation of the liver having extended to the whole lining membrane of the abdominal cavity.

Of the structural diseases, not inflammatory in their nature, some, as scrofulous tubercles, are rarely met with in the liver, others, as carcinoma, are more frequent in it than in most other internal organs, except the intestinal canal. There are no certain means of ascertaining the presence of these diseases in the liver, until the tumours which they form attain such a size as to be felt externally; though it should be suspected, when the general states of the body marking the carcinomatous and tubercular diathesis exist, and still more when these diseases are known to be present in other parts, if at the same time there are marks of irritation and disturbed action of the liver.

The 'fatty liver' is a frequent attendant on pulmonary phthisis: it cannot be recognised by any signs during life. The liver in man, as in many animals, particularly the sheep, is, as we have said, subject to become the seat of parasitic living creatures—hydatids. These are generally contained in great numbers in a firm general cyst, which not uncommonly protrudes externally, and bursts, or is opened by a lancet, when numerous pellucid bladder-like bodies of different sizes, floating in a transparent fluid, escape.

The nature of the changes to which the secreting action of the liver is prone is but little understood; a further consideration of these changes would be misplaced here.

The *treatment* of diseases of the liver is regulated by the general principles according to which the cure of diseases in other parts is attempted, and will of course vary with the nature of the particular affection requiring it.

LIVERPOOL, a municipal and parliamentary borough and seaport of Lancashire, stands on the right or east side of the æstuary of the Mersey, in 53° 24′ N. lat. and 2° 58′ W. long. The etymology of the name Liverpool is, according to the popular belief, derived from the name of a bird called a liver or lever, which was said to frequent the site of the town, great part of which was formerly a marshy pool, which was filled and emptied with the flowing and ebbing of the tide. In conformity with this popular tradition, the corporate seal of the town bears the figure of a bird, which however, as there represented, is of a species wholly unknown at the present day, if indeed, as is much doubted, such a bird ever existed. The name of the town has also been derived, and with at least an equal appearance of probability, from the Welsh words Llér pwll, signifying 'place on the pool,' and it is certain that antiently the whole of the æstuary of the Mersey, as far up as Runcorn, was called Lyrpul, Lyrpoole, or Litherpool. In confirmation of this etymology, it may be observed that the name of Liverpool is pronounced 'Lerpool' by many of the country-people who live in the neighbourhood.

No mention is made of Liverpool in Domesday-book, though it contains the names of several places in the vicinity, and also the grant of all the parts between the Ribble and the Mersey to Roger of Poictiers, by whom it is said the castle of Liverpool was built. This was probably the origin of an English town and port which are now second in commercial importance to London only. An act was passed in 1659 for demolishing the castle of Liverpool, on the site of which St. George's church now stands.

In 1173 the town received its first charter from Henry II., a mark of royal favour occasioned by the importance of the place as a means of communication with Ireland. A second charter was received from John in 1207; and a third, constituting it a free borough for ever, was obtained from Henry III. in 1227. The town flourished under the privileges thus granted. During the civil war it held out for twenty-four days against the army under Prince Rupert; at the expiration of that term the place was taken, and many of the garrison and inhabitants were put to the sword. Until the close of the seventeenth century Liverpool was a chapelry attached to the parish of Walton, but at that time it was made a separate parish, the population of which was about 5000 souls. In 1650 it is said there were only fifteen ships belonging to the port. Towards the middle of the next century three docks were constructed for the convenience of the shipping employed in the African and West Indian trades. The chief exports were then, as at present, furnished by the manufacturers of Yorkshire and Manchester, and consisted of hardwares, cutlery, and woollen goods. These were shipped in slave-ships to the coast of Africa, where they were bartered for negroes, who were conveyed to the West India plantations; the ships returning thence loaded with sugar and rum. In 1764 more than half the African slave-trade was carried on by the merchants of Liverpool. That trade has happily ceased since 1806, and this town has obtained an ample compensation for the loss in the rapid extension of the cotton manufacture, which having its principal seat in Lancashire and the adjoining county of Cheshire, Liverpool has become the port where the great bulk of the raw material of the manufacture is received, and whence the exports of manufactured goods are chiefly made to all parts of the world. Still more recently, and especially since the employment of steam-vessels for the conveyance of merchandise, this port has enjoyed a very large proportion of the trade between England and Ireland, for the prosecution of which it is peculiarly well situated. This intercourse having been placed upon the footing of a coasting-trade, and no entries of the goods conveyed being required by the custom-house, it is not possible to give any accurate account of its extent. Some idea of its importance may however be formed from the following statement of the quantity and value of animals and agricultural produce brought into Liverpool from Ireland in the years 1831, 1832, and 1837, compiled by the managers of the steam-vessels engaged in that trade:—

	1831.		1832.		1837.	
	Quant.	Value.	Quant.	Value.	Quant.	Value.
		£		£		£
Cows . . (number)	90,715	907,150	69,624	765,864	84,710	1,365,360
Calves . . . " .	4,196	2,990	1,694	10,164	316	711
Horses . . . " .	296	5,920	679	13,580	3,414	68,280
Mules . . . " .	243	3,645	29	290	319	2,552
Sheep . . . " .	134,762	235,834	74,260	129,955	225,050	450,100
Lambs . . . " .	25,725	25,725	24,077	24,077	24,669	22,202
Pigs . . . . " .	156,001	585,004	149,090	484,543	595,422	1,488,555
Eggs . . (crates)	2,506	50,120	4,097	81,940		
Wheat (quarters)	277,060	831,180	338,649	948,217		
Oats . . . . " .	380,679	532,951	325,720	309,434		
Barley . . . " .	21,328	37,324	14,486	24,626		
Rye . . . . " .	613	920	213	320		
Beans . . . " .	8,452	16,904	7,927	12,683		
Peas . . . . " .	1,724	3,448	1,233	1,973		
Malt . . . . " .	6,850	17,125	6,009	15,023		
Meal . . (loads)	149,816	187,270	169,817	203,780		
Flour . (sacks)	93,154	209,596	177,252	407,680		
Bacon . (bales)	13,099	65,495	10,771	64,626		
Pork (barl. & ½ barl.)	15,480	45,300	13,595	41,430		
Beef (tiers. & barls.)	7,580	30,728	9,044	41,142		
Hams . (hhds.)	590	11,800	817	19,608		
Butter . (cwts.)	5,754	11,508	10,348	21,731		
" . . (firkins)	258,087	645,217	992,830	775,999		
" . (half do.)	19,217	24,021	15,861	21,412		
Lard . . (tierces)	465	3,720	693	6,583		
" . (firkins)	4,542	6,813	10,800	17,820		
		4,497,708		4,444,500		3,397,760

The returns for 1837 include only seven of the twenty-six articles enumerated in the previous years, but as regards some of those seven exhibit a very important increase.

The number and classification of houses in the borough, assessed to the poor-rate in 1834-5, were as follows:—

64	at	£3	£192
153	"	4	612
628	"	5	3,140
3,337	"	6	20,022
3,303	"	7	23,121
2,795	"	8	22,360
1,755	"	9	15,795
2,026	"	10	20,260
1,056	"	11	11,616
1,372	"	12	16,464
2,450	"	13	31,850
949	"	14	13,286
461	"	15	6,915
761	"	16	12,176
220	"	17	3,740
576	"	18	10,368
351	"	19	6,669
296	"	20	5,920
6,132	above	20	247.390
28,685			471,896
1,092	Warehouses		118,616
3,425	Breweries, workshops, &c.		129,865
Total 33,202			720,377

No considerable town in England has received greater improvement during the past half-century than Liverpool. Before that time the streets were narrow and inconvenient, and the buildings were wholly devoid of architectural beauty, but successive alterations have given to the town an amount of commodiousness and elegance not to be met with in any other commercial port in this country. This altered condition has been produced by the exertions of the corporation, in whom is vested the property of a great proportion of the houses. As the leases of these have progressively fallen in, they have been renewed only on the condition of expending the sums necessary for the required embellishment. The value of the corporation estates is estimated at three millions of money, and the annual income derived from rents and dock-dues has of late increased to upwards of 320,000*l.* A great proportion of this income has been devoted to the improvement of the town, including the building of churches, hospitals, and other charitable and public edifices. The sum expended in these objects, including the cost of widening streets, between 1786 and 1838, is stated to have amounted to 1,668,500*l.* The disbursements of the corporation have so far exceeded its income that it has incurred a considerable debt, and in October 1832, when a Report was made on the subject, the amount of its outstanding bonds was 792,000*l.*

The most important public buildings are the town-hall, the Exchange buildings, and the custom-house. The building of the town-hall was begun in 1749, but was not completed in its present form and extent until near the end of the last century. The interior was accidentally burnt in 1795, and restored, with many improvements, at an expense of 110,000*l.* The ground-floor of this building contains the council-room, several committee rooms, the mayor's, town-clerk's, treasurer's, and town-surveyor's offices. The principal story is approached by a very handsome staircase, and contains a very fine suite of rooms, which are magnificently furnished. The saloon is 30 feet 6 inches long and 26 feet 6 inches wide. The two drawing-rooms are respectively 32½ feet and 30 feet long, and 27 feet wide. The large ball-room is 89 feet long, 41½ feet wide, and 40 feet high; the second ball-room is 61 feet by 28, and 26 feet high; and the banquet-room, in which the mayor receives his guests, is 50 feet by 30, and 25 feet high. The whole of these rooms communicate with each other. The staircase is lighted by means of a dome with lateral windows: the height from the floor of the building to the centre of the dome is 106 feet. The staircase is ornamented by a colossal statue of Canning, by Chantrey, and surmounting the dome is a colossal figure of Britannia.

The Exchange buildings form with the town-hall three sides of a quadrangular area, which is used by the merchants of Liverpool as an Exchange. This quadrangle is 197 feet long from north to south, and 178 feet wide; it therefore contains 35,066 square feet, which is more than twice the size of the recently destroyed Royal Exchange of London. The buildings which form the west side of the area are occupied as offices by merchants; while the east side comprises a news-room, 94 feet by 52 feet, which is frequented by the merchants and brokers; and an underwriters' room above, of somewhat smaller dimensions. The architecture of the two wings harmonises with that of the town-hall. In the centre of the area is a bronze monument, erected in honour of Lord Nelson. This monument, which is executed in bronze, consists of a marble basement and a circular pedestal, supporting figures emblematical of Nelson's principal victories. The statue of the dying admiral rests one foot on a prostrate enemy, and the other on a cannon; and he is receiving upon his sword a naval crown from Victory.

The custom-house, in which are also contained the dock offices, the excise-office, and where it is intended shortly to place the post-office and the office for the distribution of stamps, is situated on the site, now filled up for that purpose, of the old dock. The land on which it stands, valued at 90,000*l.*, was given by the corporation, which also undertook to expend 175,000*l.* in the erection of the building, under an agreement with the government, by which, in consideration of 150,000*l.*, to be paid by annual instalments of 25,000*l.* each to the corporation, the latter was bound to make over the property to the government at the end of twenty years. The extreme length, measuring from east to west, is 466 feet 8 inches. The principal front faces the north, and in the centre there is an octostyle Ionic portico, with columns of five feet diameter; and at each end are projecting wings, each of which is 94 feet wide. The basement is used for storing bonded goods; the west wing is occupied by different offices of the custom-house; and the centre contains the 'long-room' of that establishment and the approaches to other parts of the building. The east wing contains the excise-office and the dock offices, and will also afford accommodation for the post-office and the stamp-office. The long-room is 146 feet in length, 70 feet wide, and 45 feet high, and is surmounted by a dome 50 feet high: the passages and staircases of the wings are lighted by means of two smaller domes. The height of the rooms in the principal story is 20 feet, in the second story 21 feet 6 inches, and in the attics 14 feet 8 inches.

Liverpool contains 28 churches, some of which are handsome modern buildings; besides numerous chapels and meeting-houses, belonging to the Roman Catholics and various denominations of Protestant Dissenters. The church dedicated to Saint Nicholas, the tutelar saint of mariners, according to the Romish calendar, is the oldest place of worship in Liverpool, having existed as a chapel-of-ease under Walton parish before the town became a separate parish; it stands near the river, at a short distance from the town-hall. The body of the church was rebuilt in 1774; and the tower, which fell down in 1810, has since been rebuilt in a good style: it has a peal of twelve bells. Many of the churches were built with the funds of the corporation, but others have been erected at the cost of private individuals under private acts of parliament. The town contains many buildings devoted to charitable purposes. The workhouse, which is one of the best managed in the kingdom, is almost like a little town: it will accommodate about 1800 people; a fever hospital belongs to it. The infirmary, originally opened in 1749, was rebuilt on a better site in 1824 at the cost of 27,800*l.* It contains 234 beds for male and female patients. The lunatic asylum, which is capable of accommodating sixty patients, is a neat and commodious building, with spacious cells and day rooms, and furnished with warm baths. The foundation stone of this asylum was laid in January, 1829, and the building was erected at the cost of about 11,000*l.* A building previously used for the same purpose is now used as a barrack. Besides these there are two smaller hospitals, two dispensaries, and an ophthalmic infirmary. The Blue-coat School, established in 1709, has accommodation for 250 boys and 100 girls, who are educated, boarded, and clothed gratis. There are also charitable schools for the blind, and for the deaf and dumb, two corporation free-schools, and numerous other schools supported by different denominations of Christians. The Mechanics' Institution in Mount Street is built on ground given by the corporation, and cost 11,000*l.* The theatre, or lecture-room, will contain 1200 persons; it was publicly opened during the visit of the British Association at Liverpool in 1837. Attached to this institution are schools, in which, for very moderate charges, boys receive an education according to the station which they are intended to occupy. There is no town in the kingdom which, in proportion to its size and population, is better provided than Liverpool with scientific and literary institutions. The Royal Institution, formed in 1814 by Mr. Roscoe, by shares or subscriptions of 100*l.* each, was opened in 1817, and in 1822 the subscribers were incorporated by royal charter. The building has a frontage of 146 feet, and contains numerous spacious apartments, among which is a lecture-room, capable of accommodating 500 persons. The second and third stories of the building are occupied by the Museum of Natural History, which is the largest and most valuable in that part of the kingdom. The institution likewise possesses many valuable paintings; casts of the Ægina Marbles and the Phigaleian Frieze, and an extensive collection of philosophical apparatus. Courses of lectures are given on literature, on the various branches of physical science, and on the different branches of medical knowledge. There is also a grammar-school attached to the institution. The Literary, Scientific, and Commercial Institution was set on foot in 1835 by a few young men engaged in commercial pursuits, and already contains a library of 2200 volumes. It is supported by an annual subscription of 2*l.* from the members, for which they have the advantage of a news-room, lectures on various literary and philosophical subjects, and classes for the acquisition of languages and other branches of learning. The Medical Institution, recently built at the cost of about 3000*l.*, contributed chiefly by members of the medical profession, contains a museum and library, and comprises various halls and committee-rooms, and a theatre capable of holding 500 persons.

The borough gaol is a large building, on the plan recommended by Howard; it has been principally used for the confinement of debtors. The County House of Correction at Kirkdale stands within the limits of the borough; it contains more than 400 cells, and is calculated for the reception of 500 prisoners. This establishment was formerly situated at Preston, and was removed to Liverpool because the largest proportion of the prisoners being furnished from its population, a considerable expense in their conveyance would by that means be saved to the county.

The market-places in Liverpool are upon an extensive scale: Saint John's Market, which stands in the centre of the town, covers a space of 1½ acres, being 550 feet long and 135 feet wide, the whole under one roof, supported by 116 pillars. Meat, poultry, fruit, and garden vegetables, are daily sold in this market, but the principal market-days are Wednesday and Saturday. The fish-market is on the opposite side of the street in which Saint John's Market stands. There are several smaller market-places in different parts of the town.

The principal places of public amusement are:—the Theatre, on the east side of Williamson Square; the Royal Amphitheatre, in Great Charlotte Street; the Liver Theatre, at the top of Church Street; the Wellington Assembly-Rooms, in Mount Pleasant; and the Rotunda, in Bold Street. There are also a large and well-stocked botanic garden at Edge Hill and a zoological garden in Derby Road.

Several cemeteries on a large scale have lately been made in or near Liverpool: that of St. James, which is formed out of an old stone-quarry, contains the statue of Mr. Huskisson, who is interred there.

The town is plentifully supplied with water by a company connected with the corporation, formed in January, 1800, and incorporated by act of parliament, and by a second company, which brings its water from the village of Bootle, about three miles from the town to the north. The streets and shops are well lighted with coal-gas, supplied by two companies, which make handsome returns to the proprietors.

The growth of the town will be seen from the following statement of its population at different times, from the end of the seventeenth century:—

Years.	Population.	Years.	Population.
1700	5,714	1770	35,600
1710	8,168	1777	34,107
1720	11,833	1790	55,732
1730	12,074	1801	77,708
1742	18,000	1811	94,376
1756	18,500	1821	118,972
1760	25,787	1831	165,221

By the Municipal Corporation Act (5 & 6 Wm. IV., c. 178), the council consists of a mayor, 16 aldermen (one for each of the sixteen wards into which the town is divided), and 48 councillors, one-third of whom are elected every year, those who vacate their office being eligible for re-election. The mayor is a justice of the peace during his year of office, and for one year after. The aldermen serve for six years: one-half are elected every three years. The council thus constituted has the right, under a private act of parliament passed in 1835, of nominating persons to fill corporate offices, and is empowered to make laws for regulating the police of the town, of the docks, and of the port generally, for lighting and watching the town, and for the suppression of disorderly and immoral practices. General sessions of the peace are held four times in the year, in which the recorder, who is appointed by the crown, presides as judge. The assizes for the hundreds of Salford and West Derby, forming the southern division of the county, are held in the town. Liverpool is a parliamentary borough, sending two members to the House of Commons. The right of voting rests in the householders occupying premises of the annual value of 10*l.* and upwards, and in all free burgesses not receiving alms. The number of persons registered as electors in these two classes, in 1836 and 1837, respectively was:—

	1836.	1837.
Householders paying rates	10,252	10,715
Freemen	3,197	3,175
	13,449	13,890

The number of actual electors is not so great as is indicated by the registers, because some names are entered in both capacities. The number who gave their votes at the general election in 1837 was 9091, of whom 6670 were householders, and 2421 were freemen.

The living is a rectory, divided into 'two *medieties*—the new church of St. Peter, and the parochial chapelry of St. Nicholas.'

The progress of Liverpool as a commercial port may be traced from the receipt of customs duties during the last 100 years, which has been as follows:—

Years.	Customs Receipt.	Years.	Customs Receipt.	Years.	Customs Receipt.
1733	£92,466	1800	1,058 578	1829	3,315,041
1750	215,961	1805	1,766,370	1830	3,562,114
1755	202 367	1810	2,675,766	1831	3,599 206
1760	248,312	1815	2,360,967	1832	3,925,062
1765	269,435	1820	1,488,072	1833	3,733,132
1770	231 994	1824	1,984,522	1834	3,946,306
1775	274,655	1826	3,087 651	1835	4,272,841
1780	198,830	1827	3,308,904	1836	4,450,426
1785	690,928	1828	3,180,503	1837	4,351,496
1795	469,438				

The growth of the trade of Liverpool has been further shown by the number of vessels unloaded in the docks, and the amount of dues collected on the same. [DOCK.] The number of ships unloaded and amount of dues collected in each of the years ending 24th of June, 1837 and 1838, were,—

	Ships.	Dock Dues.
1837	15,038	£191,330
1838	14,820	161,843

The course of the trade of the port is shown by the following statement:—

Number and Tonnage of Vessels Entered Inwards and Cleared from the Port of Liverpool during the year 1837, *under each of the different Heads below stated.*

	INWARDS.				OUTWARDS.			
	British.		Foreign.		British.		Foreign.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Europe, generally	548	81,739	471	78,517	587	92,385	502	86,208
Africa	96	24,069	5	469	93	21,867	1	92
Asia	133	47,718	..	..	125	48,639	1	463
America, *viz.*:—								
British Northern Colonies	328	146,688	..	..	328	123,288	..	..
„ West Indies	197	51,930	..	..	219	58,733	..	..
Foreign West Indies	12	2,298	2	401	39	7,921	18	4,647
United States	161	64,841	504	233,258	134	65,904	486	228,304
South American States	210	47,944	3	743	210	50,749	4	839
Total	1,685	467,127	985	313,388	1,735	469,486	1,012	320,553
Fisheries, *viz.*:—								
Greenland	..	..	..	..	..	..	..	..
Isles of Guernsey, Jersey, &c.	9	715	1	59	26	3,090	..	..
Isle of Man	246	16,411	1	87	211	11,824	..	..
Irish Trade	3,339	466,230	..	..	2,728	372,067	..	..
Other Coasters	5,002	440,326	..	..	4,746	410,659	..	..
Total	10,281	1,390,809	987	313,534	9,446	1,267,126	1,012	320,553

It will be seen from this statement that very nearly two-fifths of the tonnage inwards and outwards are engaged in the trade with the United States of America, and that of the shipping so engaged nearly four-fifths are under a foreign flag. It will be further observed, that the intercourse with Ireland is about equal in amount to that kept up with every port in Great Britain.

Liverpool has benefited more than any port in the kingdom (London alone excepted) from the application of steam-power to navigation. Steam-ships of the first class proceed to and arrive from Dublin daily. With Drogheda the intercourse is kept up four times a-week; with Belfast three times a-week; with Waterford, Newry, and Londonderry, twice every week; with Glasgow daily; with the Isle of Man, Beaumaris, Bangor, Menai Bridge, and Carnarvon, as frequently; and throughout every day the Mersey is enlivened by steam-vessels, conveying passengers to and from the towns and villages on the opposite side of the river.

The inland trade of Liverpool is much assisted by means of canals, the most important of which in extent is the Leeds and Liverpool canal, 128 miles long. The Mersey and Irwell navigation served until the opening of the Liverpool and Manchester railroad for the conveyance of bulky and heavy goods to and from Manchester. The Duke of Bridgewater's canal connects the Mersey with Birmingham and Staffordshire, and, joining the Grand Trunk canal, thus perfects the communication with London. The trade with North Wales, through the western part of Cheshire, is carried on by means of the Ellesmere canal; and the river Weaver navigation connects Liverpool with the salt district and the heart of Cheshire. [CANALS.] The modern adaptation of iron railways for the rapid conveyance of goods and passengers was first brought into practical operation by the Liverpool and Manchester railway, which was opened for use in September, 1830. The traffic upon this line from that time to Midsummer, 1836, since which date such particulars have not been made public, was as follows:

	Merchandise. Tons.	Coal. Tons.	Passengers. Number.
From 16 Sept. to 31 Dec., 1830 .	1,433	2,630	71,951
„ 1 Jan. to 30 June, 1831 .	43,070	2,899	188,726
„ 1 July to 31 Dec. .	65,488	8,396	256,321
„ 1 Jan. to 30 June, 1832 .	72,601	29,455	174,122
„ 1 July to 31 Dec. .	86,942	39,940	182,823
„ 1 Jan. to 30 June, 1833 .	96,457	41,375	171,421
„ 1 July to 31 Dec. .	98,247	40,134	215,071
„ 1 Jan. to 30 June, 1834 .	104,356	46,039	200,676
„ 1 July to 31 Dec. .	106,380	53,298	235,961
„ 1 Jan. to 30 June, 1835 .	113,647	55,444	205,741
„ 1 July to 31 Dec. .	116,982	60,802	268,106
„ 1 Jan. to 30 June, 1836 .	117,617	68,893	222,848
	1,023,120	449,296	2,393,767

From these figures, which do not include great numbers of cattle, sheep, and swine conveyed from Liverpool towards the interior of the country, it appears that in less than six years there were conveyed upon this railway nearly two millions and a half of passengers, and but little short of a million and a half tons of merchandise and coals. Exactly one century before the opening of this line, the town of Liverpool contained only one carriage, and no stage-coach came nearer to the town than Warrington, the traffic being then principally carried on by means of pack-horses. In 1760 there was only one stage-coach between Liverpool and London, and the journey required four days: the first mail-coach to London began to run on the 25th July, 1785. Now that the time required for the performance of this journey has been reduced, by means of the Grand Junction and Birmingham railways, to a ride of ten or eleven hours, the number of passengers must be reckoned by hundreds of thousands in the year, an alteration which adds another and an effective element towards the continued growth and prosperity of Liverpool.

It appeared from the annual bills of mortality printed at Easter, 1838, that the number of baptisms in the town and vicinity during the year was 10,145, the number of marriages 3017, and of burials 9979. Of the births and baptisms, there were belonging to the

Established Church . .	6,273
Roman Catholics . . .	2,917
Presbyterians . . .	116
Baptists	64
Independents 128, Unitarians 25, Methodists 107 . . .	260
Friends 13, Jews 33, other Dissenters 469	515
	10,145

Of the deaths in the parish, 6875 in number, there were—

Of persons under 2 years .	2,483
„ Between 2 and 5 „ .	822
„ „ 5 and 10 „ .	312
„ „ 10 and 20 „ .	255
„ „ 20 and 30 „ .	563
„ „ 30 and 40 „ .	579
„ „ 40 and 50 „ .	534
„ „ 50 and 60 „ .	445
„ „ 60 and 70 „ .	435
„ „ 70 and 80 „ .	308
„ „ 80 and 90 „ .	123
„ „ 90 and 100 „ .	13
„ 100 years and upwards .	3
	6,875

For further particulars relating to canals and railroads connected with Liverpool see LANCASHIRE.

LIVIA. [AUGUSTUS.]

LI'VIUS, with his full name, **LU'CIUS LI'VIUS ANDRONI'CUS**, was the first person who introduced a regular drama upon the Roman stage. (Liv., vii. 2.) He is said to have been the slave and afterwards the freedman of M. Livius Salinator. The time and place of his birth are uncertain; but his first play was probably exhibited 240 B.C., in the year before Ennius was born. (Cic., *Brut.*, c. 18; *De Senect.*, c. 14; *Tuscul.*, i. 1; Gell., *Noct. Attic*, xvii. 21.) We learn from Livy the historian, that he acted in his own pieces, and that after his voice failed him, in consequence of the audience frequently demanding a repetition of their favourite passages, he introduced a boy to repeat the words, while he himself gave the proper gesticulations. (Liv., vii. 2.) The fragments of his works, which have come down to us, are too few to enable us to form any opinion respecting them: Cicero says that they were not worth being read a second time. (*Brut.*, c. 18.) They were however very popular at the time they were performed, and continued to be read in schools till a much later period. (Hor., *Epist.* ii., i. 69-73.) The hymns of Livius were sung on public occasions, in order to avert the threatened anger of the gods. (Liv., xxvii. 37.) Festus informs us (under *Scribas*) that the Romans paid distinguished honour to Livius, in consequence of the success which attended their arms in the second Punic War, after the public recitation of a hymn which he had composed. Livius wrote both tragedies and comedies: they appear, if we may judge from their names, to have been chiefly taken from the Greek writers. The titles, which have been preserved, are—Achilles, Adonis, Ægisthus, Ajax, Andromeda, Antiopa, Centauri, Equus Trojanus, Helena, Hermione, Ino, Lydius, Protesilaodamia, Serenus, Tereus, Teucer, Virgo.

LI'VIUS, TITUS, the Roman historian, was born at Patavium (Padua), B.C. 59. We possess very few particulars respecting his life. He appears to have lived at Rome, and to have been on intimate terms with Augustus, who used, according to Tacitus (*Ann.*, iv. 34), to call him a Pompeian, on account of the praises which he bestowed upon Pompey's party. He also appears to have superintended the studies of Claudius, who was afterwards emperor. (Suet., *Claud.*, c. 41.) He died A.D. 17, in his 76th year.

Livy's great work, which was originally published in 142 books, gave an account of the history of Rome, from the earliest period to the death of Drusus, B.C. 9. Of these books only 35 are now extant, namely, the first ten, which contain the history of the city to B.C. 293; and from the twenty-first to the forty-fifth inclusive, which commence with the second Punic War, B.C. 218, and continue the history to the conquest of Macedon, B.C. 167. There also exist brief epitomes of the lost books, as well as of those which have come down to us, which have been frequently supposed, though without sufficient reason, to have been compiled by Florus. We have however only epitomes of 140 books; but it has been satisfactorily shown by Sigonius and Drakenborch, on Livy, *Ep.* 136, that the epitomes of the 136th and 137th books have been lost, and that the epitome of the 136th book, as it is called, is in reality the epitome of the 138th. Many hopes have been entertained at various periods of recovering the lost books of Livy's original work, but they now appear to be irrevocably lost. Erpenius and others stated that there was a translation of them in Arabic; but such a translation has never been discovered. The fragments of the lost books, which have been preserved by grammarians and other writers, are given in Drakenborch's edition That portion of Roman history which was contained in the lost books has been written in Latin by Freinshemius with considerable diligence, and has been published in the Delphin and Bipont editions, together with the extant books.

We have no means for ascertaining at what time the whole of the history was completed, though there are indications of the time in which some particular portions were written. In i. 19, Livy mentions the first shutting of the temple of Janus by Augustus after the battle of Actium, B.C. 29; whence we may conclude that the first book was written between this year and B.C. 25, when it was closed a second time. He must also have been engaged on the 59th book after B.C. 18, since the law of Augustus, 'De maritandis ordinibus,' passed in that year, is referred to in the epitome of the 59th book.

The fame of Livy appears to have been widely extended even during his life, if we may believe a story related by Pliny (*Ep.*, ii. 3), and repeated by Jerome, that a native of Cadiz came to Rome with the sole object of seeing the great historian. Tacitus (*Ann.*, iv. 34) and Seneca (*Suasor.*, vii.), among the later Roman writers, speak in the highest terms of the beauty of his style and the fidelity of his history—praises which have been constantly repeated by modern writers. But while most will be ready to admit that his style is eloquent, his narrative clear, and his powers of description great and striking, it can scarcely be denied that he was deficient in the first and most important requisites of a faithful historian, a love of truth, diligence and care in consulting authorities, and a patient and pains-taking examination of conflicting testimonies. His chief merits and defects as an historian have been ably drawn by Professor Malden in his 'History of Rome' published by the Society for the Diffusion of Useful Knowledge (pp. 39-41), from which we extract the following remarks:—

'Livy made very little use even of such inscriptions and public documents as were within his reach. He appeals indeed to the treaty of Spurius Cassius with the Latins, engraven on a column of brass (ii. 33): but in the notable instance of the inscription on the Spolia Opima of Cornelius Cossus, preserved in the temple of Jupiter Feretrius, which was at variance with the received fasti (or register of magistrates) and the common accounts of historians, he does not appear to have had the curiosity to examine the monument himself, but is content with repeating the report of Augustus Cæsar (iv. 20). This is one of the few passages in which he descends to a critical comparison of evidence and authorities; and it will serve as a proof how little expert he was in that art of an historian, and how little he valued its results: for though in this digression he professes to believe in the superior authority of the inscription, in the main course of his narrative he follows the beaten track of the writers who had gone before him. He makes no mention of other monuments which we know to have existed; the brazen column in the temple of the Aventine Diana, on which was engraven the treaty of Servius Tullius with the Latins, with the names of the tribes who were members of the league (Dion., iv. 26); the treaty of Tarquinius Superbus with Gabii, written on a bull's hide, and preserved in the temple of Dius Fidius (Dion., iv. 59); a treaty with the Sabines, of the time of the kings (Hor., *Epist.*, ii. 1, 25); the treaty with Carthage in the first year of the republic (Polyb., iii. 22) (and here his negligence is without excuse; for, even though the document itself might have perished before his time, he could have found the translation of it in Polybius, if he had consulted him before he began to narrate the Punic wars); and finally, the treaty with Porsenna, which was known to Pliny (*H. N.*, xxxiv. 14). He does not therefore found his narrative upon contemporary records, but avowedly draws his materials from the works of earlier annalists, Fabius Pictor, Calpurnius Piso, Valerius Antias, Licinius Macer, Ælius Tubero, and reposes upon their authority. As long as his guides agree in the main points of their story, he follows them without fear or doubt. When they openly contradict each other, especially on questions of names or dates, then he sometimes honestly confesses the difficulty, and acknowledges in general terms the uncertainty of the history of the first centuries of the city. But very many discrepancies less flagrant, and even some as important as those which he has specified, he passes over without notice; and yet we know with certainty that they existed, because they appear in the narrative of Dionysius, who drew from the same authorities as Livy. But though the course of his narration is sometimes checked by the conflict of external testimony, he is never induced to pause or doubt by any internal difficulty, any inconsistency or contradiction, or perplexity in the received story. Nothing less than a miracle is too strange for his acquiescence. It is evident that he has bestowed no labour upon examining the probability of the events which he relates, or investigating their connection as causes and effects.

'There are also sufficient proofs that he wrote hastily, and even carelessly. He sometimes mentions incidentally in a subsequent part of his history, circumstances which he has omitted in their proper place. Thus it is only by his remarks on the proposal for communicating the dignities of pontiff and augur to the plebeians (x. 6) that we learn from him that Ramnes, Titienses, and Luceres, were names of the antient tribes. He sometimes repeats (xxxv., 21 and 39), sometimes contradicts himself (xxx. 22, and xxxiv. 44). It is an instance and proof both of his carelessness and his want of familiarity with the antiquities of his country, that though he expressly informs us that, till a very short time before the capture of the city, the Roman way of fighting was in close phalanx with long spears, yet in no description of a battle does he allude to such tactics, and commonly uses of the older times the terms which relate to the more modern structure of the army. We cannot therefore feel assured that he always represented accurately the statements of the older annalists from whom he takes his materials.

'Any errors however which might arise from these causes would be single and detached, could bear but a very small ratio to the bulk of the history, and would not affect its general spirit. But the very tone and manner of Livy's work, however great may be his power of description, however lucid his style of narration, however much he may dazzle the imagination or interest the feelings of his readers, is a warning against implicit belief. He excelled in narration and in the eloquent expression of excited feelings, and he obviously delighted in the exercise of his genius. In reporting the traditions of the early ages of Rome, he seems less desirous to ascertain the truth than to array the popular story in the most attractive garb. He is not so much an historian as a poet. As the history advances, and the truth of facts is better ascertained, he is of course compelled to record them with greater fidelity; but still his whole work is a triumphal celebration of the heroic spirit and military glory of Rome. Here then is a disturbing force which has borne him away from the strict line of historical truth. To this desire of exalting the glory of his country (and no doubt to a similar impulse actuating those from whom he copied) we must ascribe the singular phenomena which appear on the face of the history—that in perpetual wars with the surrounding states, the Romans were never defeated in the open field' (ix. 19); that when they were distressed, it was always by pestilence, or famine, or sedition; and that at such seasons their enemies abstained from attacking them; that they gained victory after victory without subduing their opponents; that taken cities re-appear in the power of their original possessors; that consuls and dictators triumph in succession over nations that are still able to supply subjects for new triumphs to new consuls and dictators; that slaughters, which must have exhausted any state of antient Italy, diminished not the number of their perpetually renovated adversaries. To this passion for extolling the military reputation of Rome we owe the comparative neglect of the less popular and less ostentatious subjects of domestic history. Every war and triumph, of which any memorial, true or false, existed, is scrupulously registered; but the original constitution of the state, the divisions of its citizens, their several rights, the contests between the orders, the constitution of the general or partial assemblies of the people, the powers of the magistrates; the laws, the jurisprudence, their progressive melioration; these are subjects on which our information is vague and scanty and ill-connected. It is evident that to the mind of Livy they possessed comparatively little interest; and that on these matters, to say the least, he did not exert himself to correct the errors or supply the defects of the writers who preceded him. He was satisfied, if from a popular commotion he could extract the materials of an eloquent speech. It is a sufficient proof that on this most important portion of Roman history he was really ignorant, that with all his powers of language he does not convey clear and vivid ideas to the minds of his readers. Who has risen from the perusal of the early books of Livy with the distinct notion of a client or of an agrarian law?'

In addition to the history of Rome, Livy wrote several other works, which have not come down to us; amongst which Seneca (*Ep.* 100) mentions dialogues on historical and philosophical subjects; and Quintilian (*Inst. Orator.*, x. 1), a letter to his son, recommending the study of Demosthenes and Cicero.

The best editions of Livy are those by Crevier, 1735-1740; Drakenborch, 1738-1746; Ernesti, 1804; Ruperti, 1817; Döring, 1816-1824; and Kreysig, 1823-1827. His Roman History has been translated into most European languages; but we are not aware of any one which gives a faithful representation of the original work: the most esteemed are the translations in German by Wagner (1776-1782) and Cilano (1777-1779); in Italian, by Nardi (1575); in English, by Baker (1797); and in French, by Dureau de la Malle and Noel (1810-1812; and 1824).

LIVONIA (*Livland;* in German, *Liefland*), is one of the Baltic provinces of European Russia, situated between 56° 34′ and 59° 3′ N. lat., and 23° 20′ and 27° 38′ E. long. It is bounded on the north by Esthonia (or the government of Reval), on the north-east by Lake Peipus, on the east by Pskow, on the south-east by Vitepsk, on the south-west by Courland, and on the west by the Baltic, which contains the great island of Oesel, and some smaller ones belonging to this province. The area, according to Schubert, is 20,708 square miles; but other writers make it only 17,150 or 17,560 square miles. The province derives its name from its first inhabitants (the *Liven*, Livonians, a Finnish tribe), whose race is now extinct, or confounded with the Esthonians and the Lettonians (*Letten*). The surface is on the whole level and gently undulating, with here and there some hills, which rarely exceed 100 feet in height. There are no mountains properly so called: the highest ground of the whole province is the Mesenberg, near Wenden, which rises to the height of 1200 feet. Livonia is covered with vast forests, lakes, rivers, meres, marshes, and heaths. The soil on the sea-coast (which is bounded by a cliff several fathoms high) is very sandy: in the interior, sand, clay, loam, and moorland alternate; but there are also many very fertile tracts. In the east the appearance of the country is not pleasing; the better portions are in the south, especially on the banks of the Düna, where there is some very picturesque scenery. Most of the forests and marshes are in the west. The Baltic forms the great bay of Riga, between the continent and the island of Oesel. Of the lakes, 1120 in number, the most considerable are—the great lake of Peipus, united by a narrow channel with that of Pskow on the north-east; and the lake Werzierwe, 80 square miles in extent, in the centre of the province, which is connected by the Great Embach with lake Peipus. The following are smaller, viz.:—lake Burtnek, from which the river Salis issues, and runs into the Bay of Riga; lakes Marienburg, Felin, Luban, Stintsee, and others. The principal river is the Düna, which is the boundary between Livonia and Courland till it reaches Kirchholne, where it changes its direction, and empties itself at Dünamünde, below Riga, into the bay of Riga. It receives on the right side the Ewest and the Oger, and on the left the Bulleraa, which runs from Courland along the Bay of Riga and falls into the Düna near its mouth. Other smaller rivers are—the Aa, which rises in the circle of Wenden; the Salis; the Pernau, which empties itself at Pernau into the Bay of Riga; the Little Embach, which flows into lake Werzierwe which it leaves as a navigable stream under the name of the Great Embach, and runs into lake Peipus. The smaller rivers and streams are near 300 in number.

The climate is disagreeable, being cold and raw till the end of May, but very hot in the three summer months, with frequent thunder-storms. September has often some fine days, though occasionally with night frosts. On the whole the weather is very changeable and unsettled.

The chief occupation of the inhabitants is agriculture. The country produces corn, chiefly rye and barley, flax, hemp, and linseed. The fruit, such as apples, plums, and cherries, is very indifferent. There are some good horses on the estates of the nobles, but those of the peasantry are small and of little value. The horned cattle are small; sheep of the German breed are kept by the nobles; the peasants have an inferior breed, the coarse black wool of which is manufactured into cloth. Goats, swine, and domestic poultry are kept chiefly by the nobles, citizens, and clergy. There is abundance of game, white and grey hares, and especially feathered game; of beasts of prey there are bears, wolves (in large numbers), lynxes, and foxes; and of animals hunted for their fur, beavers, otters, martins, badgers, and squirrels. On the islands and sea-coast seals are taken, and fish of various kinds are abundant, especially in lake Peipus. There are no metals. Potters' clay and limestone are obtained in some parts. There are no manufactures, properly speaking, except in Riga. The country people spin yarn and thread, and make coarse cloth, linen, and wooden wares. The brandy-distilleries are numerous. The exports are corn, hemp, flax, and linseed; the imports salt, iron, lead, colonial produce, wine, manufactured goods, and articles of luxury.

The population, according to the latest accounts we can procure, is 754,000, consisting of—1st, 330,000 *Letten* in the circles of Riga and Wenden, who probably settled here at the beginning of the twelfth century, and expelled the *Liven*, or proper Livonians. They are a well-behaved, pretty industrious, and cleanly race, of Slavonian origin, speaking a peculiar Slavonian dialect, and on the whole more polished in their manners than the Esthonians. They are chiefly peasants. 2nd. *Liven*, or Livonians, now confounded with the other inhabitants, but of whom there may be 1800 in some villages in Wenden, who speak their own language, a dialect of the Finnish. 3rd. Esthonians, in the circles of Dorpat, Pernau, and Arensburg, wholly resembling their brethren in Esthonia, about 370,000. 4th. Germans and Swedes, formerly the masters of the country, and now forming the nobility, clergy, and burghers in the towns; about 45,000. 5th. Russians, 7000, and a very few Jews. Almost the whole, except the Russians, who are of the Greek church, profess the Lutheran religion. There are about 4000 Roman Catholics and 1000 Calvinists. The peasants were formerly serfs, but vassalage was abolished in 1818, and they are now nearly in the same condition as the German peasantry.

The provinces of Livonia, Esthonia, Courland, and Semgallen belonged in the earliest times to the Russian state, to which however they only paid tribute, and had their own government. The Russians did not even oppose the enterprises of foreign conquerors; thus it happened that during the distracted state of Russia they made themselves wholly independent of it, and could not be reduced to subjection till Peter the Great was able to assert his rights to these provinces. Livonia was almost unknown to the rest of Europe till 1158, when some traders from Bremen, in search of a new commercial intercourse with the north, were driven, on their voyage to Wisby in Gothland, upon the coast of Livonia. The people of Bremen now visited the country more and more frequently for the purposes of trade, and even formed settlements in it. In 1186 Meinhard, an Augustine monk, with other Germans, settled in Livonia and having converted the natives to Christianity, became the first bishop. But Albrecht, the third bishop, who came with a new company of adherents to the Düna, was the first who was able to estabilsh his spiritual authority on a secure foundation. He built in the year 1200 the town of Riga, and fixed his see there.

Towards the end of the century Canute VI., king of Denmark, made himself master of these provinces, which Waldemar III., one of his successors, ceded for a sum of money to the Teutonic order, which was united with the Order of the Knights Sword-bearers, founded in 1201 by bishop Albrecht, so that the Teutonic Knights remained in possession of the four provinces. At length the weakness of the Order, which was unable to resist the czar Ivan II., Wasiljewitsch, who sought to recover those provinces that had been detached from the Russian empire, caused the entire dissolution of the whole state. Esthonia placed itself under the protection of Sweden; Livonia was united with Poland; Courland and Semgallen became a duchy under Poland, which Gotthard Kettler, the last grand-master of the Teutonic order, obtained as a fief under that crown. From that time Livonia became the apple of discord for which Sweden, Russia, and Poland disputed for a century (1561 to 1660). By the treaty of Oliva, in 1660, Poland ceded those provinces to Sweden, and they were united with Esthonia. By the treaty of Nystadt, in 1721, both were annexed to the Russian empire.

Livonia is divided into five circles, those of Riga, Dorpat, Arensberg, Pernau, and Wenden.

(De Bray, *Essai sur l'Histoire de la Livonie*, 3 vols., Dorpat, 1817; Hassel, *Erdbeschreibung*, &c.)

LIVO'NECA. [ISOPODA, vol. xiii., p. 52.]

LIVORNO, called by corruption Leghorn by the English, and Livourne by the French, is a seaport town on the west coast of Italy, in the grand-duchy of Tuscany. It stands at the southern extremity of a low and partly marshy plain, which extends from the left bank of the Arno to the hills of Montenero, which are a projection of the ridge which runs by Volterra, and divides the basin of the Arno from that of the Ombrone or Maremma of Siena. The hills of Montenero end abruptly on the sea about three miles south of Livorno: they are naturally stony and barren, but the slope towards Livorno is covered with country-houses and gardens, which are the resort of the merchants and their families during the summer, and have a fine sea-view, which embraces the coast and the Apennines to the north towards the Gulf of La Spezia, the islands of Gorgona, Capraia, and Elba, and the mountains of Capo Corso, or the northern extremity of the island of Corsica. Livorno is 14 miles south by west of Pisa, and 45 west by south of Florence, in 43° 33′ N. lat. and 10° 19′ E. long.

The town is neatly and regularly built; the streets are wide and mostly straight, and there is a fine square in the middle of the town. The western district, called la Nova Venezia, is intersected with canals, by which the goods are carried in boats from the shipping in the harbour and landed before the warehouses of the merchants. Many of the private houses are handsome, uniting Italian outward architecture with interior comfort. The shops are well supplied with goods, and fitted up in good taste. Of all the towns in the Mediterranean perhaps Livorno most resembles an English town; the inhabitants are, by long intercourse, familiar with the English, and well disposed towards them, and the English language is spoken, or at least understood, by many of the natives. The people are active, steady, and peaceably inclined. A greater tolerance exists here than in any other part of Italy: the English and Lutherans have chapels and burying-grounds, the Greeks a church, and the Jews a very handsome synagogue. The English burying-ground, situated on the ramparts, is adorned with numerous marble monuments—among others that of Smollett, who died here. The town itself is little more than two miles in circumference; but two large suburbs, one beyond the north or Pisa gate, and the other to the south, called Borgo Cappuccini, have gradually increased to the size of towns, and have been lately included within the boundaries of the Porto Franco, wherein goods can be landed and warehoused, and exported again without paying duty. The outer mole, which is more than a mile in length, and joins the light-house, affords a pleasant walk. The harbour is tolerably large, but not sufficiently deep for large vessels, which lie in the roads, where the anchorage is safe and good. The Darsena, or interior harbour or dock, is only fit for smaller vessels. Near the Darsena is a fine colossal statue of Ferdinand I., the benefactor of Livorno. The lazzarettos, of which there are three, outside of the town and on the sea-shore, are remarkable for their excellent distribution and perfect security, being surrounded by wet ditches, and furnished with extensive warehouses and convenient lodgings.

Livorno is entirely a commercial place: it has however a casino, or assembly-house, a theatre, very good inns and coffee-houses, and the vicinity of Pisa affords the opportunity for a pleasant drive and an interesting excursion. Elementary schools and infant schools have been of late years established at Livorno; and the Jews, who are about 15,000 in number, and many of whom are descended from Spanish and Portuguese Jews expelled from the Peninsula two centuries since, vie with the Christians in promoting popular education. The population of Leghorn is now reckoned at 75,000, among whom are individuals of every nation in Europe, besides Turks, Moors, Armenians, and Jews from Africa and Asia.

Livorno has no claim to classical antiquity; it is first mentioned as a village, parish, and fort, adjacent to Porto Pisano, or the harbour of Pisa, in the eleventh century. It was ravaged in the wars between Genoa and Pisa, was taken possession of by the Visconti of Milan, and afterwards by the French General Boucicault, who sold it in 1407 to the Genoese for 26,000 golden ducats. Pisa and its port had fallen at that time into the hands of the Florentines, who not long after effected the purchase of Livorno from the Republic of Genoa, in 1421, for 100,000 golden florins. The Florentines established docks at Livorno, where they built their vessels, and surrounded the place with walls. As the neighbouring Porto Pisano became gradually filled up by the simultaneous effects of the alluvial deposits of the Arno and other streams, and by the sand thrown up by the western storms, the importance of Livorno as a port increased in proportion, until at last it entirely obliterated the former. But the great increase of Livorno took place in the following century, under the dynasty of the Medici. The grand-duke Cosmo I. granted to all new settlers privileges and immunities from taxes, and security from pursuit in consequence of debts contracted or penalties incurred in other countries. He also built a mole and light-house, and made it the station of the galleys of the military order of St. Stefano, whose avocation, like that of the order of St. John of Jerusalem, was to cruise against the Mussulmans. His successor Ferdinand I. greatly extended the improvements begun by Cosmo; he raised regular fortifications round the town, built warehouses, a fortress, a lazzaretto, and numerous other buildings, and excavated a navigable canal communicating with the Arno. He not only confirmed the privileges and immunities to new settlers granted by Cosmo, but he published an indulte in forty-eight articles, dated the 10th of June, 1593, by which merchants of all nations and of every religion, Greeks, Armenians, Turks, Jews, Moors, and others, were invited to come and settle at Livorno, without fear of being molested on account of their religion, and with full security for their persons and property. It happened that about this time the fanatical intolerance of the Spaniards was driving away the Jews and Moors from the Peninsula, and several thousand Jews availed themselves of the asylum thus offered to them by Ferdinand. A number of Corsicans, dissatisfied with their Genoese rulers, and of Provençals, scared away by the civil wars which desolated France, came also to settle at Livorno. Cosmo II. continued to favour Livorno, and gave it municipal statutes, built new ships of war, and when the edict of Valencia, in September, 1609, by Philip III., banished all the remaining Moors from Spain, Cosmo invited 3000 of those exiles to settle as colonists in the territory round Livorno. But the insubordination and fierceness of those strangers obliged the grand-duke some time after to embark them for the coast of Africa. Livorno has continued ever since to prosper through the enlightened protection of the successive grand-dukes and the tranquillity which Tuscany has in general enjoyed. During the first years of the war of the French Revolution, the neutrality adopted by the grand-duke Ferdinand, whilst all the rest of Europe was at war, favoured greatly the commerce of Leghorn. When Bonaparte however invaded Italy in 1796, he did not respect the neutrality of Tuscany, but sent a body of troops to seize upon all English, Portuguese, Neapolitan, and Austrian property at Leghorn, and even insisted that the merchants of Leghorn should deliver the balances and deposits which they had in their hands belonging to individuals of the above nations, an act of bad faith which the merchants honourably avoided by subscribing a round sum, which they paid to the French. After the rupture of the peace of Amiens, Livorno enjoyed a kind of neutrality under Maria Louisa of Spain till 1808, when Napoleon occupied Tuscany and annexed it to the French empire. Upon this, the trade of Livorno was annihilated, its counting-houses gradually became deserted, a ship seldom entered the harbour, many of the merchants wound up their accounts, and retired to Pisa and other places. Livorno was one of the ports which suffered most from the Continental system, and in which the dominion of Napoleon was most disliked. With the peace of 1814 the prosperity of Livorno returned, and it has made rapid strides ever since. Population and buildings have rapidly increased. The immunities of the Porto Franco have been extended to the suburbs, an aqueduct has been constructed, and other improvements have been effected. A railroad is now in progress between Livorno and Florence. A capital of thirty millions of Tuscan livres (one million sterling) has been raised by shares of 1000 livres each for the purpose. The length of the road will be about 50 miles.

The imports into Livorno are either for consumption or for deposit. In the first place, Livorno supplies with foreign goods Tuscany, Lucca, part of the Roman States, and partly also Modena and Parma. In the last century it used to supply Lombardy also, but Trieste has now supplanted Livorno in this branch of trade. The deposit trade of Livorno was also in the last century more extensive than it is now. The English, Dutch, American, and other ships from the Atlantic carried thither manufactures and colonial goods and exchanged them for cotton, silk, and other produce of the Levant, which were brought to Livorno by Italian and

Greek vessels. The facilities afforded by the lazzarettos and warehouses, the perfect freedom of trade, and the security enjoyed there, made Livorno a most convenient place of exchange between the Levant and the nations of western Europe. This relation of things is now materially altered. Commerce is become more direct: the English, American, and other vessels from the west proceed straight to the Levant and the Black Sea to exchange their cargoes, and the improvements that have taken place in Turkey of late years, and the security afforded to navigation by the state of general peace, all tend to favour the direct intercourse between consumer and producer, and to diminish the importance of ports of deposit, such as Livorno, Malta, Lisbon, &c. Still the transit trade of Livorno is considerable; its warehouses are always well supplied, and it is a convenient place especially for the smaller vessels from the coasts of Italy and its islands to take in their cargoes.

The principal articles of produce of the country exported from Livorno are: silk, either in thread or manufactured, to the amount of about three millions of francs annually; oil, two millions; straw hats, three or four millions—formerly this article amounted to seven millions of francs; iron from Elba, paper, potash, alabaster, coarse woollen cloths for the Levant, coral gathered on the coasts of Barbary and Sardinia, and manufactured at Livorno; and anchovies, which are fished off the island of Gorgona, opposite Livorno. The chief imports are: corn from the Black Sea, French woollens, English cotton goods, hardware, salt fish, and colonial articles. In 1832 the imports amounted to sixty-eight millions of francs, and the exports about fifty millions. In the same year there entered the port of Livorno 199 English vessels, 126 Austrian, 75 Russian chiefly from the Black Sea, 61 American, 30 Swedish, 9 Danish, 4 Dutch, 61 Greek, besides more than 2000 coasting vessels from the coasts of Italy, France, and Spain.

(Serristori, *Saggio Statistico;* Magri e Santelli, *Stato antico e moderno di Livorno*, 3 vols. 1772.)

LIVRE, antiently a money of account in France, afterwards a coin. The word is derived from the Roman *libra*, or pound, the standard by which the French money was regulated, twenty sous being made equal to the livre, or libra. Kelly, in his 'Complete Cambist,' vol. i., p. 141, says, 'Accounts are kept in France in francs of ten decimes, or a hundred centimes. Before the year 1795 they were kept in livres of 20 sous or 240 deniers. The livre and franc were formerly of the same value, but the franc is now 1¼ per cent. better; thus 80 francs equal 81 livres, and by this proportion the antient monies have been generally converted into modern. By a decree of 1810 the following proportion was established: pieces of 48 livres, at 47 fr. 20 centimes: pieces of 24 livres, at 23 fr. 55 centimes; of 6 livres, at 5 fr. 80 centimes; of 3 livres, at 2 fr. 75 centimes.

The livre was formerly of two kinds, Tournois and Parisis. The *Livre Tournois* contained 20 sous Tournois, and each sol or sous 12 deniers Tournois. The *Livre Parisis* was of 20 sous Parisis, each sous worth 12 deniers Parisis, or 15 deniers Tournois; so that a livre Parisis was equivalent to 25 sous Tournois; the word Parisis being used in opposition to Tournois on account of the rate of money, which was one-fourth higher at Paris than at Tours.

In the money of the Mauritius, or Isle of France, colonial livres are used, two of which equal a franc.

Kelly, *ut supra*, vol. i., p. 269, says, under 'Neufchatel in Switzerland,' there are different modes of keeping accounts here. The most antient method is in *Livres foibles*, of 12 gros or 144 deniers, which is partially retained, particularly in rents and inferior departments of business. The second way of keeping accounts is in livres Tournois of Neufchatel, divided into 12 sous or 240 deniers, one livre of which equals 2½ livres foibles, and is worth 13½*d.* sterling money. Another mode was introduced in 1798, which is in franken of 10 batzen, or 100 rappen.

The *Lira Italiana* is the Italian livre; equal to the French franc, with its divisions and multiples in proportion. There is also the lira of Modena, and the lira of Reggio; the former worth 3¾*d.* sterling, the latter worth only two-thirds of the lira of Modena.

Accounts are likewise kept in several parts of Canada in livres according to the antient system of France. (Kelly, vol. i., p. 59; ii., 293.) This is called old currency.

LIXI'VIUM, a term which is synonymous with *ley*. It was used by the older chemists to signify a solution of an alkali in water; and what is now usually called an alkaline solution, or a solution of an alkali, was termed indifferently an alkaline ley or alkaline lixivium.

LIZARD. [LACERTIADÆ; SAURIANS.]

LIZARD POINT. [CORNWALL.]

LJUNGAN-ELF. [ANGERMANLAND.]

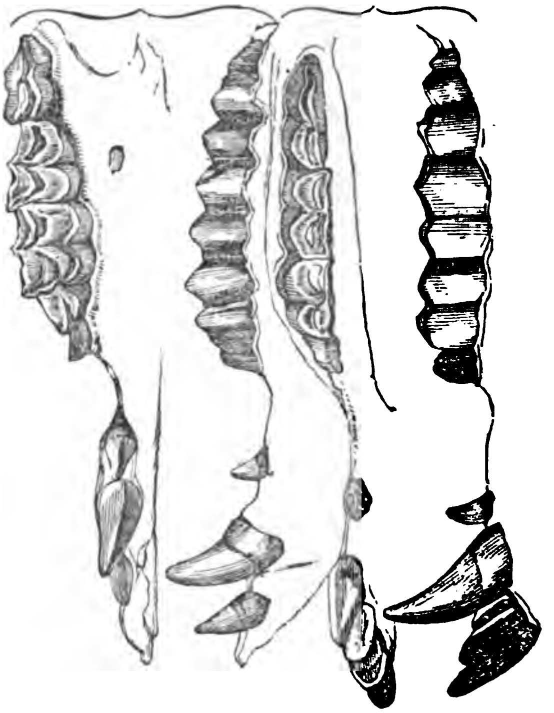
LJUSNAN-ELF. [SWEDEN.]

LLAMA (*Auchenia* of Illiger; *Lama* of Cuvier and others), the generic name for that form of the *Camelidæ* which is confined to the New World.

ORGANIZATION.

Dentition:—Incisors $\frac{2}{6}$, Canine $\frac{1-1}{1-1}$, Molars $\frac{5-5}{4-4} = 30$.

The difference between the dentition of the two subfamilies of *Camelidæ*, *Camelus* and *Auchenia*, appears to consist mainly in the absence of the two small pointed teeth, which are found in the interval or 'bar' between the canines and the molars in the *Camels*, from the jaws of the *Llamas*. Thus the *Llamas* have four false molars, as they may be termed, less than the *Camels*. In other respects the dentition of the one is, as nearly as may be, the dentition of the other. The following cut exhibits the dental arrangement of the *Dromedary*, and will convey a sufficiently accurate idea of the same parts in the Llamas, if the spectator will suppose the absence of the four teeth abovementioned. The difference was considered by M. F. Cuvier to be of such small importance, that he has not considered it necessary to give a figure of the dentition of *Auchenia*.



Teeth of Dromedary. (F. Cuvier.)

Baron Cuvier observes, that the *Camels* and *Llamas* differ in many points from the horned ruminants. Considered as a whole, the head of the former presents a narrower and more lengthened muzzle (un museau plus aminci), a cranium larger in proportion, orbits placed more forward, and the edges of those orbits more prominent, in consequence of the temples being more sunk.

In the *Llama* the bones of the nose are short, and their extremity notched; their base is slightly enlarged; the lacrymal bone is but little advanced upon the cheek, and leaves a wide space between its anterior angle and the upper external angle of the nasal bone. It does not cover the orbitary part of the maxillary bone, but stops above the suborbital internal hole; nothing of the vomer is to be seen above the spheno-palatine hole, and a small portion of the pterygoïd internal apophysis scarcely shows itself there. The parietal bones are soon united into a single bone much wider than it is long; the posterior suture of which remains, nevertheless, before the occipital crest. The temporal wing of the posterior sphenoid bone has a descending prominence, and its pterygoid wing terminates in a sharp point, which projects more than that of the pterygoid apo physis. The tympanic bones are compressed, but project very much: the occipital crest is well marked.

The true *Camels*, according to the same author, have the occipital crest still more marked and the temples still more sunken than they are in the *Llamas*, and almost as much as they are in the *Carnassiers*. The occipito-temporal suture is very much in front of this crest. The bones of the nose are of much less width at their bases, and there is a great space between the small membranous portion which exists at their angle and the lacrymal bone, which is extremely small on the cheek; it does not reach in the orbit even to the edge of the suborbital internal hole. There is, as in the *Llama*, a small membranous space between the lacrymal, frontal, and palatine bones, which advances to that spot by a small tongue-shaped portion. The wing of the vomer shows a small portion above the analogous hole of the spheno-palatine bones. The internal pterygoid apophysis does not exist except towards the point of the wing: it does not rise till it reaches the body of the sphenoid bone, and there is no space between the wing of that bone and the wing of the palatine bone.

In all other respects, as regards the head, the *Camels* and *Llamas* offer a singular resemblance. The sockets of the incisors are smaller than in other ruminants, and the canal analagous to the pterygo-palatine terminates in the palate by more numerous holes. The oval hole is smaller. Internally the floor (plancher) of the cerebral cavity is much more united than it is in the *Deer* and the *Sheep*; the clinoid posterior apophyses form together only one small plate; and the region where the optic nerves are lodged is nearly on a level with that of the pituitary gland.

The anterior teeth of the *Camels* exhibit a considerable difference from those of the other ruminants: they have, in the first place, both above and below, the first molar, or rather false molar, detached from the others, and situated forwards, as we have seen above; and which, from its isolated position and pointed form, puts on the appearance of a canine tooth. They have moreover a true canine tooth implanted at the anterior border of the maxillary bone. This tooth becomes in aged subjects developed like the canine of one of the great *Carnassiers*. Lastly they have a true upper incisive tooth implanted in the intermaxillary bone, and this also puts on the form of a canine tooth: thus the *Camels seem* to have in the upper jaw three canines on each side. In the lower jaw they have only the eight ordinary incisors; but besides that the detached molar performs the office of a canine tooth, the external incisor has a pointed form, and rises to interlock (s'engrener) between the upper canine and incisor: this then again represents a canine tooth, and in the old camel it has the entire appearance of a strong canine of a *Carnassier*.

'In the *Llamas*,' continues Cuvier, 'whilst they have, like the *Camels*, only five molars in a series, and often even only four below, I do not find the detached anterior molar, or at least I must think that it falls very early; but the upper canine and incisor, and the external incisor below, are disposed as in the Camels, and are only more compressed and trenchant at their edges. In both these subgenera the lower incisors are large, strong, a little unequal, and directed forwards.'

The metatarsal and metacarpal bones of the *Camels* and *Llamas* are easily recognised, because they are divided higher than in the other ruminants and well above the articular pulleys. In the *Camels* the scaphoid and cuboid bones of the tarsus are not soldered, and always remain distinct. The two edges of the rotatory pulley (poulie rotulienne) of the *femur* are in the *Camel* nearly equal, as in the *Hog*. In the ruminants generally the ulna is scarcely more than an appendage to the radius, but the distinction generally remains marked throughout the length of the bones, though they become soldered by age, as in the *Ox*, *Deer*, *Sheep*, and *Gazelles*: in other cases the ulna disappears soon after passing the olecranon, as in the *Giraffe*, and still more in the *Camel*. In the *Camels* and the *Llamas* the tuberosities of the upper head of the humerus are not elevated as in the other ruminants. With regard to the pelvis, the *Camel* has the external angle of the ischium pointed and without truncation, and the spinal angle large and rounded; but this last is as much and more advanced than the other. The posterior front of the pelvis is enlarged, and its posterior border much more like that of the horse; and so it is in the *Llama*. (*Ossemens Fossiles*.)

Professor Owen has detected an osteological character, not noticed by Cuvier, which peculiarly marks the *Camelidæ*, viz. the absence of the perforations in the transverse processes of the cervical vertebræ for the transmission of the vertebral arteries.

In the structure of the stomach, the *Camelidæ* exhibit a marked difference from other ruminants. This part of the organization in the true Camels is explained in the article Camel; and though doubts have been thrown on the fact, the stomach of the *Llama* is formed upon the same peculiar principle as that which governs the development of this viscus in the *Camel*. Sir Everard Home maintains that, though a portion of the stomach of the *Llama* is, as it were, intended to resemble the reservoirs for water in the *Camel*, these have no depth, are only superficial cells, and have no muscular apparatus to close their mouths and allow the solid food to pass into the fourth cavity, or truly digesting stomach, without going into these cells. Dr. Knox, on the contrary, has shown that the real differences between the stomachs of the *Llama* and *Camel* are much less than had been imagined. The truth is, that in making observations on parts of this description, a great deal depends upon the care taken to keep the body of the subject in a fixed position. Thus we find Mr. Spooner, on the occasion of his reading his notes on the *post mortem* examination of a *Dromedary* that died in the Garden of the Zoological Society, observing that though he found nothing to add to the accounts already given by Daubenton and Sir E. Home, the cells of the first cavity in the subject on which he was reading contained food; and he was therefore induced to suggest that doubts might be entertained of the correctness of the generally received opinion, that these sacs are destined to act as reservoirs for fluids.

Upon this, Mr. Owen stated that he also had found in the cells of the stomachs of *Llamas* which he had dissected more or less of food; but he suggested the probability that this might have been forced into them by moving the animal about after death, when, muscular power being abolished, resistance to the admission of the food into the cells would have ceased. He added, that in the instance of the *Camel* which was killed some years since at the Royal College of Surgeons (the particulars of the examination of which have been published by Sir E. Home), the cells of the second and first cavities of the stomach were found to be filled with water only: in that case the animal had been kept without drink for three days, was then allowed to drink freely, was killed three hours afterwards, and was opened without being moved from its erect position. Mr. Cox, on the same occasion, suggested that the existence of food in the cells in the instances referred to might perhaps be accounted for by the fact that the animals in question had been kept for many years in this country, where they were at all times provided with water: under these circumstances a receptacle for the preservation of fluid would not be called into use; and the cells having therefore ceased to be applied to that purpose, the muscular power of their apertures would have been consequently diminished. Colonel Sykes added, that on examining, in India, the stomach of a *Camel*, he had found the cells devoid of food. (*Zool. Proc.*, 1832.) Professor Owen informs us that the *Camel* killed at the College of Surgeons had been a long time in England; but the function of the water-cells was not altered, as the experiment clearly proved.

The student, if he be disposed to doubt at all, will have his doubts on this point cleared up by an examination of the parts in the Museum of the Royal College of Surgeons, prepared by Professor Owen; and, as this part of the subject is peculiarly interesting, we proceed to give a description from the pen of that gentleman of the preparations there preserved. No. 566 B (Physiological Series), is the stomach of a fœtal Llama (*Auchenia Glama*, Desmarest). This singular form of ruminating stomach, observes Mr. Owen, is peculiar to the Camel tribe; it is in some respects simpler than that of the horned ruminants, and in others more complicated. Like the stomach of the small species of Moschus (No. 554), the psalterium is less distinctly separated from the abomasus, and at this early period of existence it exhibits in the Llama a similar deficiency of the characteristic laminæ. The reticulum however is much more complex, each of the larger alveolæ being developed into many smaller ones, a structure partially indicated in the reticulum of the Goat (No. 564), and more strongly marked in that of the Ox (No. 464 A). There are moreover two groups of cells developed from the rumen, which differ from those of the reticulum in being shallower, and being visible from without, giving a sacculated character to those parts of the paunch. The several compartments of the stomach have been laid open in this preparation to show their communications with each other and the character of their inner surface. The rumen is lined with cuticle, but is wholly destitute of the villi which characterize it in the horned ruminants. It is partially divided into two compartments by a strong fasciculus of muscular fibres, which, commencing on the left side of the cardiac orifice, traverses the paunch longitudinally. On the right side of this ridge, about fourteen smaller muscular fasciculi pass off at right angles, and these ridges are connected by still smaller fasciculi, running transversely between them at different distances from each other; the quadrangular spaces which result from the above arrangement of fasciculi are partly closed by a production of the lining membrane, leaving a circular aperture in the centre of each square for the passage of liquids into the cells beneath. The compartment of the paunch to the left of the great longitudinal ridge terminates in two sacculi, at what may be considered the cardiac extremity. The sacculus nearest the œsophagus is simple; the one farthest from it is developed into a series of cells, of a smaller size but of precisely similar construction to those on the opposite side of the paunch—a series of smaller muscular bands passing off at right angles from the larger one, which separates the two sacculi, and these lesser bands being connected by transverse fasciculi, in the intervals of which the cells are developed. The reticulum, or water-bag, is laid open, showing that the cells are situated between a series of parallel muscular fasciculi, as in the rumen; but their further subdivision is carried to a greater extent, and their orifices are not guarded by membranous productions. The external muscular coat of this cavity is so disposed that its exterior is smooth and uniform, and the cells are scarcely visible from without. The œsophagus is laid open, so as to show the muscular ridge which traverses it longitudinally, and winds round the upper part of the reticulum to terminate at the orifice of the psalterium. 'It is obvious,' continues Mr. Owen, 'that by the contraction of this fasciculus, all communication between the first two cavities and the œsophagus would be cut off, and the remasticated food would be conducted, as in the horned ruminants, into the third cavity. A slighter degree of contraction would cut off the communication with the rumen, and allow the passage of fluids direct into the reticulum or water-bag, which probably takes place when the Camel or Llama drinks. A free communication however subsists between the water-bag and paunch. A porcupine's quill is passed through the oblique canal leading to the third cavity; this cavity in the Camel is a small sacculus, distinct from and intervening between the reticulum and psalterium; it is not so distinct in the Llama; but on a close inspection, the inner membrane nearest the orifice above mentioned may be seen to be produced into ridges, which are arranged in a reticulate or alveolar form; and as a similar structure is more distinctly observable in the Camel, this cavity was considered by Daubenton as the true analogue of the reticulum, and the water-bag as a peculiar super-addition. The remainder of the stomach in the fœtal Llama may be seen to form one elongated continuous cavity, bent upon itself at its lower third without rugæ or laminæ, the latter being afterwards developed at the cardiac half of this cavity. The pylorus is a small transverse aperture protected by a large oval protuberance. The duodenum is considerably dilated at its commencement. No. 566 C exhibits a small portion of the stomach of an adult Llama, showing the canal which passes along the upper part of the reticulum, and conducts the ruminated food from the œsophagus to the third cavity. The muscular fibres of the greater ridge, forming the upper boundary of this canal, are displayed: some of the fibres wind round the aperture of the third cavity, while others return and pass into the lesser ridge. It is these latter fibres, observes Mr. Owen, which, by a forcible contraction, draw up the orifice of the third cavity towards the cardia, and close the communication between the œsophagus and water-bag. The commencement of the reticulum, analogous to the third or supernumerary cavity in the Camel, is kept distended by a bristle. No. 566 D is a portion of the greater group of cells from the paunch of an adult Llama. The cuticle which lines these cells is turned down, and the subjacent membrane removed, to show the muscular fibres of the larger fasciculi, and also those of the lesser connecting bands, which are distinctly muscular, and evidently calculated to close the orifices of the cells.' Mr. Owen further observes that, after death, when these contractile parts have ceased to act, the smaller matters contained in the paunch, such as grains of oats, &c., may pass into these cells; but their contents he always found to be chiefly fluid. No. 566 E is the reticulum, second cavity, or true water-bag of the Llama. This cavity, Mr. Owen remarks, is not lined with cuticle, as in the horned ruminants; the other differences are pointed out in the description of the following preparation.[*] The muscular fibres of two of the larger ridges have been dissected; they form by no means such powerful fasciculi as in the corresponding ridges of the paunch-cells. The middle fibres in each ridge become tendinous; but the lateral fibres continue muscular, and pass off to the different connecting ridges, from which they spread over the entire circumference of the cells, and constitute the second or internal muscular tunic of this part of the stomach. On the opposite side of the preparation a portion of the external layer of fibres is exhibited. (*Catalogue*, vol. i.)

We here see that the structure in this very essential part of the organization is similar in both the forms of the *Camelidæ*, and that the Llamas of the New World, as well as the Camels of the Old World, are provided with the means of preserving fluids in cells appropriated to that office. Such a provision is consistent with the localities and habits of both; for if the parched deserts wherein the lot of the Camel is cast require such a modification of the stomach, the Llama, whose stronghold is the mountain-chain that traverses the southern parts of America, and which is found high up on the Andes, often out of the reach of lakes, requires little less.

Mr. Owen, in his interesting paper 'On the Anatomy of the Nubian Giraffe,' states that the action of the abdominal parietes in rumination is much stronger in the Camel than in the Giraffe; and he observes that it is a singular fact, and one which has not hitherto been noticed, that the *Cameline Ruminants* differ from the *true Ruminants* in the mode in which the cud is chewed. In the *Camels* it is ground alternately in opposite directions from side to side: in the *Oxen*, *Sheep*, *Antelopes*, and *Deer*, the lower jaw is ground against the upper in the same direction, by a rotatory motion. The movements may be successively from right to left, or from left to right, but they are never alternate throughout the masticatory process, as in the *Camels:* and here again, he remarks, in the rotatory motion of the jaws of the *Giraffe*, while masticating the cud, we have evidence of its affinity to the horned ruminants. (*Zool. Trans.*, vol. ii. Communicated Jan. 1838.)

With regard to external characters, we have, both in the Llamas and the Camels, the long neck and comparatively small head, and the prolonged moveable upper lip, deeply fissured vertically; we miss, in both, the naked muzzle, and find the apertures of the nostrils mere fissures capable of being shut at pleasure. The differences in the dentition have been already noticed; and though we look in vain for the humps of the true Camels on the backs of the Llamas, yet there is, according to Molina, a conformation in the latter resembling that excrescence, and consisting of an excess of nutritious matter, in the shape of a thick coat of fat under the skin, which is absorbed as a compensation for occasional want of food. The most marked difference appears to exist in the structure of the feet; and this difference is, as we shall presently see, demanded by the several localities and habits of the two groups. No structure can be imagined more admirably contrived for the support and passage of an animal over arid sands than the elastic pad which forms the sole of the Camel's foot, and on which the conjoined toes rest.

But the problem to be solved was the adaptation, in an animal of generally similar structure, of a foot to the exigencies of the case. The pad which connects the toes of the *Camel* beneath would have afforded no very sure footing to an animal destined to climb the precipices of the Andes; and we accordingly find, in the *Llama*, toes with strong and curved nails, completely separated from each other, and each defended by its own pad or cushion, so as to present the most perfect modification of the parts with a view to firm progression, either in ascent or descent, whilst there is nothing in the structure calculated to impede great rapidity upon comparatively plain ground.

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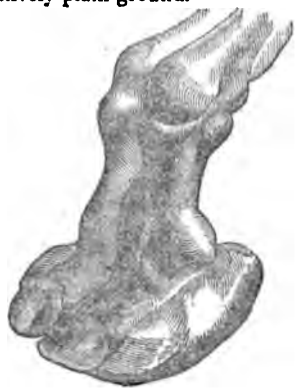
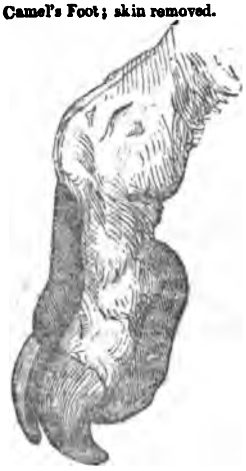
[*] No. 567, a portion of the reticulum, or water-bag, of a Camel, injected and showing more distinctly the nature of its living membrane, and that the inner surface of this cavity is a secreting and absorbing surface. This membrane has been removed from one of the greater and from some of the lesser bands, showing the muscularity of these parts, and that none of the fibres become tendinous, as in the Llama, in the larger bands. (*Cat.*) See, further, CAMEL, vol. vi., p. 189.



Camel's Foot; skin removed.



Foot of Llama; with the skin on.

Natural History.

Considerable doubt is still entertained as to the number of species belonging to the genus *Auchenia*, and we shall endeavour to trace some of the accounts given, beginning with some of the earlier historians and zoologists, and continuing the inquiry down to the present time.

The Spaniards, when they conquered South America, found the Llama, which seems to have been the only beast of burthen possessed by the natives, to whom it likewise gave food and raiment; for the flesh was eaten by them, and the hair or wool was woven into cloth. We cannot be surprised that so useful an animal should have been called by the conquerors a sheep, especially when we recollect the qualities of its flesh and of its wool; and accordingly we find the Llamas described as sheep by the earlier Spanish writers. Thus, Augustin de Zarate, treasurer-general in Peru in 1544, in his account of the conquest, speaks of the Llama, as it was observed in the mountains of Chili, as a sheep of burthen. He says that in situations where there is no snow, the natives, to supply the want of water, fill the skins of sheep with that fluid, and make other living sheep carry the skins; for he remarks that these Peruvian sheep are large enough to serve as beasts of burthen. De Zarate evidently had the eye of a zoologist, for he says that these sheep resemble the camel in shape, though they have no hump. He states that they can carry about a hundred pounds or more, that the Spaniards used to ride them, and that their rate of travelling was four or five leagues a-day. His description appears to be that of an eye-witness, and bears upon it the impress of truth. When they are tired, says De Zarate, they lie down, and the load must be taken off, for neither beating nor help will make them get up. Their weariness is manifested in a very disagreeable way when a man is on one of them; for our author says that if the beast is pressed on under such circumstances, it turns its head and discharges its saliva, which has a bad odour, into its rider's face. He speaks of them as of great utility and profit to their masters, praises their good and fine wool, particularly that of the species named *pacas*, which have very long fleeces, and shows that their keep costs little or nothing, either in money or trouble; for they are satisfied with a handful of maize, and are able to go for four or five days without water. He declares that their flesh is as well-flavoured as that of a fat Castilian sheep, and notices the public shambles for the sale of it in all parts of Peru then frequented by these animals. But, he remarks, this was not the case on the first arrival of the Spaniards; for when an Indian killed a sheep at that time, his neighbours came for what they wanted, and then another Indian would kill a sheep in his turn.

The Llama soon found its way to Europe; for we find, in the 'Icones Animalium' (Gesner, &c.), a figure of one with a collar round his neck, led by a man, apparently his keeper. This figure is by no means badly executed, and is given as the *Allocamelus* of Scaliger, who speaks of it as an animal 'in terra Gigantum' (Patagonia probably), with the head, the ears, and the neck of a mule, the body of a camel, and the tail of a horse: 'Quamobrem ex Camelo et aliis compositum 'Αλλοκάμηλον appellavimus.' The figure, it appears, was taken from a print, with the following account:—'In the year of our Lord 1558, on the 19th day of June, this wonderful animal was brought to Middleburgh (Mittelburgum Selandiæ), having never before been seen by the princes of Germany, nor recorded by Pliny nor other antient writers. They said it was an Indian Sheep from Piro (perhaps Peru), a region nearly six thousand miles distant from Antwerp.' Then follows the description, from which it may be gathered that the animal was either a brown Llama or a pied one. The neck is stated to have been very white, 'cygneo colore candidissimum,' and the body rufous, 'rufum aut puniceum.'

John de Laet (fol., Leyden, 1633) appears to have collected most of the Spanish authorities up to his time. He quotes Garcilaso as saying that the domestic animals of the Peruvians are of two kinds, the greater and the less; which the Peruvians, as a common name, call *Llama*, that is, cattle or sheep (pecudes); thus the shepherds say *Llama mickec*. They call the greater cattle (majus pecus) *Huanacu-llama*, on account of its similitude to the wild animal which is named *Huanacu*, and from which it differs in colour only; for the domestic Llamas (domesticum pecus) are found of various colours, like the horse; but the wild Llama is only of one colour, like chestnut. The greater kind have a great resemblance to a camel, except that they want the hump, and are not so large. The small kind (minus pecus) they call *Paco-llama*, and this is only fed for its flesh and its wool, which is the best and longest, as it is unequal to the carrying of burthens.

De Laet then turns to Acosta. 'Peru,' says the latter, 'has nothing better or more useful than its cattle, which our countrymen call Peruvian sheep, but which the Peruvians, in their tongue, name *Llama;* for they bring large profit, and are kept for next to nothing (vilissimo alitur). These cattle furnish the natives with wool for their vestments, like our sheep, and are used by them as beasts of burthen. There is no necessity for shoeing them, guiding them by a rein, or feeding them with oats; for these animals serve their master gratuitously, being content with the wild herbs which they meet with everywhere. There are two kinds (species)—one which is woolly and called *Paco* by the natives, the other covered with a slight fleece (villis levibus) only, and nearly naked, whence it is more fitted for carrying burthens, called *Guanaco*. They are rather larger than sheep, but less than heifers, with a long neck like the camels, lofty legs, and a compact body: the colour is various, for some are white, some black, some brown, and some piebald (versicolores), which they call *Moromori*. Their flesh is good, although rather gross (spissior), but that of the lambs is much the best and the most delicate; but they are rarely killed, because they are of by far greater use as beasts of burthen, and their wool serves for making cloth. This wool the barbarians clean, spin, and weave into garments; but it is of two sorts, one coarser and more common, which they call *Havasca*, the other finer and more loose (absolutior), which they call *Cumbi* (according to Garcilaso, *Compi*): from this last they weave various curtains and hangings (aulea et peristromata) of most elegant workmanship, which last a long time, and in splendour do not yield to silk; nay, what is wonderful for barbarians, they are so neat in their weaving that the elegance is nearly equal throughout, nor is the web or woof ever apparent. The antient Peruvian monarchs kept up many works for weaving *Cumbi*, the principal artificers in which lived at Capachica, on the banks of the lake Titicaca. These wools they dyed with the juice of various herbs, according as the nature of the work required. But most of the Peruvian barbarians are cunning in this weaving, and have in their huts instruments adapted for the art; and from these sheep they draw most of the necessaries of human life. By far the greatest use of these animals however is in carrying burthens; for sometimes 300, sometimes a drove of 1000, carry various articles of merchandise, skins of wine, chocolate (cocam), maize, *Chunno*, and quicksilver to Potosi and the other mines and towns.' Acosta then speaks of their employment in conveying silver from Potosi, &c., and observes that he has often wondered how droves of these animals, sometimes consisting of 1000, sometimes of two only, and not unfrequently laden with 3000 bars or plates (laminæ) of silver, worth 3000 ducats, should make their way, accompanied by a few barbarians only, who direct them, and load and unload their burthens, and hardly attended by one or two Spaniards, passing the night in the open air and without a guard,—and that so safely that a bar is scarcely ever missed, such is the security of travelling in Peru. 'The burthen of each beast,' continues Acosta, 'amounts to 100 and sometimes 150 lbs., which they carry three, or at the most four, leagues a-day, according to the length of the journey. But their leaders know their stations, where food and water for their cattle abound: here they pitch their tents, and unload their beasts. When however they have only one day's journey to make, the Llamas are able to bear a load of even 200 lbs., or to move forward as many as eight or ten leagues. These animals rejoice rather in a cool than in a fervid temperature, and therefore they are propagated immensely in the mountains, whilst they fail in the plains, on account of the too great heat. The bald sheep (calvum pecus), or Guanacoes, are of a fawning (vernile) and gentle aspect: often, as they walk along, they stop and regard the passers-by without any expression of fear or pleasure, so attentively with erected neck, that it is difficult to abstain from laughter; sometimes they are so suddenly terrified, that they run off to the mountain precipices with the greatest swiftness, so that it is necessary to shoot them to save their loads. The Pacoes also become so enraged sometimes, or are so wearied with their burthens, that they lie down with their burthens, and cannot be made to rise either by threats or blows; whence a proverb has arisen, and stubborn or obstinate men are said to be *Impacatos*. For this there is no better remedy than for the conductor to stop and sit down by the animal, until by his blandishments he prevails on the animal to rise spontaneously.'

It further appears that the Llamas are subject to scab, called by the 'barbarians' *carachen*, which is deadly not only to the animal which has taken it, but spreads by contagion among the flock, so that almost the only remedy is immediately to bury the diseased animal. Garcilaso however mentions other remedies: the most powerful is stated to be a very simple one, namely, anointing the affected parts with lard (adipe suilla). The price of a Llama varies in different provinces; but the 'barbarian' who possesses two or three is considered sufficiently rich. Garcilaso adds that the Peruvians, before the arrival of the Spaniards, did not milk their flocks, which give that secretion very sparingly, and only in sufficient quantity for their young; neither did they make cheeses of their milk.

De Laet then proceeds to state, that besides these domestic herds, Peru produces certain wild animals which are not easily to be seen in other parts of the New World, except in the neighbouring country of Chili. Some of these are called *Guanaco* or *Huanacu*, from a similitude to which the domestic kinds obtained the same name. The flesh of these is good, according to Garcilaso, but not so good as that of the domestic *Huanacu Llamas*. The males keep a look-out on the highest hills, whilst the females are feeding in the valleys; and when the former observe the approach of men from afar, they neigh almost like a horse, to warn the females. If the men come nearer, they flee, driving the females before them. The wool of these is short and rough, but it is notwithstanding used by the 'barbarians' for making cloth. These animals are taken in snares and nooses. Others again are called *Vicuñas:* these are not very unlike goats, except that they have no horns, and are larger, and are of a leonine colour or more ruddy; these live in the highest mountains and groves, and love the colder regions, but especially the solitudes which the Peruvians designate by the common name of *Punas;* neither are they annoyed by snow or frost, but are rather recreated thereby. They go in flocks, and run most swiftly. Such is their timidity, that at the sight of men or wild beasts they hurry instantly into inaccessible or hidden fastnesses. There were formerly a great number of these animals here, but they are now become much more rare on account of the promiscuous licence in hunting. Their wool is very fine, and like silk, or rather like the wool of the Beaver, and the natives deservedly estimate it highly; for besides other properties, it is also said to resist the heat and impart coolness, whence it is especially used for caps. Next to these come the *Tarugas* or *Tarucas*, which are larger and more swift than the Vicuñas, and of a more burnt colour, with pendulous and light ears: they rarely collect in herds, and generally wander about the precipices singly. Garcilaso says that these are a species of deer, but less than those of Europe. They were innumerable in the time of the Yncas, so that they entered the very towns; nor was there any deficiency of their fawns and does. Thus far De Laet, who says that all these animals produce bezoar stones, of which those of the *Pacoes* and *Guanacoes* are the smallest and lowest in estimation, whilst those from the *Vicuñas* are rather larger and better, and those of the *Tarugas* the best of all.

We now turn to Hernandez. We find in the Roman edition (fol. 1651) a figure of the '*Pelon Ichiatl Oquitli*, Ovis Peruviana,' with a description. Both figure and description leave no doubt that the brown Llama is the animal represented. There is a very long commentary, well worth the attention of the curious reader. Of this '*Aries* sive *Ovis Peruviana*,' two kinds are mentioned: the first like the animal represented; the other small and stunted (parvæ et pygmææ), with short legs, but strong and able to carry domestic burthens, such as water, corn, &c. Another kind, the *Pacos*, are stated not to be so corpulent. In the catalogue of Hernandez the *Pelon Ichiatl Oquitli* is called *Peruichatl.*

Marcgrave gives a figure of the long-wooled and larger *Llama*, under the name of *Ovi-camelus*. In some parts it is not bad; in others, the muzzle and fore-feet for instance, it is monstrous. He says that the larger kind of *Ovi-camelus* is called *Paco*. His description is worth consulting; and he says, among other statements, that they bore the ears of these 'sheep,' and run ropes through them, by which their masters manage them and lead them where they please. He then gives another figure, much better executed than the other, of a second species, which is nearly naked in regard to fleece, and is only covered by a light and short one (calvum pecus of De Laet?); and says that it partly resembles a camel and partly a deer, so that it might be well called in Greek ἐλαφοκάμηλος—Elaphocamelus.

We gather then from these and other early writers, that there were three kinds of these animals, *Guanacoes* or *Huanacoes*, *Pacoes*, and *Vicuñas*, the term *Llama* being applicable to each of them, and merely signifying cattle or sheep, but these kinds are by no means clearly defined. 'Until the last half century,' says Mr. Bennett, 'the great majority of naturalists, including Ray, Klein, Brisson, and Linnæus, concurred in reducing them to two species, the *Llama* or *Guanaco*, commonly used as a beast of burthen, and the *Paco* or *Vicugna*, cultivated for its flesh and its wool. Of this opinion was Buffon when he wrote the history of the Llama and the Paco; but the observation of living specimens of the Llama and the Vicugna, and the communications of the Abbé Béliardy on the subject, induced him afterwards to admit the latter animal as a third species distinct from the preceding. In this he was followed by Molina, who, in his 'Natural History of Chili,' separated also the Guanaco, and added a fifth species, the Hueque, or Chilian sheep of the older authors. Gmelin, Shaw, and almost every subsequent compiler, have adopted these five species without examination, giving to them such synonyms as they could pick up almost indiscriminately from the writers on the natural history of America, and thus creating a mass of confusion which it would be both vain and useless to attempt to unravel.' (*Gardens and Menagerie of the Zoological Society.*)

Pennant gives as species the *Llama*, the *Vicuña*, the *Paco*, the *Guanaco*, and the *Chilihueque*, but gives figures of the first two only.

M. F. Cuvier makes the number of species three—the Llama, the Paco, and the Vicuña; M. Lesson gives the same; Dr. Fischer records the same three and a fourth, *Auchenia Arucana* (Chilihueque) as doubtful. In his addenda et emendanda he notices *L. Huanaca* (Auchenia

Huanaca, Hamilt. Smith; *Cervocamelus* of Jonston) with a query if it is not a mere variety of *L. Peruana*. As a synonym to *Lama Paco* he adds *Auchenia Paco* (Hamilt. Smith), *Camelus Guanaco* (Traill). To *Lama Vicuña* he adds *Auchenia Vicugna* (Hamilt. Smith), less than the former; and to *Lama Arucana*, *Auchenia Arucana* (Hamilt. Smith).

Mr. Bennett observes that it seems to be the general opinion among the leading writers of the present day that the subdivision of the genus has been carried to too great an extent. He thinks that M. F. Cuvier is fully justified by the imperfect accounts of Molina in rejecting as species the *Guanaco* and the *Hueque* of that writer. Mr. Bennett states that he should have little hesitation in proceeding still further, for he is strongly inclined to agree with Baron Cuvier in regarding the *Paco* as a mere variety of the *Llama* with the wool more amply developed; and in considering the *Vicuña* as the only animal of the group that deserves to be specifically distinguished from the latter. Skeletons of both the Llama and Vicuña are preserved in the Museum of the College of Surgeons, London.

Geographical Distribution.—The Cordillera of the Andes, below the line of perpetual snow. Peru (but not in Mexico) and Chili principally, though now much reduced in numbers; in Columbia and Paraguay they are more rare. Most of the navigators to the Straits of Magalhaens and south-western coasts of America mention Guanacoes from early times down to the expeditions under Captain King and Captain Fitzroy inclusive, and the flesh of these animals has afforded a salutary refreshment to the crews.

Habits, Food, Reproduction, &c.—The habits of the Llamas may be in great measure gathered from the descriptions of the Spanish writers above given. In a wild state they keep together in herds, sometimes of one or two hundred, feeding on a sort of rushy grass or reed called *ycho*, which grows on the mountains, and, it is said, never drinking when they have sufficient green herbage. They resort to a particular spot to drop their dung, which a good deal resembles that of a goat, sheep, or giraffe, a habit which is often fatal to them from betraying their haunts. Modern observers have noticed the careful look-out that they keep, and the rapidity with which they flee, then turn to gaze, and again swiftly gallop off. Molina says that the Guanacoes leave the mountains, where they passed the summer, at the beginning of winter, when they descend to the plains. Here they are hunted down, at least the young and inactive, with dogs by the Chilians. During the chace they are said frequently to turn upon their pursuers, neigh loudly, and then take to their heels again. Another mode of capturing them by the Indians is for many hunters to join and drive them into a narrow pass, across which cords have been drawn about four feet from the ground, with bits of cloth or wool tied to them at small distances, somewhat in the way adopted by gardeners to keep small birds from the seeds. This apparatus with its pendent trumpery frightens the animals, and they get together, when the hunters kill them with stones tied to the end of leathern thongs. If there are any Guanacoes among them, they leap the cords and are followed by the Vicuñas. Those that we have seen in captivity have been tolerably mild and tame, but very capricious, accepting biscuits and such delicacies from visitors, but ejecting a copious shower of saliva in their faces at the least real or fancied affront. This shower, though sufficiently unpleasant, has not, as far as our experience goes, the acrid and blistering properties ascribed to it by some authors. Genitale masculum tenue est, et recurvum. Est autem luxuriosum valde, et turpius in exercendo venereo actu, quam ullum mundi animal. Fœmina enim vulvam habet nimis parvam, quæ in terra jacens ita se componit, ut mas illi supervenire queat, qui tunc temporis gemitus specie maximè vociferatur, nec aliud tunc quasi fit, quam quod unum alterum conspuat, et non raro diem integrum consumant, ante quam actum ipsum venereum incipiant et absolvant. To the general truth of this account of the commentator on Hernandez we can bear testimony. The female, which has only two teats, is said to go six months with young.

Utility to Man.—We need not here repeat those uses to which these animals have been applied by man. Cords and sacks, as well as stuffs for ponchos, &c., are fabricated from the wool*, and the bones are converted into instruments for weaving the same. Nor is even the dung neglected, for it is used as fuel. In short, these animals seem to have been to the aborigines what the reindeer (with the exception of the milk) is to the Laplander. Surrounded by herds of such animals which required almost no care, and by the spontaneous productions of the soil, the Indian had no incentive to improvement. Humboldt has an eloquent passage on this subject. 'When we attentively examine this wild part of America, we seem to be carried back to the first ages when the earth was peopled step by step; we appear to assist at the birth of human societies. In the Old World, we behold the pastoral life prepare a people of huntsmen for the agricultural life. In the New World, we

Male Brown Llama. (F. Cuvier.)

Paco. (F. Cuvier.)

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* In reference to the wool we may here state, that a herd of 36, including the kinds called Llamas, Alpacas, and Vicunas or Vigonias, were sent from Lima (Peru) and Concepcion (Chili) to Buenos Ayres by journeys of two or three leagues. To those who may be inclined to import these animals it may be necessary to state that they were fed during the journey with potatoes, maize, and hay: as soon however as the potatoes were exhausted, constipation came on so obstinately that medical relief was required. They were shipped as a present from Godoy, the Prince of the Peace, to the Empress Josephine, but only eleven arrived at Cadiz in 1808, just as Godoy fell into disgrace. Here two died, and indeed the rest were near being thrown into the sea by the infuriated rabble, in their detestation of the late minister and minion. The poor Llamas were however saved from the tender mercies of the populace by the governor of Cadiz, and were consigned to Don Francisco de Theran of Andalusia, who had a fine menagerie at San Lucar de Barrameda. When the French occupied the province, Marshal Soult protected them, and M. Bory St. Vincent, who was with the army, studied their habits and executed drawings of them, which were lost at the battle of Vitteria. M. Bory paid great attention to their wool, and some from each of the kinds was sent to the Academy of Sciences at Paris. From the report of the French naturalist and the philosophical Spaniard, it would appear that the fleece of the Alpa-vigonia (produced by a cross between a Vigonia and an Alpaca) has much greater length than that of any other variety and is six times heavier.

See 'The Menageries,' vol. i., published by the Society for the Diffusion of Useful Knowledge, where much interesting information is collected.

look in vain for these progressive developments of civilization, these moments of repose, these resting-places in the life of a people. . . . Those species of ruminating animals which constitute the riches of the people of the Old World are wanting in the New. The bison and the musk-ox have not yet been reduced to the domestic state; the enormous multiplication of the Llama and the Guanaco have not produced in the natives the habits of the pastoral life.' These multitudes are already lessened, and the form itself will probably ere long be extinct. Civilization has brought with it the animals of the Old Continent. The horse and the mule have almost entirely superseded the Llamas as beasts of burthen, and the sheep and the goat, in great measure, as contributors to the food and raiment of man.

Vicuna. (Buffon.)

Brown Llama, exhibited in England.

The white Llama, according to Feuillée, is said to have been the presiding deity of the natives of Callao, before that province was annexed to the empire of the Yncas.

ARRANGEMENT.

The similarity to the Camel appears to have struck every writer who has treated of the Llama.

White Llama, exhibited in England.

Linnæus places the genus *Camelus* at the head of his Pecora, and makes *Glama* and *Pacos* species of that genus. *Camelus* is followed by *Moschus*.

Pennant also arranges the *Llama* and *Pacos*, &c., under his genus *Camel*, which is placed between the *Musk* and the *Hog*.

Gmelin retains the Linnean arrangement, adding three (so called) species to those recorded by Linnæus.

Cuvier places the great genus *Camelus* at the head of the *Ruminants*, and makes it consist of the Camels properly so called and the *Llamas* (Auchenia). *Camelus* is followed by *Moschus*.

Mr. Gray makes his subfamily *Camelina*, the third of his family *Bovidæ*, consist of *Camelus* and *Auchenia*.

M. Lesson arranges the Llamas as the third genus of his *Camelées*, the two first being *Camelus* and *Mericotherium*. This third and last genus is immediately succeeded by the *Moschinées*.

Dr. Fischer, following Linnæus, places *Camelus* at the head of the *Pecora;* that genus is followed by *Lama;* and *Lama* by *Moschus*.

Mr. Swainson (1835) makes the '*Solipedes*, single-hoofed quadrupeds,' his fifth tribe of *Ungulata*, consist of the genera *Camelus*, *Auchenia*, and *Equus*.

Mr. Ogilby (1836) gives the *Camelidæ* as the first family of the order *Ruminantia*, with the following characters:—

Fam. 1. Camelidæ.

Feet subbisculcate, callous beneath, toes distinct at the tip from the sole; no spurious hoofs, no horns; *incisor teeth*, two above, six below.

2. Genera.

1. *Camelus*, whose characters are—
    - *Toes* conjoined, immoveable.
    - *Muzzle* furnished with a *chiloma*,[*] the upper lip (labrum) divided.
    - *Lachrymal Sinuses*, none.
    - *Interdigital Pits*, none.
    - *Inguinal Follicles*, none.
    - *Teats*, four.
2. Auchenia.
    - *Toes* disjoined, moveable.
    - *Muzzle* furnished with a *chiloma*, the upper lip divided.
    - *Lachrymal Sinuses*, none.
    - *Interdigital Pits*, none.
    - *Inguinal Follicles*, none.
    - *Teats*, two.

Mr. Ogilby goes on to state that the *Camelidæ* form what Mr. MacLeay would call an aberrant group; they differ essentially, observes the former, from other Ruminants in the structure both of the organs of locomotion and of mastication, and their generic distinctions consequently depend upon characters which have no application to the remaining groups of the order. On the other hand, the principles of generic distribution which subsist among the rest of the *Ruminantia* appear, in Mr. Ogilby's opinion, to furnish negative characters only when applied to the *Camelidæ*; but though necessarily expressed negatively, the absence of lachrymal, inguinal, and interdigital sinuses forms, in reality, positive and substantial characters; and as such, should be introduced into the definition of these, as well as of other genera, in which they unavoidably appear in a negative form. The *Camelidæ*, in Mr. Ogilby's arrangement, are immediately followed by the *Cervidæ*. (*Zool. Proc.*, 1836.)

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[*] Tumid upper lip contiguous with the nose or nostrils.

⁂ No fossil species of *Auchenia* has yet been discovered; but Mr. Darwin brought home from South America the remains of a most interesting animal nearly allied to the *Llamas*, which Mr. Owen has characterized under the name of *Macrauchenia*. [Macrauchenia.] The cervical vertebræ in this form present the same character in the absence of the holes for the vertebral arteries in the transverse processes as in the Llamas and Camels. (Owen.)

LLANDAFF. [Glamorganshire.]

LLANDILO-VAWR. [Caermarthenshire.]

LLANDOVERY. [Caermarthenshire.]

LLANELLY. [Caermarthenshire.]

LLANGOLLEN. [Denbighshire.]

LLANOS. [Plains.]

LLANRWST. [Denbighshire.]

LO, ST., a town in France, capital of the department of Manche, 152 miles west by north of Paris, in a straight line, or 171 miles by the road through Evreux, Lisieux, and Caen. The origin of this town is disputed. It stands on the river Vire, and is irregularly built: it has a fine 'place,' or open space. There are four parish churches, of which that of Nôtre Dame is the principal. The church of Ste Croix is in the Norman style, of which it is considered to be the best preserved specimen in France. The prefect's office, lately erected, the town-hall, the courts of law, and the prison, are the chief public buildings. The population, in 1831, was 8154 for the town, or 8421 for the whole commune; in 1836 it was 9065 for the commune, showing an increase in five years of 644, or about seven and a half per cent. The chief manufactures are of fine woollen cloths, serges, druggets, and woollen shawls; bed-ticks, calico, lace, and tape; woollen and cotton yarn; leather, common cutlery, and iron goods. There are slate-quarries in the neighbourhood. The chief trade is in the above manufactures; iron, salt butter, cider, honey, corn, cattle, horses, and poultry. There are eight well-frequented fairs in the year. There are a Society of Agriculture and Commerce, a high school, a public library of 5000 volumes, an hospital, a theatre, public baths, and several government offices.

The arrondissement comprehends 436 square miles, and had, in 1831, a population of 99,250; in 1836, of 100,717. It is subdivided into nine cantons and 120 communes.

LOACH. [Cobitis.]

LOADSTONE. [Iron—*Ores*.]

LOAM, a soil compounded of various earths, of which the chief are silicious sand, clay, and carbonate of lime, or chalk. The other substances which are occasionally found in loams, such as iron, magnesia, and various salts, are seldom in such proportions as materially to alter their nature. Decayed vegetable and animal matter, in the form of humus, is often found in loams in considerable quantities, and the soil is fertile in proportion.

According as the loams are composed, so they vary in quality. Those which consist of a great portion of loose sand, with little humus, and with an impregnation of iron, are very unproductive; and those which contain too much clay, and are on an impervious subsoil, are very difficult to cultivate. But between these extremes there are soils which cannot be surpassed in fertility as wheat-land. What renders loams so much more fertile than either clays or sands is, that the pure earths are in themselves almost entirely barren: sand lets the moisture run through it and evaporate rapidly; clay retains it, but locks it up in its own substance, and does not allow the tender young roots of plants to push through it; chalk has the same mechanical quality, besides containing very little organic and soluble matter, from which plants derive their chief increase. Sand and clay alone, without a considerable portion of humus, will not make a rich soil; but when a portion of calcareous earth is joined to both, the humus is more readily rendered soluble, and the clay and sand are prevented from forming a mortar, which would harden too readily, and prevent the influence of the air from reaching the roots. Good loams allow of that circulation of moisture which acts so prominent a part in the process of vegetation. It is almost universally admitted that the most fertile soils always contain a proportion of calcareous matter; and by adding chalk to those soils in which it does not abound, whether sandy or argillaceous, a manifest improvement is always produced.

It has been asserted that in the climate of France, in the neighbourhood of Paris, the best soil for the growth of wheat is composed of equal portions of fine sand, clay, and chalk. Upon what grounds this is assumed, does not appear very clear. The greater the natural moisture of any climate, the greater proportion of sand is required to make a fertile loam; and the greater the proportion of humus, the less sand will be required to temper the clay. The analysis of soils known to be extremely fertile gives a very great difference in the proportions of the different earths.

In the climate of England the soil which is generally preferred for cultivation is a loam, rather light than heavy; at least half of which is silicious sand, one-third clay, and the rest chalk. Such a soil is called a good loam; it is land which will produce almost every thing which is usually cultivated on sands or clays: it is not too stiff for carrots and turnips, and not too loose for wheat and beans. It is of most easy cultivation at all times of the year, provided the subsoil be sound, and not too retentive of water. It requires only to be occasionally recruited with manure, to restore to it the humus which vegetation has consumed, and to be kept free from the weeds which naturally spring up in all fertile soils. All attempts to improve the nature of a soil should have for their object the bringing it to a state of loam, by the addition of those substances which are deficient. If there is too much clay, chalk and sand may be added, or a portion of the clay may be calcined by burning, in order to destroy its attraction for water, and thus act the part of sand in forming the loam. Limestone or calcareous sand and gravel are still more efficacious for this purpose: they not only correct too great porosity, or too great tenacity, but also act chemically on the organic matter in the soil, rendering the humus soluble, and fit to be taken up by the roots of plants. If there is too much sand, marl composed of clay and chalk is the remedy. Good loams require much less tillage than stiffer soils, and will bear more stirring to clean them than sands. Hence they are cultivated more economically, and more easily kept free from useless weeds; while the produce is more certain and abundant. They can be impregnated to a higher degree with enriching manures, without danger of root-fallen crops, or of too great an abundance of straw at the expense of the grain. For artificial meadows they are eminently proper: all the grasses grow well in good loams, when they are on a dry or well-drained subsoil, which is an indispensable condition in all good land. Sheep and cattle can be depastured on them during the whole year, except when there is snow on the ground. If there should be means of irrigation, no soil is better suited to it than a light loam on a bed of gravel; or even if the subsoil is clay, provided sufficient under-draining prevent the water from stagnating between the soil and subsoil, which, as practical men very properly express it, would poison any land.

A loamy soil requires less dung to keep it in heart than either clay or sand; for while it is favourable to the process by which organic matter buried deep in the soil is converted into insoluble humus, it also permits that part of it which is nearer to the surface to attract oxygen from the air, and thus it is converted into a soluble extract, which is to the roots of plants what the milk of animals is to their young—a ready-prepared food easily converted into vegetable juices.

The analysis and classification of soils is of the greatest importance to all those who take farms; for the rent of land is very seldom proportioned to its intrinsic value: one farm may be worth double the rent of another, where the apparent difference in the soil is very trifling. Those who have had long experience of the expense of cultivation, and the average produce of certain lands, can nearly guess what rent it may be safe to offer; but a stranger has no criterion to judge by. Hence it is notorious that a stranger coming to take a farm from a distant district is almost invariably deceived. Why should not the value of a soil be ascertained as readily as that of any article of commerce? If there were certain points of comparison, it would be so; but in this the theory of agriculture is wofully deficient. A man guesses at the qualities of land by the colour, the feeling, and other uncertain signs: it seldom or never occurs to a farmer to examine the component parts of a soil, by merely diffusing a portion in water, and testing the deposits—much less to compound artificial soils, and compare them with those found in the fields. Yet every gardener can prepare soils suited to different plants, and make loams of all degrees of richness or consistence. In all these it will be found that sand, clay, chalk, and decayed vegetable substances, in various proportions, are the chief ingredients. If therefore these are found in a natural loam, we may safely conclude that it will be equally productive, and the deficiency of any one ingredient may be supplied artificially. This would be going rationally and scientifically to work; and the result would be a more certain and satisfactory practice of husbandry.

It might be an interesting and highly useful inquiry to ascertain the effect of the contact of various kinds of earth, moistened with water, in exciting galvanic action, which no doubt greatly influences the chemical affinities of the elements from which the plants derive their increase. It is a subject which has scarcely ever been noticed, and we would strongly recommend scientific experiments in this branch of vegetable physiology.

LOANGO, on the west coast of Africa, is the most northern of the four countries or districts which are said to have antiently constituted the kingdom of Congo, as explained in the articles CONGO, ANGOLA, and BENGUELA. In the first-mentioned of these articles there is an enumeration of the chief authorities from which we derive our information respecting all these countries.

Loango extends along the coast from Cape Lopez Gonsalvo in 0° 44′ S. lat. to the river Congo or Zaire, which separates it from Congo in about 6° S. lat. To the north it is said to be bounded by Gabon, or Pongo, and to the east by the country called Mokoko, or Anziko. Pigafetta, on the information of Duarte Lopez, extends its limits into the interior about 200 miles from the coast.

According to Olferd Dapper, Loango, or Loangego, as he writes the name, was antiently only one of the divisions of the territory properly so called, others being Mayomba, or Majumba, Kilongo, Piri, and Wansi. Other early accounts describe the principal provinces of the kingdom of Loango as being Loangiri, Loangomongo, Kilongo, and Piri. To these others add Sette, Gobbi, and other districts.

Loango, the capital town, called by the natives Banza Loangiri, is in the province of the same name, which occupies the south-western angle of the country. It stands in a large plain, at the distance of three miles from the sea. It is described both by Battel and Dapper, and the latter also gives an engraved representation of it. Here, among other buildings is or was attached to the royal palace the dwelling of the king's wives, stated to be five hundred in number. The reigning king in Battel's time (1589—1607) had four hundred children.

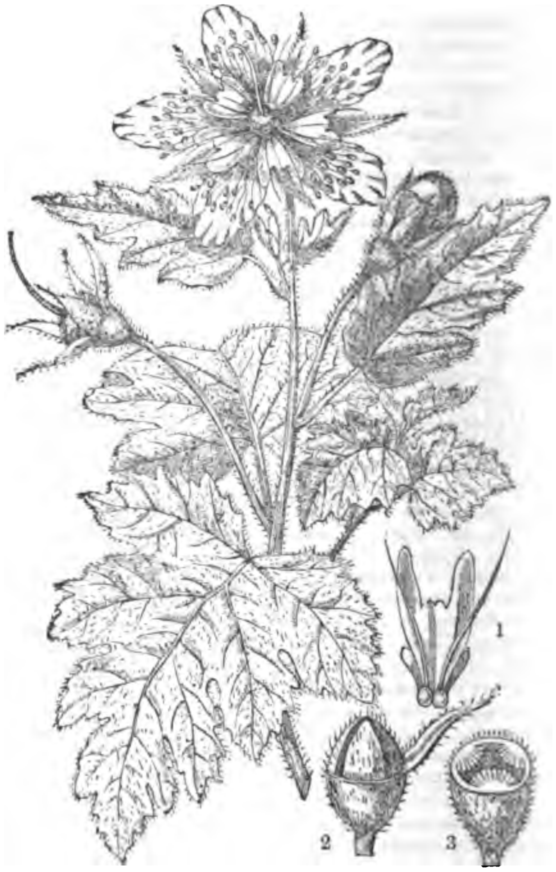
Another account gives the king seven thousand wives, one of whom occupies a very extraordinary position, having, it is affirmed, the right of directing the entire public conduct of the king, and of taking his life if he refuse to obey her commands. Nay, although married to the king, she may choose any other man she pleases for her lover, and all the children she produces are still accounted of the blood royal. At the same time it is death for her gallant to be surprised in the embraces of another woman. This highly privileged lady is nominated by the king himself to the post she fills, and is known by the name of the Makonda.

The government, like that generally prevalent among the barbarous tribes of this part of Africa, is the most absolute species of despotism. Battel states that the kings of Loango are believed by their subjects to be divinities, and that the titles by which they are known, Samba and Pango, have that signification in the language of the country. In particular, they are held to have the power of bringing down rain from the sky; and this useful prerogative they exercise every year, on the petition of their subjects, with great ceremony. On one occasion when Battel was present, an abundant shower fell on the afternoon of the same day on which the king, seated on his throne, and surrounded by the admiring multitude, had issued the usual command to the heavens by hurling a spear into the air; a circumstance which excited the sentiment of the national superstition to a wonderful pitch of enthusiasm. The successor to the throne is the king's next eldest brother, or, if he have no brother, the eldest son of his eldest sister. Although the king however is independent of the nobles, the latter in their own sphere appear to exercise unlimited tyranny over the common people. The religion of the country is an idolatry of the most superstitious character.

A great part of the country is covered with thick woods, and it is only mountainous in the interior towards the south. In the north it possesses some lakes of considerable extent, from which, and from the mountains, many rivers descend to the sea. Among these however there are none of much magnitude, with the exception of the Banna, at the mouth of which stands the town of Mayomba, about six miles south from Cape Negro, or nearly in 3° 30′ S. lat.

The sea contains fish in abundance, which form a great part of the sustenance of the people; the produce of the soil, which is said to yield three harvests in the year, with very little cultivation, consists of various kinds of grain, such as are raised in the adjacent regions. Among the trees are some dyeing woods. The only mineral found in the country seems to be iron. The principal animals that are mentioned are elephants and apes, both of which were formerly very numerous.

LOASA'CEÆ, a small natural order of polypetalous Exogens, consists of herbaceous and frequently annual plants covered over with stiff hairs or stings, which produce considerable pain by the wounds they inflict. They have alternate lobed leaves without stipules, large yellow, red, or white flowers, numerous polyadelphous stamens, within which are stationed singular lobed petaloid appendages, and an inferior ovary with parietal placentæ. The fruit is a dry or fleshy capsule, with the valves sometimes twisted spirally. The order is nearly allied to Cucurbitaceæ; all the known species are American, and the greater part from Chili and Peru. The genera in gardens are Loasa, Mentzelia, and Blumenbachia.



Loesa grandiflora.

1, one of the appendages within the stamens; 2, an ovary with all the sepals cut off except one; 3, a transverse section of the ovary, shewing the parietal placentation.

LOBA'RIA. [BULLADÆ, vol. vi., p. 11.]

LOBE'IRA VASCO. [AMADIS DE GAULA.]

L'OBEL, or LOBEL, MATTHEW, one of the founders of the science of systematic botany, was born in Flanders, in the year 1558, travelled in various parts of the middle and south of Europe, and finally settled in England, where he became physician to James I. He is chiefly known now as the author of botanical works illustrated by great numbers of figures, of which there are above 2000 in his 'Plantarum Historia,' a folio work published at Antwerp, in 1576, and still referred to by critical writers on systematic botany. But his name deserves mention more particularly as that of the first naturalist who devised the present method of arranging plants in their natural orders, rudely indeed, but with sufficient distinctness. In his 'Stirpium nova adversaria,' published in London, in 1570, and dedicated to Queen Elizabeth, he expressly mentions Gramineæ, Acori, under which Iridaceæ and Zingiberaceæ are included, Asphodeleæ, Serides or Cichoraceæ, Atriplices or Chenopodiaceæ, Brassicæ or Cruciferæ, Glaucia or Papaveraceæ, Labiatæ, Asperifoliæ, Leguminosæ, and some others. Lobel died at Highgate, near London, in 1616. The genus Lobelia was dedicated to him by Linnæus.

LOBE'LIA INFLA'TA, or Indian tobacco, an annual plant, growing in most districts of North America, of which the oval obtuse leaves are used in medicine. They have an undulated and irregularly-toothed margin, rough surface, and slightly pilose below, possessing a taste which gradually becomes acrid and pungent. The inflated capsules possess the same virtues.

The action on the human system is nearly the same as that of tobacco when chewed, producing a copious flow of saliva, and if swallowed in considerable dose causing great relaxation of all muscular structures, including the heart and arteries, accompanied with debility and cold perspirations, and also paleness of the surface. In large doses it proves decidedly poisonous. It frequently acts as an emetic and expectorant when given in small and regulated doses.

It has been found eminently useful in warding off or cutting short a paroxysm of asthma, either taken internally in substance, or in the form of an æthereal tincture, or inhaled as smoke along with aromatic herbs. It has been found beneficial as an expectorant and relaxant in hooping-cough, but neither in it nor asthma does it prove more than a palliative, or afford more than temporary relief; as such however it is very serviceable in some nervous affections with irregular action of the heart.

LOBELIA'CEÆ, an important natural order of monopetalous Exogens, differing from Campanulaceæ in having irregular flowers and syngenesious stamens, but otherwise resembling them very nearly; of these two characters the last is the most absolute, Isotoma, a lobeliaceous genus, being so called because its flowers are regular. The species principally inhabit the warmer parts of the world; in Europe they are rare, in North America much more common, especially in the southern states, and they are abundant in the hotter countries of South America. Many are found at the Cape of Good Hope, and in the north of India; their favourite haunts being damp woods or situations freely supplied with moisture. They abound in a milky juice, which in all is acrid, and in some so intensely so as to produce dangerous or even fatal consequences when applied to the surface of the body or taken internally. Among the most virulent is the Hippobroma longiflorum, a West Indian species, and the Lobelia Tupa, a Chilian plant now common in gardens. Nevertheless certain species have proved, in skilful hands, valuable curative agents, especially the *Lobelia inflata*, or Indian tobacco. Many of the plants of this order are cultivated in gardens for the sake of their brilliant blue or scarlet flowers: white and yellow are rare in the order.

LO'BIPES, Cuvier's name for a genus of Wading Birds (family *Longirostres*, Cuv.), the type of which is *Tringa hyperborea*, Linn. The genus is identical with *Phalaropus* of Vieillot.

LO'BO, JEROME, a native of Lisbon, entered the order of the Jesuits, and became professor in their college at Coimbra, whence he was ordered to the missions in India. He arrived at Goa in 1622, and after remaining there about a twelvemonth he volunteered for the mission to Abyssinia. The sovereign of that country, whom Lobo calls Sultan Segued, had turned Catholic through the instrumentality of Father Paez, who had gone to Abyssinia in 1603. The connexion between Abyssinia and Portugal had begun nearly a century before, when the Negus, or emperor David, having asked the assistance of the Portuguese against the Moors of Adel, Don Christopher de Gama, one of the sons of the discoverer Vasco de Gama, was sent from India with 400 men to Abyssinia. [ALVAREZ, FRANCISCO.]

Lobo sailed from Goa in 1624, and landed at Paté, on the coast of Mombaza, thinking of reaching Abyssinia by land. The empire of Abyssinia then extended much farther south than it does at present; and this route was considered by the Portuguese in India as preferable to that by the Red Sea, the coasts of which were in the hands of the Turks. Lobo proceeded some distance from Paté to the northward among the Gallas, of whom he gives an account, but finding it impracticable to penetrate into Abyssinia by that way, he retraced his steps to the coast and embarked for India.

In the following year (1625) he sailed again with Mendez, the newly appointed patriarch of Ethiopia, and other missionaries. This time they sailed up the Red Sea and landed at Belur, or Belal Bay, 13° 14′ N. lat., on the Dancali coast, whose sheik was tributary to Abyssinia, and thence crossing the salt plain he entered Tigré by a mountain-pass and arrived at Fremona near Duan, where the missionary settlement was. Here Lobo remained the remainder of that year, after which the patriarch proceeded to the emperor's court, but Lobo remained in Tigré, where he spent several years as superintendent of the missions in that kingdom. A revolt of the viceroy of Tigré, Tecla Georgis, put Lobo in great danger, for the rebels were joined by the Abyssinian priests, who hated the Catholic missionaries, and indeed represented the protection given to them by the emperor Segued as the greatest cause of complaint against him. The viceroy however was defeated, arrested and hanged, and Lobo, having repaired to the emperor's court, was afterwards sent by his superiors to the kingdom of Damot. He here introduces in his narrative an account of the Nile and its sources, 'partly,' he says, 'from what he had himself seen, and partly from what he had heard from the natives.' His account coincides in the main with the subsequent observations of Bruce and others. From Damot Lobo after some time returned again to Tigré, where the persecution raised by the son and successor of Segued overtook him. All the Portuguese, to the number of 400, with the patriarch, a bishop, and eighteen Jesuits, were compelled to leave the country in 1634. They put themselves under the protection of the Bahrnegash, by whom however they were given up to the Turks at Masowah, who demanded a ransom. Lobo was sent to India for the purpose, and he endeavoured strongly to persuade the Portuguese viceroy to send a squadron with troops to take possession of Masowah, but the viceroy had not the spirit nor perhaps the means to follow his advice, and referred him to Lisbon. Lobo sailed for Europe, but, as he himself says at the end of his narrative, 'never had any man a voyage so troublesome as mine, or interrupted by such a variety of unhappy accidents. I was shipwrecked on the coast of Natal, was taken by the Hollanders, and it is not easy to mention the dangers which I was exposed to both by land and sea before I arrived in Portugal.' Portugal was then under the king of Spain, and Lobo was sent to Madrid, where he found still more indifference with regard to Abyssinian affairs than he had experienced at Goa. Still engrossed by his favourite idea, that of reclaiming Abyssinia to the Catholic faith by means of Portuguese influence and arms, Lobo set off for Rome, but there also he found little encouragement.

In 1640 he returned to India, and became rector and afterwards provincial of the Jesuits at Goa. In 1656 he returned to Lisbon; and in 1659 he published the narrative of his journey to Abyssinia, under the title of 'History of Ethiopia,' which was afterwards translated into French by the Abbé Legrand, who added a continuation of the history of the Catholic missions in Abyssinia after Lobo's departure, and also an account of the expedition of Poncet, a French surgeon, who reached that country from Egypt, and a subsequent attempt made by Du Roule, who bore a sort of diplomatic character from the French court, but was murdered on his way, at Sennaar, in 1705. This is followed by several dissertations on the history, religion, government, &c., of Abyssinia. The whole was translated into English by Dr. Johnson in 1735. There had already appeared in

1675 a little work published by the Royal Society of London, said to be translated from a Portuguese MS., styled 'A Short Relation of the River Nile,' which is also found in Thévénot's collection, and the original of which is Lobo's. Many of the particulars coincide with those in the larger narrative. Lobo died at Lisbon in 1678. He was a man of abilities, enterprise, and perseverance, and altogether well qualified for the mission which he undertook.

LOBOPHY'LLIA. A portion of the animals included in Lamarck's genus Caryophyllia is thus named by Blainville. [Madrephylliœa.]

LOBSTER. [Astacus; Crustacea; Homarus.]

LOBULA'RIA, a group of recent zoophyta, separated from the Linnæan Alcyonia. [Alcyoneæ.]

LOCARNO. [Ticino.]

LOCHABER, a district of Scotland in the south-west of Inverness-shire, which takes its name from 'Lochaber,' a small lake in the vicinity of Fort William, which, according to Camden, was formerly written 'Loghuaber,' signifying the mouth of the lakes. The north-western boundary of this district is formed by Loch Eil, Loch Lochie, and the Caledonial Canal, while towards the south and south-west it is terminated by the shires of Perth and Argyle, from which it is partly separated by Loch Leven. The north-eastern boundary is formed by the district of Badenoch; but the natural limits in this direction are not distinctly defined, and moreover those given by different authorities are not quite in accordance. In the map of Inverness-shire published in the 'New Statistical Account of Scotland' the north-eastern boundary is nearly a straight line joining the southern extremity of Loch Ericht and the northern extremity of Loch Lochie, according to which the greatest length of the district, from north-west to south-east, does not exceed 32 miles, while its greatest width, between Lochs Lochie and Ericht, is about 20 miles; and as its form, as there given, is nearly triangular, the area must be about 320 square miles. But in the Map of Scotland published by the Society for the Diffusion of Useful Knowledge the district appears to extend as far north-east as Loch Spey; whereby its superficial extent is somewhat augmented.

LOCHES. [Indre et Loire.]

LOCI. [Locus.]

LOCK, MATTHEW, an English composer of great and deserved celebrity, was born in Exeter, and, as a chorister of the cathedral, was instructed in the elements of music by Wake the organist. He completed his studies under Edward Gibbons, a brother of the illustrious Orlando. The continuator of Baker's *Chronicle* tells us that Lock was employed to write the music for the public entry of Charles II.; shortly after which he was appointed composer in ordinary to that king. Assuming that he had reached his 25th year at the period of the Restoration, the date of his birth may be fixed at 1635. His first publication was under the title of *A Little Consort of Three Parts, for Viols or Violins*, consisting of pavans, ayres, sarabands, &c.; the first twenty for two viols and a base. In Playford's *Catch that catch can* are glees, &c., by Lock, and among them that agreeable piece of vocal harmony, *Ne'er trouble thyself about Times or their Turnings*.

Lock was the first English composer for the stage. He set the instrumental music in the *Tempest*, as performed in 1673; and in the same year composed the overture, airs, &c. to Shadwell's *Psyche*, which he published two years after, with a preface betraying strong symptoms of that irascible temper which subsequently displayed itself in very glaring colours; first in a quarrel with the gentlemen of the chapel-royal; and next, in his opposition to a plan proposed for a great improvement in musical notation by the Rev. Thomas Salmon, A.M., of Trinity College, Oxford. The abusive and bitter terms in which he expressed himself in a pamphlet, entitled 'Observations on a late Book called an Essay,' &c., which is an answer to Salmon's proposal, are at once a distinct proof of Lock's uncontrolled violent disposition, and either of his utter incapability of justly estimating a plan which would have proved highly beneficial to the art, or of his selfishness in opposing what he may have thought likely to militate against his personal interests. [Clef.] His resistance, backed by his prejudiced brethren, was unfortunately successful, and an opportunity was lost of accomplishing with ease that which every year's delay renders more difficult to effect, though ultimately, and at no distant period, the amelioration suggested by the above-named mathematician, or a still more complete and decided one, will be forced on the professors of music.

Lock contributed much to the musical publications of his day. His sacred compositions, some of which appear in the *Harmonia Sacra*, and in Boyce's *Collection of Cathedral Music*, are quaint, though they show that he was a master of harmony. But his *Music in Macbeth* is that on which his fame was built, and which will float his name down the stream of time: 'it is,' says his biographer, in *The Harmonicon*, 'a lasting monument of the author's creative power, and of his judgment. If the age in which it was produced, the infantine state of dramatic music at that period, the paucity and imperfectness of instruments, and the humble condition of what was then called an orchestra, be all duly considered, his work will be described, not as "a spark," as Dr. Burney calls it, but as a blaze of genius, the brightness of which neither years nor comparison have been able to dim, and which, could it have been aided by the enlarged means so plenteously afforded in after-times, would now have shone with a splendour that has rarely been equalled in any age or country.'

Lock died in 1677, having a few years before become a member of the Roman Catholic church. As a consequence of his conversion, he retired from the king's service, and was appointed organist to the consort of Charles, who was of the communion adopted by the composer.

LOCKE, JOHN, was born at Wrington near Bristol, on the 29th August, 1632. By the advice of Colonel Popham, under whom Locke's father had served in the parliamentary wars, Locke was placed at Westminster School, from which he was elected in 1651 to Christ Church, Oxford. He applied himself at that university with great diligence to the study of classical literature; and by the private reading of the works of Bacon and Descartes, he sought to acquire that aliment for his philosophical spirit which he did not find in the Aristotelian scholastic philosophy, as taught in the schools of Oxford. Though the writings of Descartes may have contributed, by their precision and scientific method, to the formation of his philosophical style, yet, if we may judge from the simply controversial notices of them in the 'Essay concerning Human Understanding,' they appear to have exercised a negative influence on the mind of Locke; while the principle of the Baconian method of observation gave to it that taste for experimental studies which forms the basis of his own system, and probably determined his choice of a profession. He adopted that of medicine, which however the weakness of his constitution prevented him from practising.

In 1664 Locke visited Berlin as secretary to Sir W. Swan, envoy to the elector of Brandenburg; but after a year he returned to Oxford, where he accidentally formed the acquaintance of Lord Ashley, afterwards earl of Shaftesbury. Locke accepted the invitation of this nobleman to reside in his house; and from this time he attached himself to his fortunes during life, and after death vindicated his memory and honour. (*Mémoires pour servir à la Vie d'Antoine Ashley, Comte de Shaftesbury, tirées des Papiers de feu M. Locke, et redigées par* Le Clerc, *Biblioth. Choisie*, t. vii., p. 146.) In the house of Shaftesbury Locke became acquainted with some of the most eminent men of the day, and was introduced to the earl of Northumberland, whom, in 1668, he accompanied on a tour into France. Upon the death of the earl, he returned to England, where he again found a home in the house of Lord Ashley, who was then chancellor of the exchequer, and Locke was employed to draw up a constitution for the government of Carolina, which province had been granted by Charles II. to Lord Ashley with seven others.

In 1670 Locke commenced his investigations into the nature and extent of the human understanding, but his numerous avocations long protracted the completion of his work. In 1672, when Ashley was created earl of Shaftesbury and made lord chancellor, Locke was appointed secretary of presentations. This situation he held until Shaftesbury resigned the great seal, when he exchanged it for that of secretary to the Board of Trade, of which the earl still retained the post of president.

In 1675 Locke was admitted to the degree of bachelor in medicine, and in the summer of the same year visited France, being apprehensive of consumption. At Montpelier, where he ultimately took up his residence, he formed the acquaintance of the earl of Pembroke, to whom he afterwards dedicated his 'Essay concerning Human Understanding.' In 1679 Locke was recalled to England by the earl of Shaftesbury, who had been restored to favour and appointed president of the council. Six months afterwards however he was again disgraced, and, after a short imprisonment in the Tower, was ultimately compelled to leave England in 1682, to avoid a prosecution for high treason. Locke followed his patron to Holland, where, even after the death of Shaftesbury, he continued to reside; for the hostility of the court was transferred to Locke, and notwithstanding a weak opposition on the part of the dean, his name was erased, by royal mandate of the 16th of November, 1684, from the number of the students of Christ Church. But the rancour of the court-party extended its persecution of Locke even into Holland, and in the following year the English envoy demanded of the States-general the delivery of Mr. Locke, with eighty-three other persons, on the charge of participating in the expedition of the duke of Monmouth. Fortunately Locke found friends to conceal him until either the court was satisfied of his innocence or the fury of persecution had passed away. During his residence in Holland he became acquainted with Limborch, Leclerc, and other learned men attached to the cause of free inquiry, both in religion and politics. Having completed his 'Essay concerning Human Understanding' in 1687, he made an abridgement of it, which was translated into French by Leclerc, who inserted it in one of his Bibliothèques. In that of 1686 he had already published his 'Adversariorum Methodus, or a New Method of a Common-place Book,' which was originally written in French, and was afterwards first published in English among his posthumous works. In the 'Bibliothèque' of 1688 appeared his Letter on Toleration, addressed to Limborch, which was soon translated into Latin, and published the next year at Gouda. On the Revolution of 1688, Locke returned to England in the fleet which conveyed the princess of Orange. In reward for his sufferings in the cause of liberty, Locke now obtained, through the interest of Lord Mordaunt, the situation of commissioner of appeals, with a salary of 200*l.* a-year. In 1690 his reputation as a philosophical writer was established by the publication of his 'Essay concerning Human Understanding,' which met with immense success. Independent of the merits of the work itself as an attempt to apply the Baconian method of observation and experience to establish a theory of human knowledge, many circumstances contributed to its success: among others, the personal celebrity of the author as a friend of civil and religious liberty, and the attempt made at Oxford to prevent its being read in the colleges, a measure which could not fail to have a contrary effect. Numerous editions passed rapidly through the press, and translations having been made of it into Latin and French, the fame of the author was quickly spread throughout Europe. In the same year Locke published a second letter on Toleration, in answer to an attack on his first letter by Jonas Proast, a clergyman of Queen's College, Oxford, as well as two treaties on Government. These essays were intended generally to answer the partisans of the exiled king, who called the existing government a usurpation, but particularly to refute the principles advanced in the 'Patriarcha' of Sir Robert Filmer, who had maintained that men are not naturally free, and therefore could not be at liberty to choose either governors or forms of government, and that all legitimate government is an absolute monarchy. The first essay is devoted to the refutation of the arguments by which Sir Robert supports these principles, and which are ultimately reduced to this, that all government was originally vested by God in Adam as the father of all mankind, and that kings, as the representatives of Adam, are possessed of the same unlimited authority as parents exercise over their children. In the second essay Locke proceeds to establish, what had been the leading dogma of the Puritans and Independents, that the legitimacy of a government depends solely and ultimately on the popular sanction or the consent of men making use of their reason to unite together into a society or societies. The philosophical basis of this treatise formed a model for the 'Contrat Social' of Rousseau.

The air of London disagreeing with Locke, who suffered from a constitutional complaint of asthma, he accepted the offer of apartments in the house of his friend Sir Francis Masham, at Oates in Essex, where he resided for the remainder of his life. In this retirement he wrote his third letter on Toleration, which called forth a reply from Locke's former antagonist on the subject; in answer to whom a fourth letter, in an unfinished state, was published after the death of Locke. In 1693 he first gave to the world his 'Thoughts upon Education,' to which likewise Rousseau is largely indebted for his 'Emile.' Though appointed one of the commissioners of trade and plantations in 1695, Locke still found leisure for writing. The treatise, which was published in this year, 'On the Reasonableness of Christianity,' was intended to facilitate the execution of a design which William III. had adopted to reconcile and unite all sects of professing Christians, and accordingly the object of the tract was to determine what, amid so many conflicting views of religion, were the points of belief common to all. This work being attacked by Dr. Edwards, in his 'Socinianism unmasked,' Locke published in defence of it a first and a second 'Vindication of the Reasonableness of Christianity,' &c. In 1697 Locke was again engaged in the controversy, in consequence of the publication of a 'Defence of the Doctrine of the Trinity,' by Stillingfleet, bishop of Worcester, in which the bishop had censured certain passages in the 'Essay concerning Human Understanding,' as tending to subvert the fundamental doctrines of Christianity. Against this charge Locke ably vindicated his Essay; and the controversy, after having been maintained for some time, was at length terminated by the death of Stillingfleet.

Locke's health had now become so impaired, that he determined to resign his office of commissioner of trade and plantations. He refused to receive a pension which was offered him, and which his services in the public cause had amply merited. From the time of his retirement he resided always at Oates, and devoted the remainder of his life to the study of the Holy Scriptures. Among others of his religious labours at this period, a 'Discourse on Miracles,' and 'Paraphrases, with notes, of the Epistles of St. Paul,' together with an 'Essay for the Understanding of St. Paul's Epistles by consulting St. Paul himself,' were published among his posthumous papers. These contained also the work, 'Of the Conduct of the Understanding,' and an 'Examination of Father Malebranche's opinion of Seeing all things in God.' He died on the 28th October, 1704, in the seventy-third year of his age.

The personal character of Locke was in complete harmony with the opinions which he so zealously and so ably advocated. Truly attached to the cause of liberty, he was also willing to suffer for it. Perfectly disinterested, and without any personal objects at stake in the political views which he adopted, he never deviated from modreation, and the sincerity of his own profession rendered him tolerant of what he believed to be the conscientious sentiments of others.

As a writer Locke has a happy facility in expressing his meaning with perspicuity in the simplest and most familiar language. Clearness indeed is the leading character of his composition, which is a fair specimen of the best prose of the period. His style however is rather diffuse than precise, the same thought being presented under a great variety of aspects, while his reasonings are somewhat prolix, and his elucidations of a principle occasionally unnecessarily prolonged. These are faults however which, though they may materially detract from the merits of his composition as a model of critical correctness, have nevertheless greatly tended to make his 'Essay concerning Human Understanding' a popular work.

A rapid analysis of this Essay is necessary to enable us to form a right estimate of the philosophical merits of Locke.

As all human knowledge ultimately reposes, both in legitimacy and extent, on the range and correctness of the cognitive faculty, which Locke designates by the term 'understanding,' Locke proposes to determine what objects our understanding is and is not fitted to deal with. With this view he proposes in the first place to inquire into the origin of ideas; in the next place, to show the nature of that knowledge which is acquired by those ideas, and its certainty, evidence, and extent; and lastly, to determine the nature and grounds of assent or opinion.

Before entering upon this investigation Locke gets rid of a supposition which, if once admitted, would render all such inquiry useless. The refutation of the theory of innate ideas and principles of knowledge is the subject-matter of the first book of the Essay. Generally, he observes, the common assent of men to certain fundamental principles may be explained otherwise than by the supposition of their being innate; and consequently the hypothesis is unnecessary. But, in particular, he denies that there are any such universal and primary principles as are admitted by all men, and known as soon as developed, for to these two heads he reduces all the arguments usually advanced in support of this hypothesis. Thus of speculative principles he takes the principles of contradiction and identity, and shows, by an inductive appeal to savages, infants, and idiots, that they are not universally acknowledged; and as to their being primary, he appeals to observation of the infant mind, as proving that they are far from being the first ideas of which the human mind is conscious. The principles of morals are next submitted to a similar examination; and lastly, he shows that no ideas are innate: for this purpose he selects the ideas of God and substance, which, by a like appeal to savage nations and children, he proves to be neither universal nor primary, and arrives at the conclusion that neither particular ideas nor general principles of knowledge or morals are antecedent to experience.

The only source of human knowledge is experience, which is two-fold, either internal or external, according as it is employed about sensible objects or the operations of our minds. Hence there are two kinds of ideas, ideas of sensation and ideas of reflection. Reflection might properly be called an internal sense. The latter are subsequent to the former, and are inferior in distinctness to those furnished to the mind through the sensuous impressions of outward objects. Without consciousness it is, according to Locke, impossible to have an idea; for to have an idea and to be conscious of it is the same thing. He accordingly maintains, at great length, against Descartes, that the mind does not always think, and that its essence does not consist in thinking.

Now all ideas, whether of sensation or reflection, correspond to their objects, and there is no knowledge of things possible except as determined by our ideas. These ideas are either simple, and not admitting of further reduction, or complex. The simple rise from the inner or outer sense; and they are ultimately the sole materials of all knowledge, for all complex ideas may be resolved into them. The understanding cannot originate any simple ideas, or change them, but must passively receive them as they are presented to it. Locke here makes the first attempt to give an analysis of the sensuous faculty, to refer to each of the senses the ideas derived from them separately, or from the combined operation of several. Thus light and colour are derived from vision alone, but extension and figure from the joint action of sight and touch. While the outer sense gives the ideas of solidity, space, extension, figure, motion, and rest, and those of thought and will are furnished by the inner sense, or reflection, it is by the combined operation of both that we acquire the ideas of existence, unity, power, and the like. In reference to the agreement of ideas with their objects, Locke draws an important distinction between primary and secondary qualities: the former belong really to objects, and are inseparable from them, and are extension, solidity, figure, and motion; the latter, which are colour, smell, sounds, and tastes, cannot be considered as real qualities of objects, but still, as they are powers in objects themselves to produce various sensations in the mind, their reality must in so far be admitted. Of the operations of the understanding upon its ideas, perception and retention are passive, but discerning is active. By perception Locke understands the consciousness or the faculty of perceiving whatever takes place within the mind; it is the inlet of knowledge, while retention is the general power by which ideas once received are preserved. This faculty acts either by keeping the ideas brought into it for some time actually in view, which is called contemplation or attention, the pleasure or pain by which certain ideas are impressed on the senses contributing to fix them in the mind; or else by repetition, when the mind exerts a power to revive ideas which after being imprinted have disappeared. This is memory, which is, as it were, the storehouse of ideas. The ideas thus often *refreshed*, or repeated, fix themselves most clearly and lastingly in the mind. But in memory the mind is oftentimes more than barely passive, the re-appearance of obliterated pictures or ideas depending on the will. Discerning, by which term he designates the logical activity of the intellect, consists in comparing and compounding certain simple ideas, or in conceiving them apart from certain relations of time and place. This is called abstraction, by means of which particular ideas are advanced to generals. By composition the mind forms a multitude of complex ideas, which are either modes, substances, or relations.

Locke then proceeds to show in detail how certain complex ideas are formed out of simple ones. The idea of space is got by the senses of sight and touch together; certain combinations of relations in space are measures, and the power of adding measure to measure without limits is that which gives the idea of immensity.

Figure is the relation which the parts of the termination of a circumscribed space have within themselves. He then proceeds to refute the Cartesian doctrine, that body and extension are the same; and maintains that while body is full, space is empty, and that all bodies may easily pass into it; and while the latter is not physically divisible, that is, has not moveable parts, the parts of the former are moveable, and itself is physically divisible. What however space is actually, is left undetermined. He asserts the existence of a vacuum beyond the utmost bounds of body, and this is proved by the power of annihilation and the possibility of motion. The idea of succession arises from the perception of a continued series of sensations, and by observing the distance between two parts of the series we gain the idea of duration, which, when determined by a certain measure, suggests that of time; and as we arrive at the idea of immensity by the perception that we can enlarge any given extension without limit, so the unchecked repetition of succession originates that of eternity. That of power is formed partly by a perception that outward objects are produced and destroyed by others, partly by that of the action of objects on the senses, but chiefly from that of the mind's internal operations. The latter suggests the idea of active power, the former of passive. Now the will is the power of producing the presence or absence of a particular idea, or to produce motion or rest, and liberty is the power to think or not, to act or not to act, according as appears good to the mind. The will is determined by the understanding, which itself is influenced by a feeling of the unfitness of a present state, which is called desire.

As to the origin of the idea of substance:—we often find certain ideas connected together; and in consequence of this invariable association, we conceive of them as a single idea; and as the qualities which originate these ideas have no separate subsistence in themselves, we are driven to suppose the existence of a 'somewhat' as a support of these qualities. To this somewhat we give the name of substance, and relatively to it all qualities are called accidents.

Of the ideas of relation, those of cause and effect are got from the observation that several particulars, both qualities and substances, begin to exist, and receive their existence, from the due application and operation of some other being. In the same manner the ideas of identity and diversity are derived from experience. When we compare an object with itself at different times and places, and find it to be the same, we arrive at the idea of identity. Whatever has the same beginning in reference to time and place is the same, and a material aggregate which neither decreases nor lessens is the same; but in organical and living creatures, identity is determined not merely by the duration of the material mass, but by that of the organical structure and the continuance of consciousness. Lastly, moral good and evil are relations. Good and evil are nothing but that which occasions pleasure and pain; and moral good and evil are the conformity of human actions to some law whereby physical good or evil is produced by the will and power of the law-maker. Law is of three kinds: divine law, which measures sin and duty; civil, which determines crime and innocence; and philosophical, or the law of opinion or reputation, which measures virtue and vice.

Having thus examined the origin and composition of ideas, Locke proceeds to determine their general characters. He divides them accordingly into clear and obscure, distinct and confused, into real and fantastical, adequate and inadequate, and lastly, into true and false. In treating of this last distinction, he observes that all ideas are in themselves true; and they are not capable of being false until some judgment is passed upon them, or, in other words, until something is asserted or denied of them. But there is also this property in ideas, that one suggests another, and this is the so-called association of ideas. There are associations of ideas which are natural and necessary, as well as arbitrary, false, and unnatural combinations. The danger of the last is vividly pointed out, which often arise from our having seen objects connected together by chance. Hence the association, which was originally purely accidental, is invariably connected in the imagination, which consequently biasses the judgment. Hence too a number of errors, not only of opinion but of sentiment, giving rise to unnatural sympathies and antipathies which not unfrequently closely verge upon madness. This gives occasion to a variety of judicious observations on the right conduct of education, the means of guarding against the formation of such unnatural combinations of ideas, and the method of correcting them when once formed, and of restoring the regular and due associations which have their ground in the very nature of the human mind and its ideas. What however are the leading laws of association Locke has not attempted to determine.

Before passing from this deduction of ideas to the examination of the nature and extent of the knowledge which is acquired by means of them, Locke devotes the third book of his Essay to the investigation of language and signs, which it is not important for our purpose to state.

Locke then proceeds to determine the nature, validity, and limits of the human understanding. All knowledge, strictly defined, is the perception of the agreement or disagreement of ideas, and is consequently limited to them. It extends therefore only so far as we are able to perceive the validity of the combinations and relations of our ideas, that is, so far as we are enabled to discover them by intuition, demonstration, and sensation. Intuition, which Locke calls an immediate perception of relation, does not apply to all ideas; many must be proved by means of some intermediate ideas. This is the province of demonstration, every step of which however is an act of intuition. Demonstration again does not apply to the proof of all ideas, since in the case of many no middle ideas can be found by means of which the comparison may be made. Sensation is still more limited, being confined to what is actually passing in each sense. Generally, all knowledge directs itself to identity or diversity, co-existence, relation, and the real existence of things. Identity and diversity are perceived by intuition, and we cannot have an idea without perceiving at the same time that it is different from all others. With regard to co-existence our knowledge is unlimited; for our ideas of substances are mere collections or aggregates of certain single ideas in one subject; and from the nature of these single ideas, it is impossible to see how far they are or not combinable with others. Hence we cannot determine what qualities any object may possess in addition to those already known to us. As to the actual existence of things, we have no intuitive knowledge thereof, except in the case of our existence; that of God is demonstrative, but of all other objects we only sensuously know that they exist, that is, we perceive mediately by sensation their existence or presence.

Locke next passes to an examination of propositions, axioms, and definitions. The utility of axioms is denied on the ground that they are not the only self-evident propositions, and because equal if not greater certainty is contained in all particular identical propositions and limited cases. Moreover they do not serve to facilitate knowledge, for all particular propositions will find a more ready assent; as, for instance, the proposition, twice two are four, will be more easily admitted than that the whole is equal to its parts. Moreover axioms are not useful for the proof of all lower propositions involved in them; they cannot consequently form the basis of any science: for example, no science has ever been raised on the basis of the principle of contradiction. They do not even contribute to the enlargement of knowledge; the false as well as the true may be proved by them, and consequently they serve at best but for endless dispute. Among these barren and unprofitable propositions, Locke reckons not merely those that are identical, but analytical also, or those in which a property contained in a complex idea is predicated of it: *e.g.* Every man is an animal. By such judgments or propositions we learn in fact nothing, and our knowledge is not increased in the least degree. Knowledge can only be extended by such judgments as predicate of a subject some quality or property which is not already involved in the idea of it. Synthetical propositions therefore are alone of value. In the next place he examines certain metaphysical problems, and concludes of most of them that they do not admit of any precise solution, while others might easily be set at rest if men would only come to the investigation of them free from all prejudices. Some very valuable remarks are added upon the sources of error, and on enthusiasm and faith, the due limits of which are pointed out, and the important truth repeatedly insisted upon, that reason is the ultimate test of revelation. The work concludes with a division of the object-matter of science or knowledge, which he makes to be threefold. 1, Natural philosophy, or physica, which is the knowledge of things both corporeal and spiritual. The end of this is speculative truth. 2, Ethics, or practica, which is the skill of rightly applying our powers and actions for the attainment of things good and useful, the end of it being not bare speculation, but right, and a conduct suitable to it. 3, The doctrine of signs (*σημειωτική*), the business of which is to consider the nature of the signs which the mind makes use of for the understanding of things or the conveying of its ideas to others. This is the most general as well as most natural division of the objects of the understanding. For man can employ his thoughts about nothing but either the contemplation of things for the discovery of truth; or about the things in his own power, which are his own actions for the attainment of his ends; or the signs which the mind makes use of in both, and the right ordering of them for its information.

Such is the celebrated Essay which has formed the basis of more than one school of modern philosophy, whose very opposite views may indeed find some support in the occasional variations and self-contradictions of its author. For it must be admitted that it is deficient in that scientific rigour and unity of view which preclude all inconsistency of detail. Nevertheless, rightly to appreciate Locke's philosophical merits, all contradictory passages must be neglected, or interpreted by the general spirit of his system. Attaching our attention then to the common mould and whole bearing of the Essay, we must conclude that the authority of Locke is unduly claimed by the followers of Condillac and the ideologists of France, whose object it was to approximate as closely as possible the rational thought and sensuous perception, and to explain the former as simply a result of the latter. For although Locke took in hand the defence of the sensuous element of knowledge, and, in opposition to Descartes and the idealists, endeavoured to show that in the attainment of science we set out from the sensible as the earlier and the better known, still he was far from denying that the rational thought, which is the perfection of human cognition, is really and truly distinct from the motions of the mind or soul occasioned by sensation. Setting out with the assumption of the permanence of ideas in the mind, Locke proceeds to illustrate the development of the particular into the general; and having then shown their difference from the unreal creations of the fancy, proceeds to determine their degree of verity. This description of the advance from the simple idea to universals and to knowledge, evidently implies an independent and spontaneous activity of the mind, which assents to the sensuous impressions, and confirms them by its conviction. Locke therefore is far from looking upon human science and knowledge as the simple results of the impressions produced by external objects on the senses. Nevertheless there is another aspect of his theory which in some degree justifies the use which has been made of his name, and under which he appears to be proceeding in the direction of thought, of which the ideologists have attained to the height. Knowledge as well as sensation is looked upon as the joint result of the reciprocal action of outward objects and the mental faculties, wherein as much depends on the qualities of the external as on those of the internal. While he admits that assent is entirely subjective, he nevertheless grants that outward objects constrain it; and as a consequence of such a view, he teaches that notwithstanding the idea produced in the mind by an outward object be a passive affection of the mind, it nevertheless reveals to the mind its efficient cause; and that to this manifestation of outward objects by the senses there is invariably attached, as by a necessary consequence, the judgment that those objects exist really. It is therefore clear that, according to Locke, we receive from the senses not merely the object matter of knowledge, but that likewise the forms under which we conceive of objects are furnished to the mind from the same source.

The works of Locke have been collected and frequently published in 3 vols. fol., and a Life of him was written in 1772; but the most complete and best edition is that in 10 vols. 8vo., London, 1801 and 1812. A Life of Locke was published in 1829, by the late Lord King, a lineal descendant of his sister.

LOCKED JAW. [Tetanus.]

LOCKEREN, a town of East Flanders, in 51° 8′ N. lat. and 3° 58′ E. long., distant 6 miles north-west from Dendermond, and 10 miles east-north-east from Ghent, on the high road from that city to Antwerp. On the 1st of January, 1831, the population of the town amounted to 16,069 souls, and the number of houses to 2378. Several of the streets are regular and well built; the market-place is large, and surrounded by excellent houses. There is a large and commodious hospital, built in 1829, with funds chiefly contributed by three private citizens, one of whom gave the ground upon which it stands. Besides the parish church there are three chapels, a handsome town-hall, an orphan asylum, a prison, and seven communial and nine private schools.

Lockeren is a place of considerable trade, and contains many and various manufactories. Among the fabrics which are produced are cotton, linen, and woollen cloths, cotton hosiery and yarn, lace, sail-cloth, hats, and cordage; there are also many breweries, dye-houses, tanneries, and salt-refineries. A market is held every Wednesday, at which considerable quantities of farming produce are sold.

LOCRIS was employed to designate the country of three distinct Grecian tribes, the Locri Epicnemidii, the Locri Opuntii, and the Locri Ozolæ.

The Locri Epicnemidii and Locri Opuntii, who appear to have been more antient than the Locri Ozolæ, since the latter are not mentioned by Homer, inhabited the eastern coast of Phocis, and were separated from the latter country by a mountain range which stretches from Mount Œta to the borders of Bœotia. The northern part of this range, which is much higher than the southern, was called Cnemis, whence the Epi-cnemidii Locri derived their name. The Opuntii Locri derived their name from Opus, their chief town, on the borders of Bœotia.

The Locri Ozolæ were bounded on the west by Ætolia, on the north by Doris, on the east by Phocis, and on the south by the Corinthian Gulf. According to Strabo (ix., p. 427) they were a colony from the Eastern Locri. The origin of their name is uncertain; none of the etymologies given by Pausanias (x. 38) and Strabo (ix. 427) appear to be satisfactory. The inhabitants of the Western Locris are said by Thucydides (i. 5) to have been a wild and barbarous people even in the time of the Peloponnesian war; and in their manners and customs they appear to have resembled their neighbours the Ætolians. The principal towns of western Locris were Amphissa and Naupactus. Amphissa (Salona), an inland town at the head of the Crissæan Gulf, was destroyed by order of the Amphictyons, B.C. 338, for cultivating the sacred ground of Crissa. It was afterwards rebuilt, and in the war with the Romans, B.C. 190, it is mentioned by Livy (xxxvii. 5) as a place of considerable importance. Amphissa is said by Æschines (*Ctes.*, c., 39) to have been 60 stadia from Delphi, and by Pausanias (x., 38, sec. 20) 120 stadia. The real distance, according to Sir W. Gell, is seven miles. Naupactus (Nepakto, or Lepanto), on the sea-coast on the borders of Ætolia, was for a long time in the possession of the Athenians, who established there, in B.C. 455, at the close of the third Messenian war, those Messenians who quitted Ithome. On the termination of the Peloponnesian war it fell into the power of Sparta, and in later times was subject to the Ætolians.

The Leleges appear to have been the earliest population of Eastern Locris (Strabo, vii. 321); but the country was also inhabited in very early times by some tribes of the Hellenic nation, probably by Æolians. The Opuntii pretended that they were the most antient Hellenic people in Greece; and that Cynus, their port, had been inhabited by Deucalion, when he first descended from Parnassus (Strabo, ix. 425).

The Locri Epizephyrii, or Western Locri, who inhabited the south-eastern extremity of Italy, were a colony, according to Ephorus, of the Locri Opuntii, but according to Strabo of the Locri Ozolæ. It would appear from a statement in Pausanias (iii. 3, sec. 1) that the Spartans took a part in the foundation of this colony. An account of the political constitution of the Locri Epizephyrii is given in Müller's *Dorians* (ii., p. 243, English transl.). The time of the foundation of this colony is uncertain; according to some accounts it was founded B.C. 710, and according to others B.C. 683. The Locri Epizephyrii are said to have been the first Greek people who had a written code of laws (Strabo, vi., 397), which was drawn up by Zaleucus about B.C. 664.

Coin of Locris.
British Museum. Actual size. Silver.

LOCUS. This word, or the Greek τόπος, signifying simply *place*, was used by the first geometers to denote a line or surface over which a point may travel, so as always to be in a position which satisfies some given condition. Thus, suppose it required to find the position of a point at which a given line subtends a right angle: the answer is, that the number of such points is infinite; for that any point whatsoever upon the surface of a sphere which has the given line for its diameter is such a point as was required to be found. This would be expressed as follows:—the *locus* of the point at which a given line subtends a right angle, is the sphere described on the given line as a diameter. If however the point were required to be in a given plane, its locus would no longer be the whole sphere, but only that circle which is the common section of the sphere and the given plane.

The following assertions are really nothing more than common propositions of geometry, stated in such a manner as to introduce the term locus. (1.) The locus of the vertex of an isosceles triangle described upon a given base is the straight line which bisects the base at right angles. (2.) The locus of the vertex of a triangle which has a given base and a given area is a pair of straight lines parallel to, but on different sides of, the base. (3.) The locus of the vertex of a triangle which has a given base and a given vertical angle, and which lies on a given side of the base, is an arc of a circle of which the given base is the chord; and so on.

The geometrical analysis of the Greeks depended much upon the investigation of loci, and the method of using them will sufficiently appear by one instance. Suppose, for example, it is required to describe a triangle of given area and given vertical angle upon a given base. Laying down the given base, it is easy to draw the parallel which is the containing line, or locus, of the vertices of all the triangles which have the given area; and also, upon the same side, the arc of the circle which is the locus of the vertices of all the triangles having the given vertical angle. If then the parallel and the arc of the circle intersect, the point or points of intersection are obviously the vertices of triangles which satisfy all the required conditions; if they do not intersect, the problem is impossible. When the locus of all the points satisfying a given condition cannot be ascertained by elementary geometry, and when this locus is therefore taken for granted, we have the species of solution which was called *mechanical*. An instance of this will appear in the article Trisection of the Angle.

It is to be understood that no curve whatever is called the locus of a point, unless any point whatsoever of that curve may be taken as the point in question. Thus, if each of six points should satisfy certain conditions, all lying upon a given circle, and if no other point of the circle should satisfy those conditions, that circle would not be called the locus of the points.

LOCUST. The terms Locust and Grasshopper are applied to various insects of the order Orthoptera, and belonging to a section of that order to which Latreille applies the name *Saltatoria*, on account of the power of leaping which the species possess. The insects belonging to this section are remarkable for the great size of the thighs of the posterior pair of legs, which are generally very long, and adapted for leaping. The males of some of the species make a shrill sound by the friction of the elytræ. The part by which the sound is created is situated on the inner side and near the base of each elytra, is often transparent, and has been compared to a piece of talc. In other species the sound is produced by the friction of the thighs against the elytra.

The section *Saltatoria* contains three families, to which the names *Achetidæ*, *Gryllidæ*, and *Locustidæ* are applied by Dr. Leach. The family *Achetidæ* is thus defined:—Elytra horizontal; wings longitudinally folded, often produced beyond the elytra; tarsi three-jointed. This family contains the genera Gryllotalpa of *Ray*, *Leach*, and others, of which the mole-cricket (*G. vulgaris*) of this country affords an example, and *Acheta* of Fabricius, which is the Gryllus proper of the 'Règne Animal.' The common cricket in our houses (*Acheta domesticus*) belongs to this genus. The genera *Tridactylus* and *Myrmecophila* are also included in the present family. In the family *Gryllidæ* the wings are disposed in an oblique manner when folded, the tarsi are four-jointed, the antennæ are long and setaceous, and the oviduct is exserted in the female, of a long and compressed form, and recurved.

The insects of this family form the genus *Locusta* of the 'Règne Animal.' The *Acrida viridissima* is the largest among the British species of the present group. This insect is not uncommon in some parts of England, and is about two inches in length and of a bright green colour.

The family *Locustidæ* is distinguished by the following characters:—Wings when folded meeting at an angle: tarsi three-jointed; antennæ filiform or ensiform; oviduct not exserted. The Locustidæ of Dr. Leach are comprised in the genus *Acridium* by Latreille. Unfortunately there is much confusion as regards the names of some of the genera and subgenera contained in this as well as the other families above noticed. Names originally applied to large groups are restricted to smaller sections, and as entomologists differ in opinion as to which particular division shall retain the original name, the same names are used to designate different groups; hence the references made to Latreille's portion of the 'Règne Animal.'

The principal genera contained in the family *Locustidæ* are:—

Locusta (Leach), in which the hinder legs are about equal to the whole body in length, and the antennæ filiform or terminated in a club. Upwards of twenty species of this genus are enumerated by Mr. Stephens in his 'Catalogue of British Insects,' and it is to this group that the *Gryllus migratorius* of Linnæus belongs, a large species, which has occasionally been found in Britain, and which in some parts of Europe sometimes multiplies to such a degree as to devastate large districts. Africa at all times appears to have been peculiarly subject to the ravages of these insects: of their extraordinary devastations in this portion of the globe we have records from the earliest authors, and the works of the most recent travellers confirm them. Mr. Barrow, in his 'Travels,' states, 'that in the southern parts of Africa an area of nearly two thousand square miles might be said literally to be covered with them. When driven into the sea by a north-west wind, they formed upon the shore for fifty miles a bank three or four feet high, and when the wind was south-east the stench was so powerful as to be smelt at the distance of 150 miles.' In Messrs. Kirby and Spence's 'Introduction to Entomology' numerous accounts of a similar nature will be found. In some parts of Africa they are cooked and eaten by the natives. The natives of Senegal are said to dry them, and having reduced them to powder, use them as flour.

Genus *Gomphocerus* (Leach). Hinder legs exceeding the body in length; antennæ capitate, having a spoon-shaped club in both sexes; anterior tibiæ simple. This genus contains numerous species, six or seven of which are found in England. They are usually of small size, and, together with the smaller species of the preceding genus, are commonly called grasshoppers.

Genus *Acrydium* (Leach). The species of this genus may be distinguished by the large size of the scutellum, which is produced posteriorly and covers the wings. They are found on hot sandy banks.

The genus *Pneumora* (Thunb.) has been established for the reception of certain African Locustidæ, which have a membranous pellet between the terminal hooks of the tarsi, the antennæ filiform, the posterior legs shorter than the body, and the abdomen vesicular—at least in one of the sexes.

The genus *Proscopia* of Klug contains numerous apterous species peculiar to South America, in which the body is long and cylindrical, the head destitute of ocelli and prolonged anteriorly, the antennæ short and filiform, the posterior legs long, and approximated to the intermediate pair, which are remote from the anterior pair.

LOCUST TREE is the Robinia Pseudacacia of botanists, a North American forest-tree. [ROBINIA.] The same name has also been given to the Ceratonia Siliqua, or Carob or Algaroba tree, which inhabits the Levant, and bears large pods, filled with nutritious pulp.

LOCUSTA (Crustaceology). [PALINURUS.]

LODDON. [BERKSHIRE.]

LODÈVE, a town in France, capital of an arrondissement, in the department of Hérault, on the road from Paris to Narbonne, Perpignan, and Barcelona. This town is noticed by Pliny, who calls the townsmen Lutevani. In the later Roman documents the name appears to have been corrupted to Loteva, whence the name Lodève. It was included in the Roman province of Narbonensis Prima. In the middle ages it was the seat of a vicecounty; but in the crusade against the Albigenses the bishops of Lodève became lords of the town, and remained so till the French revolution. The bishopric (now suppressed) was established in the fifth century: the bishop was a suffragan of the archbishop of Narbonne. The town stands in a pleasant valley amid the lower slopes of the Cévennes, on the left bank of the Lergue, a small feeder of the Hérault. It is surrounded by antient walls; the streets are narrow, and the houses ill built. The population in 1831 was 9834 for the town. or 9919 for the whole commune; in 1836 it had increased to 11,208 for the commune. The chief manufacture is that of coarse woollen cloths; hats, leather, earthenware, and soap are made; olive oil is pressed, and brandy distilled. Quarries of grey and white gypsum are worked in the neighbourhood. There are several judicial or fiscal government offices, an Agricultural Society, and a high school. Cardinal Fleury was born here.

The arrondissement of Lodève has an area of 474 square miles, and is subdivided into 72 communes; the population was 55,911 in 1831; in 1836 it was 57,730.

LODI, PROVINCIA DI LODI E CREMA, one of the provinces of the Lombardo-Venetian kingdom, is bounded on the north by the provinces of Milan and Bergamo, on the west by that of Pavia, on the south by the Po, which divides it from the duchy of Parma and Piacenza, and on the east by Cremona and Brescia. The province is part of the great plain of the Po, and is watered by the Adda, Serio, Lambro, and other affluents of that river. This province was divided into two small ones until the end of the last century, which were separated by the Adda, namely, Crema to the east of that river, which belonged to the republic of Venice, and Lodi west of the Adda, which was part of the duchy of Milan.

The actual province of Lodi and Crema is thirty miles in length from east to west, from the river Oglio near Orzinovi to the river Lambro near Melegnano; and above twenty-seven miles from north to south, from the southern boundaries of the province of Bergamo to the bank of the Po opposite Piacenza. It is divided into eight districts, namely, 1, Lodi, with 22 communes, 1935 houses, and 28,670 inhabitants; 2, Telobuonpersico, 29 communes, 1320 houses, and 12,326 inhabitants; 3, Sant' Angelo, 17 communes, 1582 houses, and 15,037 inhabitants; 4, Borghetto, 19 communes, 1842 houses, and 19,425 inhabitants; 5, Casal Pusterlengo, 21 communes, 2353 houses, and 28,263 inhabitants; 6, Codogno, 24 communes, 4534 houses, and 38,952 inhabitants; 7, Pandino, 15 communes, 1970 houses, and 15,474 inhabitants; 8, Crema, 50 communes, 5498 houses, and 45,888 inhabitants. The soil is partly sown with corn and pulse, and partly planted with the vine and mulberry-trees; but the best part consists of artificial meadows, irrigated by canals, which feed numerous cows, from the milk of which the rich cheese is made, known in Lombardy by the name of Lodigiano, but which, by an old misnomer, is called in Southern Italy and the rest of Europe by the name of Parmesan. The annual produce is stated at 14,817 cwts. of flax, 1,028,997 cwts. of hay, 6402 cwts. of cheese, 2187 cwts. of butter, 4384 cwts. of silk cocoons, besides corn and wine. The number of cattle is stated at 36,046 heads of large cattle, 10,070 horses, 1135 asses and mules, 1338 sheep, and 15,523 pigs. (*Carta Topografica della Provincia di Lodi e Crema*, published by G. B. Orcesi of Lodi, with *Statistical Tables*, 1833.)

LODI, the capital of the province, situated on the high road from Milan to Southern Italy, is a well-built town on the right bank of the Adda, in a rich country: it is a bishop's see, and a place of considerable trade, and has 15,890 inhabitants, with manufactories of pottery and delft-ware, and silks. Crema, on the right bank of the river Serio, is smaller than Lodi, has 8870 inhabitants, manufactures of linens, and a fine stud for the improvement of the breed of horses in Lombardy. Lodi has a royal lyceum and a gymnasium, besides a clerical seminary, and a house for female education, founded by Mrs. Cosway, the widow of the English artist of that name. There is also a house of industry for paupers, an orphan asylum, two hospitals, and a Monte di Pietà. The sums spent annually by these establishments for the relief of the poor amount to 259,000 Italian livres, or about 10,400*l.* sterling. The savings' bank of Lodi, which was opened in 1823, had, at the close of 1837, a deposit of 300,000 Italian livres, about 12,000*l.* sterling. In every commune there is a school of elementary instruction, as in the rest of Lombardy.

LOFODEN ISLANDS. [Trondheim.]

LOG and LOGLINE. This is the apparatus by which the velocity of a ship's motion through the water is measured. If at any moment a piece of wood, or other light substance, be thrown out of a ship while sailing, as soon as it touches the water it ceases to partake of the ship's motion; the ship goes on, and leaves it behind. If then after a certain interval, say of half a minute, the distance of the vessel from the floating body be accurately measured, the rate of the ship's motion through the water will be ascertained; we do not say the actual rate of the ship's going, but only that of its motion through the water, because in many cases currents exist, and the wood itself is carried along; consequently the true rate cannot thus be known.

This is the principle of the log: in practice the log is a flat piece of wood, sometimes shaped like a fish, but more generally of the figure of a quadrant, loaded with lead at one of its edges to make it float upright; to this is attached a line about 150 fathoms long, divided into equal lengths by little pieces of knotted twine rove into it. These divisions begin about twenty or thirty yards from the log, where a piece of red rag is usually fastened, in order to show the place readily. All the line between the log and the rag is called the stray line, and is of course omitted from the account. When the log is thrown into the sea, which is done from the lee quarter of the vessel, the logline, by the help of a reel on which it is wound, is immediately veered out, at least as fast as the ship sails; as soon as the red rag leaves the reel, a half-minute glass is turned, and when the sand is all run down, the reel is stopped. Then by measuring the quantity of line run out, the distance sailed by the vessel in half a minute is known, and by calculation its rate of going per hour. There are various ways of dividing the line, the most usual of which is to place the knots at distances of fifty feet from each other; now as 120 times half a minute make an hour, and 120 times fifty feet make almost a geographical mile, so many knots will run from the reel in one experiment as the vessel sails miles in the hour; from this comes the expression of a vessel's sailing so many knots an hour—meaning miles. Fifty-one feet would be more accurately 120th part of a mile than fifty feet; but it is found practically that the ship's way is always a little more than that given by the log, arising from the circumstance that the line is unavoidably pulled in some degree, and the log is consequently not a fixed point; it is moreover safer to have a ship behind the reckoning than before it, which induces many commanders to shorten the distances between the knots to forty-eight and even forty-five feet. Whatever distance be taken, it is found convenient to subdivide it into ten parts for decimals of a mile. Careful commanders remeasure the log-line frequently, to ascertain if it varies from its original length. In case of an alteration they apply a correction to the rate found by a common process in the rule of three—as the length which the commander reckons upon is to the real interval, so is the apparent rate to the true rate. A similar correction is required if the half-minute glass is found to be wrong.

In the best regulated vessels the log is hove every hour; and in calculating the ship's going it is supposed that the rate has not varied between the intervals of heaving; but if the wind has sensibly varied, or more or less sail has been set during the time, then an allowance is made according to the discretion of the person who keeps the account.

About twelve years ago a very curious log was invented by Mr. Hookey, which though ingenious was too complex to come into general use; its object was to afford as great a resistance as possible to the pull of the line, and at the same time to be easily drawn back to the ship when its work was done. This log is shaped like a fish, and the line is in its mouth.

A more practically useful suggestion of Mr. Hookey was to soak the line in a mixture of three parts linseed oil and one part fish oil, which prevented its shrinking; a matter of no small importance when it is considered that a new line without preparation will lose 50 or 60 feet of its length by contraction when wetted.

All histories of mechanical invention will be found to contain suggestions for improving the mode of taking a ship's reckoning, some of which are worth a trial; but, so far as we are aware, the old log is invariably adhered to.

LOG-BOARD and LOG-BOOK. These contain the account of the ship's progress as deduced from observations of the log. The log-board is either a large piece of plank, blackened, ruled, and prepared for writing on with chalk, or else a slate with divisions scratched upon its surface. As soon as the seaman has hove the log, and the rate of motion is ascertained, the number of knots, with the odd tenths, are written on the board, each in its proper ruled column; also the course of the vessel, the direction of the wind, and any remarks made at the moment. This is repeated every time the log is hove, and once in twenty-four hours the whole is copied into a blank book called the log-book, which is ruled for the purpose in the same way as the log-board, and in which also all the transactions relative to navigation are inserted, such as bearings and distance of lands, rocks, and shoals, the direction and velocity of currents, and the state of the weather. It is also usual to set down every day the whole course and distance run, calculated from the results of all the several trials made by the log, with the distance and bearing of some port to which the ship is approaching. The account thus obtained is technically termed dead reckoning, and is never quite correct, being subject to all the errors caused by changing the direction and velocity in the intervals of observing, by the sort of guess usually made at the course and rapidity of currents, and at the amount of the falling off of the vessel from its apparent course, technically called lee-way. The dead reckoning is however necessarily used until an opportunity is afforded of taking observations for latitude and longitude, or until some place whose position is known comes in sight; the true place of the ship is then substituted in the log-book for that obtained by dead reckoning, and from that place subsequent reckonings are made until another observation.

Log-books are commonly sold in seaports, properly ruled for recording the events of a voyage. Although, strictly speaking, the log-book is confined to these objects, it is usual to include under the same appellation the whole of the ship's journal, or diary of occurrences.

LOGARITHMS. The etymology of this word is λογῶν ἄριθμος, *the number of the ratios*; and the reason for the appellation will appear in the course of this article. We assume that the reader has the common knowledge of logarithms, and of the method of using them.

We have abandoned the intention of giving a view of the rise and progress of logarithms, for the following reasons. The subject is now one of such wide extent, when its theory and practice are both included, that it would be like writing the history of a complete science to put together all that would be needed in an article professing to show the past and present state of logarithmic algebra, as well as of logarithmic computation. If we were to confine ourselves to the latter only, the view of the subject would be too confined. And since the elements of the subject now usually given are clothed in the most modern algebraical form, it would take considerable space to explain at length the processes of the early writers in terms intelligible to those who are not conversant with their writings. We shall therefore devote the first part of this article to such explanations as will enable the student, fresh from modern books of algebra, to read the various histories which exist with facility; and we shall then point out how to deduce the principal formulæ connected with logarithms.

The early history of logarithms will be found at length in the preface to Dr. Hutton's Tables; in the 'History of Logarithms' contained in the first volume of Dr. Hutton's

Tracts; in Delambre's 'Histoire de l'Astronomie Moderne,' vol. i., pp. 491-568. See also Napier, Briggs, Gunter, Kepler, Mercator, &c.

The idea of logarithms originally arose (in the mind of Napier) from the desire to make addition and subtraction supply the place of multiplication and division. A table, in which are registered 1, a, a^2, a^3, &c., supplies this desideratum to a certain extent; for since a^x multiplied by a^y gives a^{x+y}, we find the product of the two first by adding their exponents, and looking in the table for the $(x+y)$th power. Thus for the set 1, 2, 4, 8, 16, &c., a table of logarithms is easily constructed, a specimen of which is as follows:—

Num.	log.	Num.	log.	Num.	log.
1	0	32	5	1024	10
2	1	64	6	2048	11
4	2	128	7	4096	12
8	3	256	8	8192	13
16	4	512	9	16384	14

Thus, to multiply 64 and 128, that is, to find the product of the sixth and seventh powers of 2, we must take the (6+7)th or 13th power, which, from the table, is 8192.

Such a table would be useless for general purposes, since it omits more numbers than it contains. But if we take a very little greater than unity, the powers will increase but slowly, and every whole number within given limits may be made either a power of a, or very near to a power of a. Suppose for instance that we wish for a table of logarithms which shall contain among its numbers either every whole number under a million or a fraction within h of every number under a million. Extract the square root of one million, the square root of that square root, and so on, until, say the rth root of one million has been extracted, and let this rth root be $1+t$. It is obvious that this extraction may be carried on until t is small as we please. Consequently $(1+t)^r$ is a million, and every lower power of $1+t$ is less than a million, so that (m standing for a million) no two consecutive powers differ by so much as the difference of m and $m\,(1+t)$, or by so much as mt. If then we proceed with the extraction until mt is less than h, we shall have t of the degree of smallness required: that is, since every whole number less than m lies between two powers of $1+t$, having exponents less than r, *à fortiori* every such whole number must be within h of some power of $1+t$.

This is in fact the first view which was taken of the method of constructing tables of logarithms; and it must be remembered that Napier was not in possession of the modern way of expressing the powers of quantities. On the methods of facilitating such enormous computations, and on the details which still remained for the first calculators after they had applied all the analysis which they had, we have not here to speak; but we shall now show how the table may be formed by mere labour, and how the word logarithm arises.

Let us suppose that our system is to be such that 0 being the logarithm of 1, a hundred thousand shall be the logarithm of 10. If the hundred-thousandth root of 10 be extracted and called $1+t$, it would be found that 2 is very nearly the 30103rd power of $(1+t)$, that 3 is very nearly the 47712th power of $1+t$, and so on. If then, beginning with 1, we increase it in the ratio of 1 to $1+t$, giving $1+t$; if we increase this in the ratio of 1 to $1+t$, giving $(1+t)^2$, and so on, it appears that we shall reach 2 (or very near to it, one way or other), when 30103 such ratios have been taken; or if we pass from 1 to 10 by 100,000 steps, increasing each time in the same ratio, we shall come nearest to 2 in 30103 steps, which is therefore the number of times the increase is made in a certain ratio, or the number of the ratios, the λογῶν ἄριθμος, or the logarithm of 2.

In such a table it must of course follow that the logarithm of a product is exactly or very nearly the sum of the logarithms of the factors, since for instance 2 being $(1+t)^{30103}$ and 3 being $(1+t)^{47712}$ very nearly, 6 must be very nearly $(1+t)^{77815}$. Nor is this property altered, if we divide or multiply all the logarithms by the same number. If then we divide every logarithm by 100000, the logarithm of 10 becomes 1, that of 2 becomes ·30103, and that of 3 becomes ·47712, as in the common tables.

The first step of importance which was made in the logarithmic analysis was the following. If t be very small, the lower powers of $1+t$, the square, cube, &c., are $1+2t$, $1+3t$, &c., very nearly; or if m and n be not so great but that mt and nt are still small, the mth and nth powers of $1+t$ are $1+mt$ and $1+nt$ very nearly. But the logarithms of these powers are m and n; that is, if k and l be small, the logarithms of $1+k$ and $1+l$ are very nearly in the proportion of k to l. If then we take two numbers, a and b, and extract a very high root (say the rth) of both, so that the results are very near to unity, say $1+k$ and $1+l$, we have (nearly)

$$\text{log.}\sqrt[r]{a} \;:\; \text{log.}\sqrt[r]{b} \;::\; k \;:\; l.$$

But the two first terms are in the same ratio as log a : log. b, since the multiplication of the former terms by r gives the latter. Consequently, when the logarithm of one number is known, that of any other can be found to any degree of nearness. We shall presently see this in a clearer form; it is sufficient here to show how the theorem was first obtained. If to the preceding methods we add that of Interpolation, which Briggs used with success, we have before us the bases of the original computations of logarithms.

It was evident from the first that the connection between a logarithm and its number must be of the following kind: when the logarithm increases in arithmetical progression, the number must increase in geometrical progression; so that if a and $a+b$ be the logarithms of A and AB, then $a+2b$, $a+3b$, &c., must be the logarithms of AB^2, AB^3, &c. Several mathematicians had formed this conception; but the preliminary difficulty which stopped their progress was their being unable to present the series of natural numbers (or fractions of a high degree of nearness to them), in the shape of terms of a geometrical progression. The great merit of Napier is threefold: first, he distinctly saw that all numbers, within any given limit, may be either terms, or as near as we please to terms, of a geometrical progression; secondly, he had the courage to undertake the enormous labour which was requisite for the purpose; thirdly, he made an anticipation of the differential calculus in developing the primary consequences of the definition.

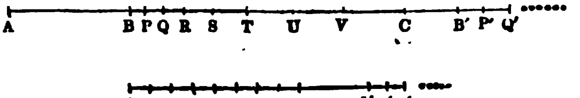
The predecessors of Napier probably did not well understand the notion of a quantity varying in geometrical ratio, while another varied simultaneously, but in an arithmetical ratio. The difficulty is that which a beginner finds in seizing the notion of compound interest carried to its extreme limit, so that every fraction of interest, however small, begins to make interest from the moment it becomes due. We have preferred to omit this consideration in the article Interest, where it would have been of no practical use, and to introduce it here, where it may aid in the explanation of the first principles of logarithms.

Let £1 become £$(1+r)$ in a year, and consequently, at the same rate of interest, it becomes £$(1+r)^n$ in n years. Suppose however that interest, instead of being payable yearly, is paid z times in a year, and that interest makes interest from the moment it is paid. Consequently, at the end of the first, second, &c. fractions of a year, the pound first put out becomes

$$1+\frac{r}{z},\quad \left(1+\frac{r}{z}\right)^2,\quad \left(1+\frac{r}{z}\right)^3 \;\ldots$$

or $\left(1+\frac{r}{z}\right)^z$ at the end of one year, and $\left(1+\frac{r}{z}\right)^{nz}$ at the end of n years.

If we may make z as great as we please, that is, if we may make payments of interest follow one another as quickly as we please, we may make the increase of the pound approach as nearly as we please to a gradual increase, of which it must be the characteristic that in successive equal times the amounts are in geometrical progression. Let A B become A C in a time represented by bc. Divide bc into any number of equal parts, and in the successive equal times bp, pq, qr, &c., let a point move through B P, P Q, Q R, &c. In the article Acceleration is explained the manner in which a succession of impulses, sufficiently small in amount, and often repeated, may be made to give, as nearly as we please,

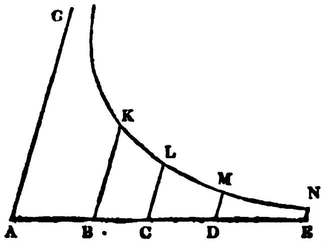


the results of a perfectly gradual motion. At B let a velocity be given sufficient to carry the point to P in the time bp; at P let an impulse be given which would cause P Q to be described in the time pq, and so on. And let A B, A P, A Q, &c. be a continued set of proportionals, namely, A B : A P : : A P : A Q : : A Q : A R, &c. Increase the number of subdivisions of bc without limit, and we approach as a limit to gradual motion of such a kind that the distances of the point from A, at the end of *any* successive equal times, shall be in continued proportion. To show this, suppose we compare the motion from B to C with any other part of the motion described in some subsequent time $b'c'$ (equal to bc), and which carries the moving point from B′ to C′. Divide the time $b'c'$ into as many equal parts, $b'p'$, $p'q'$, &c., as before, and let B′P′, P′Q′, &c. be the lengths described in the second set of subdivisions. Then by the law of the motion A B : A P : : A B′ : A P′, whence B P and B′P′ are in the ratio of A B to A B′; and similarly P Q and P′Q′ are in the ratio of A P to A P′, that is, of A B to A B′; and so on. Consequently, the sum of B P, P Q, &c., or B C is to the sum of B′P′, P′Q′, &c., or B′C′, in the same ratio of A B to A B′; whence also A C is to A C′ as A B to A B′, or A B : A C : : A B′ : A C′. That is, if in any one time the distance from A increases from X to Y, and in any other equal time from X′ to Y′, then X : Y : : X′ : Y′. From which it readily follows that the distances attained at the ends of successive equal times are in continued proportion.

More than this, the velocities of the moving point at B and B′ are as B P to B′ P′ (these being spaces described in equal times): and the ratio of these, however many may be the number of subdivisions, is always that of A B to A′ B′. Hence a gradual motion of the character described is one in which the velocity of the moving point increases in the same proportion as the distance from A.

In the preceding diagram, the time elapsed from B to C is the logarithm of A C, that of A B being 0. An infinite number of systems may be constructed, depending on the different velocities with which the moving point may be supposed to start from B. In Napier's system, at least in that system stripped of certain peculiarities not worth noting at present [Napier; Briggs], A B being a unit, the point starts from B at the rate of a unit of space (A B) in a unit of time: obviously the most simple supposition which can be made, and which has procured for this system the distinctive title of *natural* logarithms. In Briggs's system the point starts from B with such a velocity that (A B being 1) it shall have attained 10 times A B in one unit of time. This requires, as we shall see, an initial velocity of 2·302585 … times A B in one unit of time.

In addition to the principles here laid down, a known property of the hyperbola very early showed that logarithms would become applicable to geometry: and thus it happened that the first decidedly algebraical step in the computation of logarithms was announced in Mercator's 'Logarithmotechnia,' as the quadrature of the hyperbola. Let A F and A G be the asymptotes of an hyperbola, and let A B, A C, A D, &c., be in continued geometrical progression. Draw B K, C L, D M, &c. parallel to the other asymptote A G, then the hyperbolic trapezia B K L C, C L M D, D M N E, &c., are equal, or B K L C, B K M D, B K N E, &c., are in arithmetical progression. So that any trapezium B K M D is a logarithm to its terminal abscissa A D. This property was the discovery of Gregory St. Vincent, who published it in his 'Opus Geometricum,' Antwerp, 1647. It was therefore unknown both to Napier and Briggs.



We shall now take the question of logarithms, availing ourselves of the power of modern algebra.

Definition.—By the logarithm of a number let any such function of that number be understood as has the following property. When x is to y as x' is to y', the logarithm of x exceeds or falls short of the logarithm of y by as much as the logarithm of x' exceeds or falls short of that of y'. Let ϕx be the function which a number is of its logarithm: so that $x = \phi\,(\log x)$. If then a and $a + b$ be logarithms of x and y, and if c be the logarithm of x', then as $x : y : : x' : y'$, $c + b$ must be the logarithm of y'. And x, y, x' and y' are severally $\phi\,a$, $\phi\,(a+b)$, $\phi\,c$ and $\phi\,(c+b)$. But $x\,y' = x'y$, or

$$\phi\,a \times \phi\,(c+b) = \phi\,c \times \phi\,(a+b).$$

Let $\phi\,a$ or x be the number which has 0 for its logarithm; then $a = 0$; and calling N the number in question, we have

$$N \times \phi\,(c+b) = \phi\,c \times \phi\,b,$$

$$\text{or}\quad \frac{\phi\,(c+b)}{N} = \frac{\phi\,c}{N} \times \frac{\phi\,b}{N}.$$

But by the theorem proved in the article Binomial Theorem (p. 413), this can only be true on the supposition that $\phi\,c \div N$ is such a function of C as C^c, where C is independent of c. Consequently, the number whose logarithm is c must be $N\,C^c$. This evidently satisfies the conditions, and the theorem quoted shows it to be the only function which satisfies the conditions.

It is most convenient to assume 1 as the number N, which has 0 for its logarithm. We have then the following equation, connecting a number with its logarithm,

$$C^{\log x} = x:$$

so that every number has a logarithm for any value of C we may take, only it must be remembered that the same value of C must always be used. The logarithms of all numbers for a given value of C form a *system:* and C is called the *base* of that system.

Given a system of logarithms, we now inquire how to find the logarithms in any other system. Let A and B be the bases of the systems, and a and b the logarithms of any number x in the two bases. Then we have

$$A^a = x,\quad B^b = x,\quad \text{or } A^a = B^b;$$

$$\text{whence}\quad B = A^{\frac{a}{b}},\ \text{or } \log B\ (\text{base } A) = \frac{a}{b},$$

$$b = \frac{a}{\log B\ (\text{base } A)},\ \text{or } \log x\ (\text{base } B) = \frac{\log x\ (\text{base } A)}{\log B\ (\text{base } A)};$$

that is, to turn one system of logarithms into another with any new base, divide every logarithm in the system by the logarithm which there belongs to the new base.

We now proceed to the method of determining logarithms. In the article Limit it is shown, by means of the binomial theorem, that of the two series

$$1 + a + \frac{a^2}{2} + \frac{a^3}{2.3} + \frac{a^4}{2.3.4} + \ldots.;$$

$$1 + ax + \frac{a^2x^2}{2} + \frac{a^3x^3}{2.3} + \frac{a^4x^4}{2.3.4} + \ldots.;$$

the second is the xth power of the first. A remarkably simple case presents itself, which, in fact, leads to Napier's system of logarithms: it is when $a = 1$. In this case the first series becomes

$$1 + 1 + \frac{1}{2} + \frac{1}{2.3} + \frac{1}{2.3.4} + \ldots..,$$

which is very convergent, and is 2·7182818 very nearly. This remarkable series is generally denoted by ε (sometimes by e, Laplace always uses c for it), and we have

$$\varepsilon^x = 1 + x + \frac{x^2}{2} + \frac{x^3}{2.3} + \ldots..$$

In Napier's system, then (we shall presently show that this is Napier's system), x is the logarithm of $1 + x + \frac{1}{2}x^2 + \ldots.$; or, the logarithm being given, the number can be immediately found.

Since the last equation is universally true, for x write $\log a \times x$, where $\log a$ means $\log a$ (base ε) The first side then becomes

$$\varepsilon^{\log a \times x},\ \text{or } \left(\varepsilon^{\log a}\right)^x,\ \text{or } a^x;$$

$$a^x = 1 + \log a . x + \frac{(\log a)^2 . x^2}{2} + \ldots..;$$

$$\frac{a^x-1}{x}=\log a+\frac{(\log a)^2.x}{2}+\ldots\ldots:$$

if x be diminished without limit, we have then

$$\text{Limit of }\frac{a^x-1}{x}=\log a\ (\text{base } \varepsilon);$$

or, for a given (and very small) value of x, the logarithms of different numbers (a) are very nearly in the proportion of the values of a^x-1. This is the theorem to which we have before alluded.

Let $a=1+b$, then

$$(1+b)^x=1+xb+x\frac{x-1}{2}b^2+x\frac{x-1}{2}\,\frac{x-2}{3}b^3+\ldots$$

$$\frac{(1+b)^x-1}{x}=b+\frac{x-1}{2}b^2+\frac{x-1}{2}\,\frac{x-2}{3}b^3+\ldots.:$$

if x diminish without limit, the limit of the first side has been shown to be log $(1+b)$, the base being ε, which is always to be understood when the contrary is not expressed. The limit of the second side is easily found by making $x=0$, and we thus have

$$\log(1+b)=b-\frac{b^2}{2}+\frac{b^3}{3}-\frac{b^4}{4}+\ldots.,$$

which however is only convergent when b is not greater than unity. Since this last is universally true, we find, by substituting $-b$ for b,

$$\log(1-b)=-b-\frac{b^2}{2}-\frac{b^3}{3}-\frac{b^4}{4}-\ldots.;$$

and subtracting the first from the second, remembering that

$$\log(1+b)-\log(1-b)=\log\frac{1+b}{1-b},$$

we find that

$$\log\frac{1+b}{1-b}=2\left\{b+\frac{b^3}{3}+\frac{b^5}{5}+\ldots\ldots\right\}$$

$$\text{Let }\frac{1+b}{1-b}=x,\text{ or }b=\frac{x-1}{x+1};$$

$$\log x=2\left\{\frac{x-1}{x+1}+\frac{1}{3}\left(\frac{x-1}{x+1}\right)^3+\ldots.\right\},$$

which is always convergent, but converges very slowly when x is considerable. If however we make

$$x=\frac{z+1}{z},\text{ or }\frac{x-1}{x+1}=\frac{1}{2z+1};$$

then, remembering that $\log\frac{z+1}{z}=\log(z+1)-\log z$, we have

$$\log(z+1)=\log z+2\left\{\frac{1}{2z+1}+\frac{1}{3}\,\frac{1}{(2z+1)^3}+\ldots\right\},$$

which is very convergent when z is even so small as 1, and serves to find the logarithm of any number when that of the next lower number is given. The two following series, which may be easily proved from the preceding, will complete the list of those which are most useful in practice:

$$\log(z+a)=\log z+\frac{a}{z}-\frac{1}{2}\,\frac{a^2}{z^2}+\frac{1}{3}\,\frac{a^3}{z^3}-\ldots.$$

$$\log(z+a)=\log z+2\left\{\frac{a}{2z+a}+\frac{1}{3}\left(\frac{a}{2z+a}\right)^3+\ldots.\right\}.$$

It only remains to show the identity of this system with that of Napier. If t be the number of seconds elapsed from the beginning of a motion, and if a^t be the length described in that time, then the time is the logarithm of the length described. The *velocity* at the end of t seconds in the differential coefficient of a^t, or a^t. log a, where the logarithm used is that of the preceding algebraical system: this velocity is therefore log a at starting, or when $t=0$. Now, in Napier's system this velocity is unity, or $a=\varepsilon$: that is, the base of Napier's logarithms is the series called ε. But in the system where base is 10, log a is 2·3025851, which is the velocity at starting assumed by Briggs.

By the foregoing series a system of Naperian logarithms may be calculated with a very small fraction of the labour which they cost their inventor. This having been done for all whole numbers within the given limits, the logarithm of any fraction is readily found by subtracting the logarithm of the denominator from that of the numerator.

It must be admitted that Briggs, by his construction of the decimal system, divides with Napier the merit of inventing logarithms, considered as an instrument of calculation. In the Naperian system the table must either be carried to an enormous length, or whole numbers only must have logarithms, and every logarithm of a fraction will require two entries of the table and a subtraction. But in Briggs's system the logarithm of every decimal fraction can be found by one entry of the table, and one inspection of the fraction.

The peculiarity of this system (the base of which is 10) is as follows:—Every number or fraction is either a power of ten, positive or negative, or lies between two powers of ten. The powers of ten are ranged in the following table:—

....

$10^{-4}=\cdot0001$	$10^{0}=1$	$10^{1}=10$
$10^{-3}=\cdot001$		$10^{2}=100$
$10^{-2}=\cdot01$		$10^{3}=1000$
$10^{-1}=\cdot1$		$10^{4}=10000$

....

From which the following rules may easily be obtained: a number which has m figures before the decimal point lies between 10^{m-1} and 10^{m}, and its logarithm therefore lies between $m-1$ and m, or it is $m-1+$ a fraction less than unity. Also, if a fraction be less than unity, and if its first significant figure lie in the nth decimal place, this fraction lies between 10^{-n} and $10^{-(n-1)}$; so that its logarithm is $-n+$ a fraction less than unity. Now the convenience of Briggs's system lies in this, that the fraction less than unity, which is a part of every logarithm, does not depend on the position of the decimal point, but entirely upon the significant figures: the reason being, that an alteration of the position of the decimal point being a multiplication or division by some whole power of 10, alters the logarithm by the addition or subtraction of a whole number. This question is discussed in every treatise on the mode of using logarithms.

Let a be the base of a system of logarithms, and let log x signify simply the Naperian or natural logarithm of x; then by the theorem already proved

$$\log\ (\text{base } a)=\frac{\log x}{\log a}=\frac{1}{\log a}\cdot\log x.$$

The factor $1\div\log a$, which converts Naperian logarithms into those whose base is a, is called the *modulus* of the system whose base is a. In Briggs's system this modulus is ·4342945 nearly, and the logarithms of this system being called *common* or *tabular* logarithms, we have—

$$\text{common log } x=\cdot4342945\times\text{Nap. log } x$$

$$=\frac{43}{99}\times\text{Nap. log } x,\text{ very nearly.}$$

$$\text{Nap. log } x=2\cdot3025851\times\text{com. log } x,$$

$$=\left(\frac{100-1}{43}+\frac{1}{4000}\right)\times\text{com. log } x.$$

In the article Negative and Impossible Quantities will be found a further extension of the theory of logarithms: in Tables will be found a list of tables for different purposes. A treatise on computation by logarithms will be found in the 'Library of Useful Knowledge,' in 'Examples of Processes of Arithmetic and Algebra.'

LOGARITHMIC CURVE and LOGARITHMIC SPIRAL. The former has for its rectangular equation $y=a^x$, and its most remarkable property is that its subtangent is the same at every point of the curve. The latter has $r=ca^{\theta}$ for its polar equation, and its tangent always makes the same angle with its radius vector; whence it is called the equiangular spiral.

LOGIC. [Organon.]

LOGISTIC. [Proportional.]

LOG'OS, λόγος, the Greek for *a word*, is used as a theological term.

1. *The Jewish doctrine of the Logos.*

The phrase *the Word* or *Memra of Jehovah* (מֵימְרָא דַיְיָ) occurs repeatedly in the Chaldee Targums, where it commonly stands in the place of יְהוָֹה (Jehovah) in the Hebrew original. There are however passages in which this phrase appears to denote a distinct personal existence; and many eminent critics, among whom are Bertholdt and Wegscheider, are decidedly of opinion that the Targumists intended it to apply to the Messiah; 'plainly showing it to have been their belief that the Shechinah, or Word, as some of them indeed expressly say, would employ the future Messiah, when he should be born, as the instrument of his gracious designs, and would be joined to him in a personal union.' (Bertholdt, *Christol. Jud.*)

Philo often speaks of the Logos, but his views on the subject are involved in much obscurity. He seems however to have had the idea of a two-fold Logos; the one denoting a conception in the divine mind according to which the world was created; the other a personal existence, the Son of God, partaking of the divine nature, though inferior to the supreme God, the Creator of the world (δημιουργος), presiding over the universe, the instructor and guide of man, the High Priest and Mediator between God and man. These two ideas of the Logos he often confounds together. The passages from Philo are collected in Dr. J. P. Smith's *Scripture Testimony to the Messiah*, book ii., cap. vii., sect. 4.

See also the descriptions of Wisdom and the Word of God in *Prov.* viii.; *Wisdom of Solomon*, x. 15-19; xi. 1-4; xviii. 15 (compare 1 *Cor.*, x. 4, 9, where the same actions are attributed to Christ); and in other parts of the *Wisdom of Solomon* and *Ecclesiasticus*.

These opinions are thought by some to represent the antient Jewish doctrine respecting the word of God, corrupted by a mixture of heathen philosophy; and by others to have been wholly borrowed either from the Platonic philosophy or from the Magian doctrine of divine emanations and Æons.

2. *The Christian doctrine of the Logos.*

The only examples of the theological use of this word in the New Testament are found in the writings of John (*Gospel*, c. i.; 1*st Epistle*, i. 1; *Rev.*, xix. 13). These passages are generally allowed to refer to Christ; but the sense in which Logos is to be taken, and the nature of the connection between this Logos and the person of Christ, are subjects of much dispute.

The Trinitarian expositors assert that these passages can mean nothing else than that the Logos is a distinct personal subsistence, which has existed from all eternity in a union of nature and of essence with God, which created the universe, and which was joined with a human nature to form the person of Christ.

The Arian doctrine represents the Logos as an emanation from the Deity, superior to all other created beings, and which supplied the place of a human soul in the person of Christ.

Most Unitarian divines consider it to be used either for God himself, or as an abstract term for the wisdom and intelligence of God which was fully imparted to Christ to fit him for his mission.

Those who attribute to the Logos a personal existence give different reasons for the origin of the name. Some explain it to mean the *speaker* or *teacher*, by metonymy, as Christ is called by John the Light, the Way, the Truth, the Life; others interpret it *the promised one;* and others consider that as speech (λόγος) is a *medium* of rational communication, so the name Logos is given to the *Mediator* between God and man, one who speaks to man in the name of God.

(The Lexicons of Schleusner, Wahl, and Bretschneider, *in loco;* Kuinoel, *Comment. in Lib. Hist. N. T.*, *Prolegomena in Johan.*, sect. 7; Lücke *on the Epistles of John*, in the *Biblical Cabinet*, p. 102; Dr. J. P. Smith's *Scripture Testimony to the Messiah;* Lardner's *Letter on the Logos*, *Works*, vol. x.)

LOGWOOD, a kind of timber imported from the West Indies for the purposes of the dyer, is the wood of a low tree called *Hæmatoxylon Campechianum*, found very commonly in many parts of the West Indies and adjoining continent, especially Honduras, on which account it has been called Campeachy-wood. It belongs to the natural order Leguminosæ, and to the section Cassieæ. The branches are usually crooked, spiny, and deformed; the leaves are small and pinnate; the flowers grow in long racemes, are yellow, sweet-scented, and have ten separate stamens, half of which are shorter than the others. The fruit is a thin flat two-seeded legume, not opening at the sutures, but bursting longitudinally by a division passing down though both valves.

The wood is hard enough to take a fine polish, and might be used by cabinet-makers; it is not however imported for that purpose. In Jamaica the tree is used for fences, in the same way as the whitethorn in England, and it is said to be admirably adapted for the purpose. Logwood is so heavy as to sink in water, and scarcely susceptible of undergoing decay.

Its colouring matter is dissolved both by water and alcohol, and it is principally derived from the presence of a peculiar body, to which Chevreul, who discovered it, gave the name of *hematin* or *hæmatoxyline:* this is sometimes so abundant as to exist in the wood in crystals of distinct form, of a fine red colour, and considerable size. Besides hematin, logwood contains resin, oil, acetic acid, and salts of potash, and lime combined with a vegetable acid, a little sulphate of lime, alumina, peroxide of iron, and manganese. [HEMATIN; HÆMATOXYLON.]

Logwood is employed by the calico-printer to give a black or brown colour, the cloth being always first impregnated with alum mordant, and thus black is obtained. Iron mordant and logwood also yield a black, but it is not so good as with the alum mordant. Cloth with the alum mordant, dyed in a mixture of logwood and madder, has a fine brown colour fixed upon it. Logwood is also employed in the preparation of some lakes.

Trade.—(*Bois de Campèche*, French; *Kampescholz*, German; *Campecheout*, Dutch; *Palo de Campeche*, Spanish.) The importations of this dye-wood into the United Kingdom during each of the last ten years, and the quantities re-exported and taken for use, have been as follows:—

	Imported. Tons.	Exported. Tons.	Consumption. Tons.
1828	14,045	6395	9,297
1829	13,893	6226	8,852
1830	16,781	5937	10,100
1831	14,852	6011	10,405
1832	18,773	4427	12,415
1833	26,079	7045	17,595
1834	21,054	4548	14,026
1835	16,744	3697	14,727
1836	12,880	4385	12,361
1837	14,699	3316	12,023

The importations of logwood are brought into Europe from the West Indies and Mexico. The British possessions of Jamaica and Honduras have upon the average furnished about one half of the above importations into this kingdom. The principal part of the exportations from England are made to Russia, Prussia, and the Netherlands. Logwood is an article of commerce the price of which fluctuates violently. Under ordinary circumstances of demand and supply its price is from 5*l.* 10*s.* to 7*l.* per ton. It has sometimes been sold as low as 4*l.*, and at others as high as 35*l.* per ton. At this time (January, 1839) a temporary short supply has raised the price to about 12*l.* per ton. The duty when imported from a British possession is 3*s.* per ton, and when from a foreign country 4*s.* 6*d.* per ton.

LOHEIA. [ARABIA.]

LOIR, a river in France belonging to the system of the Loire.

LOIR ET CHER, a department in France bounded on the north by that of Eure et Loir; on the north-east by that of Loiret; on the south-east by that of Cher; on the south by that of Indre; on the south-west by that of Indre et Loire; and on the north-west by that of Sarthe. Its form approximates to that of a parallelogram, having its longer sides facing the north-east and south-west. Its greatest length is from the neighbourhood of Montmirail (Sarthe) to that of Vierzon (Cher) 82 miles; its greatest breadth is from between Châteaudun (Eure et Loir) and Orléans (Loiret) to the neighbourhood of La Chartre (Sarthe) 46 miles. The area of the department is estimated at 2424 square miles; with a population in 1831 of 235,750; in 1836 of 244,043; showing an increase in five years of 8293, or about 3½ per cent.; and giving a little more than 100 inhabitants to a square mile. In respect of size the department is almost equal to the English county of Devon, but it has not half the population of that county. Blois, the capital, is 96 miles south-west of Paris in a direct line, or 105 miles by the road through Orléans. It is in 47° 35′ N. lat., and 1° 20′ E. long. from Greenwich.

The department is almost entirely a flat, having in the south-east part a considerable number of étangs, or pools, and marshes. The supracretaceous strata which occupy the chalk-basin of Paris extend into the department from the north-east, and occupy the banks of the Loire as far as the junction of the Beuvron. In all other parts the department is occupied by the chalk itself. The general inclination of the surface is toward the west and south-west.

The principal river is the Loire, which has a tolerably direct south-west course of 30 miles, or rather more, through the department, which it divides into two nearly equal portions; it is navigable throughout. The Cher, one of the principal tributaries of the Loire, enters this department on the south-east, near Mennetou, and flows westward, in one part upon, but mostly within, the border of the department, past the towns of Mennetou, Selles, St. Aignan, and Montrichard, into the department of Indre et Loire. The Cher is navigable for about 15 miles before leaving this department.

The Grande (or Great) Sauldre enters the department on the east side, and after being joined by the Petite (Lesser) Sauldre and the Rere, both of which also rise out of the department, and by the Croisine, joins the Cher just below Selles. The Feuzon, another feeder of the Cher, has a small part of its course within the department. The Beuvron and the Cosson enter the department from the east, and after receiving, each of them, a few small streams, fall into the Loire on the south-east bank, near one another, a few miles below Blois. The Cise Landezon, a small stream, falls into the Loire opposite the Cosson. In the northern part of the department the Loir enters it near Cloyes, a town a little below Châteaudun, and flows in a sinuous channel to the south-west past Freteval, Vendôme, Les Roches, and Montoire. The Braye, a feeder of the Loir, flows partly on, partly within, the north-western border till its junction with the Loir. The Graisne and the Coeuteron, feeders of the Braye, also water the north-west. None of these rivers are navigable in the department. The Canal du Berry, intended to shorten the navigation of the Loire, by avoiding the tedious bend between the junction of the Allier and that of the Indre, has about 46 or 47 miles of its course in this department.

The department is traversed by six 'Routes Royales,' or government roads, having an aggregate length of 189 miles, viz. 128 in repair, 28 out of repair, and 33 unfinished. The most important of these roads is that which runs from Paris through Châteaudun and Vendôme to Tours. The next in importance is that which runs from Paris by Orléans and along the north bank of the Loire to Blois. At Blois it divides; one branch continuing along the north bank of the Loire to Tours, where it joins the main road through Châteaudun, crosses the Loire, and runs to Angoulême and Bordeaux; the other branch crosses the Loire at Blois, and runs by Celles to Châteauroux, where it falls in with the road from Paris to Limoges, Cahors, and Toulouse. Another road runs from Blois to Vendôme and Le Mans. The main road from Paris by Orléans to Châteauroux and Limoges crosses the eastern side of the department. The 'Routes Départementales' are fourteen in number, and have an aggregate length of 253 miles, of which 149 are in repair, 29 out of repair, and 75 unfinished. The bye-roads and paths are in number two thousand two hundred and seventy-four, and have an aggregate length of 4190 miles.

The soil varies much; the northern part is in general more productive than the southern. About three-fifths of the whole are arable; and about one-seventh consists of land entirely unproductive, or of open waste land on which poor pasturage is obtained; about one-ninth of the soil is woodland. The quantity of meadow and good pasture land is small; but the vineyards are tolerably extensive. The quantity of grain raised is greater than the consumption of the department. The best wines are the white wines of Noels and Murettains and the red wines of the banks of the Cher. Vegetables, fruit, and hemp are grown in considerable quantity; liquorice and beet-root, the latter for sugar, are cultivated on a large scale. Horses, horned-cattle, and sheep are bred; the last in considerable number: there is a stud maintained at Blois for the improvement of the breed of horses; and prizes are given to the owners of the finest animals. Poultry, game, and fish are abundant. The mineral productions are limestone, gun-flints procured from the chalk strata, and potters' clay: some iron and lead mines are wrought.

The department is divided into three arrondissements, as follows:—

	Sq. Miles.	Pop. in 1836.	Communes.
Blois, central, .	971	118,561	138
Vendôme, north-west,	650	77,760	110
Romorantin, south-east	803	47,722	48
	2424	244,043	296

The three arrondissements contain 24 cantons, or districts under a justice of the peace.

In the arrondissement of Blois are Blois, capital of the department, on the north bank of the Loire (population in 1831, 11,002 for the town, or 13,138 for the whole commune; in 1836, 13,628 for the whole commune) [Blois]; Vienne, a suburb of Blois, south of the Loire; Mer and Suevre, near or on the north bank, and St. Dié, opposite Suevre, on the south bank of the same river; Herbault, Ouques, Marchenoir, and Ouzouer le Marché, north of the Loire, but distant from it; Chambord on the Cosson; Bracieux and Cour-Cheverny on or near the Beuvron; Contres and Cormier on the Bievre, a feeder of the Beuvron; and St. Aignan and Montrichard on the Cher; all south of the Loire. Mer (pop. 1717 for the town, 3733 for the whole commune) is in the centre of a vine distinct, and the townsmen carry on trade in wine and brandy. Suevre is a small place, with a population, in 1818, of about 1200. At St. Aignan (pop. 2228 town, 2772 whole commune) are some manufactures of woollen cloth. There are flint quarries near it. Chambord has a castle built by François I. from the designs of the architect Primatice: 1800 workmen were employed upon it for twelve years; but it was not quite finished until the reign of Louis XIV. It is a building imposing from its extent, but irregular in its construction. It is an assemblage of towers large and small, having its walls figured with small black round or lozenge-shaped stones. There is a remarkable double spiral staircase by which one person can ascend and another descend without their seeing each other. Chambord was till the time of Louis XIV. the frequent residence of the French kings. It was bestowed by Louis XV. on Maréchal Saxe, and by Bonaparte on Maréchal Berthier, prince of Wagram. At Menars on the north bank of the Loire, between Suevre and Blois, is a fine château in a park: it was formerly the abode of Madame de Pompadour, mistress of Louis XV., and subsequently of Maréchal Victor, duke of Belluno. It is now the residence of Prince Joseph de Chimay.

In the arrondissement of Vendôme are Vendôme, or Vendosme, Morée, Freteval, Les Roches, Montoire, and Trou, all on the Loir; Mondoubleau and Sargée on the Graisne; Droué and La Ville aux Clercs. Vendôme is on the Loir, which here flows in several channels; the two principal streams divide the town itself from the suburbs. A hill which commands the town is crowned by the ruins of an antient castle, the residence of the former dukes of Vendôme, destroyed during the troubles of the Revolution. The tombs of the princes of the house of Bourbon were on this occasion violated. The town is ill laid out, and by no means well built. It has a college of long established and deserved reputation. The cloisters of a fine Benedictine convent have been converted into barracks and the grounds into public walks; the conventual church has been made parochial. The population of Vendôme was, in 1831, 6590 for the town, or 7771 for the whole commune; in 1836 it was 8206 for the commune. The principal manufactures are of gloves, once very considerable but now decayed, paper, leather, and woollen stuffs. There are public baths, and some judicial and other government offices. Vendôme was antiently fortified, and was taken by storm by Henri IV. from the party of the League. The walls are now destroyed. It was the birth-place of the French poet Ronsard. Vendôme was formerly capital of the district of Vendômois, a subdivision of Beausse, or Beauce [Beausse], and gave the title of count, afterwards of duke, to a branch of the house of Bourbon, which in the person of Henri IV. came to the throne. The duchy was subsequently granted to a natural son of Henri, who, with his descendants, acted a conspicuous part in the political and military affairs of France. Louis Joseph, duke of Vendôme, A.D. 1669—1712, was the last duke of this line, and was one of the ablest and most successful generals of Louis XIV. The victories which he gained at Brihuega and at Villa Viciosa, in 1710, re-established Philippe V. on the throne of Spain. Mondoubleau (pop. 1838 town, 1917 whole commune) has the remains of an antient castle; the townsmen manufacture some serges and other woollens, earthenware, and glass. Montoire, otherwise called Querhoent (pop. 2433 town, 3072 whole commune), has a good square formed by a former duke of Tallard; the inhabitants manufacture serges and other woollens. In the arrondissement of Vendôme as many as seven hundred foundlings are brought up at the charge of the charitable institutions of Paris.

In the arrondissement of Romorantin are Romorantin, St. Genoux, La Ferté-Imbault, and Salbris on the Sauldre; Mennetou and Selles on the Cher; and La Ferté St. Aignan on the Beuvron. Romorantin gets its name from the Morantin, a brook which flows into the Sauldre at this spot. It was formerly the capital of the barren district of Sologne: and was the place from which the chancellor L'Hôpital issued an edict (called the edict of Romorantin) which prevented the establishment of the Inquisition in France. The population was, in 1831, 6537 for the town, or 6985 for the whole commune; in 1836 it was 7181 for the commune. The principal manufacture is that of woollen cloth. There are some fiscal and other government offices here. Selles (pop. 1915 town, 4121 for the whole commune) has an antient castle. The inhabitants manufacture some woollen goods. There are several corn-mills. La Ferté Imbault has a château or castle, which was in the time of Louis XIV. the residence of Maréchal d'Estampes.

The population of the above places, when not otherwise mentioned, is that of the whole commune, and from the census of 1831.

The department of Loir et Cher constitutes the diocèse of Blois, the bishop of which is a suffragan of the archbishop of Paris: it is included in the circuit of the Académie Universitaire and in the Cour Royale of Orléans. It is in the fourth military division, the head-quarters of which are at Tours. It sends three members to the Chamber of Deputies. In respect of education it is backward as compared with the rest of France: of the young men enrolled in the military census of 1828-29, only 27 in every 100 could read and write; the average of France being nearly 40 in every 100.

This department was in the days of Cæsar occupied by the Carnutes and the Turones. The greater part of it afterwards constituted the Blaisois, or Blésois [BLOIS], but the department also includes part of the former districts of Touraine, Orléanois proper, and Dunois. It contains a great many châteaux.

LOIRE, a river in France, the basin of which is bounded on the east by the Cévennes, and the mountains which form their prolongation northward; by the mountains of Morvan, the heights of Beauce, and the Menez mountains on the north; and on the south and south-west by the mountains of La Margeride, the volcanic group of Auvergne, and the heights of Gâtines, which extend from the Auvergnat group to the Atlantic.

The limits thus described include a large portion of the centre and western parts of France, constituting nearly a fourth part of the whole country. The greatest length of the basin is from north-west to south-east, from the source of the Varenne, a feeder of the Mayenne, to Mount Lozère, 370 miles; its greatest breadth is from the source of the Bouleur, which flows by the Clain into the Vienne, to the source of the Arroux, 224 miles. Its area is estimated at 50,783 square miles, or about that of England.

The Loire rises in Mount Gerbier des Jones, one of the Cévennes in the neighbourhood of Mount Mézin, several miles north-north-east of Mount Lozère, in the department of Ardèche. Its source is nearly 4600 feet above the level of the sea. The general direction of its course is at first north and north-west to Orléans, where it turns westward and flows into the Atlantic. Its first great tributary, the Allier, unites with it on the left bank, just below Nevers, at an elevation of 550 feet above the level of the sea, and at a distance of about 210 miles from its source. In the upper part of its course, above the junction of the Allier, the valley of the Loire is narrow, being bounded on the east by the prolongation of the Cévennes, which form the eastern limit of its basin, and on the west by a branch from the Cévennes, which divides the valley of the Loire from that of the Allier. The tributaries of the Loire, until the junction of the Allier, are all small; the Arroux alone, which joins it on the right bank, is navigable.

From the junction of the Allier to Orléans is a distance of nearly 100 miles, following the general course of the stream. The height of the bed of the Loire at Orléans is about 294 feet above the level of the sea. The Cher and Indre, two of its most important tributaries, join it on the left bank, 90 miles below Orléans, and not far below Tours, at an elevation of about 160 feet.

From the junction of the Cher and Indre, the Loire has a general western course of 133 miles, till it reaches the ocean. It receives, on its left bank, about 12 miles below the junction of the Cher, the Vienne, another of its great tributaries; and 36 miles lower down it receives the Maine or Mayenne, the only stream of magnitude which falls into it on the right bank throughout its whole course. At the junction of the Mayenne the height of the bed of the river is about 115 feet; and at Nantes, 48 miles lower down, and only 36 miles from the mouth of the river, 83 feet above the level of the sea.

The whole course of the Loire is above 530 miles. The navigation upwards and downwards commences at Roanne, 116 miles from its source, where it is joined by the Trambouze. It has, in the part above Roanne, a total fall of 3772 English feet, being an average of about 32·5 feet in a mile. The chief fall is in the part nearest its source. For two-thirds of the distance above Roanne it is used for floating timber, particularly of deals for boat-building; and boats can descend the stream from St. Rambert, above Roanne, but not ascend it.

This river, with its larger affluents, constitutes the great outlet for the produce of central and western France, and might be rendered much more available. The banks are celebrated for their beauty, particularly in the neighbourhood of Tours. From the melting of the snows in the Cévennes, in which it has its source, the Loire is subject to great inundations, to prevent which it has been embanked in the level tracts below Orléans. The sand and soil which its waters bring down form islands or shifting banks in its course, which materially impede the navigation, especially above Orléans: to avoid this inconvenience, a canal has been formed along the left bank of the river, from the Canal du Centre, at the junction of the Arroux, to the Canal de Briare, at Briare near Gien. Vessels of 900 tons are built at Nantes, but they cannot receive their cargoes above Paimbœuf. The tide flows about forty miles up the river, to a short distance above Nantes.

Two of the five great affluents of the Loire have been described elsewhere. [ALLIER; CHER.] The Allier rises in Mount Lozère, a few miles from the source of the Loire, and has a course of about 200 miles, nearly parallel to that of the Loire. It is navigable, during part of the year, for about 72 miles. The Cher rises near the Puy de Dôme, and has a course of nearly 200 miles, for about 55 of which it is navigable. It passes Montluçon, St. Amand, and Bourges.

The Indre rises in the remote ramifications of the central group of the mountains of Auvergne, and has a course of about 116 miles. The navigation, of 36 miles, commences at Loches. The Indre has no large affluents.

The Vienne rises in the Auvergnat mountains, west of the Puy de Dôme, and flows, first west past Limoges, and then north, past Chinon. Its whole course is about 150 miles, only about 50 of which are navigable, viz. from the junction of the Clain. It drains a large extent of country, and receives several considerable affluents.

The Mayenne rises in the southern slope of the Armorican chain, and has its course first west, and then south, past Mayenne, Laval, and Angers, just below which city it joins the Loire: its whole course is about 97 miles, for half of which, viz. from Laval, it is navigable. Though not so long as the Allier, the Cher, the Vienne, or even the Indre, its basin exceeds that of any of them, except the Vienne. Its principal feeder is the Sarthe, a stream thirty miles longer than the Mayenne, which flows by Alençon and Le Mâns, and is navigable from below Le Mâns 60 miles. The Sarthe receives the Loir (distinguished from the great stream, La Loire, by its masculine form Le Loir), a river of almost equal length with itself, which is navigable from Château du Loir, 53 miles.

The Loire was known to the Romans by the name Liger (Λείγηρ, Strabo) or Ligeris; the Allier by those of Elaver and Elauris. We are not aware that the Roman names of any of the other tributaries have been recorded.

We subjoin the following summary of the navigation of this vast river-system from the official statements of the French government:—

	Miles.
Length of the navigation of the Loire itself	512
Arroux	12
Allier	156
Loiret	2
Vienne, 55 miles; Creuse, 5 miles	60
Thoué, 11 miles; Dive, feeder of Thoué, 17 miles	28
Authion	26
Mayenne, 60 miles; Oudon, feeder of Mayenne, 11 miles; Sarthe, 80 miles; Loir, 75 miles	226
Layon	37
Sèvre Nantaise	10
Acheneau, 12 miles; Boulogne, 5 miles; Ognon, 4 miles; Tenu, 10 miles, feeders of the Acheneau	31
Brivé	15

The navigation of the Indre is not stated; that of the Cher is comprehended in the Canal du Berry, and that of the Erdre, a small feeder which joins the Loire at Nantes, in the canal from Nantes to Brest. From the length assigned to the Loire itself, the Allier, the Sarthe, and the Loire, as compared with that given above, from measurement on Brué's large map (Paris, 1818), either inland navigation has been much extended of late years, or that part of the stream used for floating timber is included in the navigation. The Loire is connected with the Saône by the Canal du Centre, with the Seine by the Canals de Briare, d'Orléans, and du Loing, and with Brest harbour by the canal from Nantes to Brest. The Canal du Berry unites the upper and lower parts of the Loire, avoiding the great bend of the river at Orléans.

LOIRE, a department in the interior of France, bounded on the north by the department of Saône et Loire, on the east by the departments of Rhône and Isère, on the south-east by the department of Ardèche, on the south by that of Haute Loire; on the south-west and west by that of Puy de Dôme, and on the north-west by that of Allier. The form of the department is irregular; the greatest length is from north-north-west to south-south-east, from the neighbourhood of La Palisse (Allier) to that of Bourg Argental, 80 miles; its greatest breadth, at right angles to the length, is by a line drawn through Roanne, 41 miles. The area of the department is estimated at 1835 square miles, being about equal to that of the English county of Northumberland. The population in 1831 was 391,216; in 1836 it was 412,497, showing an increase in five years of 21,281, or more than five per cent.; and giving about 225 inhabitants to the square mile, a population which, in density, far exceeds the average of France, and is nearly double that of the English county compared with it. Montbrison, the chief town, is in 45° 36′ N. lat. and in 4° 4′ E. long.; 236 miles south-south-east of Paris in a direct line, or 298 miles by the road through Montargis, Nevers, and Roanne.

This department is formed of a portion of the valley of the Upper Loire, and its eastern and western boundaries are skirted by the mountains which bound that valley on each side. On the east side are the mountains of Le Lyonnais, dividing the basin of the Loire from that of the Rhône. The highest points are Mont Pilat (Mons Pileatus the 'capped mountain'), so called from its head being often enveloped with clouds, 4472 feet above the level of the sea, and Boussiore, or Boussière, between Pannissière and Tarare (Rhône), 3291 feet. In the south-east the department extends across these mountains to the banks of the Rhône.

On the west side of the department are the heights of Forez and La Made, otherwise La Madeleine, separating the valley of the Loire from that of the Allier. These two mountain-chains are chiefly composed of granitic rocks or of the older limestones and sandstones; part of the high ground between the Loire and Rhône is occupied by the coal-measures; and the valley of the Loire is occupied by strata belonging to the supracretaceous group. The coal-field of this district is the most important in France. There are forty-five mining establishments, which extend over an area of 42,038 English acres. The quantity procured in 1835 was 812,914 tons: and the distribution of their produce is facilitated by the two noble rivers to which the coal-field is adjacent. The quality of the coal is very good. There are iron and lead mines in the mountains, and quarries of granite, porphyry, and marble. Whetstones and emery are also procured.

The department belongs almost entirely to the basin of the Loire, which river enters it on the south, just below Aurec (Haute Loire), and flows northward, past St. Rambert (where the downward navigation commences), Feurs, and Roanne (where it becomes navigable, both upward and downward), into the department of Saône et Loire. From the narrowness of the valley through which it flows, its tributaries are all small; the Furand, the Coize, the Loise, the Trambouze, and the Sornin join it successively on the right bank; and the Bouson, the Maire, the Lignon, the Aix, the Repaison, and the Tessonne, on the left. A small portion of the south-eastern extremity of the department belongs to the basin of the Rhône, and is skirted by that river, which divides it from the department of Isère. The Gier and the Diaume, which belong to the system of the Rhône, water this part. The official returns make the navigation of the Loire in this department amount to 83 miles, which extends it far above Roanne or St. Rambert, and shows either that the upper part has been made navigable of late years, or that the part used only for floating timber is included in the return. About five miles of the navigation of the Rhône belong to this department.

There are two canals: that from Roanne to Digoin, lateral to the Loire, 11 or 12 miles of which are in this department; and that from Rive de Gier to Givors (Rhône) on the banks of the Rhône, of which four or five miles are in this department.

There are six government roads, having an aggregate length of 192 miles, of which nearly three-fourths are in repair, the rest out of repair or unfinished. There are eleven departmental roads, having an aggregate length of 231 miles, about two-thirds of which are in good repair. There are four thousand four hundred and twenty-four bye-roads and paths, with an aggregate length of nearly 5000 miles. The principal road is that from Paris by Moulins to Lyon: it passes through Roanne. The road from Lyon to Nîmes crosses the south-east corner of the department, that from Lyon to Clermont passes through Feurs and Boën; and that from Lyon to Le Puy passes through St. Etienne. There is a railroad from St. Etienne to Lyon.

The climate of the department is temperate, and the soil, though not distinguished by fertility, tolerably productive. About half the soil is arable, but the quantity of grain is not sufficient for the dense population. There is a considerable proportion of meadow-land, on which a great number of cattle are bred. The cheeses of La Roche and Barrasin, villages in the department, are much esteemed. The vineyards are tolerably extensive, and some of the wine is in good repute. A small quantity of cider is made. The quantity of poultry reared is considerable, especially turkeys, which are fattened on chesnuts. The woods occupy rather more than an eighth of the department: they consist chiefly of pines and other resinous trees, from which excellent turpentine is obtained. The deals are sent down the Loire for boat-building and other purposes.

The department is divided into three arrondissements, as follows:—

		Area in Sq. Miles.	Population in 1831.	Population in 1836.	Communes.
Roanne	N.	688	121,817	124,871	108
Montbrison,	Central	749	120,210	124,050	138
St. Etienne,	S.E.	398	149,189	163,576	72
		1835	391,216	412,497	318

There are 28 cantons or districts, each under a justice of the peace.

In the arrondissement of Roanne are Roanne, on the Loire (population in 1831, 8890 town, 9260 whole commune; in 1836, 9910 commune) [ROANNE]; Villerost, near Roanne, on the same river; Perreux, also near Roanne, but not on the Loire; Charlieu (pop. 3123 town, 3424 whole commune), on the Sornin; Regny, Lay, St. Symphorien de Lay, and St. Just, on the Trambouze, or its branches; Néronde, on a small stream running into the Loire; St. German la Val and St. Just en Chevalet, on the Aix; St. Haon le Châtel and Renaison, on or near the Renaison; Aubierle, Changy, Crozet, and La Pacaudière, on or near the Tessonne. These are almost all small places. Perreux is famous for its wines. St. Symphorien de Lay (pop. 4500) has considerable cotton-manufactures; the town, which is walled, does not contain much above a fourth of the population of the commune. La Pacaudière is a tolerably pleasant town of 600 or 700 inhabitants. St. Just en Chevalet is on the slope of a hill: it has about 1000 inhabitants, who make hats and trade in the wood grown in the neighbourhood.

In the arrondissement of Montbrison are Montbrison, capital of the department, on the Vizezy, a small feeder of the Lignon; Moingt and Chaudieu, both near Montbrison; L'Hôpital and Boën, on the Lignon; St. Marcellin and Sury-le-Contal, on or near the Maire; St. Bonnet-le-Châtel, near the Bouson; St. Rambert and Feurs, on or near the Loire; Panissière, near the Loire; and Chazelle and Galnier, or St. Galmier, near the Coize or Croize.

Montbrison, built in the twelfth century, was the capital of the district of Forez. The town is commanded by a picturesque volcanic rock, from the top of which, in the religious wars of the sixteenth century, the Baron des Adrets, a Huguenot leader, is said to have precipitated his Catholic prisoners. The town is ill laid out and ill built; but great improvements have been made in the course of the present century by filling up the ditches which previously surrounded the town, and forming a handsome boulevard on the site of them, and by laying out and building new streets. The college, or high-school, formerly an Ursuline nunnery, has been so enlarged and embellished as to become a handsome structure. There are a theatre and a fine range of barracks for cavalry. The courts of law, the church of St. Marie, and the corn-market are handsome buildings. The population in 1831 was 5040 for the town, or 5265 for the whole commune; in 1836 it was 6266 for the commune. The townsmen manufacture some linens of different fineness. There are a small public library, an agricultural society, a botanic garden, and the different public offices necessary in a departmental capital. There are public baths, and in the neighbourhood are some mineral waters, which were known to the Romans. Some Roman antiquities have been discovered near the town, and among others the ruins of an amphitheatre.

Feurs was the Forum Segusianorum of the Romans, the antient capital of the Segusiani: it gave name to the district of Forez. Many of the houses have cellars evidently of Roman construction. There are numerous vestiges of Roman monuments. Remains of aqueducts extend for more than a mile from the town. The traces of the antient walls show the extent and importance of the place. There is an antient cromlech near the town. St. Galmier (pop. 1800 town, 2659 whole commune) has some manufactures of wax tapers for use in churches: near the town are some mineral waters. Boën has a population of about 1500: there is a paper-mill, and some trade is carried on in the corn, wine, and wood of the surrounding country. L'Hôpital has about 1000 inhabitants.

In the arrondissement of St. Etienne are St. Etienne, on the Furand (pop. in 1831, 33,064; in 1836, 41,534) [Etienne, St.]; Bourg Argental, on the Diaume; St. Sauveur and St. Julien, in the neighbourhood of Bourg Argental; Le Chambon and Firmini, on a small feeder of the Loire; St. Genest, on another small feeder of the same river; Chavanay and Condrieu, on or near the Rhône; St. Chamond and Rive de Gier, on the Gier; Chagnon, Romain, and La Fouilleuse.

At Bourg Argental (pop. 1734 town, 2502 whole commune) crapes and some other silk fabrics are made from the silk produced in the canton of Pelhusin near the Rhône, where the mulberry-tree is cultivated on a large scale. At Le Chambon (pop. 1600) coal-mines are wrought, ribands are woven, and nails, files, and knives manufactured. Firmini (pop. 2438 town, 3779 whole commune) has also productive coal-mines, and has the same manufactures as Le Chambon. St. Chamond (pop. 7475) is situated in a hollow, the sides of which are adorned by orchards, woods, and vineyards. Several of the houses are handsome, and have pleasant grounds. The parish church is a handsome building: there are public baths and a pleasant public walk. Some vestiges of Roman antiquities have been found near the town. The inhabitants are engaged in throwing silk and weaving ribands, in working coal-mines, and in the manufacture of nails or cast-iron. There are quarries of freestone in the neighbourhood. Near Rive de Gier (pop. 9178 town, 9706 whole commune) are extensive coal-works: the pits are above 950 feet in depth, and one pit is said to be nearly 1100 feet deep. There are iron-works in the town, several glass-houses and a silk-throwing mill. The soot and dust from these various establishments blacken the whole place, and render it always dirty. There is a basin or reservoir of the canal, which communicates between this town and Givors on the Rhône. Lyon is supplied with coal from this neighbourhood. Some of the coal strata in this arrondissement have been in a state of combustion for centuries. Muriate of ammonia is procured where this combustion is going on.

The population of the above towns, where not otherwise distinguished, is that of the commune, and is from the census of 1831.

The chief branches of industry in the department have been noticed above. They depend almost entirely on the abundant supply of fuel furnished by the coal-mines of the department. In addition to those already mentioned, the manufacture of coarse woollen cloths, of cotton twist, of linen and cotton fabrics, and leather, may be noticed.

The department of Loire forms, with that of Rhône, the archiepiscopal diocese of Lyon and Vienne. It is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Lyon; it is included also in the nineteenth military division, the head-quarters of which are at Lyon. It sends five members to the Chamber of Deputies.

The state of education in this department is backward. In the military census of 1828-29 only 29 of every 100 young men enrolled could read and write; the average number in all France being about 39 in every 100.

This department comprehends the antient territory of the Segusiani, with portions of some of the adjacent states; in the division of Gaul under the Romans it was included in the province of Lugdunensis Prima. Some Roman towns were included within it, as Forum Segusianum, *Feurs*; Rodumna, *Roanne*; Aquæ Segete, perhaps Aissumin, a village on the bank of the Loire; and Carilocus, a town of the Ædui, *Charlieu*. It includes the former district of Forez and portions of Le Beaujolais and Le Lyonnais proper, all subdivisions of the province of Lyonnais. At the commencement of the Revolution the departments of Rhône and Loire constituted but one, under the title of Rhône et Loire; they were subsequently divided.

LOIRE, HAUTE, a department in the interior of France, bounded on the north by the departments of Puy de Dôme and Loire; on the east and south-east by that of Ardèche; on the south and south-west by that of Lozère; and on the the west by that of Cantal. Its form is irregular. Its greatest length is from east to west, from near Bresle to between Montfaucon and Bourg Argental (Loire) 68 miles; its greatest breadth from north to south is from near Craponne to the neighbourhood of Pradelles, 44 miles. Its area is estimated at 1931 square miles, which is considerably below the average extent of the French departments, but exceeds by 60 square miles that of the English county of Northumberland. The population in 1831 was 292,078, in 1836 it was 295,384, showing an increase in five years of 3306, or little more than one per cent., and giving about 153 inhabitants to a square mile, which is rather under the average density of the population in France: but considerably above that of Northumberland, with which county we have compared it in respect of area. Le Puy, the capital, is on the left bank of the Loire, in 45° 2′ N. lat. and 3° 53′ E. long., 271 miles south by west of Paris in a direct line, or 304 miles by the road through Nevers, Moulins, and Clermont.

The department is almost entirely mountainous, at least hilly. The chain of the Cévennes passes just along the eastern boundary; the mountains of La Margeride, which unite the Cévennes to the central group of Auvergne, pass along the south-western boundary; and a branch of the Cévennes, which separates the valleys of the Allier and the Loire, passes northward through the middle of the department, from Pradelles to La Chaisedieu. Nearly the whole of the department is occupied by these mountains or their branches; and the only tracts that approach to a more level character are on the north side of the department, where the valleys of the Loire and the Allier expand to some breadth. The mountains consist for the most part of granite and the other primitive rocks, mingled with basalt and lava, the product of volcanoes long since extinct. The valley of the Allier is occupied by the supracretaceous strata. The mountains are in many places of picturesque form. Mont Mézin, or Mézene, is a colossal mountain of volcanic matter, rising more than 5000 feet above the granite on which it rests; and having a total elevation of 5816 feet above the level of the sea. This mountain, which belongs to the principal range of the Cévennes, presents some magnificent ranges of basaltic columns. In the same line are

Mont Tartas, Les Infernels, Mont Caou, or Mont Chaud, and others; all mountains of similar volcanic origin and character: Tartas has an elevation of 4410 feet above the level of the sea. The currents of volcanic matter ejected in a state of fusion from these or other mountains appear to have interrupted in several places the course of the Loire and the Allier, and obliged those streams to work out a more circuitous channel. In many places however the channels of the rivers penetrate through the volcanic rocks. The names of several of these extinct volcanoes appear to have had a Roman origin. Tartas, or Tartarou, embodies the Latin Tartarus; and Les Infernels, or Infernês, the Latin Infernus. The most striking ranges of basaltic columns in the department are those of St. Arcons d'Allier near Langeac on the Allier; Fare near Pradelles; and Espailly Polignac, and others, near Le Puy, in the valley of the Loire.

The mineral treasures are coal, lead, and antimony; granite, serpentine, statuary and other marbles; excellent freestone for building, sandstone for mill-stones, and gypsum. The quantity of coal produced in 1835 was 21,883 tons: it is the eighth of the departments in respect of its productiveness of this mineral. The chief coal-pits are at Frugères.

The principal rivers are the Loire and the Allier, which enter the department on the south, the Loire from the department of Ardèche, the Allier from that of Lozère, in which departments they respectively have their rise on each side of the central mountain-range already described. The valley of the Loire separates the central mountain-range from that of the Cévennes; and is very narrow, except in the northern part of the department. The river flows by or near Le Puy, Roche en Regnier, Beauzac, Monistrol, Bas-en-Basset, and Aurec. Its tributaries are all small. The valley of the Allier, which separates the central mountain-range from that of La Margeride, is also narrow, except just in the north part of the department. This river flows by or near Langeac, Brioude, and Auzon; its chief tributaries are the Chapeauroux (which joins it just within the department), the Ance, the Senouire, and the Alagnon. There are in the mountains several small lakes, or rather ponds.

In the official returns the Allier is stated to be navigable for ten or eleven miles in this department: probably from Brioude, where many boats are built. As in other authorities the commencement of the navigation is marked as being a little above Vichy (Allier), about sixty miles lower down, it is probable that in this upper part of its course boats can only descend the stream, not ascend it. There is no other inland navigation.

There are six Routes Royales, or government roads, in the department, having an aggregate length of 181 miles; of which (1st Jan. 1837) 123 were in repair, 22 out of repair, and 36 unfinished. The principal road is that from Paris by Clermont and St Flour to Narbonne and Perpignan, and so into Spain: this just passes through the north-western corner of the department, through the little town of Lempde, on the Alagnon. From Lempde a road branches off to Brioude, Paulhaguet, and Le Puy. From Le Puy roads run to Ambert and other towns in the department of Puy de Dôme, to Le Voulte (Ardèche) and other towns on the Rhône, to Pradelles and to Yssengeaux. From Pradelles are roads to Mende (Lozère) on the one hand, and on the other to Aubenas, Privas, and Viviers (Ardèche); and from Yssengeaux are roads to St. Etienne (Loire), and to Annonay (Ardèche). The Departmental Roads, twelve in number, have an aggregate length of about 250 miles, of which only about 100 miles are in repair. There are more than three thousand eight hundred bye-roads or paths, having an aggregate length of more than 3700 miles.

It is probable that the lowest part of the department is nearly 1000 feet above the sea level; and the summits of the highest mountains exceed 5000 feet. The climate is too cold to admit of the cultivation of the vine, except in a few more sheltered spots, as in the bottom in which the town of Le Puy stands; and there are some parts where it is too cold to admit the growth even of rye. The soil is of middling fertility. In the vague classification of the government papers three-fifths are said to be 'sandy,' nearly three-tenths stony, and the rest gravel, chalk, or limestone, with a very small proportion, about 2500 acres, of rich loam. Nearly half the land is under the plough, and the produce in grain exceeds the consumption of the department. The vineyards occupy 14,000 to 15,000 acres, but the growth of wine is inadequate to the supply of the department. The quantity of meadow land is considerable; and the heaths or commons and open pastures occupy nearly one-fifth of the surface. The breeding of cattle, and still more that of sheep, is much attended to. Mules are bred in considerable number. There are many bees kept; and in some spots silkworms are reared. Chesnuts are grown in large quantity: some kinds of fruit are cultivated to a considerable extent. The woods occupy more than a seventh of the whole department.

The department is divided into three arrondissements, as follows:

	Sq. Miles.	Population in 1831.	Population in 1836.	Communes.
Le Puy, Central and S.	860	129,722	130,844	112
Yssengeaux, or Issengeaux, N.E.	463	81,664	81,785	36
Brioude, N.W.	608	80,692	82,755	118
	1931	292,078	295,384	266

It is subdivided into twenty-eight cantons, or districts under a justice of the peace.

In the arrondissement of Le Puy are Le Puy (population in 1831, 14,844 town, 14,930 whole commune; in 1836, 14,924 commune) on the Borne, a feeder of the Loire, not far from that river; Alegre and St. Paulien (pop. 3017) near the Borne; Craponne (pop. 2274 town, 3828 whole commune) and Chomelis near the Arzon, which also joins the Loire; Roche en Reignier, on the Loire; Fay le Froid, on the Lignon, another feeder of the Loire; Monastier (pop. 1983 town, 3420 whole commune), on the Gazeille, a small feeder of the Loire; Pradelles, on a small feeder of the Allier; and Saugues (pop. 1884 town, 3833 whole commune) on the Suejols, another small tributary of the Allier.

Le Puy is described elsewhere. [Puy, Le.] The immediate neighbourhood of the city is remarkable for the picturesque forms of its volcanic rocks. That of Corneille, which immediately commands the town, is of the form of an immense cube; the rock of Polignac (mentioned above) is an oblong square, three sides of which are precipitous, crowned with the ruins of an antient castle; that of St. Michel is a lofty cone, above 300 feet high, having a church with a steeple on its summit, so that it appears, on a distant view, like a vast obelisk: the ascent to the church is by a flight of two hundred and sixty steps in the side of the rock. The rocks of Espailly are in the same neighbourhood; they have been noticed already, in speaking of the geological character of the department. There are some remarkable caverns near Le Puy. At the base of the rock of St. Michel is an antient building said to have been a temple of Diana; and on the face of that of Polignac is a coarsely sculptured head of Apollo. There are the ruins of an old castle in the same neighbourhood. Le Puy is on a site elevated more than 2000 feet above the level of the sea. Pradelles is yet higher: its site, which consists partly of granitic, partly of volcanic rocks, is 3721 feet above the level of the sea: it contains about 1200 to 1500 inhabitants.

In the arrondissement of Yssengeaux are Yssengeaux, or Issengeaux, between the Terrasse and the Lignon, feeders of the Loire; Beauzac, Monistrol (pop. 4145), Bas en Basset (pop. 5524), and Aurec, on or near the Loire; St. Didier la Sauve (pop. 1993 town, 3795 whole com.), on a feeder of the Loire; Montfaucon, near the Dunières, which flows into the Lignon; and Tence (pop. 5730), on the Lignon.

Yssengeaux is a small town, with a population, in 1831, of 3133 for the town, or 7166 for the whole commune; in 1836, of 7621 for the commune. The roofs of the houses are commonly covered with basalt. There is an Agricultural Society in the town. A rich lead-mine is wrought in the neighbourhood, and peat for fuel is dug. Monistrol has an antient palace of the bishops of Le Puy, remarkable for its lofty situation. The townsmen manufacture locks, leather, ribands, and lace. Montfaucon has a population of from 1200 to 1500.

In the arrondissement of Brioude are Brioude (pop. in 1831, 5052 town, 5099 whole commune; in 1836, 5247 commune); Langeac (pop. 2345 town, 3109 whole commune), Vieille Brioude, close to Brioude, La Motte, and Auzon, all on or near the Allier; Blesle on the Voureze, a feeder of the Alagnon; Lempde on the Alagnon, Paulhaguet on the Senouire, and La Chaisedieu, near the source of the same river. Brioude and Vieille Brioude are described elsewhere. [Brioude.] Antimony, mill stones, and whetstones are quarried in the neighbourhood of Langeac. Lempde is in a fertile district; it has a population of about 1000: there is a bridge over the Alagnon. Excellent coal is dug in the neighbourhood. At the village of Vezezouls, on the Allier, many boats are built for the navigation of that river.

The manufactures of the department consist chiefly of thrown silk, lace, paper, and woollen stuffs; skins for holding wine or other liquids; bells for horses and mules, glass, and leather. The trade consists in the sale of the foregoing articles, grain, chesnuts, dried pulse, sheep, mules, and deals. Three thousand individuals leave the department yearly to obtain employment in other departments as sawyers, embankers, chimney-sweeps, porters, &c.

This department constitutes the diocese of Le Puy, the bishop of which is a suffragan of the archbishop of Bourges. It is in the jurisdiction of the Cour Royale of Riom, and in the circuit of the Académie Universitaire of Clermont Ferrand. It is in the nineteenth military division, the head-quarters of which are at Lyon. It returns three members to the Chamber of Deputies. There is a Protestant consistorial church.

In respect of education, it is one of the most backward of the French departments. Of the young men enrolled in the military census of 1828-29 only 21 out of every 100 could read and write; being very little more than half the average number in France taken as a whole.

This department was the country of the Vellavi, a Celtic tribe whose chief town was Revessio, now St. Paulien near Le Puy. Under the Romans it was included in Aquitania Prima. It afterwards came into the hands of the Visigoths, then of the Franks, and in the middle ages formed part of the extensive dominions of the Counts of Toulouse, to whom it is probable that the bishops of Le Puy, who held the county of Le Vélay (as, from the name of its antient inhabitants, the district was called) were subject. From the Counts of Toulouse the district came to the crown of France, under which it constituted part of Languedoc. The department comprehends, besides Le Vélay, some portions of Le Vivarais and Le Gévaudan (two other subdivisions of Languedoc), of the duchy of Auvergne, in the province of Auvergne, and of the district of Forez in Le Lyonnais.

LOIRE INFE'RIEURE, a maritime department of France, bounded on the north-west by the department of Morbihan; on the north by that of Ille et Vilaine; on the north-east, for a little space, by that of Mayenne; on the east by that of Maine et Loire; on the south by that of Vendée; and on the west by the Atlantic ocean. Its form is irregular. Its greatest length is from east to west, from Ingrande (Maine et Loire) on the frontier of this department to the Pointe de Piriac, north of the little town of Le Croisic, 75 miles: its greatest breadth, at right angles to the length, is from the village of Soulvache, not far from Châteaubriand, to the little town of Legé, near the head of the Logne, a small stream that flows into the lake of Grand Lieu, 69 miles. The area of the department is estimated at 2639 square miles, being rather greater than that of the English county of Devon: the population in 1831 was 470,093, in 1836 it was 470,768, showing an increase in five years of only 675, or about one-seventh per cent., and giving 178 inhabitants to a square mile. In area, in population, and in density of population it is considerably above the average of France; but in the last two particulars it is inferior to the English county with which we have compared it. Nantes, the chief town, is on the north bank of the Loire, at the junction of the Erdre; in 47° 13′ N. lat. and 1° 33′ W. long.; 208 miles west-south-west of Paris in a direct line, or 231 miles by the road through Versailles, Chartres, Le Mans, and Angers.

The coast of this department presents a broken and irregular outline. It commences at the bottom of the little bay of Pennebe, south of the æstuary of the Vilaine, where the boundary between the departments of Morbihan and Loire Inférieure meets the ocean. This coast-line then forms the headland of Pointe de Piriac and Pointe du Croisic, with the intervening bay or roadstead of Pembron, and proceeds south-east, forming a second shallow bay between the villages of Le Pouliguen and St. Sebastien, to the mouth of the Loire, which is about seven miles wide. From the Pointe de Cheveche, which is on the south side of the mouth of the Loire, the coast forms the bay of Bourgneuf, at the bottom of which, at the mouth of the little river Falleron, the boundary of the departments of Loire Inférieure and Vendée meets the ocean. Belle Ile, opposite the Pointe de Piriac, belongs to the department of Morbihan; and Ile de Boin and Noirmoutier, of which the former is in the bay of Bourgneuf, and the second off the entrance of it, belong to the department of Vendée. The town of Le Croisic is on a headland insulated at high water, but at other times connected with the mainland by the sand. The whole length of the coast is nearly fifty miles: it is for the most part low and skirted by broad sands. The soil brought down by the Loire and other rivers is causing the land here to gain gradually on the sea. In estimating the maritime facilities of the department, the wide æstuary of the Loire, by which large vessels can get up to Nantes, must be taken into the account. There are considerable salt marshes along the coast.

The surface of the department is generally level, especially in the northern, western, and southern parts. In the north-eastern and eastern parts, the high land, which separates the basin of the Loire from that of the Vilaine, extends to the upper part of the river Erdre. The country slopes gradually towards the west. The Loire has a fall in its course through this department of about 100 feet in nearly seventy miles, of which fall more than 80 feet are below Nantes.

The department is occupied chiefly by the coal-measures and the subjacent strata, covered in some places by alluvial deposits. There are some strata of good coal on the banks of the Loire and the Erdre; the principal coal-works are between Ancenis and Ingrande, and at Nort. In respect of productiveness of coal, this department ranks next to that of Haute Loire, and is the ninth department in France. The quantity raised in 1835 was 21,742 tons. Peat is dug near the mouth of the Loire, on the north bank. Iron-ore is tolerably abundant; and a tin-mine is wrought at Piriac on the coast. Fine-grained granite, slate, marble of a greyish tint, and limestone are quarried in different places. The loadstone is found on the north bank of the Loire, near the mouth; and crystals of quartz, from which the 'Alençon diamonds' are made, mica, felspar, kaolin or porcelain earth, and clay for various purposes are procured. There are considerable salt-works in the marshes on the coast.

The most important river is the Loire, which touches the border of the department at Ingrande (Maine et Loire), and forms for about 20 miles the boundary between this department and that of Maine et Loire: its remaining course, which is about 50 miles in length, is within the boundary of this department. The bed of the Loire is in this part full of small islands, which line its channel. It is navigable throughout its course, for small vessels; large vessels can get up to Nantes, where there is a bridge.

The Vilaine forms, for about 20 miles between Langon and Rieux, the north-western boundary of the department, which it separates from those of Ille et Vilaine and Morbihan. It is navigable throughout for small vessels. The Falleron, a small stream not navigable, forms for about eight miles the southern boundary of the department.

The other rivers are feeders either of the Loire or of the Vilaine. The Havre joins the Loire at Oudon; the Erdre, 50 miles long, at Nantes; and the Elier de Mean, or Brivé, above St. Nazaire; all on the north bank. The Erdre, the largest of the three, rises in the department of Maine et Loire, near the town of Cande, flows westward into the department of Loire Inférieure, and turning southward above the little town of Nort, joins the Loire. Just above its junction it expands into a long lake of about a mile and a half broad, and six or seven miles long. The navigation forms part of the canal from Nantes to Brest: it commences below Nort, about 12 miles from the junction of the Erdre with the Loire. The Divate rises in the department of Maine et Loire, and forms the boundary of the two departments till its junction with the Loire: the Sèvre Nantaise joins the Loire at Pont Rousseau opposite Nantes; and the Acheneau at the village of Brezay, between Nantes and Paimbœuf: all these join the Loire on the south bank The whole course of the Sèvre Nantaise is about 65 miles about one-third of which is in this department or upon the border: the navigation commences at the village of Monnières, about 10 miles above its junction with the Loire. The Acheneau is the outlet of the lake of Grand Lieu. a considerable sheet of water, approximating in form to a square with a side of four or five miles. Its area is estimated at 17,000 or 18,000 acres. It receives the Boulogne, 34 miles long (augmented by the Logne and the Isoire), on the south, and the Ognon, 20 miles long, on the east. The Tenu, 18 miles long, joins the Acheneau just after the latter leaves the lake on the north side. The Ognon, the Boulogne, and the Isoire rise in the department of Vendée. The Acheneau is navigable throughout its whole course from the lake of Grand Lieu to the Loire, about 12 miles.

The affluents of the Vilaine are the Cher, 25 miles long; the Don, 40 miles long; and the Isaac, 34 miles long: they belong entirely to this department.

Besides the lake of Grand Lieu, which is the largest inland lake in France, there are nearly six hundred smaller lakes or pools, whose aggregate area is about equal to that of Grand Lieu.

The only canal is that from Nantes to Brest, of which about 60 miles are in this department. The navigation of the Erdre is incorporated in this canal, and is included in the length given above. From the Erdre the canal follows the valley of the Isaac, on the right bank of that river, to the Vilaine.

There are six Routes Royales, or government roads, having an aggregate length of 299 miles, of which 208 were (1 January, 1837) in repair, 45 out of repair, and 46 unfinished. The principal road is that from Paris to Nantes and Paimbœuf. It enters the department immediately after leaving Ingrande (Maine et Loire) on the north bank of the Loire, and proceeds along or near that bank by Varades, Ancenis, and Oudon to Nantes. It crosses the Loire by the bridge at Nantes to Pont Rousseau, and passes along or near the south bank to Paimbœuf. Roads lead from Nantes by Pont Château and Roche Bernard (Morbihan) to Vannes (Morbihan); to Rennes (Ille et Vilaine), one by the village of Derval and another by Châteaubriand; by Pont Rousseau and Legé to Les Sables d'Olonne (Vendée); and by Pont Rousseau and Montaigu (Vendée) to La Rochelle (Charente Inférieure). There is a road from Ancenis by Nort and Blain to Rédon (Morbihan). There are also thirteen Departmental Roads, having an aggregate length of more than 200 miles, of which not quite 120 miles are in good repair; the rest out of repair or unfinished. The bye-roads and paths are about 5500 in number, with an aggregate length of about 8000 miles.

The air of the department is mild, but humid: the predominant winds are the south-west and north-east. The thermometer does not commonly exceed 93° (Fahrenheit) in the hottest part of the summer, or fall below 45° or 50° in winter: the mean temperature of the year is about 57°. The department is considered healthy on the whole, though some diseases are promoted by the moisture of the climate.

Nearly half the soil is under the plough: wheat, oats, rye, buckwheat, millet, and a little barley are the kinds of grain chiefly cultivated; the quantity raised is equal to the consumption of the department. Pulse and flax are also grown. Meadow lands occupy nearly a sixth of the department; and heaths, commons, and other open pastures more than a sixth. The number of cattle is great: those on the south bank of the Loire are considered to be of an excellent breed. The horses are small, but well made and spirited. Sheep are not numerous; but attention has been paid of late years to the improvement of the breed. Swine are numerous, and are fed on the acorns from the forests. The vineyards occupy nearly 75,000 acres; they extend all along the left or south bank of the Loire and the coast. The wine is chiefly white, and of middling quality. Apples, cherries, chesnuts, and other fruit are grown. Cider is made from the apple, and a drink resembling it from the service berry. Woods occupy about 80,000 acres: the oak is the principal forest-tree. Wolves, wild boars, and deer of different species are found in these woods. Poultry and bees are kept in considerable quantity. The rivers, the lake of Grand Lieu, and the smaller lakes or pools abound with fish; and the sardine, the sole, the ray, and other fish are caught on the coast. There are oyster-banks on the coast.

The department is divided into five arrondissements, as follows:—

		Area. Sq. Miles.	Population. 1831.	Population. 1836.	No. of Communes.
Nantes	S.E.	685	205,627	205,892	66
Ancenis	E.	302	46,703	45,765	27
Châteaubriand	N.E.	539	62,242	62,275	37
Paimbœuf	S.W.	298	42,129	42,580	25
Savenay	N.W.	815	113,392	114,256	51
		2,639	470,093	470,768	206

It is subdivided into 45 cantons, or districts under a justice of the peace.

In the arrondissement of Nantes are—Nantes, at the junction of the Loire and the Erdre; Pont Rousseau, a suburb of Nantes, on the south bank of the Loire; Clisson, on the Sèvre Nantaise; Vallet (population 5967) and Lorroux-Bottereau (pop. 4991), between the Sèvre and the Loire; Vieillevigne (pop. 5451), on the Ognon; Legé (pop. 3213) on the Logne, St. Philibert (pop. 3200) on the Boulogne, and Machecoul (pop. 3665) on the Falleron. Nantes had, in 1831, a population of 77,992 for the town, or 87,191 for the whole commune; in 1836 it was reduced to 75,895 for the commune. [Nantes.] Clisson has the ruins of a castle in which the celebrated Oliver de Clisson, constable of France, was born: there is a fine view from these ruins. The town is at the junction of the Sèvre and the Moine; the townsmen (pop. 1928 town, 2432 whole commune) feed cattle and manufacture some linens. Near St. Philibert, on an island in the lake of Grand Lieu, is a Druidical monument; and not far from the adjacent shore of the lake another. The inhabitants of the neighbourhood have a tradition that the lake was formed by a terrible convulsion, in which a town called Herbadilla was swallowed up.

In the arrondissement of Ancenis are Ancenis, Oudon, and Varades (pop. 3506), on the Loire. Ancenis had, in 1831, a population of 3263 for the town, or 3749 for the whole commune; in 1836 it had decreased to 3667 for the commune. [Ancenis.] Oudon has a lofty and picturesque octagonal tower, and the remains of a castle, said to have been built in the ninth century. The population of the whole commune is probably under 2000, and not above one-third is in the town itself. Varades is by some considered only a village: it is on a rising ground, on the north bank of the Loire, commanding the adjacent valley of that river. The ruins of an old castle crown the neighbouring eminence of La Madeleine. There are important coal-works at Montrelais, in this neighbourhood. They employed many years since about 300 men.

In the arrondissement of Châteaubriand are Châteaubriand, or Châteaubriant, on the Cher; St. Julien de Vouvantes, on the Don; and Nort (pop. 4751), on the Erdre; Châteaubriand had, in 1831, a population of 3027 for the town, or 3709 for the whole commune; in 1836 it had decreased to 3634 for the commune. The town is of antiquated appearance, and is commanded by the ruins of an old castle, the principal front of which formed part of the line of the ramparts. The townsmen manufacture 'sabots,' or wooden shoes, serges, tiles, and bricks; iron is procured in the neighbourhood. This place is noted for conserve of angelica and other confectionery. Several government and departmental roads converge here. Nort carries on some trade with Nantes, in coal from the neighbouring mines, wood for building and for fuel, and iron. At the village of Melleraie, between Châteaubriand and Nort, is a convent, now belonging to the monks of La Trappe; it was formerly a monastery of Bernardin monks. This community of Trappists consisted in 1819 of more than a hundred individuals, partly French and partly English. The English members had joined the community in their own country, where it was settled for some time. At Derval in this arrondissement are some Druidical stones. There was formerly a strong castle at this village.

In the arrondissement of Paimbœuf are Paimbœuf and Le Pellerin, on the south bank of the Loire; Port St. Père, on the Acheneau; St. Père en Retz, near Paimbœuf; Pornic and Bourgneuf on the sea; and Machecoul. Paimbœuf is situated in a low marshy flat; it consists of one main street, well built, with a quay along the bank of the Loire. It was, at the commencement of the last century, a hamlet of fishermen; but the increase of the trade of Nantes rendering it desirable to have a station lower down the river, where larger vessels might land or take in part of their equipment, Paimbœuf was chosen; and by the middle of the last century it had become, according to Expilly (*Dictionnaire des Gaules*, &c.), a village of 5000 to 6000 persons. Although it has since been constituted a town, and made the capital of an arrondissement, it seems to have declined; for the population, in 1836, was only 3872. Perhaps however Expilly's statement of the population is incorrect. There is a ship-building yard in the town, in which frigates have sometimes been built. Large vessels commonly and smaller ones frequently discharge part of their cargoes at Paimbœuf, from whence they are forwarded to Nantes in small craft. Bourgneuf (pop. estimated at about 2000), gives name to the bay at the bottom of which it is situated, and in which the sand and mud are gradually accumulating: the former port of Bourgneuf is now dry, except at high-water. A great deal of salt is made along the shore of the bay. Machecoul (pop. 3665) was formerly capital of the duchy of Retz, comprehending all (or nearly all) that part of the department which is south of the Loire.

In the arrondissement of Savenay are Savenay, on a little brook running into the Loire; Couéron (pop. 4053), Donges, and St. Nazaire, on the north bank of the Loire; Guérande and Le Croisic (pop. 2200 town, 2800 whole commune), on or near the sea; Pontchâteau, on the Elier de Mean or Brivé; Blain (pop. 4899), on the Isaac; and Herbignac. Savenay had, in 1836, a population of 2079 for the commune. There are salt-works in the marshes near the town, and the townsmen carry on considerable trade in cattle. At St. Nazaire (pop. 3789) is a singular monument, probably Druidical. Loadstones are found, and peat is dug in the neighbourhood of this town. Guérande (pop. 2041 town, 8190 whole commune) is more populous, wealthy, and commercial than Savenay: there are salt-works here. At Pontchâteau (pop. 3300) a large quantity of wash-leather is manufactured. Blain is described elsewhere. [BLAIN.]

The population, when not otherwise distinguished, is that of the whole commune, and is from the census of 1831.

The manufacturing and commercial activity of this department is considerable. Salt-works are numerous; and there are iron-works. Porcelain, glass, earthenware, pottery, and tiles; bed-ticking and serge in considerable quantity; cotton goods, leather, hats, rope, paper, corks, brushes, brandy, and chemical articles, are made: ship-building, both for the merchant service and for the navy, except ships of the line, is carried on; and the cod, herring, and coast fisheries employ many hands. Trade is carried on from the ports of Nantes and Paimbœuf with all parts of the world; and the navigation of the Loire and its tributaries affords considerable facilities for inland trade.

This department forms the diocese of Nantes, the bishop of which is a suffragan of the archbishop of Tours. It is in the jurisdiction of the Cour Royale, and the circuit of the Académie Universitaire of Rennes; and is included in the twelfth military division, the head-quarters of which are at Nantes. It returns seven members to the chamber of deputies.

In respect of education this department partakes of the backwardness which characterises the whole of Bretagne. Of the young men enrolled in the military census of 1828-29, only twenty-four in every hundred could read and write; the average of France was above thirty-nine in every hundred.

This department constituted the territory of the Namnetes, or Nannetes (*Ναμνιταὶ*, Strabo; *Ναμνηταὶ*, Ptolemy), one of the Celtic nations conquered by Cæsar. They formed part of the Armorican confederacy broken and subdued by that conqueror in the third year of his command. That part of the department which lies south of the Loire was included in the territory of the Pictones or Pictavi, another Celtic people. In the Roman division of Gaul the territory of the Namnetes was included in Lugdunensis Tertia; that of the Pictones in Aquitania Secunda. Condivicnum, or Condevicnum, the capital of the Namnetes, took in the later period the name Namnetes, or Nannetes, whence its modern name Nantes. Corbilo, another town of the same people, mentioned by Strabo, was on the north bank of the Loire, perhaps on the site of the present Couéron. Ratiatum, a town of the Pictavi, is fixed by D'Anville at St. Pierre, or St. Père en Retz. The district of Retz takes its name from Ratiatum. The department constituted in the middle ages a portion of Lower Bretagne, and partook of the fate of that province. [BRETAGNE.] The western part about Pont Château constituted the duchy of Coislin; the western part south of the Loire constituted the duchy of Retz.

LOIRET, a department in the central part of France. It is bounded on the north by the department of Seine et Oise; on the north-east by that of Seine et Marne; on the east by that of Yonne; on the south-east, for a short space, by that of Nièvre; on the south by that of Cher; on the south-west by that of Loir et Cher; and on the north-west by that of Eure et Loir.

Its form is that of an irregular oval; its greatest length is from west-north-west to east-south-east, from between Orléans and Châteaudun (Eure et Loir), to the neighbourhood of Bonny on the Loire, 73 miles; its greatest breadth, at right angles to the length, is from the neighbourhood of Malesherbes to that of La Ferté-Senneterre, 51 miles. Its area is estimated at 2585 square miles, which is above the average of the French departments, and is exactly equal to that of the English county of Devon. The population in 1831 was 305,276; in 1836 it was 316,189; showing an increase in five years of 10,913, or above three and a half per cent., and giving 122 inhabitants to a square mile. This department is below the average of France both in amount and density of population, and very far below the English county with which we have compared it. Orléans, the capital, is in 47° 54′ N. lat. and 1° 54′ E. long., 67 miles south by west of Paris in a direct line, or 71½ miles by the road through Etampes.

The hills that branch off from the prolongation of the Cévennes in the neighbourhood of Autun, and extend north-westward, separating the basin of the Loire from that of the Seine, enter this department on the south-east side, and extend for some distance along the northern bank of the Loire, subsiding near the source of the Vernisson, a feeder of the Seine, which rises within three or four miles of the banks of the Loire. The hills of the forest of Orléans, part of the heights of Beauce, a range of high lands branching from the Armorican mountains, enter this department on the north-west side, and advance to meet the range of hills just described. They are separated only by the intervening valley of the Vernisson. Some maps represent the two as forming one continuous range. With the exception of these low hills the surface is tolerably level.

The greater part of the department is occupied by the supracretaceous rocks belonging to the chalk-basin of Paris. These occupy the valley of the Loire for a short distance on each side of the river; and extend over all the country northward of the Loire and westward of the Loing. The districts east of the Loing and south of the Loire are occupied by the chalk which surrounds the Paris basin, except for a short distance from the banks of the Loire on each side of the river where the chalk is covered by supracretaceous rocks. The only minerals are building-stone and potters' clay.

The principal river is the Loire, which is navigable throughout. It enters the department at Bonny, and flows north-west by Briare, Gien, and Jargeau to Orléans, gradually bending to the west, so that at Orléans its course is nearly from east to west. From that city it gradually bends to the south-west, and passing Meung and Beaugency, enters the department of Loir et Cher. Its length in this department may be estimated at about 80 miles. Several small streams join the Loire on each side. The Loiret, though it gives name to the department, is scarcely more than six or seven miles long. Its springs however supply such an abundance of water as to render it navigable for two miles and a half. It is never entirely frozen over.

The other rivers belong to the system of the Seine, in the basin of which the northern part of the department is included. The Loing, a tributary of the Seine, rises in the department of Yonne, enters this department on the east side, and flows northward by Montargis into the department of Seine et Marne; of its whole course, which may be estimated at more than 70 miles, nearly 30 miles are in this department. The Aveyron and the Ouanne, tributaries of of the Loing, have their source in the department of Yonne, but join the Loing in this department, to which about 17 miles of the course of the Ouanne, the larger of the two, belong.

The canal of Orléans begins in the Loire, a little above that city, and runs north-east to the valley of the Moulon, a feeder of the Loing, along which it proceeds until it joins the canal of the Loing near Montargis. The length of this canal may be estimated at 45 miles. The canal of Briare commences in the Loire at Briare, and runs northward, but by a circuitous course along the valley of the Loing, first on the right, then on the left bank of the river, to Montargis: its length may be estimated at nearly 35 miles. It crosses a projecting portion of the department of Yonne; otherwise it belongs entirely to that of Loiret. The canal of the Loing commences at Montargis, where it communicates with the two above-mentioned canals, and follows the valley of the Loing, first on the left bank, then along the bed, then along the right bank, and again along the bed of the river till its junction with the Seine at Moret. Of its whole length, which may be estimated at about 33 miles, about 11 or 12 belong to this department. Of the lateral canal of the Loire, formed from Digoin to Briare, to avoid the natural difficulties of the navigation of the river, about 11 miles are in this department.

There are in the department nine Routes Royales, or government roads, having an aggregate length of 269 miles, viz. 158 in repair, 63 out of repair, and 48 unfinished (1 Jan. 1837). A road runs from Paris to Orléans· it enters the department at Artenay, and runs direct to Orléans. From Orléans two roads run, one along the north bank of the Loire, by Meung and Beaugency, to Blois (Loir et Cher), and Tours (Indre et Loire); the other, crossing the Loire by the bridge at Orléans, runs south to Châteauroux and Limoges. Another road from Orléans follows the north bank of the Loire to Gien and Briare, when it falls in with the high road from Paris to Nevers (Nièvre) and Moulins (Allier). Other roads run from Orléans, by Montargis, to Courtenay in the north-east part of the department, and to Châteaudun in the department of Eure et Loir. The main road from Paris to Nevers and Moulins, and from thence to Lyon on one hand and Clermont on the other, enters the department on the north side, near Ferrières, and runs south by Montargis to Briare, where it unites with the road from Orléans to Nevers. The Routes Departementales (departmental roads), fourteen in number, have an aggregate length of more than 250 miles, of which about two-thirds are in repair, the rest out of repair or unfinished. The bye-roads and paths exceed 12,000 in number, and have an aggregate length of above 12,000 miles.

About one-sixth of the soil consists of rich loam, and about as much of gravelly or stony land, or of uncultivated heath or other waste; the remaining two-thirds consist almost entirely of a light sandy soil. The produce in grain, especially oats, is very considerable, and far exceeds the consumption of the department. Almost two-thirds of the land are arable. A considerable quantity of pulse, fruit, saffron, flax, hemp, and colza, are raised. The banks of the Loire, between Briare and Orléans, constitute one of the most sterile portions of the department. The hills of Beauce, which rise to the northward of this barren tract, are covered with vineyards: the red wines which they produce are of excellent quality; the white wines are very poor. The quantity of horned cattle is considerable; sheep of English breeds and merinos have been naturalised with success. The quantity of meadow-land is about 60,000 acres; the extent of the commons and other open pastures is about 140,000 acres. A great quantity of poultry, especially turkeys, is bred for the supply of Paris. Bees are numerous in the hills of Beauce, and the honey is considered excellent. The rivers, with the numerous étangs or pools, supply the neighbouring departments with fresh-water fish. The quantity of woodland is considerable, amounting to nearly one-sixth of the whole department. The principal forests are those of Orléans in the centre, and of Montargis in the eastern part of the department.

The department is divided into four arrondissements, as follows:—

	Situat.	Area in Sq. Miles.	Population.		Communes.
			1831.	1836.	
Orléans	W.	929	137,820	141,637	106
Pithiviers	N.	459	60,039	60,628	98
Gien .	S.	570	41,273	43,643	49
Montargis	E.	627	66,144	70,281	95
		2585	305,276	316,189	348

The number of cantons, or districts under a justice of the peace, is 31.

In the arrondissement of Orléans are Orléans (pop. in 1831, 40,161; in 1836, 40,272) [ORLEANS]; Châteauneuf (pop. 2864 town, 3160 whole commune); Meung (pop. 2589 town, 4630 whole commune); and Beaugency (pop. 4182 town, 4883 whole commune), all on the north bank of the Loire; Jargeau, Mesnin, and Notre Dame de Cléry, on or near the south bank; Olivet on the Loiret; Patay near the Connie, a feeder of the Loir; Neuville near the source of the Œuf or Essone, a feeder of the Seine; and Artenay, on the road from Paris to Orléans. Châteauneuf has some manufactures of coarse woollens and linens. Meun, or Meung, has an antient palace, formerly belonging to the bishops of Orléans. The inhabitants of the town are engaged in tanning and paper-making, in the cultivation of the vine, and in fishing. There are many corn-mills. It was the native place of Jean de Meun, a poet of the middle ages, of some repute at the court of Philippe le Bel. The town was several times taken in the wars with the English, and in the civil dissensions of the sixteenth century. Beaugency has a bridge of thirty-nine arches over the Loire. The townsmen manufacture serges, hats, and leather. There are several distilleries. The wines of the neighbourhood, as well as of Meun, are excellent, and furnish a considerable article of trade. Jargeau was taken by the English in the war under Henry V. and VI., and retaken in the year 1429. Notre Dame de Cléry has a church, formerly collegiate, with a lofty spire, which at a distance forms a striking object. Louis XI. rebuilt this church, which had been destroyed by the English, and directed that his body should be buried there instead of at St. Denis. His request was complied with; and his tomb, which had been removed during the Revolution to Paris, was replaced in its former situation after the restoration of the Bourbons. It was at one time much resorted to, from the fame of the miracles which the Virgin was supposed to work there. At Olivet the great Duke of Guise was assassinated by Poltrot, as he was preparing to form the siege of Orléans. Patay was the scene of the first pitched battle won by the French over the English, after the appearance of Jeanne d'Arc had turned the tide of success.

In the arrondissement of Pithiviers are Pithiviers (pop. in 1831, 3882 town, or 3957 whole commune; in 1836, 4023 commune) and Malesherbes, on the Œuf, or Essone; Puiseaux (pop. 1876 town, 1970 whole commune), between the Essone and Suzain, a feeder of the Loing; Beaune and Boiscommun on the branches of the Suzain; and Achère, or Asheres le Marché. Pithiviers is well known for its almond-cakes and its lark-pies, of which a considerable number are sent to Paris. Considerable trade is also carried on in cattle, wine, vinegar, honey, and saffron. The town has three yearly fairs. The saffron grown round Pithiviers is considered the best in Europe. Building-stone, which takes a polish almost equal to marble, is quarried in the neighbourhood. Malesherbes was the lordship of one of the ministers and the defender of Louis XVI. on his trial before the Convention. Puiseaux was nearly destroyed by a flood in A.D. 1698: 150 houses were overthrown, and 100 lives lost, besides much cattle.

In the arrondissement of Gien are Gien (pop. in 1831, 4631 town, 5177 whole commune; in 1836, 5330 commune), Briare (pop. 2243 town, 2730 whole commune), and Bonny, all on the north bank of the Loire; and Beaulieu, Châtillon sur Loire, St. Goudon, and Sully, on the south bank. Gien has a handsome bridge over the Loire. The chief, if not the only manufacture, appears to be that of superior earthenware: there is also some trade in wool and leather. Briare consists of one main street, straight and tolerably well built; and is chiefly inhabited by the boatmen who work on the Loire, or on the Canal de Briare, which here opens into that river. A considerable trade, especially in wine, is carried on, which is promoted by the situation of the town at the junction of the Canal de Briare with the Loire. Bonny, or Boni, is a tolerably good looking town, about the same size as Briare. Sully has a handsome château and a church formerly collegiate. It gave the title of duke to Maximilian de Bethune, minister of Henri IV. The population of the commune at the commencement of the present century was 2500.

In the arrondissement of Montargis are Montargis (pop in 1831, 6781; in 1836, 7757), Châtillon sur Loing (pop 1721 town, 2126 whole commune), and Ferrières, all on or near the Loing; Courtenay on the Clery, a feeder of the Loing; Château Renard, on the Ouanne; and Lorris, on the Casseau, one of the affluents of the Moulon, which flows into the Loing. The origin of Montargis is not known, but the remains which have been discovered show it to have been a place of some note in the time of the Romans. There are some bridges over the Loing. Towers called 'the towers of Chenevières;' the remains of a circus near them; and a military way, still called 'Cæsar's road,' which are of Roman origin: and in 1725 the remains of a portico with a mosaic pavement were discovered. The town is small, but pleasantly situated in the midst of meadows: it is walled and had an antient castle built by Charles V., in which, on account of the purity of the air, the queens of France were accustomed to lie in. In this castle was formerly shown the portrait of a celebrated dog, who, according to tradition, pointed out the grave and overcame in a legal combat the assassin of Aubry de Mondidier, his master. The incident was dramatized and performed with considerable success at the minor theatres of London some years since, under the title of 'The Dog of Montargis, or the Forest of Bondy.' The castle was pulled down about A.D. 1810. The streets of Montargis are broad and straight, but the houses are ill built. The only parish church, that of La Madeleine, in the middle of the town, is much admired for its architecture. There are two large paper-mills forming one establishment about a mile from the town: in the same establishment woollen rags are reduced to the state of wool for the purpose of being again spun and woven. The trade of Montargis is promoted by the canals of the Loing, of Orléans, and of Briare, which unite near the town; the chief articles of trade are cattle, corn, wine, wood, and wool. The exhalations from these canals have caused a deterioration in the air of the place, once so famous for its purity and healthfulness. Montargis has a handsome theatre, one or two subordinate courts of justice, and an agricultural society. This town was besieged by the English, A.D. 1427, but the siege was raised, and the besieging force entirely defeated by Dunois, bastard of Orléans. It was however taken by the English in A.D. 1431, and retained by them till A.D. 1438. Montargis was the birth-place of the quietist Madame La Motte Guyon, whose poems were translated by Cowper, and of Manuel, procureur or attorney of the commune of Paris in the French revolution. Châtillon sur Loing was the birthplace of Admiral Coligny. Château Renard was one of the strongholds of the Huguenots in the religious wars of the sixteenth century: its fortifications were on that account demolished by Louis XIII. Lorris was formerly distinguished by a recognised custom of deciding all questions of disputed debts, in the absence of documentary evidence, by single combat between the debtor and creditor; if gentlemen, with swords; if of inferior rank, with fists.

Near the village of Nogent sur Vernisson are some remains of a Roman town or post, the name of which is unknown. The principal relic is a theatre, in the enclosure of a château, called Chenevier. The benches or seats are formed of small cubical stones, similar to those employed in several Roman edifices. Several medals, a bronze Mercury, and other antiquities have been discovered; and in the neighbourhood of the theatre, in a thicket, are some remains supposed to be those of baths. These antiquities have been but little noticed by the French antiquaries.

The manufactures of the department are considerable. The wool of Beauce and Sologne is made up into various fabrics: parchment and hosiery are manufactured; and sugar refining, vinegar-making, and the distillation of brandy are carried on to a considerable extent. Trade is carried on in the agricultural produce, grain, wine, and timber; in brandy, earthenware, and moulds for the sugar-refiners.

The department constitutes the diocese of Orléans, the bishop of which is a suffragan of the archbishop of Paris. It is in the jurisdiction of the Cour Royale and in the circuit of the Académie Universitaire of Orléans: and in the first military division, the head-quarters of which are at Paris. It returns five members to the Chamber of Deputies.

In respect of education this department is rather above the average of France: the number of young men in the military census of 1828-29 who could read and write was forty-two in every hundred; the average of France being rather more than thirty-nine.

This department formerly constituted part of the territory of the Carnutes, one of the Gallic nations of Celtic stock. In the Roman division of Gaul it was comprehended in Lugdunensis Quarta. Genabum, or Cenabum, the modern Orléans, was one of the chief trading stations of the Carnutes. This town took at a subsequent period the name of Aureliani, probably from the emperor Aurelian. A town is mentioned in the Itinerary of Antoninus by the name of Belca, which is probably the present village of Bouzi, on the left of the road from Orléans to Gien. A part of the territory of the Senones, another Celtic people, is included in the department: Brivodurum, the modern Briare, was one of their towns. In the decline of the Roman Empire, this department was ravaged by the Huns; and afterwards divided between the Franks and the Visigoths, whose territories were separated by the Loire. It subsequently came altogether into the hands of the Franks, and in the division of their territories among the sons of Clovis, formed part of the kingdom of Orléans. It was included in the great Duchy of France united to the crown by Hugues Capet. [ORLEANS.] It comprehends Orléanais proper, with part of Gâtinois and Dunois, subdivisions of the province of Orléanais; also a part of the former province of Berri.

LOKMÂN is represented in the Koran and by later Arabian tradition as a celebrated philosopher, contemporary with David and Solomon, with whom he is said to have frequently conversed. He was, we are told, an Arabian of the antient tribe of Ad, or, according to another account, the king or chief of that tribe, and when his tribe perished by the Seil-ol-Arim [ARABIA, vol. ii., p. 215] he was preserved on account of his wisdom and piety. Other accounts, drawn mostly from Persian authorities, state that Lokmân was an Abyssinian slave, and as noted for his personal deformity and ugliness, as for his wit and a peculiar talent for composing moral fictions and short apologues. He was considered to be the author of the well known collection of fables in Arabic, which still exist under his name. There is some reason to suppose that Lokmân and Æsop were the same individual. This supposition is founded on the close correspondence of the traditional accounts of the person, character, and life of Lokmân, with those of Maximus Planudes respecting Æsop. [ÆSOPUS, vol. i., p. 155.] Even the name of Lokmân may, by a slight transposition, be derived from the Greek Alkman. If Lokmân is not altogether a fictitious person, his history seems to have been mixed up with that of Æsop. The monk of Constantinople probably engrafted many incidents of his life on the few circumstances recorded by the classic writers respecting that of the Greek fabulist. He may have been induced to do it by the apparently Asiatic origin of Æsop and the derivation of his name (from *αἴθω* and *ὤψ*, which to a Greek would seem no forced derivation), and this assumed Asiatic origin might afterwards give rise to his dull buffooneries, his bodily defects, and Æthiopic extraction.

The fables of Æsop have by no means the character of antient and original Greek compositions. Many of them are strongly marked with an Oriental character. They bear a very striking resemblance to the Indian fables in the 'Panchatantra;' they allude to Asiatic manners and customs; and animals are mentioned in them, which are only found in Upper Asia, as monkeys, peacocks, &c. In the fables of Lokmân the same peculiar features frequently occur. Hence we may safely infer that both collections were originally derived from one common source, the Indo-Persian entertainment of this description: from this source certainly came the fabulous work attributed to Syntipas (who was no other than the Sindbad of the 'Arabian Nights'), and other works of that kind, which during the middle ages so powerfully attracted the attention of Europe.

(See Boissonnade, *Præf. ad Syntipam*, p. vi.; Grauert, *De Æsopo et Fabulis Æsopicis*, Bonnæ, 1825.)

The fables of Lokmân show, in many instances, evident marks of a later and traditional origin; the moral or application is frequently misunderstood, or at least ill adapted to the apologue; a few antient expressions had then become obsolete and are interpreted by words of more modern origin; and the language in general exhibits some slight deviations from grammatical accuracy, and approaches nearer to the modern Arabic idiom; as for instance, in the use of the oblique case instead of the first case. The style is easy and flowing. The fables have often been reprinted for the use of those who are beginning to study the language, after the first edition with a Latin interpretation, by Erpenius, Lugd. Batav., 1615; the best and latest editions are by Cousin, Paris, 1818; Freytag, Bonnæ, 1823; and Roediger, Halis, 1830.

LOLI'GO. [SEPIADÆ; TEUTHIDÆ.]

LOLIGOPSIS. [SEPIADÆ; TEUTHIDÆ.]

LO'LIUM, a genus of Grasses, containing a few species common in many parts of the northern hemisphere, is defined as follows:—Spikelets many-flowered, distichous, contrary to the rachis, sessile. Flowers not bearded at the base. Glumes 2, nearly equal, one of them very often deficient in the lateral spikelets, herbaceous, awnless. Paleæ 2, herbaceous; the lower concave and awnless, or awned under the apex; the upper with two keels. Stamens 3. Ovary smooth. Styles 2, very short. Stigmas feathery. Hypogynous scales 2, fleshy, entire or two-lobed. Rachis not jointed. There are two species which require notice. 1, *L. perenne*, the common Ray-grass, or Rye-grass of the farmer, with lanceolate awnless spikelets which are longer than the glume, a naked stem, and a perennial root. Of this, which is one of the most valuable of our pasture grasses, an account is given elsewhere. [RYE-GRASS.] 2, *L. temulentum*, or darnel, with elliptical awned spikelets, straight awns longer than the paleæ, glumes the length of the spikelet, and an annual root. Of this species mention is made not only in all parts of Europe, but in Japan, New Holland, China, and Monte Video; it is remarkable as being the only well authenticated instance of a plant belonging to the order of Grasses, in which narcotic or even deleterious properties have been found. The grains are said to produce intoxication in man, beasts, and birds, and to bring on fatal convulsions. According to Christison, darnel, when mixed with flour and made into bread, has been known to produce headache, giddiness, somnolency, delirium, convulsions, paralysis, and even death. A few years ago, the same author tells us, almost the whole of the inmates of the Sheffield workhouse were attacked with symptoms supposed to be produced by their oatmeal having been accidentally adulterated with Lolium; and a case is on record of a small farmer near Poitiers in France having killed himself by persevering in the use of darnel flour for making bread; his wife and servant, who discontinued to eat it, escaped, but were violently affected with vomiting and purging.

LOLLARDS, a religious sect which arose in Germany at the beginning of the fourteenth century, and differed in many points of doctrine from the church of Rome, more especially as regarded the mass, extreme unction, and atonement for sin. It took its name, according to some writers, from Walter Lollard or Lolhard, who was burnt alive for these doctrines at Cologne in 1322; but it would seem that Walter rather received his name from the sect, than gave a name to it. The real origin of the term appears to be the German *lullen*, *lollen*, or *lallen*, to sing, with the well-known termination of *hard* which is subjoined to so many German words; and it implied a person who was continually praising God in sacred songs. Lollard subsequently became a term of reproach for all heretics, who were supposed to conceal erroneous doctrines under the appearance of piety; and, in England, at the close of the fourteenth century, it was given to the followers of Wicliffe. Knighton, noticing the success of that reformer's doctrines (*Twysd. Script.* x. col. 2664) says, 'more than half of the people of England in a few years became Lollards.'

Mosheim, in his 'Ecclesiastical History' (b. iii., part ii., ch. 2), observes, 'Charles, duke of Burgundy, obtained a decree from Sixtus IV., in the year 1472, by which the Cellitæ or Lollhards were admitted among the religious orders, and were withdrawn even from the jurisdiction of the bishops; and Julius II., in the year 1506, conferred on them still greater privileges. Many societies (he adds) of their kind still exist at Cologne and in the cities of the Netherlands, though they have essentially departed from their antient manner of life.' This, of course, was previous to the French Revolution. (Furetiere, *Dictionnaire Universel*; Mosheim, *Institutes of Ecclesiastical History*, by Murdock, 8vo., Lond., 1832, vol. ii., p. 454-456.)

LOMATO'CERAS. M. Bronn has given this name to a generic group embracing certain of the Linnæan Graptolithi [GRAPTOLITHUS] instead of Priodon, which had been assigned to them by Nilson, but previously employed by Cuvier for a genus of fishes. Graptolithus scalaris and G. sagittarius, Linn., belong to this group, which as far as yet known is confined to the 'transition strata,' in which it occurs in Norway, Bohemia, France, North Germany, Shropshire, &c., generally accompanying trilobites. (Bronn, *Lethæa Geognostica.*)

LOMBARD, an antient name in England for a banker. It was derived from the Langobardi, or Lombards, a company of Italian merchants, the great money-changers and usurers of the thirteenth century, who appear to have settled in England before the year 1274, and took up their first residence in a street of the city, still called, from them, Lombard Street.

Stowe, in his 'Survey of London,' 4to., 1603, p. 202, says, 'Then have ye Lombard Streete, so called of the Longobards and other merchants, strangers of diverse nations, assembling there twise every day. The meeting of which merchants and others there continued until the 22nd of December in the year 1568, on the which day the said merchants began to make their meetings at the Bursse, a place then new builded for that purpose in the warde of Cornhill, and was since by her majestie Queen Elizabeth named the Royal Exchange.'

The extortions of the Lombard merchants in King Edward III.'s time became so great that he is stated to have seized upon their estates. They continued however to follow their trade; and when Henry VI. borrowed money of them, they had the customs mortgaged to them for security.

(Du Cange, *Gloss.* v. 'Langobardi;' Pennant's *Hist. of Lond.*, edit. 1790, p. 407; Nares's *Glossary*.)

LOMBARDIC ARCHITECTURE. This style, which has already been touched upon in the article GOTHIC ARCHITECTURE (vol. xi., p. 320), may claim to be considered the generic one which prevailed after the extinction of the Roman until the appearance of the Pointed or Gothic. It is the intermediate link between them, but so united with them that it is difficult to fix with precision where it begins or where it terminates. Yet although the same elements, variously modified indeed, may be traced in our Saxon or Early Norman and Norman styles, and also in the contemporary styles of other countries, the term is usually restricted to the Italian architecture of the period alluded to, which, if it has something in common with those collateral styles, namely, what they borrowed from it, possesses also much that is sufficiently distinct, and that marks it as a separate class. In the degenerate Roman architecture the rudiments of a new style were beginning to develop themselves, owing to the almost general application of the arch, both as a constructive and ornamental feature, and also to the subordinate rank assigned to columns, which, besides being engaged, or partly inserted into the wall, were greatly diminished in size, that is, although they retained the same proportions as before, they were upon a comparatively diminutive scale in proportion to the edifice itself, each story being, as in the Colosseum, decorated with its own order. Consequently, though nominally no change had been made, in reality a great revolution in art had been effected.

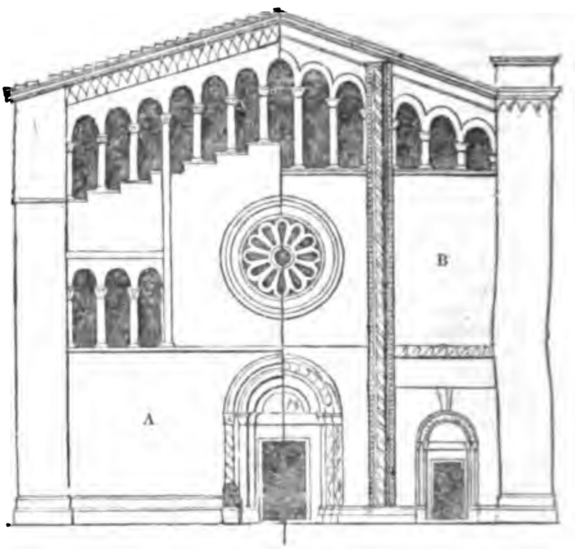
Notwithstanding therefore that we are accustomed to regard the Lombardic historically as altogether another style, it does not present much greater discrepancy of character from that which it supplanted than the latter does from the earlier Greco-Roman. In fact it was only a further development of the system introduced during the decline of Roman architecture, and so far more consistent and homogeneous than the other, which exhibited the attempt to reconcile discordant features and conflicting principles, namely, small orders applied merely as decoration, and tiers of arches whose piers form the solid parts and supports of the structure. Whether it was the result of chance, caprice, or necessity, or of all three, the Lombardic style reconciled these two contradictory modes by combining together the arch and the column, and rendering the latter the essential support of the former. It is true, arches resting upon insulated columns occur in buildings of the *Decadence* period, for instance, in what are now the churches of Sta. Costanza and Santo Stefano Rotondo, at Rome; but in such cases, instead of springing immediately from the capitals of the columns, the arches rest upon a piece of entablature forming a square block above the capital (which practice has been copied in the interior of St. Martin's church, London). The discarding all appearance of entablature was undoubtedly an improvement, since such detached fragments of it served only to render the impropriety—supposing there to be any—of placing arches upon columns all the more glaring, because indicating what ought to be a continuous horizontal member. At first the columns themselves were mostly tapering, not cylindrical as the slender detached ones met with in the Pointed style, and the capitals bore a more or less close resemblance to those of the Corinthian order in contour and proportion. The capital itself however was larger in proportion to the rest of the column, thereby affording a greater surface or impost for the arches to rest upon; and also combining the appearance of security at that point with general lightness of appearance. The shaft was mostly plain, yet frequently highly ornamental, striated or carved in different ways, and sometimes twisted, either singly or with two stems twining spirally around each other. Columns furnishing examples of all these different modes occur in the cloisters of San Paolo and San Giovanni Laterano at Rome, and the capitals present quite as much variety, it seeming to have been the aim on such occasions to introduce as much diversity as possible, instead of so arranging the columns as to have two of the same kind placed together; a practice probably originating in making use of columns and fragments taken from other buildings; and afterwards retained as conducing to variety and richness.

Although the arches were, as frequently as not, quite plain, and without archivolt mouldings of any kind, the use of archivolts was by no means uncommon; sometimes consisting of merely a single moulding enclosing a plain border around the arch, at others divided into *faciæ*, and more or less enriched, as in the front of the cathedral of Pisa, in which building the arches describe more than a semicircle above the capitals of the columns, being prolonged downwards by a deep abacus, consisting in some places of two, in others of a single plain block resting immediately on the capital; a mode certainly preferable to that of placing a mere lump of entablature upon the column, and not ungraceful in itself, because it gives greater height and importance to the arches, which, being narrow, would else appear stumpy, depressed, and overloaded by the ornament around them. Similar blocks or *abaci* occur in the remains of Frederick Barbarossa's palace at Gelnhausen, where small heads or masks are introduced immediately above such abaci, so as to fill up the space there between the arches, and continue in some degree the vertical lines produced by the columns.

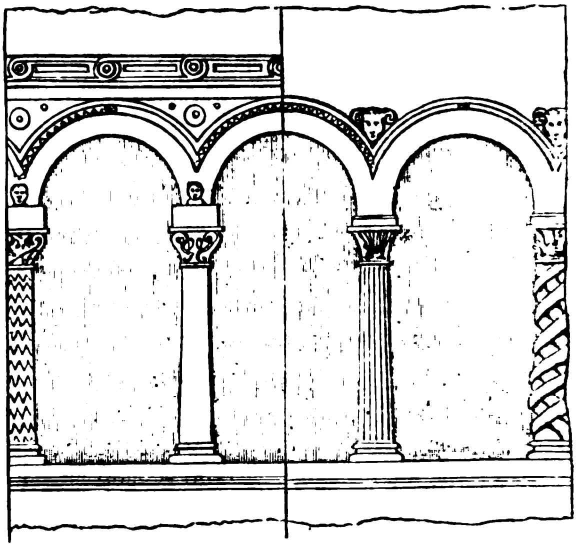
Among the other more prominent characteristics of this style, which are all that we can here touch upon, it should be noticed, that whether forming actual porticos and galleries, or closed up and applied merely as decoration, these arcades were generally small in proportion to the building itself, and instead of occupying the entire width of the front, or other elevation, were mostly inserted into distinct compartments of it, slightly recessed within the general face of the wall, so that the plain spaces between them assumed the appearance of buttresses, or, when narrow, of plain pilasters continued up to the cornice of the gable or roof, and cutting through whatever string-courses, or other horizontal mouldings (if there were any), divided the different stories or stages of the edifice. Such buttress-like surfaces—for buttresses they cannot properly be termed—were occcasionally more or less enriched; sometimes so much so, as to produce vertical lines of ornament continued the entire height of the building, as in the front of San Michele at Pavia—which city may be considered as the cradle of Lombardic architecture. When, as was frequently done, these surfaces were made wider at the angles of the front than elsewhere, they gave an expression of repose and of great solidity to it, serving as it were as a frame to the architectural decoration.

Among the other peculiarities of this style, that arising from small open galleries immediately beneath the cornice or roof is too remarkable to be overlooked, especially in gable fronts, where the arches of such galleries follow the slope of the roof itself, the columns being successively elevated one above another on steps (so that the base of those supporting the centre arch are above the lower arches), as at San Michele, just mentioned; or else by placing the columns on the same horizontal line, and gradually increasing their height, as in the front of Pisa cathedral. To this may be added the very prevalent custom of making an upper cornice or border of very small interlacing arches, or rather of mouldings producing that appearance. Pinnacles are of rare occurrence, and when introduced have the look of being set on the part they rise above, being separated from it by horizontal mouldings; besides which they are generally low, and somewhat resemble pedestals. Pinnacles of this description may be found surmounting pilaster-breaks, and cutting through either an horizontal cornice or the sloping ones of a gable, as in the front of the cathedral at Monza.

To render the above slight account of this mediæval Italian style more intelligible, some of its elements and leading forms are here indicated in a sketch exhibiting two different compositions of a façade; the half front marked A showing the columns of the arcade in the gable all of the same height, but placed on different levels; while that marked B represents them standing on the same horizontal line, and consequently unequal in height. The side B also shows a variation in regard to the form of the gable, which, instead of extending the whole width of the front, takes a horizontal direction over the pier at the angle. An enriched pilaster face is also introduced in this division of the cut, and, although rather peculiarly applied, is warranted by the authority of San Michele at Pavia. A very imperfect idea however is thus conveyed of the variety of features, combinations and proportions which the style itself admits.



The other cut gives an example of an arcade on a larger scale, with columns variously ornamented, and having their capitals surmounted by blocks, which give greater elevation to the arches themselves. This however is only one particular mode; besides which both the columns and arches here shown are uniform in their proportions, and consequently must not be considered as attempting to afford a definite standard of a style which permits such very great latitude in regard to features of that sort.



LOMBARDO VENETIAN KINGDOM, REGNO LOMBARDO VENETO, is a state of North Italy, composed of the former duchies of Milan and Mantua, and of the territory of the late republic of Venice. The duchy of Milan came into the possession of Charles V. in 1535, after the death of the last duke Sforza, who left no issue. [LOMBARDY.] Charles V. left it to his son Philip II. of Spain; and it remained under the Spanish branch of the house of Austria for a century and a half, until the extinction of that branch, when by the result of the war of the Spanish succession it passed under the dominion of the German branch of the house of Austria. The duchy of Mantua was governed for a long time by the Gonzaga as a fief of the empire, but the last duke, Ferdinand, having sided with the French during the war of the Spanish succession, the emperor Joseph I. put him under the ban of the empire, and the Austrian troops having taken Mantua, the emperor annexed it to the duchy of Milan. Austria continued to govern these united states till Bonaparte's invasion of 1796. By the peace of Campoformio of the following year Austria gave up Milan and Mantua, and received as a compensation for them and Belgium, which was also taken from her by the French, the territory of the republic of Venice, which

Bonaparte had overthrown. Milan and Mantua, or Lombardy Proper, were constituted first as a republic dependent on France, and afterwards into a kingdom, of which Napoleon made himself king in 1805. At the close of that year, in consequence of the campaign of Austerlitz, Napoleon retook from Austria the Venetian territories, which he annexed to Lombardy, styling the whole by the name of the kingdom of Italy, though this new kingdom did not comprise above one-third of Italy. He added to it the state of Modena, the Legations, and lastly in 1808 the Papal Marches. The whole population of this kingdom was about six millions. In 1814 the Austrian and allied forces occupied the kingdom of Italy, and the emperor Francis again took possession of his former territories of Milan and Mantua, and also of Venice, the latter as a compensation for his loss of Belgium; and this measure was confirmed by the congress of Vienna. The districts south of the Po were restored to their former sovereigns; Modena to its duke, and the Legations and Marches to the Pope. The emperor Francis then constituted the territory of Milan, Mantua, and Venice into a kingdom, styled Lombardo-Veneto, which was annexed to the imperial crown of Austria.

The northern boundaries of the Lombardo-Venetian kingdom, proceeding from east to west, are the Alps of Friuli, and the Carnic Alps, which separate it from Carinthia and Carniola, and several offsets of the Rhætian Alps, which divide it from the Tyrol; farther to the north-west it is bounded by the main chain of the Rhætian Alps, from the Ortler Spitz to Monte Jorio, which divide it from the Grisons. From Monte Jorio, an irregular boundary line, not very definitely marked by nature, divides the Lombard territory from that of the Canton Ticino, which forms part of Switzerland. This boundary-line between the two states terminates on the eastern coast of the Lago Maggiore, a few miles north of the influx of the river Tresa. From thence southward, the Lago Maggiore, and the river Ticino, which issues from it, mark the western boundary of the Lombardo-Venetian kingdom, and divide it from the Sardinian territories. The course of the Po marks its southern boundary, and separates it from Parma, Modena, and the Papal State, except in one part of the Modena frontier, where a slip of ground along the southern bank of the Po, which belonged to the old duchy of Mantua, continues to form part of the present Austrian Lombardy. In the delta formed by the Po, the branch of that river called Po d'Ariano, the mouth of which is named Porto di Goro, marks the limits between the Austrian and Papal territories. [Ferrara, Legazione di.] The eastern boundary of the kingdom is formed by the Adriatic. Its limits to the north-east are fixed at the mouth of the river Ausa, west of the Isonzo. [Friuli.]

The Lombardo-Venetian kingdom is governed by a Viceroy, who is generally an arch-duke of the Imperial Austrian family, and resides at Milan: it consists of two great administrative divisions: 1, Provincie Lombarde, or government of Milan; and 2, Provincie Venete, or government of Venice. These divisions acknowledge for their respective political heads the governors of Milan and Venice. Each division is subdivided into provinces called Delegaziohi, at the head of which is a delegate; each province is divided into districts, and at the head of each district is a commissary. The districts are subdivided into communes, and each commune has a podestà for its local magistrate. The provinces are described under the following heads: Lombard provinces—Bergamo; Brescia; Como; Cremona; Lodi e Crema; Mantova; Milano; Pavia; Sondrio, or Valtellina. The Venetian provinces are likewise described under Belluno; Padova; Rovigo; Treviso; Venezia; Verona; Vicenza; Udine, or Friuli.

The whole population of the kingdom consisted in 1832 of 4,279,000 persons, namely, 2,379,000 in the Lombard provinces, and 1,900,000 in the Venetian. (Serristori, *Saggio Statistico dell' Italia*, Vienna, 1833.) In 1837 the population of the Lombard provinces had increased to 2,460,079. (*Bollettino di Notizie Statistiche*, published by Lampato, Milano, Maggio, 1838.) We have not seen any corresponding statement concerning the Venetian provinces later than 1833.

The governor of each of the two great divisions of Milan and Venice is advised and assisted by a central congregation or provincial assembly, consisting of landholders and deputies from the royal towns, of which there are several in each province. Every province returns two landholders, one noble and the other not noble, as deputies, and every royal town returns one deputy. The respective communal or municipal councils select three persons, out of whom the emperor, as king of Lombardy, chooses one as a deputy. The deputies are elected for six years. These congregations are not legislative assemblies, but boards of administration; they settle the proportion of the taxes, both general and local; they inspect the accounts of repairs of roads, bridges, &c., and have also the superintendence of the charitable establishments of the country and their revenues. They can petition the sovereign concerning the wants and wishes of the people. Their resolutions are by a majority of votes. In every head town of a province there is a provincial congregation consisting of eight, six, or four landowners, one-half nobles, and the other half not noble, who concern themselves especially with the administration of the municipal and communal finances of their respective districts. The communes have their own councils, and a complete system of communal administration has been established. (*Collection de Constitutions, Chartes, et Loix fondamentales des Peuples de l'Europe et de l'Amérique*, par Dufay, Duvergier et Gaudet, vol. v.)

The administration of the Lombardo-Venetian kingdom since the Restoration has paid peculiar attention to the material improvements of roads, bridges, canals, dykes, and other public works, for which, in the course of fifteen years, from 1820 to 1834, the treasury has disbursed forty-two millions of livres for the Lombard provinces alone. This amount is independent of the sums expended by the communes for the communal or cross roads, which from 1814 to 1831 amounted to about twenty-four millions, for a length of 3294 miles of road. Thirty-five years since there were few communal roads in Lombardy deserving the name. Of the forty-two millions disbursed by the government treasury, five millions have been employed in constructing or repairing the dykes in the province of Mantua; about four millions in completing the great canal called Naviglio; a million and a half in making roads in the mountainous districts of Bergamo; about as much again for the great commercial road of the Splugen; two millions and a half for the road over the Stilfser Joch, and nearly three millions more for continuing it along the eastern bank of the lake of Como down to Lecco; 2,323,000 livres for completing the cathedral of Milan; another million for other improvements at Milan; 600,000 livres for the splendid bridge at Buffalora on the Ticino; 200,000 livres for a new asylum for the deaf and dumb; 270,000 livres for buildings accessory to the university of Pavia; 103,000 for a new college at Sondrio in the Valtellina; half a million for roads in the province of Pavia, &c. A recent French traveller observes that 'nowhere perhaps on the Continent is the administration of the roads and bridges more actively and usefully employed than in Lombardy. The whole of this part of Italy exhibits a solid material prosperity; it presents the fine side of the Austrian dominion. The roads are like the walks of a garden, and they are kept in repair with the greatest care. This government, economical and parsimonious in other respects, is great and magnificent in this. The excellent state of repair of the high roads of the Lombardo-Venetian kingdom is maintained at the annual expense of about 1,305,000 francs for 1518 Italian miles (60 to 1° of lat.) of length of road.' (Valéry, *Voyages en Italie*, b. 2, ch. xiv.)

The towns of Lombardy, Brescia, Bergamo, Como, and Milan above all, are being embellished, and are increasing in population. Venice is the only exception to this generally prosperous condition: but Venice had been silently decaying for a century before its fall; and Bonaparte, by subverting its national government, completed its ruin. The subsequent stagnation of maritime trade, during the long war that followed, aggravated her distress. When Venice came into possession of Austria in 1814, there were no less than 44,000 individuals, nearly one-half of the population, who required, if not permanent, at least occasional relief from charity. The hospices and other houses for the old, the infirm, &c., were in a state of decay, and from 1814 to 1821 nearly four millions and a half of livres were spent in restoring and supporting those institutions; and four millions more in the following ten years. By these means, about 6000 helpless individuals were relieved. The house of industry for the able-bodied poor had been neglected by the French administration, and the commune or municipality of

Venice was too poor to bear the extraordinary charges required in order to put that institution in a fit state to fulfil its object. The government took it in their own hands for some years, and spent 719,000 livres upon it, till the year 1821, when it was restored to the hands of the commune in a prosperous condition, being able to supply its expenditure by its own means and the produce of the labour of its inmates. Besides the classes thus relieved, there were still numerous families, many of whom had seen better days, but who had fallen into distress, and required at least occasional relief. For these a 'Commission of public beneficence' was established, consisting of the principal citizens, with the podestà and the patriarch at their head: the government began by contributing to its funds at the rate of 100,000 livres a year; it then received subscriptions, donations, and bequests, and now it has an income of about half a million of livres. It distributes relief, especially during winter and in seasons of dearth, to nearly 40,000 individuals annually. The payment of pensions to former public servants, and to several of the old patrician families (who lost their income by the fall of the republic), which had been interrupted under the French administration, was resumed by the Austrian government. Independent of these direct helps, the government undertook the repair of numerous palaces, churches, and other public buildings which were threatened with ruin, as well as of the canals and bridges, and especially of the great marble dyke called the Murazzi, upon which Venice depends for its safety from the waves of the Adriatic. Fifty-three millions of livres have been spent by the treasury for all these objects in the last twenty years. By making Venice the head town of one-half of the kingdom, and the seat of a government, and of numerous offices and boards of administration, considerable advantage has accrued to the town, inasmuch as salaries to the amount of nearly two millions of livres annually are expended in it. The archives of the Venetian republic, the richest collection perhaps of state documents existing, have been placed and arranged in the convent of the Frari, where they fill more than 200 apartments. The Ducal palace of St. Mark, with its splendid marble staircases and apartments adorned with paintings by Titian, Paul Veronese, Tintoretto, and other great masters, had been turned under the French administration into public offices and courts, to the great injury of its ornaments, paintings, and sculptures. The Austrian administration has cleared and restored that monument of antient Venetian greatness, and leaving it unencumbered for the admiration of the public, has purchased the palace Corner and other buildings, at the cost of nearly half a million of livres, for the accommodation of the offices and officers of the administration. Another half million has been devoted to the establishment of the Patriarchal Seminary, and an equal sum for the Academy of the Fine Arts. The whole of Venice has been made a porto franco, by force of which regulation articles of foreign importation are consumed within the town without paying duty. All these cares and benefits have considerably alleviated the general distress which was observable in Venice for several years after the peace: travellers who did not search into the remote causes of it, attributed all to the fault of the Austrian government. The accounts of those tourists who visited Italy in the first years after the peace, when everything was still unhinged in consequence of the great political change, are now quite out of date. The commerce of Venice has revived; the arrivals in the port of Venice, which were 1295 in 1832, amounted in 1837 to above 3000 vessels, of the aggregate burthen of 211,000 tons. Venice ranks now as the third port of Italy, next to Leghorn and Genoa. The maritime commerce of Austria has increased wonderfully since the peace. Twenty years ago it had not above 300 merchant vessels; it has now above 3000, about one half of which belong to Venice. (*Bollettino Statistico di Milano* for the years 1835-38; *Semplice Verità in risposta alle Accuse di Enrico Misley*, Paris, 1834.)

In the department of popular education the Austrian government has extended to the Lombardo-Venetian kingdom the same general and uniform system which it had already established in its German States, and which is one of the most complete in all Europe. The elementary schools were first opened in Lombardy in 1822, and ten years after there was hardly a commune without its school, whilst several of the more extensive and populous communes had two. The number of communes in the Lombard provinces is 2234, and the elementary schools for boys are 2348, and those for girls 1231. Out of the aggregate number of the schools there are 71 upper schools consisting of four classes; the rest consist of two or three classes. The course of instruction is:—First class, spelling, slate-writing, elementary religious instruction, the first two rules of arithmetic. Second class, reading, writing, the catechism, the four rules of arithmetic, and fractions. The course in the first and second classes lasts three years. Third class, calligraphy, Italian grammar, specimens of epistolary and narrative composition, the elements of Latin, explanation of the gospels for Sundays and other holidays, arithmetic, fractions and rule of three. Fourth class, geometry, the principles of architecture, mechanics, geography, drawing, natural history. A fifth class is established in the chief towns of provinces, in which are taught history, the principles of commerce, book-keeping, mathematics, chemistry, the history of the arts, and the German, French, and English languages. The course in the upper schools lasts from three to four years.

The female elementary schools are divided into three classes:—First class, spelling and writing, mental arithmetic, needlework, written arithmetic, and religious instruction, consisting of the little catechism. Second class, religious instruction, orthoepy, the elements of grammar, the four rules of arithmetic, writing and parsing, marking and embroidery. Third class, sacred history, explanation of the gospels, calligraphy, Italian grammar, epistolary composition, the knowledge of weights and measures, and of currency.

In these schools there is upon an average one teacher for every 40 pupils. Corporal punishment is strictly forbidden. The tuition is gratuitous, the schools being supported from the communal fund. The schoolmasters have from 250 to 400 livres of fixed annual salary. A register is kept in every commune, and verified by the rector of the parish, of all the children from 6 to 12 years of age, who are all expected to attend their regular course at the schools, unless they have a dispensation from the visiting inspector, on account of illness or other sufficient cause.

In 1833 there were in the province of Bergamo 906 boys out of every 1000 of the prescribed age who attended the elementary schools. In the province of Como there were 778 out of every 1000; in that of Brescia 747; in that of Sondrio or Valtellina 733; in that of Milan 687; in that of Pavia 647; in Lodi e Crema 646; in that of Cremona 632; in that of Mantua 513. The proportion of girls was as follows:—Bergamo 909 of every 1000; Brescia 619; Sondrio 427; Pavia 403; Lodi e Crema 382; Mantua 330; Milan 302; Cremona 210; Como 195.

Of the Venetian provinces we have not seen later reports than 1825, when the system had not had time to attain its full extent. There were then about 1400 schools, attended by 62,000 boys, being only one-fourth of the whole number of the prescribed age, and directed by 1553 teachers or assistants, and 29 female schools frequented by 2390 girls. There were 405 communes still deficient in schools. The system however was extending, and has been in progress annually ever since. (Quadri, *Prospetto Statistico delle Provincie Venete.*)

The text-books used in these schools are: spelling-book for the lowest class, spelling-book and reading-book; little catechism; an historical compendium of the Old Testament; historical compendium of the New Testament; duties of subjects; elements of physics; elements of geometry; introduction to geography, in two parts; introduction to Italian grammar; guide to composition; religious instruction for the two elementary classes; methodical guide for teaching; little tales for instruction; principles of arithmetic in four parts, for each of the four classes. These books are sold at a few centimes each, and about 192,000 copies of them are distributed annually to the pupils. (Sacchi, *Memoria Statistica sull' attuale Stato dell' Elementare Istruzione in Lombardia, in confronto degli altri Stati d'Italia*, Milano, 1834; *Bollettino Statistico di Milano, anno* 1835, *primo semestre*, pp. 81, and fol.)

In the upper elementary schools of the chief towns of provinces there are courses of methodical teaching for those who are intended for schoolmasters. About 500 pupils follow these courses annually.

There are also in the towns and villages of Lombardy 'scuole festive,' or Sunday and holiday schools, above 200 in number, for children above twelve years of age, or for those below that age, who cannot on account of their occupations attend the daily elementary schools. In some of these lessons are given in drawing applied to the arts. In Milan the Academy of the Fine Arts gives evening courses during the winter for those operatives who wish to learn ornamental, architectural, and plan drawing, machinery, engineering, &c. There are also for the wealthier classes about 50 collegi convitti, or public boarding-schools, and 80 private ones, besides 600 private daily-schools. Infant-schools have also been established of late years in most towns of Lombardy. ('On the Institution of Infant Schools and Holiday Schools in Lombardy,' in No. xix. of the *Quarterly Journal of Education*, July, 1835.)

From the upper elementary schools boys who intend to pursue their studies pass into the gymnasia, of which there is one in almost every town, and about 66 in the whole kingdom, with about 300 professors, and attended by between 7000 and 8000 students. The gymnasial course lasts six years, four of which are employed in the study of Latin and Greek grammar and prosody, the geography and history of the Austrian empire, and Roman antiquities. The other two years are engrossed by rhetoric and poetry, study of the classics, algebra, general geography, and history, antient and modern, and religious instruction. (Sacchi, *Quadro Statistico dell' Istruzione Ginnasiale in Lombardia*, in the *Bollettino Statistico di Milano*, March, 1835; and also an article on 'Italian Education,' in No. vi. of the *Quarterly Journal of Education*, April, 1832.) Besides the gymnasia, there are 38 private institutions for youths, 'case private d'educazione maschile,' approved of by the government, which exercises an inspection over them. There are two general direzioni, or boards, at Milan and Venice, for the superintendence of all the establishments for secondary or grammar education throughout the kingdom. For the instruction of young ladies there are 34 collegi femminili, mostly under the direction of the nuns of Santa Teresa, of Sales, of Santa Chiara, and other orders, which devote themselves to the education of youth, and which are the only convents existing in the Lombardo-Venetian kingdom. All other monastic institutions were suppressed long since under the French, and their property was sold.

The Lombardo-Venetian kingdom is not only better supplied with elementary instruction than any other Italian state, but it is the only one in which a universal system of popular education has been established. With regard to 'secondary' or gymnasial education this kingdom is also better provided than any other Italian state, the continental dominions of the king of Sardinia alone excepted. The method however of the gymnasial education has remained as it was of old, and is susceptible of improvement. It is considered by many persons that too much time is spent about Latin, at least by the majority of the pupils, who are not intended for the bar and other learned professions. Above the gymnasia are the Lycea, of which there are 12 in the whole Lombardo-Venetian kingdom, namely, two at Milan, and one in each of the following towns: Bergamo, Brescia, Mantua, Cremona, Como, Lodi, Venice, Verona, Vicenza, and Udine. The Lycea are devoted to philosophical studies, and the course lasts two years.

Lastly, the two universities of the kingdom, Padua and Pavia, supply instruction in all professional branches of learning. A detailed account of these universities is given in an article on the 'Statistics of Education in Italy,' in Nos. v. and xvi. of the *Quarterly Journal of Education*, Oct. 1834.

The object of the Austrian government in this extensive system of education is clear and definite; it proposes to form a population of docile but not ignorant or indolent subjects; to make individuals in general contented with their respective stations in life, without precluding any one from using his honest exertions to make the best of that station; and also, if talents and opportunities should favour, to rise to a higher one without injury to others or disturbance to society. There is no exclusive caste in Lombardy; all are equal before the law, and any one may attain the highest offices of the state. 'The Austrian government,' says an intelligent French traveller, already quoted, 'is both military and pedagogical; sergeants and schoolmasters are its functionaries. The effects of this general education are already quite perceivable in Lombardy, and we may expect soon to see the fulfilment of a very fine sentiment of the emperor Francis. Being urged once by some Milanese noblemen to proclaim a distinct criminal statute for this kingdom, as the Austrian statute was considered too mild for the temper of the Italians, he refused, saying that the spread of education and civilization would render his code as fit for Lombardy as it was for the hereditary states. "When all the people shall be able to read," said he, "they will stab no longer."' (Valéry, *Voyages Historiques et Littéraires en Italie*, b. iii., ch. 12.)

The Austrian civil and criminal codes are in force in the Lombardo-Venetian kingdom. Of the merits of the Austrian civil code much has been written, and several modern jurists, Thibaut, Schmidt, and others, have considered it in several respects superior to the French or Napoleon code. The penal code is generally milder than the French; but the trial, or *débats*, as the French call them, are not public: the depositions of the witnesses are taken in writing, and communicated to the accused, who can demand to be confronted with the witnesses against him. A legal proof is required, besides the full moral conviction of the judge, in order to condemn a culprit. This legal proof is made out not solely, as it has been misstated, from the confession of the accused, but also from the deposition of the witnesses and from circumstantial evidence. Two assessors attend the judge throughout the whole proceedings, and affirm upon oath their legality and impartiality. Every species of torture has been abolished since the reign of Joseph II. The Austrian penal code has also abolished the penalty of confiscation, which the code Napoleon retained in certain cases—among others, against emigrants. By the Austrian law, the property of a state prisoner or political emigrant who will not surrender himself for trial is placed in the hands of trustees, who administer it for the benefit of his family, creditors, and heirs; and it is restored to him on his return, or to his next of kin after his death, if he dies an emigrant. For other particulars we refer readers to the code itself, as many misrepresentations of its provisions have gone about the world, in books of travels or political pamphlets, few of the authors of which have taken the trouble of ascertaining the truth. There is however one work, with a half-official character, which has undertaken to refute many of the most outrageous charges made against the Austrian administration in Lombardy, by appealing to texts, dates, and notorious facts. (*Semplice Verità in risposta alle Accuse di Enrico Misley*, Paris, 1834.)

Religious toleration is guaranteed by the Austrian laws. The Protestants have a chapel at Venice, and another at Bergamo. The Greek or Eastern communion has a church at Venice; and the Jews have synagogues at Venice, Mantua, Padua, and other towns.

The Italian regiments are,—eight of infantry, of three battalions each; one battalion of chasseurs, or light infantry; and one regiment of cavalry. These are numbered among the other regiments of the Austrian army, and, like them, are called to do duty in any part of the monarchy. There are besides two garrison battalions at Mantua and Venice; and a corps of gendarmerie for the police service. There is a military college and a school of artillery at Milan. The navy consists of from thirty to forty vessels of war, including three ships of the line; and its principal station is at Venice, where there is a college for cadets, also a corps of marines, and a battalion of naval artillery. In all, the number of the military furnished by the kingdom in time of peace amounts to about 30,000 men, being one man to 142 inhabitants. [AUSTRIA, EMPIRE OF.] There are eight fortresses in the kingdom, namely, Mantua, which is the strongest of all, Peschiera, Legnago, Osopo, Pizzighettone, Rocca d'Anfo, Palmanova, and Venice. The Austrian troops garrison also, conformably to treaties, three frontier places belonging to neighbouring states, namely, Piacenza in the Duchy of Parma, and Ferrara and Comacchio in the Papal State. In most head towns of provinces there is a commandant. The 'comando generale militare,' or military head-quarters, is stationed at Verona.

The hierarchy consists of two archbishops, of Milan and Venice, the latter of whom has the rank of Patriarch; and eighteen bishops. The parishes are 4483, and the clerical seminaries 17. The clergy in all amount to 23,818 individuals.

The judiciary consists of a Tribunale di Prima Istanza, both for civil and criminal matters, in every head town of a province; of two courts of appeal, one at Milan and the other at Venice; and lastly, of a supreme court for the whole kingdom, called the Senate, which sits at Verona. Two commercial courts are established, one at Milan and the other at Venice. In each of the smaller towns is a Pretore, or inferior judge, corresponding to the juges de paix in France. There are 133 Pretori in the whole kingdom.

The Lombardo-Venetian kingdom is generally one of the most fertile countries of Europe; and the industry of the inhabitants and the extensive system of irrigation increase the natural fertility of the soil.

The numerous rivers which come from the Alps are perennial, and the fields of Lombardy never appear in that parched condition which those of southern Italy, and of many parts of Spain and Portugal, exhibit in summer. The most fertile provinces of the kingdom are those of Lombardy proper, and those of Padua, Treviso, Vicenza, Verona, and Friuli, in the Venetian territory. The poorest provinces are Valtellina and Belluno.

Lombardy proper produces in abundance every thing that is necessary for the sustenance of its population; corn, wine, rice, fruits, cheese, and excellent meat. The two principal articles of exportation are:—1, silk, which is exported annually to the amount of eighty millions of Italian livres, or about 3,200,000 pounds sterling, besides silk manufactures of the value of from twelve to fifteen million of livres: 2, rice, of which the average annual produce is valued at about thirty millions of livres, one half of which is exported. The districts in which the rice is cultivated are the low flats of the provinces of Mantua, Crema, Cremona, and part of that of Milan, as well as the provinces of Padua and Rovigo. The cultivation of rice, which requires the fields to be laid permanently under water for a certain period, has been considered by many as productive of diseases among the peasantry, and yet other authorities, persons who are natives of the districts, and medical men also, among others Frank and Adolfi, contend that this is an error, and that the inhabitants of the rice districts, such as Crema, enjoy as much health and as great longevity as those of the hilly countries of Bergamo and Brescia. (*Analisi delle Risaje*, Crema, 1833; and also an article, 'Le Risaje del territorio Cremano giustificate,' in the *Bollettino Statistico* of Milan, June, 1838.) The other articles of exportation are cheese, especially from Lodi, which is erroneously called Parmigiano, and hemp, which is cultivated in the provinces of Padua, Venice, and Rovigo. Salt is imported from Istria, Parma, and Sicily.

The principal manufactures, besides those of silks already mentioned, are glass, especially at Venice, paper, ornamental works in bronze, and straw hats, especially at Bassano, which are equal to those of Tuscany: there are also establishments for spinning cotton, and other minor works. Lombardy is essentially an agricultural country, and receives most of the manufactured goods which it uses from the other parts of the Austrian monarchy. The bookselling and publishing trade, although subject to the censorship, is more flourishing at Milan than in all the rest of Italy put together. About 1000 new works of every description are published annually throughout the kingdom. Expensive engravings, as well as lithographic prints, form a considerable branch of industry. The journals published in the Lombardo-Venetian kingdom amount to nearly forty; there are daily newspapers at Milan and Venice, and weekly ones in most of the head towns of provinces, and the rest are scientific and literary journals, either monthly or quarterly. Milan and Venice have each an academy of the fine arts, and Milan has also a 'conservatorio,' or college for musical pupils.

The public charitable establishments, hospitals, orphan and foundling asylums, houses of industry, Monti di Pietà, &c., in the whole kingdom are to the number of eighty-eight.

The taxes paid by the kingdom amount to about eighty-three millions of livres, or nearly three millions and a half sterling, and the sources of taxation have remained for the most part the same as they were under the French administration, but the respective burthens of some of the taxes, such as the land-tax, the tax derived from the monopoly of salt and tobacco, the postages, &c., have been somewhat alleviated since the Austrian restoration. The latter has abolished the tax which the French government had put on those who exercised the liberal professions, such as artists, literary men, physicians, &c.

With regard to the expenditure, the public officers, and especially the magistrates and judges, are better paid now than they were under Napoleon's government. In the Lombard provinces alone, the stipends of the judges and pretori amount to 2,055,070 livres or francs annually, while under Napoleon they amounted to 1,640,389 livres only. The professors of the universities of Pavia and Padua have also had their salaries increased. We have already seen that the government treasury assists the communes in supporting and extending the system of popular education. The large sums spent annually by the treasury on public works, roads, canals, dykes, bridges, and charitable institutions have also been mentioned above. The conservatory, or school of music, at Milan, under the French was supported by the tax laid on the licensed gambling-houses annexed to the theatres. The Austrian government has suppressed the gambling-houses, and pays out of its treasury 36,000 francs for the conservatorio, and 240,000 as an encouragement to the theatres.

Making every allowance for the political aspirations and disappointed national feelings of many Italians who regret being dependent on a foreign power, it may be affirmed with safety that the Lombardo-Venetian kingdom is in a thriving and progressive condition, and that it is the best administered country in Italy, excepting perhaps Tuscany.

The general amnesty published in September, 1838, by the emperor Ferdinand, in favour of all political offenders, has contributed to restore a feeling of satisfaction to the bosom of numerous families. Further investigation and discussion on the subject of the Austrian administration in Lombardy may be found in two articles of the *Foreign Quarterly Review*, 'The Austrian Government and the Italian Liberals,' in No. xxvi., May, 1834; and 'Italy and Europe,' in No. xxviii., December of the same year.

LOMBARDY and LOMBARD CITIES. The name of Lombardy, which is derived from that of the Longobards, its former possessors, has been applied in its widest sense, though with no very definite limitation, to that tract of country which the Romans called by the name of Cisalpine Gaul, and which includes the principal part of the basin of the Po, from the point where that river leaves behind it the hills of Montferrat to its entrance into the Adriatic. It consists chiefly of an immense plain nearly two hundred miles in length, and from between sixty to seventy miles in breadth from the lower offsets of the Alps to the foot of the Tuscan Apennines, besides the numerous valleys which open into it from the north. A physical description of this fine region is given under Po.

The overthrow of the kingdom of the Longobards by Charlemagne did not destroy the political existence of that people. They retained their laws and institutions, their property, and their numerous and powerful nobility; they continued a nation and a kingdom, subject however to the monarchy of the Franks. At Pavia, which was then the capital of the country, the successors of Charlemagne were crowned with the iron crown of Lombardy as kings of Italy, previous to their coronation at Rome as emperors of the West and kings of the Romans. The Longobard code continued in force for the Longobard population, while the descendants of the antient inhabitants, or Romans, as they were called, lived under the Roman law. The name of Lombardy was retained, but only for a part of the former dominions of the Longobards: the duchies of Spoleto, Friuli, Tuscany, and Benevento, although some of them continued to be ruled by Longobard dynasties, were not included in the general name.

The feudal system, according to which the possession of land was the pay of the soldier, and constituted his liability to military service and feudal duties, was more fully developed under the weak successors of Charlemagne, when every duke, count, or marquis began to consider himself as independent, and in order to support his independence divided and subdivided the land belonging to him among numerous subfeudatories called vavassors, who swore fealty and homage to him, and were bound to follow him to the wars.

At the same time, that is to say, about the ninth century, the towns began to rebuild their walls, which had been razed by the barbarians, in order to defend themselves against the incursions of the Hungarians, Saracens, and other predatory bands. The towns had retained the antient system of curiæ, or municipalities, and the citizens elected their own magistrates. The distinction between Longobard and Roman became gradually obliterated among the people; they were all Italians or Lombards together.

After the deposition of Charles the Fat in 888, the crown of Italy was disputed for about seventy years among a succession of pretenders, Italians and Burgundians, until Otho I. of Saxony seized it with a firm hand, and was crowned at Rome by the pope, A.D. 961. Otho and his successors resided chiefly in Germany; they came now and then to Italy at the head of armies, when they generally pitched their tents and held their sovereign court in the plain of Roncaglia near Piacenza, whither all the great feudatories of Lombardy and other parts of Italy, and the magistrates of the towns, were summoned to pay their homage, and to listen to the sovereign's decisions and 'placita.' But with the emperor's return to Germany the great vassals retired to their castles, and the magistrates and bishops returned to their cities. Each town and district was in a manner independent of every other, all acknowledging allegiance to a distant sovereign.

The political system of most towns of North Italy in the tenth and eleventh centuries consisted of the nobles, feudatories, and subfeudatories, at the head of whom were the respective archbishops or bishops, and of the principal citizens, who constituted their council, and were consulted by them. The citizens elected their magistrates, called *scabini*, subject to the approval of the bishop. The emperors appointed to the sees, the old mode of election by the clergy and people having fallen into disuse in consequence of the bishops having become feudatories of the empire. The emperors also appointed from time to time their missi, or commissioners, who were often Italian nobles or prelates, and were the representatives of the imperial authority. As for the supposed municipal charters granted to the towns by Otho I., there is no evidence of them. A veil covers the first period of the history of the municipal emancipation of the towns of Lombardy, for no historian of the tenth or eleventh century has traced its progress; it grew silently under the reign of Otho and his successors, the citizens slowly and gradually appropriating to themselves the prerogatives of the sovereign, and not wishing to attract attention to their encroachments.

Towards the middle of the eleventh century we find discord first breaking out in Milan and other cities between the various classes of the population. The vavassori, or inferior nobles, of whom there were several gradations, owing to the extensive system of subfeudation, or subtenure, rose in arms against the great nobles, at the head of whom was the archbishop Heribert. The archbishop defeated them and drove them out of Milan, but being joined by the malecontents from the neighbouring towns, they appealed to the emperor Conrad, who came to Italy in 1036, and deposed and imprisoned the archbishop. Heribert soon made his escape, and returned to Milan, where he was joyfully received by the clergy, the nobles, and the people, and in order to defend himself against the imperial forces he called to arms the people of every district of the town, without distinction of condition. Till this time the use of arms had been a privilege of the nobles or milites. On this occasion Heribert introduced the carroccio, or cart drawn by oxen, in imitation of the ark of the Israelites, with the great banner of the city fixed upon it, which was drawn in the midst of the militia, and upon which stood the leaders, who from a raised platform gave their directions during the fight. By degrees every city adopted the carroccio, which became a kind of palladium, and the emblem of popular independence. Thus it was that the episcopal government of Milan and other cities prepared the way for their municipal liberty. In 1041 the plebeians or burghers rose against the whole class of nobles, owing to some insult offered by one of them to a common citizen. Lanzo, himself a noble, led the people; a battle was fought in the streets, and the nobles were obliged to leave with their families. The archbishop Heribert, who this time had taken no part in the quarrel, emigrated with the rest. The nobles, being joined by others, blockaded Milan, and reduced the citizens to famine, when after three years Lanzo managed to bring about a reconciliation, and the nobles returned. In fact, the citizens could not well do without them, for they formed the only cavalry; and their acquaintaince with the world and their connexions with other states made them useful in the councils.

In 1059 began the long struggle at Milan and in the rest of Lombardy on account of the married clergy. The church of Milan had its peculiar liturgy and system of discipline, called Ambrosian from its great bishop St. Ambrose, and was almost wholly independent of Rome. According to this discipline married men could be ordained priests, as in the Eastern church, and could continue to live with their wives, though an unmarried priest could not marry after his ordination. If a priest became a widower and married again, he was interdicted from exercising his functions. Several passages in the works of St. Ambrose seemed to countenance this system, which existed for ages in other parts of the Western church, notwithstanding several councils had attempted to enforce celibacy among the clergy. At last the council of Pavia, A.D. 1021, in which pope Benedict VIII. presided, attended by the archbishop Heribert, decreed that married priests should separate from their wives and observe in future perpetual celibacy. But the archbishop did not strictly enforce this decree in his diocese, and things continued as before till long after his death (Giulini, *Storia di Milano*, vol. iii.), when several fanatics, among whom was a deacon, excited the people against the married clergy, and against the archbishop Guido, who favoured them; and great disorders followed. Hildebrand, afterwards Gregory VII., who directed the councils of Rome at the time, took part with the zealots, with the view of subjecting the see of Milan entirely to that of Rome. Pope Alexander II. undertook to enforce the decree of celibacy, and he sent for the purpose Erlembaldo as his legate to Milan, giving him a consecrated standard, and issued at the same time a brief forbidding any one to hear the mass of a married priest. This was in the year 1063, and it revived the tumults in Milan. Erlembaldo, supported by a troop of factious persons, insulted the clergy and even drove them from the altar. Then came a bull of excommunication from Rome against the city of Milan, because its clergy and people would not submit to the papal orders. The archbishop however stood firm on the rights of his see, and the people, taking his part, drove away the zealots and the agents of Rome. Weary of the struggle, the archbishop at last resigned, and Gotofredus, a Milanese cardinal, was elected in his stead and consecrated by the suffragans. Pope Alexander excommunicated him, and appointed a certain Attus in his place. Civil war now raged at Milan for several years, until Erlembaldo, the great leader of the zealots, was killed in an affray in the year 1076, to the great joy of the citizens. Gregory VII., for he had now become pope, seeing that force could not subdue Milan, began to weaken its metropolitan by detaching the suffragans from his jurisdiction, annexing Como to the patriarchate of Aquileia, Aosta to the archbishopric of Tarantasia, and Coira to that of Mainz. Genoa and Bobbio were detached from the jurisdiction of Milan at a later period. The great influence which Gregory acquired through the aid of the Countess Matilda, and his triumph over the emperor Henry IV., facilitated the subjection of the see of Milan, whose archbishops became gradually dependent on Rome, received the pallium from the pope, and swore obedience to him. As a consequence of this the clergy became subjected to the Roman discipline, and the regulation was enforced of not admitting any persons to orders except unmarried men. Nothing is said by the historians about those who were already married, but it appears that they were allowed to live and die in peace. Verri, in his *Storia di Milano*, ch. v., has carefully investigated this curious and obscure period of ecclesiastical history, which saw the extinction of the independence of the Milanese or Ambrosian church.

In the great contest of the investitures, Milan, Lodi, Cremona, and other Lombard cities were at first swayed by the nobility, who were mostly favourable to the emperor, but at last in the decline of the imperial authority they joined the Countess Matilda and her second husband Guelph, with whom they formed an alliance. It was during this long struggle that the cities really established their independence, acknowledging no longer the imperial missi, or vicars. The citizens then began to elect a certain number of magistrates, whom they styled consuls, who administered justice and commanded the militia; they were chosen from three orders, namely, captains, or nobles of the first rank, vavassori, and burghers. How the consuls were elected, how many there were, and how long they remained in office, is not ascertained; for the chroniclers of those times do not enter into these particulars. We find as many as twenty consuls at the same time mentioned. The rural nobles inscribed themselves among the citizens, and came to reside, at least for part of the year, in the city, in order that they might participate in the political rights. A council of credenza, 'trust,' consisting of a certain number of citizens of each class, formed a town-council, which deliberated in secret. On important occasions the parliament, or general comitia of the people, was convoked by the sound of the great bell, to give their opinion by acclamation on some matter which had already passed the council of trust. The decisions were promulgated in the name of the 'popolo,' or 'commune,' which meant the whole community. There was no distinction between the judicial and executive powers, nor any real legislature; and for this reason, that the right of making laws was still considered as a prerogative of the king or emperor, assisted by the magnates, or great feudatories, and by the judges, at the great diets convoked for the purpose in the plain of Roncaglia. Laws and written constitutions were few in those times, and the consuls enforced the customs and precedents, 'consuetudines et usus,' which were collected, in 1216, in a kind of code, and published at Milan and other cities. The war of the investitures being over, the cities continued to acknowledge, at least nominally, the emperor's sovereignty over Italy, his right of exacting military service, of giving the investitures of feudal tenures, of sending royal and imperial judges distinct from the magistrates of the people, of demanding the 'foderum,' or tribute for the maintenance of the emperor and his suite whenever he came to Italy, and lastly of sending from time to time his 'missi,' or vicars, who represented the person of the sovereign.

The Lombard cities, having now secured their municipal liberties, began to fight among themselves. Milan and Pavia were rivals of old, and Cremona, which was the third great city of Lombardy, was also jealous of Milan. But before they turned their arms against one another, they began by attacking their weaker neighbours. Cremona attacked Crema, Pavia attacked Tortona, and Milan attacked Lodi and Novara. At last Lombardy became divided between two parties: that of which Milan was the head included Brescia, Crema, and Tortona; and the other consisted of Pavia and Cremona, Lodi and Como. It was not ambition alone that led them to fight; it was an exuberance of animal courage, the pride of physical strength, which led one city to send challenges to another to fight on a certain day and place, to decide which of the two people was the most valiant. 'We cannot,' says Mr. Hallam, in his 'Europe during the Middle Ages,' 'extend our sympathy for the free institutions of the Italian cities to the national conduct of those little republics. Their love of freedom was alloyed by that restless spirit, from which a democracy is seldom exempt, of tyrannizing over weaker neighbours. They played over again the tragedy of antient Greece, with all its circumstances of inveterate hatred, unjust ambition, and atrocious retaliation, though with less consummate actors upon the scene.'

The people of Milan had been engaged in frequent disputes with those of Lodi, as early as the time of the archbishop Heribert, who had forced on Lodi by his arms a bishop of his own choice. From this time a mutual rancour continued to exist between the two cities, which lasted for nearly a century. In 1107 the Milanese made war upon the people of Lodi, destroyed their harvests for four consecutive years, and at last, in June, 1111, took the town, killed many of the inhabitants, plundered the rest, razed their houses, and drove the survivors to the neighbouring villages. The spot is still known by the name of Lodi-Vecchio. The people of Pavia on their side took Tortona and burnt it. In 1118 the Milanese began a furious war against Como, which lasted ten years, and which an anonymous contemporary poet has compared with the Trojan war. In 1127 the people of Como were obliged to submit to pay tribute to Milan, and the walls of their town were razed. The distant emperors, whose authority since the war of the investitures had become almost null, did not attempt to check these disorders. But in the year 1152 Frederic of Hohenstauffen, a man of a different stamp from his predecessors, was chosen emperor by the electors of Germany, and in 1154 he crossed the Alps, assumed the iron crown of Italy at Pavia, and afterwards the imperial crown at Rome. He was beset on his way by Italian exiles, especially from Lodi, who complained of the tyranny of Milan and the other dominant cities.

Frederic spoke to the Milanese the language of reason and justice; he ordered them to let their neighbours of Lodi live in peace, and allow them to rebuild their town. The Milanese with scorn refused to obey, and the war began between the emperor, joined by the militia of Pavia and Cremona on one side, and the Milanese and their allies on the other. The war lasted several years, and horrid cruelties were committed by both parties. At last Milan was obliged to surrender, in March, 1162; the inhabitants were ordered to leave the town with all they could carry, after which Milan was sentenced to be treated as it had treated Lodi—to be razed to the ground; and the people of Cremona, Pavia, Lodi, and Como readily executed the sentence. The Milanese were scattered in the villages around. Thus far the treatment of Milan was only a stern retribution; but a change took place in the character of the respective parties; the conquerors abused their triumph, and the former oppressors became the oppressed without having given any fresh provocation. Frederic having returned to Germany, his officers and podestas treated the Milanese and other Lombards with the most unsparing rigour, and oppressed them in every way. Even the towns of the Imperial party, such as Cremona, were not treated much better; they were allowed to retain their consuls, but were oppressed with taxes. The emperor was applied to for redress, but in vain. At last a general spirit pervaded the cities of Lombardy, and extended to those of the Marches of Verona and Treviso beyond the Adige. In April, 1167, a secret conference was held by deputies of the various cities, in the convent of Pontida, in the territory of Bergamo; and it was resolved to form a league for the common protection, and to assist the Milanese in rebuilding their city. Pope Alexander III. declared himself protector of the Lombard league, which consisted of fifteen cities: Cremona, Bergamo, Brescia, Ferrara, Bologna, Modena, Milan, Parma, Piacenza, Verona, Vicenza, Padua, Venice, Treviso, and Lodi, which was obliged to follow the rest. The league was afterwards joined by Ravenna, Rimini, Reggio, Bobbio, Tortona, Vercelli, Mantua, and Novara. Pavia only remained attached to the emperor's party, and as the marquis of Montferrat took the same side, the allies, after rebuilding Milan, founded a new town on the borders of Montferrat, which they called Alessandria, from the name of their protector. The towns re-established their consular governments, and a kind of federal diet was assembled at Modena, composed of consuls of the various cities, who were styled rectors of the league. But this appearance of a federal union lasted only as long as the contest with Frederic, after which it dissolved itself. The league however carried its purpose bravely for the time. After several campaigns, the Lombard militias completely defeated the Imperial army at Legnano, in May, 1176, took the emperor's camp, and Frederic was obliged to escape alone to Pavia. This led to a truce, and afterwards to the peace of Constance, in 1183. By this celebrated treaty, which served for ages after as an authority for regulating questions which arose between the German empire and the North Italian states, the cities were confirmed in their independent administration; they had the right of declaring war, of coining, in short all the attributes of sovereignty, under an acknowledgment however of the emperor as king of Italy and their suzerain, who appointed an imperial vicar to represent him in Lombardy, as well as judges of appeal in civil matters; and they were bound to furnish him with foderum on his passage, as well as with a military contingent against other states who were not members of the Lombard league.

The glorious struggle of the Lombards for their independence being terminated, they soon fell again to quarrelling among themselves. Several of the towns, in order to check their internal factions, adopted the institution of the Podesta, which Frederic had first introduced. This officer was a kind of dictator; he was supreme judge, assisted however by lawyers or assessors, and had the right of inflicting capital punishment. He was always chosen from the territory of another town, and from among the nobility, and changed generally every year. It was imagined that by chosing a stranger, impartiality might be better secured. Milan chose, in 1186, for its podesta, Uberto Visconti, of Piacenza. The consuls still remained as magistrates of various kinds. The first in rank were styled 'Consuls of the Commune,' and they commanded the militia of the respective districts of the city. There were also 'Consuls of Justice,' who were justices of the peace, and 'Consuls of the Merchants,' elected by the various trades. The consuls of the commune had the administration of the finances, but were obliged to consult with the council of credenza. In 1198 a fresh rupture broke out at Milan between the nobles and the 'popolani' or burghers. The latter insisted on having their separate council, which was called 'Credenza di Sant' Ambrogio,' and it happened that several nobles sided with the popular party, and had their names inscribed in the registers of trades. The Credenza di Sant' Ambrogio was at first composed of artisans; the wealthier citizens, merchants, and men of liberal professions formed another distinct credenza, which they called Della Motta. The valvassori, or inferior nobles, formed likewise their own council (Verri says they joined that of La Motta) distinct from that of the higher nobles or capitani, who, with the archbishop at their head, assembled in their own council, called 'Credenza dei Gagliardi.' Each of these councils had its consuls, who made edicts for those under their respective jurisdiction. In matters concerning the whole state, deputies from each class assembled in a general council, the numbers of which appear to have varied from 200 to 1000. The manner of electing these deputies, their condition and qualifications, and the duration of their office, are not ascertained. The podestà summoned the general council upon important occasions.

The four credenze however generally resolved themselves into two parties, the nobles and the popolani (or plebeians). The nobles of that epoch were strong by their connexions, their subfeudatories and dependents, forming altogether a numerous and compact body, the most warlike part of the population; they were the only cavalry that had stood the brunt of the wars against Frederic Barbarossa. Their superior address, their acquaintance with foreign courts and councils, gave them great advantage; the archbishop and his dependents were on their side; and so in most cases was the podestà, as he also was a noble. But they were haughty and overbearing towards others, and quarrelsome among themselves; and the burghers on their part, as they became wealthier, would no longer brook their assumed superiority. The consequence was that the nobles were driven out of Milan and Brescia, but they returned, being supported by their friends from Cremona and other places. Reggio, Bologna, and other cities were likewise distracted. Besides these internal feuds, there was the old rivalry among the towns, which revived after their united contests with the emperor had terminated. The interminable list of these petty wars, which is given by Bossi and other historians, without any intelligible account of the origin of most of them, excites a feeling of indignation mixed with contempt; people were killed, property was destroyed, and families were made unhappy by these absurd feuds.

One half of the index of the fifteenth volume of Bossi's 'History of Italy,' which comprises the events of the thirteenth century, consists of such heads as these:—Wars of the Lombard cities; private wars of various Italian cities; other wars of the Italian cities; fresh contests between the Italian cities; peace made between several cities; wars and tumults in the cities; wars of the Italian cities (this head is repeated at least twenty times); wars of Lombardy; tumults of Brescia and Milan; tumults at Piacenza; wars in Lombardy and other parts of Italy; wars of Romagna, Genoa, Tuscany, &c.; and all this, independent of the great struggle which was then carried on between the popes and Frederic II. and his son Manfred. [GUELPHS AND GUIBELINS.]

Such was the condition of the free Italian cities in the thirteenth century, and such the manner in which their citizens enjoyed that independence for which their fathers had bravely fought at Legnano. The eloquent panegyrist of the Italian republics of the middle ages attempts to excuse their pugnacious propensity by observing that 'there were then no regular soldiers like ours, who have now to bear all the privations and dangers of war; military service was then a temporary duty, the pleasure and pastime of every citizen, to which he consecrated a few days every year; he fought in sight of his own walls; if he was wounded he was brought back to his own house; and if he died his loss was lamented by all his townsmen' (Sismondi, *Républiques Italiennes*, ch. xv.); and further on he says that 'in all the quarrels of the wealthier citizens, first with the nobles, and afterwards with the lower classes, civil liberty was frequently violated, and personal rights and security were often overlooked; but while in the midst of these disorders civil liberty was trampled upon, democratic liberty remained. Democratic liberty consists, not in security, but in power; it does not ensure to nations either tranquillity or order, economy or prudence, but it carries within itself its own reward.' It affords the sweetest enjoyment to the citizen who has once tasted of it, in the gratification of influencing the fate of his country, and of sharing in its sovereignty, not acknowledging any authorities he has not himself created.' (*Républ. Ital.*, ch. xxv.) This is a portrait of democracy by one of its ablest and most conscientious apologists.

It has been said that notwithstanding all these feuds the Italian free cities prospered; the real truth is that some of them flourished at the expense of the others. It is observed that a number of towns which are mentioned as being of importance in the eleventh century, had disappeared in the thirteenth. We read of the glory and wealth of Milan and Florence, but we take no account of the depopulation and calamities of Lodi and of Pisa; it is the same with antient history. We see Rome growing and thriving, but we are apt to overlook the numerous towns of Latium and of Samnium which were annihilated through her predominance. Several causes contributed to keep up the wealth of the great Lombard cities during the middle ages; the extraordinary fertility of their territory, their manufactures, in which they were unrivalled in Europe, and the practice of their citizens of lending money at high interest throughout Europe, from whence the name of Lombard became synonymous with that of banker as well as usurer. But however flourishing the cities might be, the subject country had little participation in their splendour, and the greatest sufferers in the continual wars between them were the unfortunate country-people, who in all these republics had no political rights, had no voice in these quarrels, but were doomed to suffer from both parties, who treated them like dogs. The chronicler Ferratus of Vicenza makes an appalling sketch of the sufferings of the rural population, of which Sismondi gives an extract in ch. xxviii. of his history.

In the contests between the popes and Frederic II. the Lombard cities were divided: Milan, Brescia, Piacenza, and Modena were against the emperor; Cremona, Parma, Modena, Reggio, were for him. But his most effective ally was Eccelino da Romano, whom the Veronese had made their podestà, and who contrived in the midst of the confusion to make himself master not only of Verona, but also of Vicenza and Padua, and all the Marches. In 1237 Frederic attacked the Milanese and their allies at Cortenova, near the river Oglio, and completely defeated them. Still the emperor was prevented by other accidents from pursuing his advantage, and Milan was saved. A desultory war continued till his death.

Meantime renewed affrays between the nobles and the burghers of Milan induced the latter, who were dissatisfied with the podestà for favouring the nobles, to have a distinct podestà, or magistrate for themselves, as they had already a separate credenza and separate consuls. They chose for this office Pagano della Torre, lord of Valsesina, a powerful feudatory, who had been of great use to the Milanese after the defeat of Cortenova, and they styled him 'Protector of the people.' The nobles had now for their champion the archbishop Fra Leone da Perego, a fanatical monk, who distinguished himself by his subserviency to the pope, and his zeal against the Cathari, a kind of heretics, many of whom were burnt at Milan. On the death of Pagano della Torre, the people chose his nephew Martino for their chief magistrate, with the title of 'Elder,' 'Anziano della Credenza,' for an indefinite time. He was afterwards styled 'Signor del Popolo,' 'lord of the people.' The nobles chose for their podestà Paolo da Soresina. Martino however had the advantage, and expelled Soresina. The nobles had then recourse to Eccelino da Romano, who ruled Vicenza and Verona, and had also taken Brescia. He advanced towards Milan with a splendid army, crossed the Adda, but found himself hemmed in by enemies on all sides, his own former friends Oberto Pelavicino of Cremona and Buoso di Doara, both Guibelines, having turned against him. He attempted a retreat, but was wounded and taken prisoner, and died of his wounds, in October, 1259.

The exiled nobles of Milan still kept the field, and Martino della Torre, unable to reduce them for want of cavalry, engaged Pelavicino and his troops in the service of Milan, with the title of captain-general for five years and a pension. This was the beginning of the practice so prevalent afterwards of hiring mercenary troops, or condottieri. The Milanese emigrants were besieged in the castle of Tabiago, near Brianza, where having exhausted their provisions and the water of the wells, and their horses having died, they surrendered at discretion. They were taken to Milan in chains, and confined in iron cages exposed to public view, and kept there for years.

In 1260 Martino della Torre was chosen by the towns of Lodi and Novara as their 'signore,' or lord, which in those small communities implied a more absolute authority than that which he had at Milan. The fashion spread; Cremona chose for its lord the marquis Pelavicino; Verona chose

Martino della Scala; Mantua, the count San Bonifazio; Ferrara, the marquis of Este, &c. The desire of tranquillity and repose from factions induced the citizens to submit to a chief who could make himself feared, and they chiefly required of him to punish quickly and severely those who troubled the public peace. They preferred summary and often brutal justice to anarchy.

After the death of Archbishop Perego the chapter was divided, as to the choice of his successor, between a nephew of Martino della Torre and another. Pope Alexander IV., who was offended with Martino for having allied himself with Pelavicino, a Guibeline, and suspected of heresy, named to the see the canon Otho Visconti, of a noble and powerful family, who had been exiled with the other nobles some years before. But as the Della Torre opposed his coming to Milan, considering him as an emigrant, the archbishop elect continued for several years to remain on the estates of his family near the lake of Como, where he collected many of the disaffected, with whom he carried on a sort of predatory warfare against Milan. Martino della Torre having died in 1263, his brother Philip succeeded him as lord of Milan, Lodi, and Novara, to which he added Como, Vercelli, and Bergamo, which towns elected him as their lord. Thus the foundation was laid of that consolidation of Lombardy into one state which in after-times was known by the name of the duchy of Milan. Philip della Torre died in 1265, and was succeeded by his nephew Napoleone della Torre. The Torriani, or Della Torre family, did not alter the form of the institutions of Milan; the podestà, the credenza, and the consuls remained as before, with an authority independent, apparently at least, of that of the lord. This policy was the same as that pursued by the first Medici at Florence.

As long as Pope Gregory X. lived, the archbishop Visconti was cautious in his movements, as that wise pontiff did not choose to encourage the preponderance of either Guelphs or Guibelines; but after his death in 1276 Visconti grew bolder; he took possession of Como and Lecco, and at last marched against Milan. Napoleone della Torre came out to meet him, but was surprised and taken prisoner, and he and his relations were confined in cages, after the example set by his uncle Martino. The people of Milan, hearing of the defeat, rose against the adherents of the Torriani, pelted them with stones, and drove them out of the city. A deputation of citizens was sent to the archbishop Visconti, whom they saluted as 'Perpetual Lord of Milan.' This occurred in January, 1277. 'It was but one dynasty supplanting another. The Torriani, who had raised themselves by acting the part of demagogues, introduced monarchical habits, depressed the nobles, and drove them into exile. The Visconti, returning at the head of this long-proscribed nobility, which was now ruined in fortune, and had become mercenary, found the people corrupted by servitude. There was no longer any independence of spirit in any class, no elevation of character or love of liberty; and although republican councils and popular institutions continued for a long time after, the principle of life which once animated them was extinct, and the sovereign power was transmitted by the first and virtuous Visconti to their imbecile and vicious descendants, without the nation attempting to recover it from their grasp.' (Sismondi, *Rèpubl. Ital.*, ch. xxii.)

The power of the Visconti, though in fact hereditary, was at first, at least in form, dependent on the sanction of the people, who, at the death of the actual lord, elected his successor. The council of the elders continued to discuss the laws which the lord proposed, to levy the taxes, superintend the expenditure, and to exercise the other functions of a legislature. But gradually, and especially from the time of Bernabò Visconti, the lord took upon himself to issue his own laws or statutes, to impose taxes, let to farm the revenue, make war, and, in short, exercise all the acts of sovereignty. In the fourteenth century the Visconti ranked among the most powerful Italian princes. They extended their dominions not only over Lombardy Proper, north of the Po, but over part of Montferrat, including Asti, Alessandria, Bobbio, Tortona, and also to Parma, Piacenza, Bologna, and other towns south of the Po. Gian Galeazzo Visconti received in 1395, from the Emperor Wenceslas, the title of 'Duke of Milan and Count of Pavia.' The charter of investiture included twenty-six towns and their territories, extending from the hills of Montferrat to the lagoons of Venice. Besides these he obtained also possession by force or fraud of Genoa, Lucca, Pisa, Siena, Perugia, Bologna, and other parts of Romagna. Florence alone stood in his way, and he was preparing to attack it with all his forces, when he died of the plague, in September, 1402. In the following century the duchy of Milan became circumscribed within narrower limits. The Venetians took the three provinces of Brescia, Bergamo, and Crema, between the Mincio and the Adda, which last river became the boundary of the two states. The Swiss took possession of Bellinzona, and other valleys north of the Lago Maggiore. The duchy of Milan likewise lost its conquests south of the Po. On the side of Piedmont its boundary was the Sesia, including within its limits the extensive province of Novara, which now forms part of the Sardinian territories. The duchy of Milan therefore, as possessed by the later Visconti and their successors the Sforza, from whom it came into possession of Charles V., extended about 70 miles north to south from the Alps to the Po, and 60 miles east to west. Its principal cities were Milan, Pavia, and Cremona. Mantua formed a separate duchy until the war of the Spanish succession, when it was taken possession of by the house of Austria, and annexed to the duchy of Milan. These two duchies constituted Lombardy Proper. The duchy of Milan, during a century and a half that it remained under the Spanish branch of the house of Austria, declined greatly from its former prosperity. The delegated absolutism of Spanish viceroys and governors was fatal to Milan, Naples, and Sicily. The wretched system of that administration and the misery of the population subject to it have been admirably portrayed by Manzoni, in his 'Promessi Sposi,' and by Cantù, in his 'Ragionamenti sulla Storia Lombarda del Secolo xvii.,' which is a commentary on the work of Manzoni.

With its transfer to the German branch of the house of Austria Lombardy began to recover its prosperity. But it was under the reign of Maria Theresa that improvements of every sort proceeded with rapid strides, and the duchy of Milan assumed a new aspect. The population also increased rapidly. In 1749 it was 900,000, and in 1770 it was 1,130,000. Joseph II. pursued the career of improvement in Lombardy, and Verri, who wrote his history of Milan at the time, remarked upon the dense population of this limited tract of country, and its fertility, which, besides abundantly supplying its inhabitants with all the necessaries of life, left them an annual surplus of produce for exportation to the amount of 1,350,000 sequins, about sixteen millions of francs. The consequence of all this was, that the people of Lombardy grew attached to the Austrian sway, and when the French, in 1796, invaded the country, they found the inhabitants in general extremely cool towards them and their republican doctrines. The partisans of the French gathered from other districts, from the Venetian provinces of Bergamo and Brescia, and also from Modena, Bologna, and other countries south of the Po, which were not so well administered as the Milanese. The subsequent vicissitudes of Lombardy are noticed under the LOMBARDO-VENETIAN KINGDOM.

LOMBEZ. [GERS.]

LOMBHOOK, or **LOMBOK**, an island of the Indian Archipelago, lying between 8° and 9° S. lat. and 116° and 117° E. long. It has the island of Bali on the west, and that of Sumbhawa on the east. The form of Lombhook is nearly square; its mean length and breadth being respectively 53 and 45 miles. The surface of the island is mountainous. The loftiest of its mountains, the peak of Lombhook, is said to rise to the height of 8000 feet above the level of the sea. The island is populous and well cultivated, and the whole surface is covered with verdure. It is abundantly supplied with springs of water, which feed several small streams; some of which fall into the sea on the west side, where there is a commodious harbour. Ships which enter the harbour may procure from the natives abundant supplies of oxen, swine, goats, poultry, and vegetables. The inhabitants, who are generally intelligent, and have attained a considerable degree of civilization, carry on a brisk traffic with Java and Borneo; their chief food is rice, which they cultivate by means of large tanks and reservoirs of water. The ruler or rajah of Lombhook is tributary to the sultan of Bali, and the island has never been brought under subjection by any European power.

LOMOND, LOCH, is a lake in Scotland, extending between 56° and 56° 20′ N. lat., and 4° 30′ and 4° 42′ W. long., in a direction from north by west to south by east On the east side it is bounded by the counties of Stirling and Perth, and on the west by that of Dumbarton. Its length is 24 miles. The most southern portion, which is nearly one-third of its length, is from four to seven miles across, and contains several wood-clothed islands. The whole number of islands in the lake is about thirty. North of Luss in Dumbartonshire it grows gradually narrower, being from two to one mile and even less in width. According to the 'Statistical Report of Scotland' it covers a surface of 45 square miles. Its general depth is about 20 fathoms, but in some places it is as much as 80 and even 120 fathoms. The surface is 22 feet above the mean level of the sea at Dumbarton. Its waters are supplied by a great number of small rivers, which descend from the adjacent mountains; the Enrick, the only considerable stream which falls into it, enters the lake on the east side, at that part where it is widest. The circumstance of so many streams falling into it will account for the fact of the surface of this lake being from three to five feet higher in winter than it is in summer. The river Leven, which issues from its southern extremity, carries the surplus waters to the Clyde. Loch Lomond is well known for the grand and beautiful scenery which its banks exhibit: indeed none of the Scottish lakes present a greater variety of landscape. The river Leven runs through a valley of considerable width, which is highly cultivated. The country around the southern portion of the lake is hilly, but fertile, rich, and well cultivated: it contains a number of gentlemen's seats, surrounded with fine natural woods and plantations, while the lake gives a peculiar charm to the scenery by its rocky but beautiful and finely-wooded islands. Where the lake begins to narrow, Ben Lomond on the eastern bank raises its head to near 3000 feet above the sea. Ben Lomond is a beautiful mountain, rising with a gentle ascent, and covered with fine grass to the very summit. Its beauty is increased by contrast with Tullich Hill and the mountains of Arroquhar, which rise on the other side of the lake with a steep declivity and bare and rocky summits, to nearly the same elevation as Ben Lomond. The northern extremity of the lake is completely enclosed by high, steep, rocky, and dark mountain-masses.

LOMONOSOV, MICHAEL VASILIEVITCH, the father of modern Russian poetry and literature, was born in 1711, near Kholmogor, in the government of Archangel. His father, who was a serf of the crown, was by occupation a fisherman, and Michael more than once accompanied him in fishing excursions in the White and Northern seas. The long winters were devoted by him to study, in which he was assisted by the instruction he received from a priest; and although his stock of books was exceedingly limited, being nearly confined to a grammar, a treatise on arithmetic, and a psalter, he made such diligent use of them, that at last he had them all by heart. What he thus acquired served only to increase his desire for further information: he accordingly determined to make his way at once to Moscow, to which capital he journeyed in a cart that was conveying thither a load of frozen fish. Having greatly distinguished himself, first in the Zaikonopaski School there, and afterwards in the university of Kiev, he was sent to complete his education at the Academy of St. Petersburg in 1734, where he applied himself more particularly to mathematics, physics, chemistry, and mineralogy. After two years spent in those studies he was sent to Marburg, in order that he might perfect himself under the celebrated philosopher Christian Wolff, under whom he continued three years, and then proceeded to Freyburg, for the purpose of acquiring a practical knowledge of metallurgy and mining. Yet although chiefly occupied by such pursuits, he did not neglect literature, but diligently read all the best German poets of that period, and determined to rival them. One of his first literary efforts was an ode on the taking of Khoten, which he sent to the empress Anne, and which obtained for him general admiration. In the meanwhile he had married during his residence at Marburg, the consequence of which was that he so involved himself in pecuniary difficulties, that he was obliged to lose no time in returning to his own country. After his arrival at St. Petersburg he was made an associate of the Academy in 1741; and in 1746, professor of chemistry, besides which other appointments and honours were conferred upon him, and in 1760 he was made rector of the gymnasium and university. He died April 4 (16), 1765.

The complete collection of his works, published by the Academy, which has passed through several editions, extends to sixteen volumes; and the titles alone of his works would serve to show the great range and diversity of Lomonosov's studies. It would in fact be difficult to name any one who can be compared with him for the encyclopædical multifariousness of his writings. Chronology, history, grammar, rhetoric, criticism, astronomy, physics, chemistry, meteorology, poetry—all engaged him by turns, and he showed himself to have a genius for all. Later discoveries and improvements in science have of course somewhat dimmed the lustre which his writings of that class at first shed upon his name; but the service he rendered to the literature of his country, both by precept and example, no length of time can obscure. His grammar entitles him to be considered the legislator of the language, and as the first who gave regularity and stability to its elements: in poetry he has scarcely been equalled by any one, with the single exception of Derzhavin, in energy of style and sublimity of ideas; notwithstanding that, unlike those who have succeeded him, he found no model to guide him in any of those who had gone before him, but had to purify and recast the language in which he wrote. Polevoi's biographical novel, entitled 'M. V. Lomonosov,' 2 vols., 8vo., 1836, contains, with some admixture of fiction, almost all that can now be collected regarding the life of this extraordinary man, together with notices of his chief literary contemporaries.

LONCHE'RES, Illiger's name for a genus of *Rodents*, including *Echimys* of Geoffroy, a species of *Hystrix* of Schreber and others, and a species of *Myoxus* of Zimmerman and others. [MURIDÆ; RODENTIA.]

LONCHO'PTERIS, a genus of fossil ferns established by M. Adolphe Brongniart. The species belong principally to the coal formation, but one, Lonchopteris Mantelli, is found in the Wealden deposits and in the green-sand.

The leaves are multipinnatifid, the pinnicules adnate to the rachis, marked by a midrib, and equal reticulated nervures, and uniform areolæ.

LONCHU'RA, a genus of *Fringillidæ*, separated from *Fringilla* (Temm.), by Lieut.-Col. Sykes.

Generic Character.—Bill strong, short, broad; mandibles entire, the upper one extending in an angle on the forehead, and, with it, forming the arc of a circle. Wings moderate, subacuminate; first *quill* very short and subspurious; the second, third, and fourth, nearly equal and longest. *Tail* graduated, lanceolate; middle tail feathers a little exceeding the others in length. *Feet* moderate, rather slender.

Col. Sykes observes that the peculiar spear-head form of the tail, and the ridge of the upper mandible and the forehead, forming a segment of the same circle, together with the habits of *Lonchuræ nisoria*, *Cheet* and *leuconota*, afford sufficient characteristics for their separation. Col. Sykes adds that the *Gros-bec longicone* of the Pl. Col. 96 (*Emberiza quadricolor*, Lath.), belongs to the same group.

Locality of the three species the Dukhun (Deccan). The first two are recorded as found only in the Ghauts.

Lonchura Cheet, Sykes, is described as of a pale cinnamon-brown; the body below and the rump white; quills and tail-feathers deep brown. Irides deep red-brown. *Female* with the colours less intense. Length of the body 5⅔ inches; of the tail, 2.

Habits, *Reproduction*, &c.—Col. Sykes states that these birds live in small families, and that he frequently found them in possession of the deserted nests of the *Ploceus Philippensis;* their own nest, which he exhibited on a subsequent occasion, is a perfect hollow ball, made of a delicate *Agrostis*, with a lateral hole for the entrance of the birds. It was found in the fork of a branch of the *Mimosa Arabica*, and contained ten oblong minute white eggs, not much larger than peas, being $\frac{13}{20}$ths of an inch long by $\frac{9}{20}$ths in diameter. The cry of the bird is *cheet, cheet, cheet*, uttered simultaneously by flocks in flight. (*Zool. Proc.*, 1832 and 1834.)

LONDON, the capital of the United Kingdom of Great Britain and Ireland, stands at the head of the navigable tideway of the river Thames. The latitude of the centre of the dome of St. Paul's cathedral, which stands nearly in the centre of what is strictly the *City* of London, is 51° 30′ 47·59″, and the longitude is 5′ 48·2″ W. of Greenwich. The latitude of Greenwich Observatory, according to Mr. Airy's determination, is 51° 28′ 38·07″. This portion of the metropolis, the City, including the liberties, or the districts into which the municipal franchises and privileges extend, is divided into two portions, London within the Walls, and London without the Walls, a distinction which exists no longer except in name. The original wall of the City is described as having its beginning at a fort which in part occupied the site of the present Tower of London, whence it was carried northward through the street now called the Minories to Aldgate; thence diverging to the west it crossed Bishopgate churchyard to Cripplegate; then southerly to Aldersgate; thence to the north of Christ's Hospital; turning directly south to Ludgate, it then again took a westerly course to New Bridge Street, and accompanied the line of the Fleet River to its junction with the Thames, where another fort marked its termination. The space within the line thus described comprehends London within the Walls, and includes 98 parishes. London without the Walls consists of the following 11 parishes:—St. Andrew's, Holborn; St. Bartholomew the Great; St. Bartholomew the Less; St. Botolph Without, Aldersgate; St. Botolph, Aldgate; St. Botolph Without, Bishopgate; Saint Bride's; St. Dunstan in the West; St. Giles Without, Cripplegate; St. Sepulchre Without, Newgate; Trinity, in the Minories; besides inns of court, hospitals, and other extra-parochial districts locally connected with the above-named parishes. The whole of London Bridge is held to be within the city, together with a plot of ground at the south end of the old London Bridge on the Surrey shore, and called the Bridge-foot.

These boundaries by no means include what is now understood by the name London. They do not even circumscribe the surface over which its magistracy exercises jurisdiction. The borough of Southwark, on the south side of the Thames, is, for certain purposes, subject to the jurisdiction of the corporate officers of the City of London. A great part of the manor of Finsbury is also held by the corporation by virtue of a lease granted by the prebendary of Haliwell and Finsbury, in the cathedral church of St. Paul, at an annual rent. This lease has been renewed from time to time, and the date of its origin is not recorded; but it is known that the corporation has been thus interested in the manor from the beginning of the fourteenth century. It is now usual to consider it as forming part of the metropolis, or of London, in the large sense of the term, which comprehends the City of London within and without the walls, the city of Westminster, the borough of Southwark, and the newly-created parliamentary boroughs of Finsbury, St. Mary-le-bone, the Tower Hamlets, and Lambeth. The area of these several divisions, with the number of houses and of inhabitants which they contained at the census of 1831, are computed to be as follows:—

	Area in Acres.	Houses.	Population.
City of London . . .	600	17,315	122,395
Southwark	590	22,482	134,117
Westminster . . .	2,500	21,893	202,460
Finsbury	4,670	29,605	224,839
St. Mary-le-bone . .	5,310	27,888	234,294
Lambeth	8,840	29,079	154,613
Tower Hamlets . . .	8,988	66,777	302,519
Total . . .	31,498	215,039	1,375,237

The proportionate increase in the population and number of houses that has been found at each decennary enumeration since 1801 has been as under:—

	No. of Houses.	Inhabitants.
1811 ..	16·98 per cent.	16·73 per cent.
1821 ..	16·19 „	17·66 „
1831 ..	19·42 „	20·04 „

The rate of increase has been by no means uniform in the different districts. Comparing 1831 with 1801, the total increase in the number of houses has been 63 per cent., and in the population 70 per cent.; but as regards the city of London there has been, during the same thirty years, a positive decrease in houses of 5·65 per cent., and of inhabitants 4·43 per cent. The great increase has taken place in the newly-created boroughs; the houses being there augmented in the proportion of 94½ per cent., and the inhabitants 105 per cent. The area of the City being already fully occupied by houses, there was no room for their increase, and little capacity for receiving an addition to the number of inhabitants. The trifling diminution experienced in both particulars in the city is fully accounted for by the widening of streets, and by the increased value of houses for commercial purposes, which has induced many persons to parcel out their dwellings as offices, and to remove with their families to the suburbs.

No enumeration has of late years been made of the streets of London; but it has been computed that, including squares, lanes, courts, and alleys, they amount to between 8000 and 10,000. The principal thoroughfares follow the course of the Thames from east to west. The longest line enters from Essex at Whitechapel, and runs in a nearly straight line to St. Paul's cathedral, where it divides into two arms, one of which continues near the river through Fleet-street and the Strand to St. James's palace; the other arm continues more to the north, through Holborn to the western extremity of Oxford-street and Kensington Gravelpits. From a computation made in December, 1785, it appears there were then, 'in and near the City of London, 100 almshouses, 20 hospitals and infirmaries, 3 colleges, 10 public prisons, 15 flesh-markets, 1 market for live cattle, 2 for herbs, and 23 for corn, coals, hay, &c., 15 inns of court, 27 public squares, 49 halls for companies, 8 public or free schools, 131 charity schools, 207 inns, 447 taverns, 551 coffee-houses, 5975 ale-houses, 1000 hackney-coaches, 400 hackney-chairs, and 7000 streets, lanes, courts, and alleys.'

From the official returns obtained in 1832 by the commissioners appointed to consider concerning the division of counties and the boundaries of boroughs, it appeared that there were at that time in each of the proposed parliamentary divisions the following number of houses rated at the yearly value of 10*l.* and upwards, and the assessed taxes paid within those divisions were as follows:—

	Houses assessed at £10 and upwards.	Amount paid of Assessed Taxes.
City of London . .	14,564	£205,476
City of Westminster .	17,681	303,421
Borough of Southwark .	9,923	51,262
„ Lambeth .	16,405	91,069
„ Finsbury .	23,266	201,027
„ Marylebone .	21,630	282,201
„ Tower Hamlets	23,187	93,151
	126,656	£1,227,607

From which it appears that the metropolis contained 28·58 per cent. of the total number of houses rated above 10*l.* per annum value in Great Britain, and that the inhabitants paid 29·61 per cent. of the whole amount of assessed taxes, exc of the land-tax.

&c.—The general substratum of London and its vicinity is clay. [London Clay.] Beds of clay, from 100 to 200 feet in thickness, proper for making tiles, are found in the immediate neighbourhood of the City, and all around the metropolis brick-making is or has been carried on extensively. The clay is in many parts, especially on the north side of the river, for a distance of more than a mile, covered with a thick bed of gravel.

The mean annual temperature of the air *in* London, as deduced by Mr. L. Howard from a series of observations carried on during twenty years, is 50° 5′. The mean *temperature* of each month, during the period here mentioned, was—

January .	36°·34	July .	62°·97
February .	39·60	August	62·90
March . .	42·01	September	57·70
April . .	47·61	October	50·79
May . .	55·40	November	42·40
June . .	59·36	December	38·71

The amount of rain which fell in each of the nine years, from 1826 to 1834, in the gardens of the Horticultural Society at Chiswick, and in each month of the year 1834, was as follows:—(It is not known that there is any gauge kept within the limits of the town upon which perfect reliance can be placed.)

	Inches.
1826	21·83
1827	22·18
1828	27·85
1829	26·12
1830	24·27
1831	26·93
1832	21·59
1833	25·80
1834	20·39
Average	24·10

1834.	Inches.
January .	2·87
February .	0·37
March .	0·86
April . .	0·65
May . .	1·19
June . .	1·63
July . .	6·34
August .	2·73
September	0·83
October .	0·43
November	1·75
December	0·74
	20·39

According to observations made during a series of years the following table shows the directions in which the wind has blown during each month of the year:—

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January . .	3½	4½	1½	2¼	1¾	6½	6½	4½
February . .	1½	4¾	2½	2¾	2¼	5	5½	3¾
March . .	2½	4	—	2	2¼	9½	6¼	4½
April . . .	2½	3¼	3	3½	2¾	4	5½	5½
May . . .	3	4	4½	4	1	6¼	5¼	3
June . . .	5	6½	2	4	1	3½	3	5
July . . .	2½	3	2	4	2¼	7	5	5¼
August . .	1	2¾	1½	3	2¼	6	11½	3
September .	2	4	1	4	1	6	6	6
October . .	3	3¼	2	3½	2¼	5¾	5	6¼
November .	3	3	3	2	3	6	5	5
December . .	1	2¼	3½	4	2	8¼	6	4
	30½	45½	26½	39	23¾	73¾	70½	55¾

Architecture.—Although London is known to have existed as a town for near two thousand years, with the exception of here and there a building, or a mass of old tenements, all the rest is comparatively of yesterday, there being very few portions which are more than a century old, and those in situations where they must be purposely sought out. What Roman London was is now entirely matter of conjecture, for although pavements and other fragments of antiquity have been from time to time discovered, they merely prove that Roman structures of some splendour formerly existed on the sites where such remains have been dug up; but in regard to the buildings themselves they afford no information; still less do they assist us in forming any idea of the general mode of building and the aspect of the city. Imagination may speculate freely as to the grandeur of Londinium under the Roman sway, but it is impossible for it to cheat us into the idea of the city's presenting any signs of grandeur in after-times, for under both its Anglo-Saxon and Norman sovereigns it must have been, as we shall presently see, in a most wretched condition, and its inhabitants subjected to what would now be considered intolerable nuisances and inconveniences. Londinium was most probably a British town, that is, a large enclosure protected by a rampart and fosse, previous to the invasion of the island by Cæsar, in whose time a considerable traffic was carried on between the Britons and the Gauls. But though Cæsar crossed the Thames, he makes no mention of Londinium. The first notice of it occurs in Tacitus (*Ann.*, xiv. 33), where it is spoken of as not then honoured with the name of a colonia, but still as a place much frequented by merchants and as a great depôt of merchandise. In the revolt of Boadicea (A.D. 62) Suetonius, the Roman commander, abandoned Londinium to the enemy, who massacred all the inhabitants who did not leave it with Suetonius; a circumstance which leads us to infer that it was then chiefly occupied as a Roman station. If any conclusion can be drawn from the brief notice of Tacitus, London was then incapable of making any defence, and had probably no wall that could resist the enemy; though that historian mentions the want of soldiers as the cause of its being abandoned by Suetonius. It does not appear from Tacitus whether the place was then destroyed by the Britons. At a later date London appears to have been made a colonia under the name of Augusta. (Amm. Marcell., xxvii. 8.) The antient wall of London, ascribed to Theodosius, governor of Britain, began at a fort near the present site of the Tower, and continued along the Minories, to Cripplegate, Newgate, and Ludgate. The walls are said to have enclosed an area of somewhat more than three miles in circumference, and to have been guarded by fifteen towers, which latter are conjectured to have been 40 feet high, and the walls 22. The prætorium and its adjuncts are supposed to have occupied the site of the Poultry and Cornhill, as tesselated pavements have been discovered there and at the Lothbury gate of the Bank, and near St. Mary's Woolnoth.

In regard to Anglo-Saxon London, our information is as scanty as it is with respect to the Roman city; but we may easily conceive that it must have greatly fallen off in appearance during the barbarous period that succeeded the final departure of the Romans from the island, when it was alternately attacked and ravaged by the Picts and Scots, by the Saxons and Angles. In the sixth century it became the capital of the Anglo-Saxon kingdom of Essex, and in the following one a bishop's see. Sebert, king of Essex, having been converted to Christianity, erected a cathedral church to St. Paul, and an abbey church to St. Peter, on the sites of the present cathedral and Westminster Abbey. All however that we know of London, till for many centuries afterwards, extends no further than a few sites and names, the memory of which has been preserved, notwithstanding the successive changes to which the places themselves have been subjected. At this period and for long after, the city could have been little more than an assemblage of hovels, intersected by narrow miry lanes, the whole enclosed by walls, except on the side towards the river. It was on the banks of the river, in Castle Baynard Ward, and on the south side of the present cathedral, that the residence of the Anglo-Saxon kings stood, erected either by Alfred, Edward, or Athelstan; most probably by the last, whose name is retained in that of Adel or Addle Hill. This Anglo-Saxon palace was forsaken by Edward the Confessor, who removed to that which he had erected at Westminster; after which, together with the cathedral, the first-mentioned building was destroyed by fire in 1087. The Tower Royal (at the end of the street so called) was another palace, erected after the Norman conquest, but its origin cannot be traced. In Richard II.'s time it was called the Royal Wardrobe, and was granted by Richard III. to the first duke of Norfolk.

Of public buildings there were scarcely any besides religious houses and hospitals, both which were very numerous previous to the Reformation, and of several of them the names are retained at the present day, viz. Black Friars, White Friars, Crutched Friars, Chartreux (the Charterhouse); Priories—St. John of Jerusalem, Clerkenwell (St. John's Gate), St. Bartholomew the Great, St. Mary Overies, Southwark; Nunneries—St. Helen's, Bishopgate Street, and Holywell, in Holywell Lane, Shoreditch; Hospitals—St. Giles's, St. James's (the Palace), St. Katherine's, and St. Thomas's. What few residences there were of any note were scattered about, and mingled with the meanest habitations: that of Henry, earl of Northumberland in the time of Henry VI., stood in Fenchurch Street; Crosby House (1470, a portion of which still remains, and has lately been restored), in Bishopgate Street. Oxford Place, the residence of the Veres, earls of Oxford (1598), was in St. Swithin's Lane, where were the houses of Sir Richard Empson and Dudley, the notorious agents of Henry VII.; and that of Cromwell, earl of Essex, stood in Throgmorton Street, while at a later period Aldersgate Street and other places now abandoned to shops, counting-houses, and warehouses, were inhabited by the noble and the opulent. The antient residence of the bishops of London was in Aldersgate-street.

As to the actual appearance and condition of the metropolis we have little more than conjectural and piecemeal information until we come down to times that may comparatively be termed recent; for contemporary chroniclers and topographers seem to have had no regard to the curiosity of posterity; but contented themselves with noting, whether briefly or prolixly, most drily, what they beheld, without aiming at anything like a graphic description of the whole. We may however easily picture to ourselves what London must have been even in the first half of the sixteenth century, when the act for improving and paving the city, passed in 1532, describes the streets as 'very foul and full of pits and sloughs, very perilous and noyous as well for all the king's subjects on horseback as on foot, with carriages.' If to the formidable inconveniences to which passengers and traffic were subjected, we add those of narrow crooked streets, gloomy by day and left in total darkness at night, we shall be forced to add a few shades more to the picture of the *noyous* condition of the citizens. Perhaps even the vilest bye-lanes, alleys, and courts that are now to be met with, are, except in regard to the houses themselves and their inhabitants, hardly a degree worse than was the London 'of olden times' generally. No wonder therefore that pestilence and fire should at various times have committed such havoc, the population being densely cooped up in confined and badly ventilated dwellings, constructed for the greater part of plaster and timber, covered with thatched roofs, and having each story overhanging that immediately beneath it. While this last-mentioned circumstance must have contributed not a little to unhealthiness by leaving very little space between the uppermost stories of the oppo site houses, it must also have rendered fires particularly destructive, so that what with the denseness of the buildings, the combustibility of their materials, and an insufficient supply of water, the breaking out of a fire must have threatened a conflagration of a whole neighbourhood, as is still the case at Constantinople. At the present day such a conflagration as that of the great fire of 1666 would be almost impossible, even if no efforts were made to arrest its progress.

Though churches, religious houses, and some few private residences may have been substantially built, and perhaps entitled to the epithet of magnificent, especially when compared with the ordinary dwellings, they must have been altogether insufficient to counteract the general rude and mean appearance of the city. Whatever degree of comfort or even luxury there may have been in the abodes of a few great nobles, there can be no doubt that the people generally, even including the wealthier burghers, were miserably lodged and housed. The exceptions from it are not to be mistaken for the rule itself; and if we contrast the condition of society class by class, we find that, setting aside the very highest, by whom greater state was affected than at present, all the rest will bear no comparison with the corresponding ones of modern times as regards the comforts of life. Many things which were formerly the luxuries of the few have since become the every-day necessaries of the many; to say nothing of the numerous conveniences and enjoyments now placed within the reach of nearly all, though, a century or two ago, no wealth could procure them. The pictures given us by Erasmus and Holinshed of the manners and domestic economy of our ancestors, so far from being at all flattering, portray a state of semi-barbarism; so that whatever occasion there may have been for regulating attire and restraining luxury in dress, there was no need of sumptuary laws to check excess of refinement in houses and furniture. In the early part of the fifteenth century even 'the uplandish towns in the realm' could not boast of more than three or four chimneys; and afterwards the houses of the English were described by the foreigners who came over with Philip II. as consisting of walls built with 'sticks and dirt.' In the metropolis the generality of the houses may have been a degree better; yet Holinshed himself admits that London had a very mean appearance in comparison with most foreign cities. During the sixteenth century however it greatly extended itself westward along the north bank of the river, where many of the nobility erected 'fayre and statelie' mansions, of which Northumberland House is the only one remaining, no traces of the others being left, although the names of several of them are still retained in the streets opening into the Strand. Even Exeter 'Change, which occupied the site of Exeter House, originally built by the great Lord Burleigh, has in its turn disappeared, and transmitted its name to the present Exeter Hall. Still greatly as the metropolis had increased in extent in the reign of Elizabeth, the map of it at that period (a cut of which may be seen in the 'Penny Magazine,' No. 427), shows it to have been a mere dwarf in comparison with its present gigantic dimensions: all to the north and west of the Strand was open fields and country, as well as nearly all the south bank of the river, now a populous and extensive district, and connected with the northern side by several bridges, whereas before the erection of Westminster Bridge (commenced 1739), London Bridge was the only structure of its kind which the metropolis possessed. Insignificant as the increase of buildings in Elizabeth's reign may now appear, it was regarded with so much apprehension as well as wonder at the time, that the queen issued a proclamation in 1580, forbidding the erection of any but houses of the highest class within three miles of the city. The same was done by her successor, but in neither case had the prohibition much effect; so that by 1666 many new districts and parishes had been added to the suburbs. Terrible as was the calamity which during that year befel the city itself, when upwards of 13,000 houses and other buildings, including St. Paul's cathedral and the portico added to it by Inigo Jones, fell a prey to the flames, it has been attended with much benefit. 'Heaven be praised,' exclaims Malcolm, 'Old London was burnt!' and indeed what is chiefly to be regretted now is that advantage was not taken of the opportunity then afforded of laying out the streets with greater regard to regularity and convenience. A plan for that purpose was made by Sir Christopher Wren, and another by Sir John Evelyn. If either of them had been carried into execution, the City would have been infinitely more commodious for traffic than it now is, notwithstanding the very material improvements which have taken place within the few last years, by opening a communication from New London Bridge to the Mansion House and Bank, and thence northwards to Finsbury Circus. According to Wren's plan there would have been two principal streets carried in a direct line, one from Aldgate, the other from the Tower, intersecting in their course one or two open polygonal areas or piazzas (from which other streets would have branched off), and terminating in a larger triangular piazza, in which St. Paul's would have been placed, and from which another street would have been carried in a straight course to Temple Bar. Evelyn's plan also provided for several piazzas of various forms, one of which would have been an oval with St. Paul's in the centre of it; but it differed from the other in proposing a street in a line from St. Dunstan's in the East to the cathedral, and then straight onwards to Temple Bar; but this plan did not, like Wren's, contemplate a continued quay or terrace along the river. Unfortunately the singular obstinacy and narrow-mindedness of the citizens set them both aside: the extraordinary opportunity for improvement which then presented itself was entirely thrown away, and instead of being in any respect calculated to show that noble pile to advantage, the area in which St. Paul's stands is as irregular and unarchitectural as it is inconvenient.

Within the course of the next hundred years from this date the metropolis extended itself considerably to the west and north-west, where it became more fashionable to reside; and no doubt the fire of London had a great share in this change, for their mansions in the city having been destroyed by it, the nobility removed from that seat of bustle and traffic much earlier than they otherwise might have done. Both Soho Square and Golden Square (now places of very inferior rank to the more modern ones) were built before the close of the seventeenth century; while Hanover and Cavendish Squares appear to have been erected between the years 1716 and 1720. In the reign of George II. arose three churches, each of which is distinguished by a noble Corinthian portico, viz. St. George's, Bloomsbury (consecrated 1731); St. Martin's, and St. George's, Hanover Square (1742). The first of these however has not obtained a reputation equal to that of the second, notwithstanding that it ought to place the name of Hawksmoor at least on a level with that of Gibbs. [HAWKSMOOR; GIBBS.] In 1700 Old Bond Street was partly built, but its situation was then almost rural, all to the north being fields, lanes, and uncovered ground; and many mansions which are now surrounded by buildings and streets for a considerable distance, then stood, if not quite solitary, with only a few straggling houses in their neighbourhood; such was the case with Montague House, now the British Museum, and Burlington House, Piccadilly.

Notwithstanding however that other squares and streets continued to be progressively formed, until the district on the north of Piccadilly assumed a connected town-like appearance, neither that nor any other part of the metropolis bore much resemblance, in character and aspect, to what it now does, the houses having been all, if not rebuilt, more or less modernized since that time. As one instance of this, we may observe that no one would be able to recognise St. James's Street as shown in one of the plates of Hogarth's Rake's Progress, were it not for the gateway of the palace, the only feature that remains unaltered. The town might have gone on increasing to its present bulk; yet unless improvement had kept pace with its growth, it would have been far different from what it actually is; and we should at this day have had to contend with all the inconveniences described by Gay in his 'Trivia, or Art of Walking the Streets,' which appear to have been formidable enough, both in rainy weather and after nightfall.

It was not till the beginning of the reign of George III., when the present system of paving and lighting the streets was introduced, that the metropolis began to put on a civilised appearance, by the safety and convenience of the public being attended to. Signs, posts, waterspouts, and all similar nuisances and obstructions were removed; footpaths were laid down, and lamps were lit at night. It is true the foot-pavements were exceedingly scanty, and the oil-lamps diffused a light just as scanty—certainly not brilliant enough to extinguish all at once both flambeaux and link-boys. With the exception of this very important improvement, and the increase of building, little advance was made in the architecture of the metropolis during the latter part of the last century. Almost the only public edifices of this time at all entitled to the epithet of magnificent were Somerset House and the Bank; which latter however may with equal propriety be considered as belonging to the present century, since it was not completed as at present till about 1826. The Adams indeed erected the Adelphi, Portland and Stratford Places, and two sides of Fitzroy Square; yet these can scarcely be considered as public works, and as specimens of street architecture are (at least the first-mentioned) of exceedingly questionable taste, although they may fairly be allowed to be handsome in their general air and appearance. The Adams however are entitled to the praise of having improved the general style of ordinary house-building, and of having substituted convenience, cheerfulness, and lightness for the incommodiousness and heavy taste which formerly prevailed. The Pantheon, in Oxford Street, by James Wyatt, ought perhaps to be mentioned as a piece of architecture of some note, belonging to the latter half of the last century; but it no longer exists, save in name alone, being now totally altered, except some portion of the façade, which in itself displays no very great taste, and has not sufficient size to give it importance, while the interior is now converted to a very different purpose from its original one. As buildings, none of the theatres can be dated farther back than the present century, at the commencement of which, or about 1803, we may observe that Russell Square (the nucleus of a cluster of other squares that have risen up in its immediate neighbourhood) was first formed. Covent-Garden Theatre, the first production of Sir R. Smirke, and almost the first specimen of the Grecian Doric style in the metropolis, may also be considered as the beginning of a new era in its architecture; or rather it has so happened that it has been followed by numerous other structures and improvements, which have given (at least as far as they extend) quite a different aspect to the town.

Whatever they may be in regard to architectural taste, or however objectionable when examined in detail, it cannot be denied that both Regent Street and the Regent's Park were magnificent improvements, and have, moreover, led to a variety of others. They have certainly created a taste for a degree of architectural display that would formerly have been considered quite prodigal; and if that taste be in many instances very bad—not to say paltry,—it is upon the whole preferable to the dull monotony that used, as far as their architecture was concerned, to characterize even the best of the trading streets in the metropolis. The Strand affords a very fair comparison between the old and new modes of building, the houses being of the same class, though very different in architectural character; and as even the most prejudiced can scarcely hesitate to decide in favour of the latter, it may be almost taken for granted, not only that attention to appearance is more studied than it used to be, but that the condition of shopkeepers and tradesmen is improving likewise. The alterations occasioned by the building of New London Bridge, and forming approaches to it, in consequence of the change of site, have already greatly metamorphosed that part of the city, and awakened a spirit of improvement which bids fair to keep pace with that at the other end of the town. As to King William Street, much cannot be said in praise of the façades which it exhibits. The new range of buildings in Princes Street, at that extremity of it which was previously a most inconveniently narrow lane, has, on the contrary, a somewhat imposing air of noble simplicity. Moorgate Street too, which extends from the one just mentioned to Finsbury Circus, is decidedly better than that near the bridge. While it displays a pleasing regularity of design and uniformity of character, it does not offend by too great sameness and monotony, the elevations being broken into sufficiently distinct masses; besides which the houses have an air of greater loftiness than usual, owing to the breadth of the street not exceeding their height. When the Royal Exchange (destroyed by fire on the night of Jan. 10th, 1838) shall come to be rebuilt, it will no doubt lead to various other improvements in its immediate vicinity. In addition to this, it is in contemplation to form new streets where at present either no public thoroughfares exist or only such as are very crooked and narrow. Among these is one from the Post-Office to Lothbury and the Bank; another in continuation of Farringdon Street northwards; a third to open a direct communication between Holborn and the Strand, along the east side of Lincoln's Inn Fields. A similar project is now going on for improving the neighbourhood of Westminster, by means of a spacious street intended to lead from the west front of the Abbey to Pimlico. The necessity not only for these but for other improvements of the same kind must be tolerably apparent to any one who looks at a map of London; and among them would be a direct line of communication from the upper end of St. Martin's Lane into Oxford Street; another from Coventry Street into Covent Garden Market; and a third from Holborn into the Strand, to be obtained by widening and rebuilding the whole of Drury Lane.

With the exception of the terraces in the Regent's Park, Hyde Park Terrace near Bayswater, and that in St. James's Park—which are for the greater part more tawdry than rich in point of design,—none of the newer ranges of private houses make any pretension to architectural decoration; or if any thing of the kind be occasionally attempted, as in Eaton Square, &c., it is so meagre in itself and so grudgingly bestowed, as to be quite the reverse of satisfactory. Internally however the houses themselves are, in proportion to their size, far more commodious and better fitted up than those of half a century ago. All the newer parts of the town are likewise sufficiently airy and cheerful, owing both to the greater width of the streets themselves, and to the greater breadth of the foot-pavements and the areas before the houses; while, for the last reason, the kitchens are less gloomy and the foot-pavements less muddy than in the older and narrower streets. Besides this, another advantage is that the inhabitants are less exposed to the observation of their opposite neighbours; while the system of macadamization, now so generally adopted in squares and streets, has very much abated the nuisance of the rattling of carriages.. In fact, as regards the laying out, paving, and lighting of the streets, there is very little room for further improvement: there is however one serious inconvenience attending some of the widest streets which are frequented thoroughfares—the width of the carriage-way being so great as to render it hazardous to cross them when filled with carriages. This is particularly the case in Regent Street; yet the remedy for it is easy, as all danger and inconvenience to foot-passengers would be removed by erecting a lamp-post, with a few other posts around, at one or two crossings; besides which the roadway of the crossing would then be sufficiently lighted at night. In addition to the more obvious improvements as regards paving, lighting, the widening of streets, and removal of all obstructions in them, it should be mentioned that the salubrity of the metropolis has been greatly increased both by the supply of water and the present effectual system of drainage and sewerage.

Public convenience has been better consulted than it used to be by the erection of more commodious markets, in respect to which London was till lately not so well provided as Liverpool. Although not much of an architectural improvement, the present Covent-Garden Market is far more comfortable and commodious than the old one; and both Hungerford and Farringdon Markets (the former more especially) exhibit a most welcome change from the condition of their predecessors. The wonder lies not so much in the change itself, as that it should not have taken place sooner, shelter being almost indispensable for all such places in a climate so humid and rainy as ours, and which, if not kept dry, can hardly ever be kept clean. Of covered streets of shops we have as yet but two, namely, the Burlington and Lowther Arcades; unless we choose, as far as foot-passengers are concerned, to include also the colonnades of the Quadrant in Regent Street and the Opera House. The Lowther Arcade is of exceedingly handsome and tasteful design, and may be termed even luxurious in comparison with some of the narrow alleys and lanes with shops in the city, where however the example thus set has not been adopted. Somewhat akin to these arcades, or *passages*, as the French term them, are the bazaars which have of late years become so common, though formerly Exeter 'Change was the only place of the kind, and one moreover of most homely and mean appearance, compared with the highly decorated one of the Pantheon in Oxford Street. The Pantechnicon, near Belgrave Square, is another very extensive establishment of a similar though not precisely the same kind.

Although, in comparison with many other capitals, London is by no means rich in public collections of works of art, some advancement has of late been made even in this respect, both by the establishment of the National Gallery and the unreserved access now afforded to the British Museum, whose collections have been greatly increased in the present century. The Soanean Museum can as yet hardly be said to be open to the public. An effort has been made to have both Westminster Abbey and St. Paul's opened to visitors gratuitously; but it has hitherto been unsuccessful. In the meanwhile annual exhibitions are increasing: formerly there was only that of the Royal Academy; whereas there are now two at the British Institution, one for modern pictures, the other for works of the old masters; and that of the Society of British Artists, besides one or two of paintings in water-colours. To these may be added various other exhibitions of more or less recent origin, as dioramas, panoramas, &c. Formerly the 'lions' in the Tower and the animals at Exeter 'Change used to be far famed among the sights of London; but in lieu of them we have now the Zoological Gardens at the Regent's Park and the Surrey Zoological Gardens. In the course of a few years the Regent's Park will most probably possess another novel and attractive exhibition, it being intended to convert the whole of the inner circle into a botanic garden, with buildings and other ornamental accessories; and the mention of this reminds us that St. James's Park has been altered greatly for the better, it now presenting, instead of a mere meadow and formal canal, the appearance of a well laid-out pleasure-ground, with a lake studded by islets. The Adelaide Gallery, Lowther Arcade, and the Polytechnic Institute, Regent-street (opened August, 1838), afford proof of the diffusion of knowledge. The same remark applies to the various literary and scientific institutions, of which there is now some one or other in almost every quarter of the metropolis. Another class of establishments which, as now organized, may be said to be peculiar to our own times, are the club-houses, principally at the west-end of the town, which in some degree partake of the nature of places of literary as well as convivial meeting. Some of them are not only splendidly fitted-up and afford the most luxurious accommodation within, but are very conspicuous architectural objects. When the Reform Club is finished, the south side of Pall-Mall will consist almost wholly of these palace-like edifices, whose façades offer such a contrast to that homeliness of exterior which, with here and there an exception, prevails among what are internally splendid private mansions.

One innovation of very recent date, though long before demanded by a regard to public health, is the formation of cemeteries beyond the suburbs. Some years before anything of the kind was actually adopted, a scheme was brought forward for one to the north of the Regent's Park, but it failed probably from its having been on too gigantic and expensive a scale; for that necropolis was to have been a sort of mimic Athens, with facsimiles of all its temples and other buildings. The idea itself however was taken up by other parties, and the Kelsall Green Cemetery was formed about 1832. There are now two more; one at Highgate, the other at Norwood, both of which were executed chiefly in 1838, and a fourth and fifth are about to be undertaken at Brompton and Newington Butts.

Having thus far given a summary account of the growth of the metropolis, and of some of the principal changes occasioned by the increase of wealth, we should proceed to give some description of the more important public buildings; yet, unless we were to confine ourselves to merely one or two, which, as being the most noted, have already been described by others again and again, we should very greatly exceed all reasonable limits. We therefore adopt the more novel and convenient mode of exhibiting, in a tabular form and in chronological order, a list of such public buildings as are most worthy of notice on account of their architecture. This will at all events furnish a synoptical view of our metropolitan architecture, and were similar tables drawn up of the principal buildings of other capitals and cities, including some of our own large provincial towns, more exact information of the kind might be comprised in a few leaves than can otherwise be obtained by turning over a vast number of volumes. We shall however here prefix to the table itself a few general remarks on some of those buildings and others, more satisfactory perhaps than the very brief comments there inserted.

Of older architecture the metropolis now exhibits very little, with the exception of parts of the Tower, the Temple Church, Westminster Abbey and Hall, and one or two churches, such as St. Bartholomew the Great, and St. Mary Overies, at the south end of London Bridge, which was ably restored a few years ago. Other specimens that had been spared by fire have been swept away by improvement; among the rest the Savoy Palace and Ely House. But if improvement has in this respect been as merciless as fire, and, in the opinion of antiquaries, perhaps no less mischievous, it has at least cleared away the mass of unsightly buildings which formerly blocked it up the noble abbey of Westminster and the magnificent chapel of Henry VII. attached to it, both of them among the finest specimens of their respective styles. Wren's work however, in the western towers of the abbey, shows him to have had no feeling for Gothic architecture, which style did not begin to be revived in the metropolis until the present century. As the architect of St. Paul's, Wren is justly entitled to the reputation which he enjoys; and that noble edifice has procured for his other works more celebrity than they would otherwise have enjoyed; certainly more than they actually deserve. The greater part of the churches erected by him exhibit a heavy uncouth mannerism, with hardly a redeeming beauty. Even the steeples of Bow Church and St. Bride's have been greatly over-praised; the same remark applies to the interior of St. Stephen's, Walbrook, which derives its claim to elegance solely from its cupola and columns, all the rest being poor and trivial even to meanness. The few civic buildings which he erected were not in a more refined taste; nor would such structures as the former Fishmongers' Hall and Custom House, the old College of Physicians (now converted into a butchers' market), and Temple Bar, add to the reputation of any architect of the present day.

In the next age a different mode of design began to be adopted for churches, and those of St. George's, Hanover-square, St. Martin's, and St. George's, Bloomsbury, which are certainly not otherwise inferior to Wren's, greatly surpass them in the classical dignity which they derive from their porticos. It has indeed hitherto been the fashion—for it can be termed nothing better—wholly to overlook the portico of the last-mentioned edifice, and to decry it on account of the supposed absurdity of its steeple, notwithstanding that, in its outline and architectural expression, that campanile exhibits far greater beauty and propriety than any other we can produce; while the general bad taste displayed in the design of St. Martin's has escaped from reproach on account of its portico alone. How far the architect of the latter was really gifted with taste will be more correctly judged by examining his church of St. Mary-le-Strand by Somerset-House (1714-18). As to that of St. Clement's, the steeple of which was also by Gibbs, few will dissent from the opinion passed on it by Malton, who terms it 'a disgusting fabric.'

Besides churches, there are very few public buildings of this period that make much architectural pretension, at least very few now remaining. The former building of the Bank of England, begun in 1734, possessed little beauty or grandeur, though the wings afterwards added by Sir Robert Taylor gave it its present extent of façade. St. Bartholomew's Hospital, commenced by Gibbs in 1730, is a tolerably fair specimen of the average taste of design at that period, which being the case, it is rather surprising that the Mansion House (1739) should have been so severely censured, since, taken altogether, it certainly possesses an air of dignity, and something picturesque in its side elevations. Ironmongers' Hall, Fenchurch-street, begun a few years later (1748), is very far superior in external appearance to any other of the City companies' halls then erected. In the latter half of the century few public buildings were erected, yet among them were two of the noblest which the City even now possesses, namely, the Excise Office and Newgate. The merit of the latter has been universally admitted; the other, on the contrary, is scarcely ever mentioned, notwithstanding that, for imposing grandeur of mass, and greatness of manner combined with simplicity, it surpasses everything else in the metropolis; not so the front of Guildhall by Dance (1789), which is utterly unworthy of the handsome Gothic interior which it masks, being in a most mongrel and vulgarized style, without one single merit to compensate for its absurdities. The small and picturesque front of the adjoining Gothic chapel has now disappeared, it having been taken down some years ago to make room for a building comprising the Bankrupt Courts, &c., a most insipid and tasteless design. After the Excise Office and Newgate, Somerset House is almost the only public building which distinguishes the reign of George III.; for all that has been done in the present century may be considered as commencing with the Regency. The end of the last century was however marked by the erection of the East India House, more decidedly Greek than anything which had preceded it. Compared with what it has since been, architecture was then at a rather low ebb; for although one or two of the buildings above mentioned are noble works, they must be taken as exceptions to the meagre, insipid, and monotonous style which stamps this period, and which such erections as the Adelphi and Portland-place rather confirm than contradict. With the exception of St. Peter-le-Poor (1791) and St. Martin's Outwich (1796), not one church was built from the commencement of the reign of George III. to the Regency. The year 1809 is the date from which the metropolitan architecture of the present century may be said to begin. The two Grecian orders, Doric and Ionic, were for the first time adopted as the standard mode, and insulated columns took place of engaged ones and pilasters. From this time porticos became of as general as they were before of rare application. But in London architectural character has been made to depend too much on such features alone, and even in them the chief study has been bestowed on the columns themselves, nothing whatever of embellishment—not even so much as amounts to consistent finish of the order—being bestowed on their entablatures and pediments. This pseudo-classical style, consisting in merely copying to the letter certain details of antient architecture, has in more than one instance been carried to a most offensive extent; but perhaps the most preposterous of all was the original front of the College of Surgeons, consisting of an Ionic hexastyle attached to a front which, so far from having any architectural pretensions, was in the most vulgar and barbarous taste.

Both the Custom-house and Bethlehem Hospital exhibit in some degree the same perverseness and incongruity, while many other buildings, though more consistent, are nevertheless cold and monotonous, and display nothing more conspicuously than barrenness of invention. Now that the novelty attending Grecian architecture, on its first introduction among us, has passed away, we begin to be disagreeably sensible of this, and to perceive that little or nothing has been done to naturalize it, or to render it more pliable or more copious than we first found it. Such an avowedly facsimile application of Athenian architecture as St. Pancras was not only excusable but laudable; yet one such specimen of the kind is sufficient; especially when we find that nearly every succeeding one has fallen short of it in regard to finish of details and beauty of execution, though even in St. Pancras the entablature and pediment look chillingly naked in comparison with the columns and the doors within the portico, which latter are in the most exquisite style of decoration. The small façade of St. Mark's, in North Audley Street, forms a rather striking exception from the frigidity and commonplace of Grecian design when reduced to the mere imitation of antient columns. Another pleasing exception is afforded by the New Corn Exchange, Mark Lane, which manifests some happy originality. Of such porticos as that of the College of Physicians, the most that can be said is that they are respectable copies, upon a very respectable scale. That of the Post-office (an Ionic hexastyle) is imposing for its size and spaciousness, and is well arranged, owing to its partly receding within the building as well as projecting from it, and to having only a large centre door, with a lesser one on each side of it; yet all the rest is rather poor, nor is there much of the genuine expression of the style aimed at. The façade of the University College is a more original and finer composition, besides affording the only instance of a decastyle portico. In the front of the National Gallery the architect of the structure last-mentioned has been by no means so happy: taken by itself the octostyle portico and the ascents to it make a pleasing and rather striking composition, but the cornice is by far too plain and meagre for the rich Corinthian columns, while the dome is positively bad, and altogether different in feeling and character from every other part. In the number of their columns these two porticos (of the University College and National Gallery) exhibit some degree of novelty, but as yet nearly everything of the kind we possess is upon a uniform scale far inferior to that of some of the public buildings at Paris. The only exception, where unusual magnitude has been aimed at, is the Doric Propylæum or Railway Terminus, Euston Square. Here the order displays itself effectively, not only on account of its dimensions, but also because there are no windows nor other features of that kind to interfere with it. The British Fire Office, on the contrary, exhibits a most perverse application of a Grecian Doric to a building which in itself is in the most extravagant and fantastical taste.

Most of the new churches in London and the suburbs professing to be Greek are little better than parodies and travesties of the style. They exhibit moreover a wearisome repetition of the same stale hackneyed ideas, or rather the want of any idea beyond that of tacking a few columns to the front of what would else be mere meeting-houses. These and other spiritless as well as mongrel samples of the Anglo-Grecian school seem at length to have brought the style into disrepute, and accordingly some of the more recent buildings show a desire to return to the Italian, which, if purified and treated with originality instead of servile indiscriminate copying, would in most cases recommend itself in preference to the other. The Travellers' Club-house, particularly the garden front, is a charming and beautifully finished example of the Italian, and its architect (Mr. Barry) has since given a sort of combination of that and Grecian in the new façade of the College of Surgeons. Goldsmiths' Hall is Italian of a more heavily magnificent character, which however is greatly injured by the poverty of the ground-floor and its windows, which is left very bald, notwithstanding that it is comprised within the order. Two buildings erected in 1838, the London and Westminster Bank, and the new synagogue, St. Helen's Place, belong also to the Italian school.

Here we must bring to a conclusion this general summary of the architecture of the metropolis, which it would have been a far easier task to expand than to confine to these limits. We have attempted nothing like either description or detailed criticism, the former of which at least is to be met with in a variety of works. The one more especially devoted to buildings and architecture is the new edition of 'Illustrations of the Public Buildings of London,' by W. H. Leeds. The article 'London,' in Moule's 'English Counties,' will also be found to contain a great deal of information; while in the volumes of the *Companion to the Almanac*, most of the edifices erected within the last six or seven years are described at some length. In regard to detailed criticism, the series of papers in the *Printing Machine*, entitled 'Strictures on Structures,' gives the New Palace, York Column, and various other subjects; and a similar series of architectural critiques on other metropolitan buildings has been commenced in the *Civil Engineer's Journal*.

Table of Public Buildings most worthy of Notice for their Architecture.

SEVENTEENTH CENTURY.

	Date.	Architect.	Remarks.
Whitehall Chapel . . .	1619	Inigo Jones	Chiefly admirable as the first specimen of pure Italian.
York Stairs	1626	Ditto	
St. Paul's, Covent Garden .	1631	Ditto	Tuscan, distyle in antis.
Temple Bar	1670-2	Sir C. Wren	
The Monument . . .	1671-7	Ditto	Fluted Doric column; total height, including pedestal, &c., 202 feet.
St. Stephen's, Walbrook .	1672-9	Ditto	Exterior concealed by houses; interior over-praised chiefly remarkable for its dome.
St. Paul's Cathedral, begun .	1675	Ditto	Extreme length, 500 feet; height to top of cross, 360.

Eighteenth Century.

	Date.	Architect.	Remarks.
St. Paul's finished,	1710		Style Italo-Roman; exterior both magnificent and picturesque, though not faultless.
St. George's, Hanover-square	f. 1724	J. James	Portico hexastyle, Corinthian.
St. Martin's	1721-6	J. Gibbs	Portico hexastyle, Corinthian; the general style bad.
St. George's, Bloomsbury	f. 1731	Hawksmoor	Ditto, ditto; Campanile excellent.
Mansion House	1739-53	Dance	
Westminster Bridge	1739-50	Labelye	Length 1066 feet.
Ironmongers' Hall	1748	Holden	Italian Ionic on basement.
Horse Guards	1751	W. Kent	
Blackfriars Bridge	1760-70	R. Mylne	Length 1000 feet.
Excise Office	1769	James Gandon	Plain in design, but of most commanding aspect.
Adelphi	1770	Adams	
Newgate	1770-82	Dance	Admirable in design and character.
Somerset House	1776	Sir W. Chambers	Though poor in parts, a good example of Italian. River front 590 feet.
Clerkenwell Sessions House	1780	Rogers	East front handsome.
Bank	1789-826	Sir J. Soane	Very picturesque in parts.
India House	1799	R. Jupp	Hexastyle loggia, Grecian Ionic; sculptured frieze and pediment.

Nineteenth Century.

Covent-Garden Theatre	1808-9	Sir R. Smirke	Grecian Doric; tetrastyle portico.
Drury-Lane Theatre	1811-12	B. Wyatt	
Opera-house, altered	1818	Nash and Repton	
Bethlehem Hospital	1812-15	J. Lewis	Portico hexastyle, Ionic. Length 569 feet.
Waterloo Bridge	1811	J. Rennie	Length 1326 feet.
Mint	1811	Sir R. Smirke	Grecian Doric on a basement.
Custom House	1813	D. Laing	The Long Room and centre of the river front quite altered after the accident in 1826. Length 484 feet.
London Institution	1815-19	W. Brooks	
St. Pancras Church	1819-22	W.& H.W. Inwood	The finest copy of Athenian Ionic.
Post-Office	1823-9	Sir R. Smirke	Hexastyle, Ionic portico; extent of front 390 feet.
Hanover Chapel, Regent-street	1823-5	R. C. Cockerell	Tetrastyle Ionic portico.
British Museum (new buildings)		Sir R. Smirke	
Buckingham Palace	1825	Nash and Blore	
College of Physicians and Union Club-House	1825-7	Sir R. Smirke	Grecian Ionic.
Board of Trade	1824-6	Sir J. Soane	Roman Corinthian.
Colosseum	1824	D. Burton	Hexastyle, Grecian Doric portico attached to a polygon 130 feet diameter.
London Bridge	1825-31	J. Rennie	Length 920 feet.
St. Mark's, North Audley-st.	1825-8	Gandy-Deering	Florid Grecian Ionic; façade small, but of rich design.
St. Katherine's Hospital	1826	Poynter	Chapel Gothic; the rest Old English Domestic.
Hall, Christ Church Hospital	1826	J. Shaw	Later Gothic.
Scotch Church, Regent-square	1827-8	W. Tite	Gothic.
St. George's Hospital	1827	W. Wilkins	Portico tetrastyle, with square pillars.
London University	1827-9	Ditto	Façade not completed; decastyle portico, and dome.
New Corn Exchange	1827-8	G. Smith	Grecian Doric, with pleasing originality of design.
St. Paul's School	1827	G. Smith	Hexastyle, Tivoli Corinthian on a basement.
Law Institution, Chancery-lane	1827-9	L. Vulliamy	Grecian Ionic hexastyle.
Archway, Green Park	1828	D. Burton	
Fishmongers' Hall	1827-34	H. Roberts	Grecian Ionic.
Athenæum Club	1829	D. Burton	Its bas-relief frieze the only specimen in London.
Goldsmiths' Hall	1829-35	P. Hardwick	Italian; magnificent, yet somewhat heavy, and basement poor.
Exeter Hall	1830-1	Gandy-Deering	Greco-Corinthian, distyle in antis.
St. Dunstan's in the West	1830-32	J. Shaw	Gothic; handsome Louvre tower.
York Column	1830-36	B. Wyatt	Total height, including statue, 137 ft. 9 in.
Lowther Arcade	1830	J. Turner	Greco-Italian, with pendentive domes.
Hungerford Market	1831-3	C. Fowler	
Travellers' Club	1831	C. Barry	Choice specimen of the best Italian style, particularly the design of garden front.
Charing-Cross Hospital	1830-1	D. Burton	
St. George's, Woburn-square	1832	L. Vulliamy	Gothic; handsome spire.
Westminster Hospital	1832	Inwoods	Modernized Gothic.
National Gallery	1832-7	W. Wilkins	Grecian; total extent of front 458 feet.
State-Paper Office, St. James's Park	1833	Sir J. Soane	One of his chastest productions. Style, Italian.
Pantheon Bazaar	1834	S. Smirke	
School for Indigent Blind	1834-7	J. Newman	Style Tudor, white brick and stone; central tower of rich design.
St. Olave's School	1835	J. Field	Style Elizabethan, red brick and stone.
College of Surgeons	1835-6	C. Barry	Italianized Grecian.
United University Club	1836-7	Sir R. & S. Smirke	Style a modified Italian; bas-relief panels.
St. James's Theatre	1836	S. Beazley	
Railway Terminus, Euston-sq.	1837-8	P. Hardwick	A Grecian Doric propylæum on an imposing scale.
London and Westminster Bank	1837-8	Cockerell and Tite	Style modified Italian; singular but pleasing.
Synagogue, Great St. Helen's	1837-8	J. Davies	Style Italian; interior rich and tasteful.
Reform Club	1838	C. Barry	Italian.

Divisions.—The City of London is divided, for ecclesiastical objects and for the management of the poor, into 98 parishes within the walls, and 11 without the walls. For municipal purposes the City is divided into 26 wards, each of which is in some respects a separate community. The alderman and common-councilmen, who are chosen to represent the ward (as hereafter explained) in the City parliament, form likewise a ward council, and they have the control of many of its local affairs. In most of the wards there are subdivisions into precincts, chiefly for the purposes of elections. The division into wards appears to have been made without regard to the parochial divisions, as the different wards consist of divisions of parishes as often as they are conterminous with them. An inquest jury is chosen annually in each ward, whose office it is to make presentments of nuisances and returns of non-freemen, and to perform such other duties as are within the province of a leet jury.

The comparative wealth and importance of each of the 26 wards may be estimated from the following statement of the amount of rental assessed in each for local purposes in 1771, 1801, 1831, and 1838 respectively:—

WARDS.	Amount of Rental.			
	1771.	1801.	1831,	1838.
	£.	£.	£.	£.
1. Aldersgate, Within and Without	16,001	17,827	28,860	33,297
2. Aldgate	21,082	26,467	40.044	42,529
3 Bassishaw	4,858	3,796	6,740	6,819
4. Billingsgate . . .	16,465	14,568	19,760	20,776
5 Bishopsgate, Within and Without	34,472	37,041	63,988	66,809
6. Bread Street	10,041	11,798	17,842	19,154
7. Bridge	10,230	10,179	15,847	19,036
8. Broad Street	27,982	31,835	47,408	31,903
9. Candlewick	8,444	8,424	11,958	15,067
10. Castle Baynard . . .	15,858	19.807	30,114	38,311
11. Cheap	16,410	18,994	23,488	27,733
12. Coleman Street . . .	14,282	13,951	34,043	34,785
13. Cordwainers	8,847	9,288	11,729	11,503
14 Cornhill	12,167	11,811	23,529	6,551
15. Cripplegate Within . . .	16,800	17,294	29,089	33,308
16. Cripplegate Without . .	18,378	21,834	30,617	35,691
17. Dowgate	10,144	12,156	13,939	14,897
18. Farringdon Within . . .	28,172	35,573	57,551	55,794
19. Farringdon Without . .	72,702	77,368	115,013	103,614
20. Langbourn	23,668	25,405	38,639	40,356
21. Lime Street	8,128	6,976	12,446	12,750
22. Portsoken	19,051	18,297	34,997	33,060
23. Queenhithe	8,182	8,982	13,924	13,709
24. Tower	17,480	27,807	41,200	37,437
25. Vintry	8,546	9,842	15,042	14,490
26. Walbrook	9,301	11,072	15,298	17,421
Total .	457,701	507,372	792,904	796,790

The corporation of London consists of the whole body of the citizens or freemen, under the style of 'Mayor, Commonalty, and Citizens,' viz.:—

Lord-mayor	1	
Aldermen, in addition to the Lord-mayor	25	
Common-councilmen	240	
		266

Officers of the Corporation.

The Sheriffs, who are jointly sheriff of Middlesex.
Recorder.
Town-clerk.
Common-sergeant.
Judge of the Sheriffs' Court and Assistant Judge of the Central Criminal Court.
The four Common Pleaders.
The two Secondaries.
The two Under-sheriffs.
Comptroller of the Chamber.
Remembrancer.
Solicitor and Clerk Comptroller of the Bridge House.
Coroner for London and Southwark.
Clerk of the Peace.
Bailiff of Southwark.
The four Attorneys of the Mayor's Court.
The four Auditors of the City and Bridge House Accounts.
Clerk of the Chamber.
The two Bridge-masters or Wardens.
The three Esquires, and other officers of the lord-mayor's household.
The four Harbour-masters, and other officers connected with the port of London and mooring-chain services.
The Clerks and Assistant Clerks to the lord-mayor and sitting magistrates in London and Southwark.
The Keepers, Ordinary and Chaplains, and Surgeons of the several Prisons of the city.
The Superintendant of Police, the City Marshals, and other officers connected with the police of the city, and sundry officers employed in the civil government of the corporation, collection of its revenue, the markets, &c.

The lord-mayor is elected on the 29th September in each year, from among those aldermen who have served the office of sheriff. Two such aldermen are nominated by the liverymen in common-hall, and of those two, one is selected, usually the senior alderman, by the court of aldermen. He enters upon the duties of his office on the 9th November following: if he refuses to serve, he must pay a fine of a 1000*l.* The lord-mayor elect must be presented to the lord chancellor, who signifies the assent of the crown to his election. He must also be presented, on the day on which he enters on his office, to the barons of the exchequer, when he takes the oath of office. The salary and allowances paid to him from the city funds during his year of office amount to 6422*l.* 8*s.* 4*d.*, in addition to which he receives sums from various sources which raise the official income to about 7900*l.* The expenses, chiefly arising from a sumptuous hospitality, usually exceed the income by about 4000*l.* He resides during the year of office in the Mansion-house, which is handsomely furnished, and provided with plate and jewelled ornaments said to be worth from 20,000*l.* to 30,000*l.* The functions of the lord-mayor are multifarious. A great part of his time is occupied by magisterial duties. He presides over the courts of aldermen, common-council, and common-hall. He is conservator of the Thames, and holds eight courts during the year of office, two for each of the counties of Middlesex, Surrey, Essex, and Kent, 'to enquire into all offences to the destruction of the fish, nuisances upon and impediments of the common passage of the Thames and Medway.' He presides as judge in the Court of Hustings, the supreme court of record in London, which court is generally held once a week, whence it is frequently resorted to for obtaining judgments in cases (as of outlawry) where expedition is required. He is first commissioner of the Central Criminal Court, and usually opens the sessions in person. He is a justice of gaol delivery for Newgate, and is named in every commission for that purpose. He usually opens the London session in person. He also opens and presides at the sessions in Southwark. He is escheator in London and Southwark. He is also admiral of the port of London, and is at the head of the lieutenancy of the city of London. He is properly clerk of the markets and gauger for the city. On the demise of the crown he is always summoned to attend the privy-council which declares allegiance to the successor. At the coronation, the lord-mayor acts as chief butler, and receives for his fee a gold cup.

The aldermen are elected for life, at meetings of the ward, called a wardmote, which must take place within 14 days after each vacancy shall occur. The electors are such householders of the ward as are freemen of the city and pay local taxes to the amount of 30*s.* per annum. A person refusing to serve the office when elected may be fined 500*l.*, but is excused on swearing that he is not worth 30,000*l.* With the exception of the alderman of the Ward of the Bridge (always the senior alderman, and who has no local duties to perform), every alderman appoints a deputy from among the common-councilmen of the ward. Every alderman is a justice of the peace for the city of London, and one of them attends, by a rotation among the body, for a week at one time in the justice-room at the Guildhall, for the transaction of magisterial business. In cases where two magistrates are required to determine any case at the Mansion-house, this sitting alderman proceeds there, and joins the lord-mayor for the purpose.

The common-councilmen are elected annually on St. Thomas's day, at a wardmote, the electors being the same as in the elections of aldermen. The number elected varies in the different wards, but not in proportion to their extent and presumed importance, the smallest number in any ward being 4, and the greatest 17. Any qualified freeman householder, when elected, would be subject to fine and disfranchisement for not serving, but such cases seldom or never occur. The common-councilmen do not meet in any court exclusively their own, their sittings being always under the presidence of the lord-mayor and attended of right by the aldermen. The title of the court of common-council is 'the Lord Mayor, Aldermen, and Commons of the city of London in Common Council assembled.' To constitute a court there must be present the lord-mayor or some alderman, his locum tenens, two other aldermen at least, and as many common councilmen as, with the lord-mayor and aldermen present, shall make up the number of 40. The senior law-officers of the city have seats in the court, but have no vote, and do not speak unless called upon to do so. Of late years the public have been allowed to attend, but must be excluded upon the motion of any member of the court. There are usually about 12 ordinary meetings of the court in the year. The lord-mayor may at any time call the members together, and on a requisition from a moderate number of members he seldom fails to do so. This court has now unlimited power of applying the funds of the corporation, and full legislative authority in all municipal matters, where not restrained by statute. The members of the court are severally nominated members of various committees, and thus perform various executive functions. The common seal of the city cannot be applied to any instrument but by order of the court of common-council, which thus reserves power over the disposition of the landed property belonging to the corporation.

The two sheriffs are chosen annually by such of the freemen as are liverymen of some one of the city companies. Every alderman who has not served the office is put in nomination as a matter of course. The lord-mayor, between the 1st of April and the 14th June, may put in nomination any number of freemen not exceeding nine. Any person thus nominated remains on the list until he is elected or has paid the fine of 400*l.* and 20 marks for not serving the office; and on the day of election, Midsummer-day, any two electors may put any freeman in nomination. No person is liable to serve the office twice.

The sheriffs attend the lord-mayor on state occasions and at every court of aldermen. They present the petitions of the court of aldermen or common-council to the House of Commons at the bar of the House. In the cases of addresses to the crown they attend at court for the purpose of learning when the address will be received. They attend the common-hall at elections to take the votes. They are the returning officers of the members of the House of Commons for the city of London and the county of Middlesex. Either the sheriffs or the under-sheriff of Middlesex attend at the execution of capital sentences within the city. They have the superintendence of prisons within the city, and present reports concerning their state at every court of aldermen. The sheriffs receive between them a payment from the city of 737*l.* 6*s.* 8*d.*, and they have a few incidental emoluments which one year with another raise the income to 1000*l.* for the two. On the other hand, the state which they are expected to maintain and the entertainment of the judges and aldermen who attend the Central Criminal Court at the Old Bailey subject them to very heavy expenses, amounting for each sheriff to about 2000*l.* beyond the receipts. The shrievalty being vested in the citizens of London, some of its most important duties are assigned to the judge of the sheriffs' court, and the secondaries, who are elected by the common-council.

The recorder is elected for life by the court of aldermen. He must be a freeman, but the grant of freedom may immediately precede the election. The recorder has always been chosen from among barristers. The duties of recorder are those of an advocate and adviser of the corporation. He is advised with on all cases relating to the affairs of the city, and holds a brief for the corporation in all cases, except in the courts where he himself presides. When the city is heard by council before either House of Parliament, the recorder argues the case. He is by charter a justice of the peace and commissioner of the Central Criminal Court, and a justice of the peace in Southwark. The recorder attends the lord-mayor on all important occasions of state ceremony. He sits with the judges of the court of hustings to direct them in points of law and to give judgment. The recorder acts as one of the judges at the twelve sessions holden annually in the Old Bailey, and at the conclusion of each prepares a report of the case of every capital convict for the consideration of the privy-council, and he afterwards attends to take the pleasure of the Queen thereupon. He issues warrants for the reprieve or execution of the criminals whose cases have been reported. The annual salary of the recorder is 3000*l.*, in addition to which he receives the ordinary fees on all cases and briefs which come to him from the corporation, and some other trifling emoluments.

The common-sergeant, who has always been a barrister, is elected by the common-council on the nomination of some member of the court. His duties are:—to preside daily in one of the courts of the Old Bailey during the sessions for London and Middlesex, for which purpose he is always named in the commission; he attends all meetings of the livery in common-hall; he attends all courts of aldermen and of common-council unless otherwise engaged in behalf of the corporation; he also attends the lord-mayor on all public occasions; he advises in all law cases relating to the corporation, and acts as counsel for the city in the courts in Westminster Hall. His salary is 1500*l.* per annum, in addition to which he receives fees with all cases and briefs sent to him on behalf of the city, and has some other small emoluments.

The town-clerk is appointed by the common-council, and holds his office by a grant under the common-seal during the pleasure of the court. He is the clerk of all courts holden before the lord-mayor and aldermen; of the mayor's court, of the court of hustings, of the courts of common-council and of common-hall, and of the sessions for conservation of the waters of the Thames and Medway. His duties are exceedingly various; they are such as are incident to the office of a secretary or town-clerk of a corporation, and need not be here detailed. In one year (1833) this officer attended 75 committees of aldermen and 502 committees of the common-council, in addition to his other duties. His emoluments consist of fees on licences, on leases, and on admissions to freedom or to different offices, estimated at 700*l.* per annum for himself, and 100*l.* for his clerks: besides these fees he has a salary of 1300*l.* per annum,, and an allowance of 1500*l.* per annum for the expenses of his office. He resides in apartments at the Guildhall, free of rent and taxes.

It is not necessary to enter upon any detail of the nature of other offices held under the corporation. Their duties will generally be sufficiently indicated by their designations.

In the City of London there are 89 companies or guilds, eight of which are practically extinct; and one other, that of parish clerks, is not connected with the municipal institutions of the city. Except in cases where the honorary freedom of the City is presented by a formal vote of the corporation, no person could, until recently, become a freeman who had not been admitted into one of these companies; but when by birth, apprenticeship, purchase, or gift, a person has become a member of a company, he has (by virtue of an existing bye-law) an inchoate right to the freedom of the corporation, and is admitted on proving his qualification and on payment of certain fees. Within the last few years however the antient practice has been resumed of admitting to the freedom all resident householders who may apply, by vote of common-council, without being members of any company. Most of the companies possess what is called a livery, that is, a part of their body, under the name of liverymen, if they be freemen of the corporation, enjoy privileges which other freemen do not possess: such as voting for mayor, sheriffs, chamberlain, &c., a right limited to them exclusively by an act of Geo. II. The following list exhibits the names of the companies, stated in their order of precedence. The first twelve are called the Twelve Great Companies. The names in Italics are those of extinct companies:—

1. Mercers
2. Grocers
3. Drapers
4. Fishmongers
5. Goldsmiths
6. Skinners
7. Merchant Tailors
8. Haberdashers
9. Salters
10. Ironmongers
11. Vintners
12. Cloth-workers
13. Dyers
14. Brewers
15. Leather-sellers
16. Pewterers
17. Barbers
18. Cutlers
19. Bakers
20. Wax-chandlers
21. Tallow-chandlers
22. Armourers and Braziers
23. Girdlers
24. Butchers
25. Saddlers
26. Carpenters
27. Cordwainers
28. Painter-stainers
29. Curriers
30. Masons
31. Plumbers
32. Innholders
33. Founders
34. Poulterers
35. Cooks
36. Coopers
37. Bricklayers
38. Bowyers
39. Fletchers
40. Blacksmiths

41. Joiners
42. Weavers
43. Woolmen
44. Scriviners
45. Fruiterers
46. Plasterers
47. Stationers
48. Broderers
49. Upholders
50. Musicians
51. Turners
52. Basket-makers
53. Glaziers
54. Horners
55. Farriers
56. Paviers
57. Loriners
58. Apothecaries
59. Shipwrights
60. Spectacle-makers
61. Clock-makers
62. Glovers
63. Comb-makers
64. Felt-makers
65. Frame-work knitters
66. Silk-throwers
67. *Silkmen*
68. *Pin-makers*
69. Needle-makers
70. Gardeners
71. *Soap-makers*
72. Tin-plate workers
73. Wheelwrights
74. Distillers
75. *Hat-band-makers*
76. Patten-makers
77. Glass-sellers
78. Tobacco-pipe-makers
79. Coach and harness makers
80. Gun-makers
81. Wire-drawers
82. *Long bowstring-makers*
83. Playing-card-makers
84. Fan-makers
85. *Woodmongers*
86. *Starch-makers*
87. *Fishermen*
88. Parish Clerks
89. Carmen

No company on the foregoing list, with the exception of the Carmen, is now exclusively composed of persons from whom it takes its name. The greater part of the Apothecaries' company are in some way connected with the sale of drugs or the practice of medicine; and the greater part of the Stationers' company in the trade connected with the sale of books. The livery was in former times granted only to the more wealthy citizens. An order of the court of aldermen, passed in 1697, directs that 'no person should be allowed to take upon himself the clothing (or livery) of any of the twelve companies,' those which stand at the head of the foregoing list, 'unless he have an estate of 1000*l.*; nor of the inferior companies unless he have an estate of 500*l.*' In more modern times not only has this restriction been relaxed, but it has frequently been made imperative upon many freemen of the City to take up their livery in one of the companies. The terms of admission vary with regard to different companies; but, with some few exceptions, it is open to any freeman to take up the livery of any company upon payment of its regular fees or fines. When the freedom is claimed on the ground of patrimony or servitude, the fines are usually limited to a few pounds; in other cases they vary from a few pounds to 200 guineas. These trading companies may be divided into three classes:—

1. Those which exercise an efficient control over their trade, in which class there are now only two companies, the Goldsmiths and the Apothecaries.

2. Those which have power to search for defective wares, or to prove or mark the article, or to execute any legislative enactment passed for regulating the trade. In this class there are now only the Apothecaries, Stationers, Gunmakers, and Founders, which last has the privilege of testing and marking weights.

3. Those into which persons carrying on certain occupations in the City are compelled to enter, which class includes all not enumerated in the first and second class.

The management of the affairs of these companies is entrusted to certain senior members of the livery, who form what is commonly called 'The Court of Assistants,' and which usually consists of a master, a senior warden, a junior warden, and of an indefinite number of assistants, who succeed in due rotation to the higher offices of the court. Many of the companies possess extensive estates and other property, which is applied in part to the relief of decayed members of their own body and their families, and in part to more general objects of charity. Many of them are also trustees of lands and money, which have been appropriated by the donors to specific charitable objects, and, among such objects, to education. These companies are however no part of the corporation of London, but have many of them their own charters of incorporation.

The City returns four members to the House of Commons. The right of election is in the freemen, being liverymen, and the inhabitant householders occupying dwellings of 10*l.* yearly value. The numbers of electors registered in these two classes in 1836 and 1837 were as follows:—

	1836.	1837.
Number of householders	10,322	10,673
Freemen, being liverymen	9,134	9,005
Together	19,456	19,678

It is probable that some of the above are registered in their double capacity, and thus swell the apparent number of electors. The number that polled at the general election (on which occasion the same individual can appear in one character only) of 1837, which was severely contested, was—

Householders	5,799
Fremeen, being liverymen	5,778
	11,577

Production.—That London is not commonly considered as a manufacturing town is owing to the more important aspects under which it presents itself, and not because of the absence of manufacturing industry. Manufactures of almost every kind are in fact carried on in the metropolis, and upon a scale of great magnitude; the best workmen in almost every branch of handicraft being certain of finding employment in London at the highest rate of wages. London was for a long time the only seat of the English broad silk manufacture, which is still carried on as extensively as formerly, and perhaps to a greater extent than ever, although Manchester, Macclesfield, and other towns have now become rivals in that branch of industry. Linen, woollen, and cotton fabrics are not made in or about London.

The largest breweries, distilleries, and sugar-refineries in the kingdom are in the metropolis. The manufacture of metals in almost every branch is carried on to a vast extent. It is true that a great part of the hardware and cutlery required for common purposes is made at Birmingham and Sheffield, which likewise supply the greater part of those articles required for exportation, because of the lower prices at which they can be there produced; but when taste or fashion is to be considered, and superiority of quality is desired, the London workmen are commonly employed. Almost every kind of machinery, from the smallest wheels required by the watch-maker to the most powerful steam-engines, are made in London. The making of gold and silver articles, of optical and surgical and other instruments, tools of the best quality, and musical instruments, gives employment to numerous hands. Ship-building, with all its accessaries, rope-makers, mast-makers, block-makers, anchor-smiths, &c., has always been actively prosecuted. There are also numerous chemical works on a large scale, tanneries, soap-manufactories, potteries, and dye-houses. Male and female clothing of all descriptions is made, not merely for the use of the inhabitants of the metropolis, but for the supply of wealthy persons in various parts of the kingdom, and even in the British colonies. The metropolis is also the great workshop of literature, science, and the arts. The number of books printed and published in all other parts of England is small in comparison with what is produced in London. The number of men employed as compositors in London is estimated at 2000; there are also 500 apprentices, and 1000 pressmen, in addition to those who superintend the working of the great printing-machines, and whose number has not been ascertained. In the extent to which it has now reached, the mechanical part of the labour of producing books and periodical publications in London may well be considered a manufacture. It has been computed by a bookseller long conversant with one great branch of publication—that of periodical works—that the number of such works sold on the last day of every month in London amounts to half a million of copies, occasioning an expenditure on the part of the public of 25,000*l.*; and that the number of parcels containing periodicals despatched into the country in various directions on that day is 2000. This estimate does not include weekly publications (not newspapers), about fifty in number, of which about ten millions of copies are sold in the course of the year. Of newspapers there are eleven published daily, six in the morning and five in the evening. There are besides twenty-four weekly newspapers, and thirty-eight which appear at other intervals of time, some three times and some twice a week; others on alternate weeks, and one or two monthly. The number of newspaper stamps issued for London publications between 15th September, 1835, and 15th March, 1838, was—

In the year ending 15th of September, 1836 . 19,241,640
„ 15th „ 1837 . 29,172,797
six months ending 15th March, 1838 . 14,438,556

The number of newspapers despatched from the General Post-Office in London in each of the three years ending 31st of October, 1835-6-7, was as follows:—

	Year ending 31st October, 1835.	1836.	1837.
Sent from the Inland Office .	14,066,406	12,913,878	19,046,411
„ Foreign-Office .	158,929	231,819	427,516
„ Ship-Letter Office	55,555	66,158	87,537
	14,280,890	13,211,855	19,561,464
Sent through the Twopenny-Post	234,756	242,630	367,942
Total .	14,515,646	13,454,485	19,929,406

The increase in the number of stamps and in the transmission by post during the last year above given, doubtless arises from the reduction of the stamp-duty to which newspapers were liable.

Consumption.—It is not possible to state with any pretensions to accuracy the amount of consumption in London, of any except a very few articles of general use. A considerable part of the foreign and colonial merchandise that passes every year through the custom-house of the port is forwarded into the interior of the country, and the same remark applies, though in a less degree, to the produce of London breweries, distilleries, tanneries, &c. A tolerably good test of the consumption of butchers' meat was formerly supplied by the returns of sheep and cattle sold in Smithfield market, although this would at all times be somewhat below the actual amount, because of the number of animals sold to butchers by the drovers on their road to the market; but of late years, since the improvement of turnpike-roads, and the consequent acceleration of travelling, and more especially since the adoption of steam-navigation, a great and continually increasing quantity of cattle and slaughtered meat is brought for sale to London, of which no account is taken. During all the colder months of the year, from October to April, almost every steam-vessel employed in the coasting-trade to London brings a supply to its markets. Oxen, sheep, and swine slaughtered on Saturday in Edinburgh are by this means brought and exposed to sale on the following Monday, and this branch of business is now followed with activity and regularity from almost every port of the kingdom within 500 miles of the metropolis, which has with it a constant steam communication. Live cattle, sheep, and pigs are brought by the same means during the summer months, and in considerable numbers. With this explanation the following table is offered, showing the average number of sheep and cattle sold in Smithfield market in each quinquennial period from 1730 to 1770, and the actual numbers so sold in each of the years from 1820 to 1838:—

		Sheep.	Catt'e.
1730	to 1735	568,060	93,655
1735	1740	599,466	97,548
1740	1745	531,134	85,892
1745	1750	655,516	80,876
1750	1755	680,618	80,843
1755	1760	616,750	91,699
1760	1765	635,247	86,555
1765	1770	632,812	84,244

	Sheep.	Cattle.
1820	947,990	132,933
1821	1,107,230	129,125
1822	1,340,160	142,043
1823	1,264,920	149,552
1824	1,239,720	163,615
1825	1,130,310	156,985
1826	1,270,530	143,460
1827	1,335,100	138,363
1828	1,288,460	147,968
1829	1,240,300	158,313
1830	1,287,070	159,907
1831	1,189,010	148,168
1832	1,257,180	158,640
1833	1,167,820	152,093
1834	1,237,360	162,485
1835	1,381,340	170,325
1836	1,219,510	164,351
1837	1,329,010	172,435
1838	1,403,400	183,362

The following statement of the quantity of wheat and flour brought into the port of London in each year from 1820 to 1838 contains the only information that can be given concerning the consumption of bread in the metropolis, but must not be taken as an accurate test of that fact. In ordinary seasons the great bulk of these importations are retained for the use of the metropolis and surrounding district, but in addition to the quantities thus recorded a great deal of flour is brought by land-carriage from the adjoining counties which does not pass through the books of the custom-house, nor of the clerks of the markets; and on the other hand, in seasons of scarcity, when grain is brought from abroad, much that figures in the returns of the port is afterwards transmitted to other parts of the country. In order to render the following figures as useful as possible in a comparative point of view, notice is added characteristic of each season.

Year ending Michaelmas.	Wheat. Quarters.	Flour. Sacks and Barrels.	Nature of Harvest.
1821	641,371	464,820	Average.
1822	486,484	442,818	
1823	554,851	450,095	Below an average.
1824	394,637	502,390	Average.
1825	354,267	457,231	Not quite an average.
1826	530,961	540,253	Average.
1827	447,677	482,266	
1828	409,042	450,689	Below an average.
1829	423,102	468,293	Average.
1830	1,342,745	484,793	Average.
1831	873,488	475,746	Not quite an average.
1832	908,517	627,003	Full average.
1833	695,908	542,813	
1834	459,222	409,565	
1835	457,448	442,152	Above an average.
1836	429,748	376,775	
1837	465,362	428,481	Below an average.
1838	625,407	515,005	

The following statement of the quantity of coals brought to London in each year, from 1825, will show the consumption of that article with tolerable accuracy. Of late years the greater amount of gas-lighting, the increasing number of steam-engines employed for manufacturing purposes, and still more the supplying of steam-vessels, occasion an increased consumption beyond the quantity used in families; but these circumstances cannot very materially affect the general result.

	Tons.		Tons.
1825	1,856,606	1832	2,139,078
1826	2,040,291	1833	2,010,409
1827	1,882,321	1834	2,078,685
1828	1,960,559	1835	2,298,812
1829	2,018,975	1836	2,398,252
1830	2,079,275	1837	2,626,997
1831	2,045,292	1838	2,581,085

The consumption of coals in London, in 1744, was 596,192 tons, and in 1795 had reached 1,163,100 tons.

The inhabitants of London draw nearly the whole of their supply of water, for manufacturing and household purposes, from the Thames and what is called the New River. [HERTFORDSHIRE, p. 179.] The daily consumption is stated by the directors of the principal companies (eight in number) by which it is distributed, to amount to 20,829,555 imperial gallons. Of this quantity, the north-western district receives 9,000,727 gallons, the north-eastern 7,694,828 gallons, and the district on the south side of the Thames 4,134,000 gallons. The inhabitants of the northern suburb are partly supplied by a ninth company, from ponds at Hampstead and Highgate. The six companies which draw their supply from the Thames have large reservoirs, into which the water is pumped by powerful engines, and allowed to remain sufficiently long for the subsidence of the grosser impurities. Besides these sources of supply, London has the advantage of possessing, in many parts, springs of peculiarly fine water; and there is little doubt that the comparative state of healthiness enjoyed by the inhabitants must be in a great measure attributed to the abundant supply of water and the excellent drainage.

The consumption of the metropolis, in regard to some principal articles which are under the management of the excise, may be stated with tolerable accuracy. The following statement gives the number of bushels of malt used by the London brewers, and the quantities of British and foreign spirits, tobacco, and snuff, which have been sent out with permits by the dealers or manufacturers, for consumption, in different years since 1827:—

Years.	Malt used in Brewing. Bushels.	Sent out of Stock for Consumption. Foreign Spirits. Gallons.	British Spirits. Gallons.	Tobacco. lbs.	Snuff. lbs.
1827	3,964,649	1,512,268	4,602,376	3,167,503	895,009
1830	3,176,046	1,485,953	5,222,145	3,359,273	918,946
1833	4,653,526	1,471,267	5,218,318	3,384,744	1,107,660
1835	5,284,326	1,420,600	5,941,251	4,038,317	1,086,493
1837	5,692,360	1,270,931	5,354,388	3,636,362	1,181,723

Some abatement from the above quantities, but in what proportion cannot be stated, must be made before we can ascertain the actual consumption of the metropolis, because many persons who reside beyond its limits procure supplies from London tradesmen.

Police.—Until comparatively a recent period, the police of this metropolis was very defective, although the subject had engaged the attention of the public, and had been investigated by numerous committees of the House of Commons at various times during the last fifty years. The 'Treatise on the Police of the Metropolis,' published by Mr. Colquhoun in 1797, revealed such dreadful scenes of depravity as powerfully engaged the public attention; and to that work may in a great measure be attributed the reforms which have at length been introduced. Deplorable as was the state of the police when Mr. Colquhoun's work was published, it was not worse than it had been for some centuries. As recently as the beginning of the eighteenth century it was highly dangerous to venture abroad, alone and unarmed, after dark, except in the most frequented parts of the town; and in 1728 a plan was formed for robbing the queen in St. Paul's Churchyard, as she returned from supper in the city to St. James's; but the gang being engaged in robbing Sir Gilbert Heathcote, an alderman, on his return from the House of Commons, her majesty passed unmolested. Many facts are recorded by Maitland and other historians, showing the height to which open violence was carried in those days. Fielding, writing in 1751, says: 'The great increase of robberies within these few years is an evil which to me appears to deserve some attention. In fact, I make no doubt but that the streets of this town, and the roads leading to it, will shortly be impassable without the utmost hazard; nor are we threatened with seeing less dangerous gangs of rogues among us than those which the Italians call the banditti. What indeed may not the public apprehend when they are informed, as an unquestionable fact, that there are at this time a great gang of rogues, whose number falls little short of a hundred, who are incorporated in one body, have officers and a treasury, and have reduced theft and robbery into a regular system? There are of this society men who appear in all disguises and mix in most companies.' Even so recently as the end of the last century there were many places in the metropolis where swarms of the most desperate men openly congregated, in perfect security from the police, which dared not disturb them. Among these places of resort were some, the names of which have been handed down to us as infamous for the crimes which were perpetrated in them. Open violence is now fortunately at an end, and even in the most lonely parts of the suburbs an efficient police ensures personal safety at all hours of the night. The vice which still exists is of a less obtrusive character, and crimes are now for the most part confined to depredations on property. Society has been thus tending towards improvement during the last forty or fifty years, but it is during the latter half of this period that the amendment has been most apparent. The evidence given before a committee of the House of Commons, in 1816, still detailed scenes and circumstances of villainy which are no longer to be witnessed. The establishment of the metropolitan police force, under an act of parliament in 1829, has been mainly instrumental in producing this improvement. The regulations for its management are calculated for the prevention rather than the punishment of crime, it having been among the gravest charges made against the system which it superseded that men were nursed in crime until the length to which they proceeded produced the offer of rewards for their apprehension.

The police force is under the management of two commissioners, who are in direct communication with the secretary of state for the home department; under the commissioners are 17 superintendents, 70 inspectors, 342 sergeants, and 2968 constables. The district under their care extends from Brentford Bridge on the west, to the river Lea on the east, and from Highgate on the north, to Streatham and Norwood on the south, excluding the city of London. The population of this district, at the census of 1831, was 1,493,012 souls, and the rental of houses assessed for the relief of the poor within the same, in 1837, amounted to 6,177,113*l.* per annum. The constables and officers must be men of good character, who can read and write, and who at the time of their appointment are not more than thirty-five years of age. They wear a uniform dress, and are altogether a fine and respectable-looking body of men. The whole district is parcelled out into seventeen divisions, to each of which one superintendent and an adequate number of sergeants and constables are appointed; and it is expected that each constable will exert himself to acquire a complete personal knowledge of his district. The system of responsibility throughout the force is perfect. The commissioners are answerable to the government for the due performance of their duties; the superintendents are answerable to the commissioners for their own conduct, and that of the sergeants and constables in their division; and the sergeants are answerable to the superintendents for the good conduct of the constables under their orders. The constables and officers are strictly forbidden to receive any payments or gratuities from private persons. The expense attending this system is greater than that of the old nightly watch, for which it was substituted. The total expenditure, in the year 1837, amounted to 209,754*l.* 11*s.* 11*d.*, and the charge for the former nightly watch, in the same districts, was 137,288*l.* 18*s.* 6*d.* For this difference, 72,465*l.* 13*s.* 5*d.*, the inhabitants have the benefit of an efficient day police in exchange for an inefficient nightly watch, which was frequently entrusted to infirm old men. The expense chargeable on the parishes is limited to an assessment of eightpence in the pound on the rental, and all beyond this is defrayed from the public purse. Three-fourths of the whole expense are borne out of the parish rates, limited as above mentioned; and the remaining one-fourth is paid by the Treasury. The efficiency of the metropolitan police may in part be seen from the statement of the number of persons taken into custody by its constables, in each year since it came fairly into operation, and which were:—

1831	.	72,824	of whom	31 353	were drunk.
1832	.	77,543	..	32,636	..
1833	.	69,959	..	29,880	..
1834	.	64,269	..	19,779	..
1835	.	63,474	..	21,794	..
1836	.	63,384	..	22,728	..
1837	.	64,416	..	21,426	..

The total number of persons charged with offences by the metropolitan police force in the year 1838 was 71,802, of whom 48,742 were accused of petty offences, and the remaining 23,060 of crimes usually tried before a jury. Of these numbers 20,697 in the first class, and 14,820 in the second class, or about one-half, were discharged on a hearing by the magistrates, only 2951 were committed for trial, 15,876 were discharged on payment of fines—chiefly cases of drunkenness, and the remainder were sentenced summarily by the magistrates to various short periods of imprisonment. Among the persons committed for trial, 5 were accused of murder, 16 of manslaughter, and 88 of burglary and housebreaking: the others were charged with larcenies, breaches of the peace, and other offences of inferior degree.

It will be seen that a large proportion of the persons included in these numbers were taken into custody by reason of their being drunk, in which condition they hold out temptation to dishonest persons, and require to be protected.

It has been mentioned that this police force has no authority within the City. The day and the night police in the City were till lately established on two systems wholly unconnected with each other. The day police was under the control of a committee of the court of aldermen, and its operations embraced the whole city without any reference to its division into wards, while the duty of providing the nightly watch was left to the ward authorities, each ward supporting an independent establishment of its own. The day and night police are now consolidated, and consist of—

1	Superintendent.
12	Inspectors.
50	Sergeants.
438	Constables.
501	

It is organised as nearly as possible on the plan of the metropolitan police, the City being divided for this purpose into 6 districts. There are besides, connected with the business of the justice-rooms, four men specially called police officers, and three men placed at the Mansion-house and Guildhall: the whole of this force is directed by the superintendent. Its duties are confined to the north side of the Thames, Southwark being under the metropolitan force.

There are further provided for preserving the peace of the metropolis, nine police offices, each of which has attached to it three magistrates. The offices are—

Bow Street, having attached to it	10 officers.
Queen Square, „	6 „
Marlborough Street, „	7 „
Marylebone,	7 „
Hatton Garden, „	6 „
Worship Street, „	7 „
Whitechapel, „	6 „
Union Hall, „	8 „
Thames Police, „	6 „

In addition to this there is a River Police attached to the Thames Police Office, and employing 22 Thames police surveyors and 70 river constables. The expense of these establishments is 51,724*l.* 5*s.* 5*d.* per annum. The horse-patrol was attached to the office in Bow Street until October, 1836, when it was made part of the metropolitan police force; it comprises a conductor, 4 inspectors, and 66 patrols. Their sphere of action is in the less frequented roads around the metropolis. Their respective beats and the hours of visiting different localities are continually being changed, according to the directions of the superintendents of police.

The sessions of the peace for the city of London are holden eight times in the year. The judges are the lord-mayor, aldermen, and recorder, any four of whom form a quorum, but the recorder is the acting judge. Before the establishment of the Central Criminal Court the jurisdiction of the London sessions court extended to all kinds of felonies, but in practice all crimes (except treason) which were capital by common law and all which have been called felonies by statute were tried at the Old Bailey sessions. The Central Criminal Court has twelve sessions in the year. This court was established 'for the trial of offences committed in the city of London, the county of Middlesex, and those parts of the adjoining counties which lie within the parishes of Barking, East Ham, West Ham, Little Ilford, Low Layton, Walthamstow, Wanstead, St. Mary Woodford, and Chingford, in Essex; Charlton, Lee, Lewisham, Greenwich, Woolwich, Eltham, Plumstead, Deptford, Kedbrook liberty, and Nottingham hamlet, in Kent; Southwark, Battersea, Bermondsey, Camberwell, Christchurch, Clapham, Lambeth, St. Mary Newington, Rotherhithe, Streatham, Barnes, Putney, Tooting, Graveney, Wandsworth, Merton, Mortlake, Kew, Richmond, and Wimbledon, in Surrey.' This new criminal court was established in 1834, under the act 4 and 5 William IV., c. 36, and empowers 'the lord-mayor of London, the lord chancellor, the judges, the aldermen, recorder, and common-sergeant of London, and such others as his majesty may appoint, to be judges of a court to be called the Central Criminal Court.' These judges or any two of them 'may determine all such treasons, murders, felonies, and misdemeanors as might be determined under any Commission of Oyer and Terminer for the city of London or county of Middlesex, or commission of gaol delivery to deliver the gaol of Newgate, at such times and places in the said city or suburbs thereof as by the said Commissioners shall be appointed.' The district thus described is to be considered as one county for all purposes under the act. The juries are summoned from London, or from the counties, or from both indiscriminately. The sessions thus authorised are to be holden twelve times at least in every year. This court is further empowered to try persons for offences committed on the high seas and other places within the jurisdiction of the admiralty of England, for which separate sessions used formerly to be held by the judges of the admiralty court. The great bulk of the cases brought before the Central Criminal Court are larcenies, unaccompanied by violence. The frequency of the sessions is found to be a great improvement; persons who may be wrongfully accused are speedily released, and the guilty are more quickly brought to justice.

Prisons.—There are nine prisons for the confinement of offenders within the metropolis. These are—

1. The Gaol of Newgate
2. The Giltspur-Street Compter } in the City of London
3. The Bridewell Prison
4. The New Prison, Clerkenwell, Middlesex County Gaol
5. The Coldbath-fields, County House of Correction
6. The Westminster, County Bridewell
7. The Horsemonger Lane, Surrey County Gaol
8. The Borough Compter
9. The Penitentiary at Milbank.

The Gaol of Newgate is under the control of the Corporation of London, and is the principal prison appropriated to the reception of persons brought before the Central Criminal Court. This prison has at various times been stigmatised as one of the worst regulated in the kingdom, and although various reformations have been attempted, but little effectual good appears to have been thus accomplished. In the third Report of the Inspectors of Prisons, presented to Parliament in 1838, it is stated 'that this great metropolitan prison, while it continues in its present state, is a fruitful source of demoralization, and a standing reproach on the character of the Corporation of the City of London.' The more heinous classes of offenders are placed in separate cells which are not warmed, have no privies, and are without stool or table, but in each of them is placed a Bible and Prayer Book. The numbers of persons confined in this prison in the course of the year ending Michaelmas, 1837, was 3349, of whom 802 were females. The greatest number at any one time in that year was 342, of whom 123 were females. The current expenses of the prison for the year amounted to 7785*l.* 15*s.* 10*d.*

The Giltspur-Street Compter is under the jurisdiction of the Lord Mayor and Court of Aldermen. Prisoners of every denomination and character are crowded together in the wards, yards, and sleeping cells of this prison without any possibility of classification, and, as we find it stated in the last Report of the Inspectors of Prisons, 'The Giltspur-Street Compter continues a wretched prison, with no efficient means of affording a salutary discipline. The prisoners are left together in large numbers in idleness and unrestrained communication during the whole 24 hours.' The number of prisoners confined there in the course of the year 1837 was 552 males and 130 females; the greatest number at any one time was 124 males and 48 females.

The Bridewell prison is under the jurisdiction of the governors of Bridewell and Bethlehem Hospitals, and is used for the reception of persons summarily convicted by the lord mayor or sitting aldermen. The prisoners are for the most part petty pilferers, misdemeanants, and vagrants: refractory apprentices brought before the aldermen or chamberlain of London are also sent here to solitary confinement for short periods. The prisoners were formerly employed, as a punishment, in beating hemp, which occupation has given place to the modern invention—the tread-wheel. The inmates are classified, and the *silent system* has been adopted. There were confined in this prison in the year ending Michaelmas, 1837, 770 males and 352 females; the greatest number at any one time was 90 males and 29 females. The current expenses in that year amounted to 1934*l.* 15*s.* 1*d.*

The new prison, Clerkenwell, is the general receiving prison of Middlesex for offenders committed, either for examination before the police magistrates, for trial at the sessions, for want of bail, and occasionally on summary conviction. Some degree of classification has latterly been attempted, but as the limits of the prison oblige 30, 40, or more prisoners to remain together in a small room, this division must be more nominal than real; the attempt is indeed limited to marking divisions on the floor, within which certain classes are desired to remain. The number confined in the year ending Michaelmas, 1837, was 4263 males and 2054 females, but the greatest number at any one time was 205 males and 109 females; the expenses for the year amounted to 3763*l.* 10*s.* 2*d.*

The Coldbath-fields County House of Correction is under the jurisdiction of 14 visiting magistrates appointed at each quarter-sessions; four go out of office quarterly by rotation. This prison contains felons, misdemeanants, and persons committed under the designation of rogues and vagabonds. It contains a tread-wheel. The prisoners are kept separate in classes in the different wards, and the silent system is strictly enforced. The discipline is said by the prison inspectors to be extremely good. In the year ending Michaelmas, 1837, there were confined 6625 males and 3125 females; the greatest number at any one time having been 929 males and 319 females; the expense to the county, exclusive of alterations and repairs, was 13,455*l* 14*s.* 9*d.*

The Westminster County Bridewell in Tothill-fields is under the jurisdiction of the magistrates for the City of Westminster. It is a modern building, having been first occupied in 1834: it cost upwards of 200,000*l.* The prison contains 42 day-rooms and 348 sleeping apartments, in addition to 120 dark cells in the basement. The classification of prisoners is accomplished to a great extent. Prisoners who have been convicted are subjected to the silent system. There are two tread-wheels in the prison, and two schools have been established, one for boys, the other for girls, under 17 years of age, who are committed to the prison. In the year ending at Michaelmas, 1837, there were confined 3085 males and 2439 females; the greatest number at any one time was 438, of whom 159 were females. The current expenses of the prison were 5578*l.* 7*s.* 4*d.*

The Surrey County Gaol, in Horsemonger Lane, Southwark, is under the jurisdiction of the sheriff, court of quarter-sessions, and 12 visiting magistrates of the county of Surrey. This prison contains debtors as well as criminals of all degrees, which latter are not classified, nor kept separate to any useful extent. In the course of the year, to Michaelmas, 1837, there were in this prison 1193 male and 107 female debtors. Of other prisoners the numbers were 1901 males and 605 females; the greatest number of these at any one time was 233 males and 62 females, together 295. The expense in that year was 3316*l.* 0*s.* 2*d.*

The Borough Compter, in Mill-lane, Tooley Street, is under the jurisdiction of the lord-mayor and court of aldermen of London, and the high-bailiff of Southwark. The prisoners consist of debtors, of persons committed for trial for felonies and misdemeanors, and others tried and sentenced to imprisonment, but not to hard labour; those prisoners who are sentenced to labour are sent to the County House of Correction at Brixton. The defects in the discipline and management of this prison were strongly animadverted on by a Committee of the House of Commons in 1829, and in their Report of 1838 the Inspectors of Prisons remark that 'its general state is as deplorable at this moment' as it was then. In the year ending Michaelmas, 1837, there were confined 273 male and 32 female debtors; 688 males and 464 females accused of offences; the greatest number of these at any one time was 69, of whom 23 were females: the expenses of the prison were 878*l.* 19*s.* 8*d.*

The Penitentiary at Milbank was established in 1820, and placed under the direction of the Secretary of State for the Home Department. It is built upon the plan recommended by the late Mr. Jeremy Bentham, which admits of the most perfect classification and supervision: it cost nearly half a million of money, and is capable of containing 1100 prisoners. The whole establishment is managed by a committee appointed by the Secretary of State. The prisoners are in great part persons sentenced to transportation or to death, whose punishment has been commuted to imprisonment, and it has no peculiar connexion with the police of the metropolis.

Lighting.—The whole of London is now well lighted with coal-gas. In 1694 it appears that the City was partially lighted with lamps. By the act passed in that year under which the Orphans' Fund was created, the sum of 600*l.* per annum was assigned towards that fund as 'arising from a lease granted for 21 years by the corporation, of certain lights to be used in the City;' from which it may be inferred, that the city authorities in those days derived a revenue from granting the privilege of lighting to private parties, who must of course have taken their remuneration from householders. At the expiration of the lease here mentioned, viz. in 1716, an act was passed by the municipal parliament repealing all former laws upon the subject, and ordering that for the future every housekeeper should hang out a light before his door with sufficient cotton-wicks to burn from six o'clock in the evening until eleven of the same night, after which hour the streets were consequently left in darkness. The housekeepers were at liberty to discontinue the lighting of their street lamps between the seventh night after each new moon and the third night after it arrived at the full—an instance of economy which is still practised in many of the provincial towns of this kingdom. Every housekeeper who should omit to hang out the necessary light on all other nights was fined one shilling for each offence. This system proved to be exceedingly troublesome and unsatisfactory; and after a few years a company was established which in return for a payment of six shillings per annum, which it was authorised to demand from each householder rated for the support of the poor within the city, engaged to provide a sufficient number of lamps and to keep them lighted from six o'clock until midnight. The company further engaged to pay to the Orphans' Fund the yearly sum of 600*l.* above mentioned. The insufficiency of the light thus provided may be inferred from the numerous depredations then committed in the city by highwaymen, who, riding into the streets after nightfall, perpetrated their outrages with impunity. This evil rose to such a height that government found it necessary to offer a reward of 100*l.*, a large sum in those days, for the apprehension of every highwayman in the city of London or within five miles of the same. After these evils had been endured for some years a further and a more effectual improvement was introduced. The contract just mentioned was cancelled, and an act of parliament was procured in 1736, authorising the corporation to set up as many glass lamps as should be necessary, and to keep them lighted throughout the year from the setting to the rising of the sun. To defray the cost the corporation was empowered to levy an annual rate upon every householder proportioned to the value of his house. This system was found to answer well, and continued in operation until the introduction of gas-lighting. During the 70 years that intervened London enjoyed the reputation of being the best lighted city in Europe, but no person, unless he can remember the nightly appearance of the metropolis previous to the adoption of gas-lighting, can be sufficiently aware of the value of the improvement, nor of the degree in which it operates as a measure of police. The lamps are now lighted by various joint-stock companies possessing large capitals, and which are content to derive a low rate of remuneration for the lighting of street-lamps, in return for the opportunity of supplying shops and private houses, which pay more liberally. The first established of these gas companies received a charter of incorporation in 1812; it has three stations, one in the Horseferry-road, Westminster, another in Brick Lane, Old Street, and the third in the Curtain Road, Shoreditch. Several other companies have since been established; the more important of these are, the City of London, the Imperial, the British, the Independent, and the Equitable gas companies; these supply among them more than 60,000 lights over a field extending from Bow on the east to Brentford on the west, and from Edmonton on the north to Brixton on the south. Their aggregate incomes for these lights, derived from parishes and private consumers, exceed a quarter of a million of money per annum: of this sum the corporation of London pays about 10,000*l.*

Sewers.—The sewers of the metropolis and adjacent districts, comprehending a circle of ten miles, measured from the Post-Office, are divided into seven trusts, and placed under the management of as many boards of commissioners, viz.:—

1. The City and Liberties of Westminster.
2. Holborn and Finsbury division.
3. Blackwall, Poplar, and Stepney division.
4. The City of London.
5. The Tower Hamlets division.
6. From the river Ravensborne, in Kent, to the river Mole, in Surrey.
7. Regent Street division.

There are no means of ascertaining the aggregate length of the sewers throughout these divisions. Those under the commissioners for the City of London are about 15 miles in extent, and form only a small part of the drainage of the whole metropolis. Sewers were first constructed in London in the reign of Henry VI., under an act (6 Hen. VI., c. 5) passed in 1428. This act was amended by parliament in the reign of Henry VIII.; and the law relating to sewers, passed in the twenty-third year of that reign, is still substantively adhered to by two of the seven boards of commissioners, the fifth and sixth of the above list; the other five boards are regulated by local acts. The expenses attending upon the construction and management of sewers in the different districts are repaid by means of rates levied upon the householders at the discretion of the several boards of commissioners. In the City of London the rate cannot exceed 4*d.* in the pound on the rental. Much dissatisfaction existed some years ago in regard to the efficiency of the sewerage in different parts of the metropolis. Drains which had been adequate to the drainage and cleansing of a district in former times were rendered by degrees wholly inadequate, through the increase of the population. Much has of late years been done to meet this objection; the subject has been investigated by a Committee of the House of Commons, appointed in 1834; and although there are still some obscure corners where the health and comfort of the inhabitants might be improved by a better attention to the sewers, it may be fairly stated that the drainage and the removal of impurities from London are, upon the whole, satisfactorily accomplished. The sum collected in the City of London district for sewers-rate in 1838 was 12,214*l.* 8*s.* 1*d.*

Fires.—An important part of the police of a city consists in the measures taken for the prevention and extinction of accidental fires. After the Great Fire of London, in September, 1666, an order was issued forbidding any person to proceed in rebuilding his premises until some general plan should be devised for rebuilding the city in such a manner as should prevent the recurrence of a similar misfortune. The chief improvements introduced at that time consisted in widening the streets and employing bricks for building the houses instead of wood and lath and plaster, which had previously been very generally used. The regulations adopted on that occasion were extended and improved from time to time by various acts of parliament until 1774. In that year an act was passed (14 Geo. III., c. 78), commonly called the Building Act, repealing former acts, regulating the mode of building so as to render houses 'ornamental, commodious, and, by providing party-walls of a certain thickness, secure against the accidents of fire.' Under this act it was further rendered incumbent on churchwardens to provide one or more fire-engines in every parish, to be in readiness on the shortest notice to extinguish fires; and also to have in constant readiness ladders to favour the escape of persons from burning houses. It was further made incumbent on the churchwardens to fix fire-plugs at convenient distances upon all the main water-pipes within the parish, and to have keys to open the same, so that the water might be instantly made available. Graduated rewards were also established by the same acts to persons bringing the first three parish engines for the extinction of a fire. These measures have since been greatly aided by the various offices for insuring property against fire, which have maintained, at their own charge, numerous fire-engines and corps of firemen. The legislature on its part gave facility to the officers by granting protection against impressment into the navy to those firemen who were chosen from among the watermen and lightermen employed upon the Thames. Until a recent date each of the insurance offices maintained its own engines and corps of firemen independently of all other similar establishments. A few of the most extensive made an arrangement among themselves in 1825, by which their engines and firemen were placed under the orders of one superintendent; but it was not until 1833 that the fire-offices of London became generally united for this purpose under one uniform system, each office subscribing towards the expense of the establishment in a certain agreed proportion. Under this arrangement, which is superintended by a committee of delegates, one from each of the associated offices, London is divided into five districts, three on the north and two on the south side of the Thames, viz.:—

North. 1. From the eastward to Paul's Chain, St. Paul's Churchyard, Aldersgate Street, and Goswell-street-road.
" 2. From the above district to Tottenham-court-road, Crown Street, and St. Martin's Lane.
" 3. Parts to the westward of the foregoing.
South. 4. From the eastward to Southwark-bridge-road.
5. From Southwark-bridge-road westward.

The force employed consists of a superintendent, 5 foremen, 10 engineers, 9 sub-engineers, 31 senior firemen, 35 junior firemen and 6 extramen, and the number of engines in constant readiness is 33, which are kept at 20 different stations in various parts of the metropolis: two are floating-engines, kept on the river, one moored off King's Stairs, Rotherhithe, the other off the Southwark Bridge. One-third of the men employed are constantly on duty, day and night, at the engine-houses, and the whole are liable to be called upon whenever a fire occurs. The superintendent, who must repair to the spot, wherever it may be, when a fire breaks out, has power to employ any additional number of men that may be wanted. The firemen are uniformly clothed, and have their heads protected with helmets made of hardened leather; they are provided with the most approved apparatus for the suppression of fires, the rescue of human life, and the saving of property; including ropes and lengths of scaling-ladders capable of being readily connected to any required length. The advantages attending an organized force of this description must be apparent. We have no record of the number of fires that occurred previously to its establishment in the metropolis, but a record has since been kept from which the following particulars are taken:—

Year.		Number of Fires.	Wholly burnt.	Severely damaged.	Slightly damaged.	Fires in which lives were lost.	Number of lives lost.
1833	..	458	31	135	292	5	12
1834	..	482	28	116	338	5	7
1835	..	471	31	125	315	7	11
1836	..	564	33	134	397	14	14
1837	..	501	22	122	357	16	13
		2,476	145	632	1,699	47	57

Revenues, &c.—The revenue of the corporation of the City of London is derived from various sources, the principal of which are rents of premises, dues, and market-tolls. The receipts and expenditure for the years 1831 and 1832, as given in to the Municipal Corporation Commissioners, were as follows:—

RECEIPTS.	1831.			1832		
Rents and quit-rents	£46,900	9	10	£45,998	4	6
Rents and navigation of Thames	1,249	1	5	905	17	2
Fines for leases	2,712	14	4	2,112	2	0
Markets, tolls, offices, and bequests	85,135	9	7	86,967	8	9
Brokers' rents and admissions	3,605	0	0	3,902	0	0
Freedoms sold	4,325	0	0	3,550	0	0
Casual receipts	2,174	18	7	1,635	3	1
Insurance of officers' lives	154	16	9	—		
Interest on government securities	4,480	8	4	5,198	11	8
Sale of securities	—			8,461	8	6
Sale of premises	25	0	0	—		
Balance of cash in hand	24,111	19	3	26,735	19	2
Freedoms and enrolments	1,272	10	2	1,402	16	0
	£176,147	8	3	£186,929	10	10
EXPENDITURE.						
Orphans' Fund	£12,078	12	0	11,670	6	4
Rents and quit-rents	2,478	15	7	2,489	17	7
Mansion-house expenses	1,529	15	6	5,726	18	3
Expense of magistracy, police, and prisons	28,152	9	7	36,763	11	0
Conservancy of river Thames	3,015	18	1	3,743	2	5
Artificers' and tradesmen's bills	3,160	18	11	2,081	2	9
Market charges	5,309	14	3	5,201	4	3
Law and parliamentary expenses	5,731	13	4	5,537	1	4
Return-duty on imported corn	720	9	6	1,073	8	0
Charitable donations	2,557	0	0	3,793	6	3
Salaries and allowances	24,231	10	6	24,945	6	1
Disbursements—Courts of Aldermen and Common Council	11,446	6	8	23,040	7	2
Royal and reform entertainments	2,995	17	2	—		
Bequests	909	6	10	1,022	5	10
Insurance paid	5,000	0	0	3,611	5	0
Interest and annuities	8,334	19	0	8,198	10	9
Purchase of securities	12,000	0	0	12,000	0	0
Debts discharged	10,000	0	0	15,024	5	8
Money lent	4,000	0	0	—		
Purchase for lord-mayor's household	5,708	2	2	2,693	19	0
Balance in hand	26,735	19	2	17,673	10	2
	£176,147	8	3	186,929	10	10

The first item in the above statement of expenditure requires some explanation. The court of the lord-mayor and aldermen of London had from time immemorial acted as the guardians of the children of deceased citizens, and as trustees of their property. The corporation having advanced large sums to the government upon the security of Exchequer Tallies, which were totally lost to them upon the shutting of the Exchequer in 1672, this circumstance, with the losses occasioned by the Fire of London, occasioned a deficiency in the sum owing to its orphan wards and other creditors of 747,472*l.* An act was accordingly obtained (5 and 6 Will. and Mary, c. 10), entitled 'An Act for the relief of the Orphans and other Creditors of the City of London,' in the preamble of which the above-mentioned deficiency is attributed to 'sundry accidents and public calamities,' which act established a fund for the payment of the interest upon the above sum, which payment of interest for ever was declared to be in full satisfaction of the debt. The fund created consisted of a charge of 8000*l.* per annum on the lands and revenues of the city; the profits of aqueducts, or the right of bringing water into the city; 2000*l.* per annum to be levied by assessment on the inhabitant householders; 600*l.* per annum arising from the lease granted of the right of lighting lamps, as elsewhere explained; a tax of 2*s.* 6*d.* on binding each apprentice to a freeman; and of 5*s.* upon every person admitted to the freedom of the city; 4*s.* per tun upon wine imported into London; and 4*d.* per chaldron on the metage of coals; and

6*d*. per chaldron upon all coals imported. The last tax was to commence in 1700, and to continue for 50 years; after which the lands of the city were to be charged with 6000*l*. per annum more in favour of the orphans' fund; but in 1750 the coal-tax was renewed for 35 years; and in 1767 it was further extended to 1831; and it was afterwards continued to 1837. The debt for which these charges were originally made was fully discharged in 1820, the duties imposed having been rendered more productive than was expected, owing to the great increase of the city; but it was found convenient to continue them in order to provide for the discharge of debts otherwise and subsequently incurred for various buildings and improvements, among which may be mentioned Blackfriars Bridge, Newgate prison, the Middlesex sessions-house, and improvements at Temple Bar and Snow Hill. More recently the coal duties have been continued on account of a million of money borrowed to make suitable approaches to the new London Bridge.

The total produce of the various charges and duties authorized by the act of 1694 produced between that year and 1829 is as follows:—

Payments from city revenues .	£1,324,750
Aqueducts	62,441
Assessments on inhabitant householders .	203,907
Lights	21,000
Apprentice bindings . . .	34,277
Freedoms	41,250
Duty on wine	363,442
Metage and duty on coals .	3,718,059
Sale of ground, &c. . .	50,975
	£5,820,101

The passing of the bill through parliament (1694) to authorize the levying of these duties was accompanied by an extraordinary circumstance. Considerable delay having been experienced in the proceedings of the House of Commons, the city chamberlain was authorized to disburse such sums as should be found necessary for expedition. Through some want of caution the government came to suspect that bribery was used, and a committee of the House of Commons being appointed to investigate the matter, it came out that the Speaker had actually received 1000 guineas for his services in expediting the bill through the house, and that two other members had been guilty of similar corruption. The three were consequently forthwith expelled from the house.

The freehold estates belonging to the corporation within the city are situated chiefly in and about Broad Street, Fenchurch Street, Aldgate, and the Minories. It has also a considerable estate in the parish of St. George's, Hanover Square, and possesses five-sixths of a leasehold estate under the chapter of St. Paul's This lease has been held since the beginning of the fourteenth century, and will expire in 1867. The net produce to the city arising from ground-rents is 7500*l*. per annum, but the annual value which will lapse to the church in 1867 is expected to amount to 50,000*l*. or 60,000*l*.

Most of the companies are in possession of real property and money in the public funds, but as many of them refuse to state the nature and amount of their property, it is not possible to speak more precisely on the subject. The Drapers' Company made a return to the Municipal Corporation Commissioners, from which it appears that their yearly rents amount to 23,400*l*.; and the Fishmongers have in like manner stated their income from real property to be 17,973*l*. per annum. It is known that other companies, and particularly the Mercers, Goldsmiths, and Merchant Tailors, hold large landed estates within the city of London, and elsewhere, both for their own use, and on various trusts; but the particulars of these estates are not made public.

The Irish Society is a corporation connected in a peculiar manner with the corporation of London. The origin of this connection was as follows. In the reign of James I. a considerable part of the province of Ulster was forfeited to the crown, and proposals were entertained for establishing an English colony in that province. In pursuance of this scheme articles of agreement were executed in January, 1609, between the lords of the king's council and a committee appointed by the common-council acting on behalf of the mayor and commonalty of the city of London for establishing corporations in Derry and Coleraine. It was arranged that 20,000*l*. should be advanced by a London company, to consist of a governor, deputy-governor, and 24 assistants; that the governor and five assistants should be aldermen of London; that the recorder should be another assistant, and that the deputy-governor and the rest of the assistants should be citizens of London, to be elected annually by the common-council. The Society, being thus appointed, was soon after put in possession of the estates. The sum subscribed for the purpose amounted eventually to 60,000*l*., and was chiefly furnished in different proportions by the most wealthy of the London companies. [LONDONDERRY.] The Society was incorporated on the 29th of March, 1619, and the town of Coleraine and the county of Londonderry were granted to the Society and their successors for ever. By another charter granted to the Society by Charles II. in 1662, power was given to the common council of Londonderry to make bye-laws for the government of the city, but to give them validity it was necessary that these bye-laws should be confirmed within a limited time by the Irish Society. The accounts of the Society since 1831 have been printed and laid before the court of common-council. The estates have been the subject of a suit in chancery, which has confirmed the title of the corporation to all except the lands that had been granted to the companies.

Pauperism.—Although employment may easily be obtained in London by persons in health, and adequate wages are paid, a considerable proportion of these wages are spent in intemperance, which adds largely to the amount of wretchedness owing to misfortune, sickness, and other causes. Under the orders of the commissioners for executing the act of 1833 for the amendment of the law relating to the poor, the metropolis, so far as it has hitherto been brought under the provisions of the new poor law, is divided into 26 districts or unions, as enumerated and described below, each of which is managed by a board of guardians, elected by the rate-payers of every parish within the union: in some cases the parishes are too large and populous to admit of their being satisfactorily united for this purpose; and some parishes are governed under special and local acts of parliament, which oppose difficulties to such junction. The divisions, the amount of their population in 1831, the number of guardians elected in each, and the sums expended for relief of the poor in the year ending 25th March, 1838, are as follows:—

	Population, 1831.	No. of Guardians.	Expended for Relief of Poor in Year ending 25th March, 1838.
Holborn Union . . .	42,649	20	£11,527
St. George's in the East .	38,505	18	11,683
St. Leonard's, Shoreditch .	68,564	21	17,318
St. Martin in the Fields .	23,732	24	9,318
St. Matthew, Bethnal Green	62,018	20	14,218
St. Pancras	103,548	20	19,921
Strand Union	41,820	21	14,494
Bermondsey	29,741	18	10,281
St. George, Southwark .	39,769	18	10,938
Camberwell	28,231	15	7,946
Lambeth	87,856	20	24,598
Newington	44,526	18	9,559
Rotherhithe	12,875	15	5,261
St. Olave, Southwark . .	20,021	15	5,897
St. Saviour, Southwark .	31,711	17	11,185
Stepney	72,446	23	26,426
Poplar	25,066	15	10,519
Edmonton	46,510	38	15,164
City of London (98 parishes)	57,080	101	45,850
Whitechapel	64,141	25	16,426
Greenwich	62,009	20	15,593
Lewisham	18,426	20	5,993
Kensington	75,395	25	16,293
Hackney	34,527	18	8,689
East London	38,311	20	19,233
West London	27,825	20	17,522

Begging is followed as a trade or profession in the metropolis perhaps more systematically than in any other city. The subject has at various times attracted the attention of the legislature, and considerable light has been thrown upon it by the Reports of committees of the House of Commons. In one of these Reports it was stated on evidence that two houses in St. Giles's parish (which is the principal resort of beggars) are frequented by considerably more than 200 persons, who hold in them a kind of club, from which all who are not of their profession are excluded; that children are let out by the day, and that the hire paid for deformed children is sometimes as high as four shillings per day, and that a regular school is kept in the same district where children are instructed in the arts necessary to their success as beggars. It has been stated that the number of professional beggars in and about London amounts to 15,000, more than two-thirds of whom are Irish: but this statement rests upon no certain foundation, and has been variously considered as too high or too low, according to the views which different persons take of the condition of society. It is ascertained that few of the street-beggars who pretend to be husband and wife are really married. The Mendicity Society was formed in 1818 for the purpose of remedying this evil, by affording relief to really deserving persons, and by exposing and punishing the professional beggar and impostor. This Society has an office and establishment in Red Lion-square, Holborn, and has, through the constant activity of its managers, been instrumental in moderating the evil, which however is too great in degree to be successfully combated by any merely private association.

Savings' Banks.—The various savings' banks that are open within the limits of the metropolis are no doubt resorted to by some persons who reside beyond it; and it is therefore not possible to ascertain with precision the amount of deposits made by the metropolitan population. After a careful examination of all the returns and other documents extant upon the subject, it appears that there were, on the 20th November, 1837, about 97,000 individuals resident within the metropolitan limits who had accounts open at the different savings' banks, and that the sum standing at the credit of their accounts was about 2,450,000*l.*, being 18 per cent. of the total number of depositors in England, and 15 per cent. of the total amount of their deposits. It is supposed that the class of domestic servants, who are very numerous in London, forms by far the largest proportion of depositors in savings'-banks.

Charities, Hospitals, &c.—The public charities and hospitals within the limits of the metropolis are very numerous, and many of them richly endowed. The royal hospitals of Greenwich for seamen and of Chelsea for soldiers are national establishments, and wholly independent of private support. The revenues of Greenwich Hospital are derived partly from estates in Cumberland, on which lead-mines are profitably worked, and partly from a payment of sixpence per month stopped from the wages of seamen, and in time of war from unclaimed prize-money. In Greenwich Hospital there are usually about 3000 maimed and superannuated seamen, who are boarded, lodged, and clothed, and provided each with one shilling per week pocket-money. There are besides about 32,000 out-pensioners receiving various allowances from 3*d.* to 1*s.* 6*d.* per diem. The great officers of state are nominally governors of the hospital; but it is really managed by twenty-four directors, a governor, and a lieutenant-governor. Chelsea Hospital, which is for the army, accommodates about 400 in-pensioners, and a great number of out-pensioners. The expenses are defrayed by means of contributions stopped from the pay of every officer and private soldier in the army; the deficiency, if any, being provided for by parliament. The establishment is under the direction of commissioners, a governor, and a lieutenant-governor. Connected with these two hospitals are the Royal Naval Asylum at Greenwich and the Royal Military Asylum at Chelsea, the former for the education and maintenance of 800 boys and 200 girls, the children of seamen of the Royal Navy; the latter for giving the same advantages to 700 boys and 300 girls, the children of soldiers.

The charities connected with the corporation of London are Christ's Hospital, better known as the Blue-coat School, Bridewell and Bethlehem Hospitals, St. Bartholomew's Hospital, and St. Thomas's Hospital, all of which were founded by Edward VI. Christ's Hospital contains about 1200 boys, to whom good classical, commercial, and mathematical instruction is given. They are also boarded and clothed: the annual expenses of the establishment amount to 30,000*l.* The lord-mayor and corporation of London are directors of the hospital; there are besides about 350 governors, each one of whom, at his election to the office, presents 400*l.* to the institution. The children are admitted on the nomination of the directors and governors, who exercise their privilege in rotation. Bridewell Hospital, which is under the management of the same board of governors as Bethlehem Hospital, is now used only as a prison, under which head it is noticed. Bethlehem Hospital, first erected in 1675 in Moorfields, was removed in 1814 to Saint George's Fields. It is employed for the reception and treatment of insane patients, of whom about 200 are constantly accommodated. This has lately been found inadequate to the wants of the poor who are thus afflicted in the city of London, and the building is at this time (January, 1839) receiving two additional wings. [As to St. Bartholomew's Hospital, see BARTHOLOMEW'S HOSPITAL.]

St. Thomas's Hospital, in Southwark, is governed by the lord-mayor, aldermen, and 12 common-councilmen of London, and 180 governors through donations of 50*l.* and upwards. It is capable of receiving and usually contains nearly 500 patients; besides whom it affords relief to a considerable number of out-patients, who receive advice and medicines gratuitously. There is a medical school attached to this hospital. Other corporations dependent on the corporation of London are, the corporation of the London Workhouse. The Commission of Sewers, Carpenters' School, &c.; and Gresham College, held in conjunction with the Mercers' company.

The other hospitals of the metropolis have been founded and are supported by private benevolence.

Guy's Hospital, St. Thomas's Street, Southwark, founded 1721, and richly endowed by Mr. Guy. A bequest of 200,000*l.* was made to its funds in 1829 by Mr. Thomas Hunt. It contains more than 400 beds, and medical aid is gratuitously afforded to out-patients.

London Hospital, Whitechapel Road, established 1749, and supported by voluntary contributions and subscriptions, gives relief to upwards of 2000 patients in the course of the year, the greater part of whom are surgeons' patients through accidents among the shipping on the river and in the docks, and the various manufactories in the eastern part of London. It has three physicians, three assistant-physicians, three surgeons, and three assistant-surgeons.

Charing-Cross Hospital, King William Street, West Strand, established in 1818, erected in 1831, is supported by voluntary subscriptions. It has an establishment of three physicians and two surgeons.

Westminster Hospital, established 1719; the present building was erected in 1833. It is capable of receiving 230 patients.

St. George's Hospital, Hyde Park Corner, instituted in 1733. The hospital has been recently rebuilt. There are usually nearly 300 in-patients, besides a considerable number relieved as out-patients. Four physicians, with an assistant-physician, an equal number of surgeons, two assistant-surgeons, a house-apothecary, and four visiting-apothecaries are attached to this hospital.

Middlesex Hospital, Charles Street, Oxford Street, instituted 1745, is capable of containing 300 *patients*, and affords relief also to many out-patients. Persons meeting with accidents are admitted at all times without recommendation. This hospital, which has an adequate number of physicians and surgeons, is supported by voluntary contributions and subscriptions.

The University College Hospital, built on ground opposite and belonging to University College, was opened in November, 1834. It contains beds for 130 patients, and is the hospital for the medical school of the College.

All the above hospitals have medical schools attached to them.

Saint Luke's Hospital, City Road, instituted in 1751, for the reception of poor insane persons, being parish paupers or others. With every parish-patient a sum of 4*l.* must be paid to the hospital; other patients must pay only 1*l.*, which is returned in case of death, or if the patient is discharged within a month. The hospital will accommodate 300 patients. The affairs are managed by governors contributing twenty guineas and upwards to the funds of the hospital.

Small-pox Hospital, St. Pancras, instituted 1746, is supported by voluntary contributions. Since 1799 vaccination has been adopted in this hospital, and upwards of 100,000 persons have been vaccinated by its medical officers. There is also a 'National Vaccine Establishment' in Russell Place, having in connection with it eleven 'vaccinating surgeons' residing in different parts of London and its environs.

London Fever Hospital, St. Pancras, adjoining the Small-pox Hospital, receives at all hours cases of typhus and scarlet fever without recommendation. It is supported by donations and subscriptions, and is at present increasing its means of accommodation.

Lock Hospital, Grosvenor Place, Pimlico, contains 80 patients' beds, viz. 45 for males and 35 for females. It usually receives between 500 and 600 patients during the year.

There are four Lying in hospitals in various parts of the town, viz.: Queen Charlotte's, founded 1752, situated at Lisson Green, Paddington; the British, 1749, Brownlow Street, Drury Lane; the City of London, 1750, City Road; the General, 1765, York Road, Lambeth.

A floating hospital was instituted in 1821 for the reception of sick and disabled seamen of all nations, who may present themselves without any recommendation. The Dreadnought, a ship of 104 guns, was given for this purpose by the government properly fitted up, and is constantly moored off Greenwich; it is supported by voluntary subscriptions, chiefly from owners and masters of ships trading to the port of London.

There are two Ophthalmic Hospitals, one in Moorfields, established in 1805, the other in Chandos Street, Charing-Cross; two Royal Infirmaries for diseases of the Eye, one in Cork Street, Burlington Gardens, the other in Little Portland Street, Cavendish Square; an Infirmary for diseases of the Skin, in Blenheim Street, Oxford Street; an Infirmary for diseases of the Lungs, in Artillery Street, Bishopsgate; a Royal Universal Infirmary for Children, in the Waterloo-bridge Road; a Royal Metropolitan Hospital for Sick Children, in Broad Street, Golden Square; a Royal Dispensary for diseases of the Ear, in Dean Street, Soho; and eighteen General Dispensaries, situated in various parts of the metropolis, and supported by the residents in the different localities where they are found.

The charitable institutions of the metropolis are so various and so numerous that only the following list of those which are most important can here be given, with the dates of their establishment, as far as can be ascertained.

Foundling Hospital, founded by T. Coram, incorporated 1739.
Scottish Hospital, for relief of natives of Scotland, founded in 1665.
Magdalen Hospital, for penitent prostitutes, established 1758.
London Female Penitentiary, for the same purpose, established 1807.
Hospital for French Protestants, established 1716.
Jews' Hospital, for aged poor and education of children, established 1803.
School for the Indigent Blind, established 1799.
Orphan Working School, established 1760.
Female Orphan Asylum, established 1758.
London Orphan Asylum, established 1813.
Infant Orphan Asylum.
Adult Orphan Institution.
British Orphan Asylum.
Clergy Orphan Asylum, established 1749.
Merchant Seamen's Orphan Asylum.
Sailors' Female Orphan Home, established 1829.
National Benevolent Institution, founded in 1812.
City of London General Pension Society, established 1818.
East London Pension Society.
General Annuity Society, established 1827.
Philanthropic Society, established 1788.
General Philanthropic Society, established 1813.
Society for relief of distressed Schoolmasters.
Literary Fund for relief of Distressed Authors, established 1790.
Marine Society for reception of Poor Boys to be sent to Sea, established 1756.
Deaf and Dumb Asylum, established 1792.
Artists' Benevolent Fund, established 1810.
Artists' General Benevolent Institution, established 1814.
Royal Masonic Institution, instituted 1798.
Society for Discharge of Persons imprisoned for Small Debts, established 1772.
Corporation of the Refuge for the Destitute, established 1805.
Childrens' Friend Society, for Prevention of Juvenile Vagrancy, established at Hackney Wick, 1830.
Royal Humane Society, for recovery of persons apparently dead, established 1774.
St. Ann's Society Schools, established 1709.

The principal charitable establishments, for the purpose of instruction only, are:—

The Westminster School, established by Queen Elizabeth in 1590.
St. Paul's School, founded by Dean Colet in 1510.
Merchant Taylors' School, established 1561.
St. Olave's Free Grammar-School, founded by Queen Elizabeth.
Mercers' Free Grammar-School.
St. Saviour's Grammar-School, founded 1562.
British and Foreign School Society.
National Society for the Education of the Poor.
Society for promoting Christian Knowledge, instituted in 1699.

The educational establishments of a public character, but not charitable, are:—

University College, London.
King's College, London.
School of the Corporation of the City of London.
The Charter House, founded by Thomas Sutton in 1611, is an hospital, which has a school attached to it. [Charter House.]
The University of London, incorporated in 1837, consists of a chancellor, vice-chancellor, and thirty-six fellows, who are empowered to confer degrees in arts, law, and medicine. The university chambers are at present in Somerset House. It is principally supported by grants from government. The first examination for matriculation in arts took place in November, 1838. The first examination for degrees will take place in May or June, 1839.

Of societies and establishments connected with science, literature, and the arts, the following are the principal:—

The British Museum.
The Royal Society, incorporated 1663.
The Society of Antiquaries, founded 1572.
The Society for the Encouragement of Arts, &c., established 1754.
The Royal Academy of Arts, incorporated 1765.
The Royal Institution, incorporated in 1800.
The Linnæan Society, established 1802.
The British Institution, established 1805.
The Geological Society, established in 1813.
The Society for the Diffusion of Useful Knowledge, established in 1826, incorporated in 1832.
The Horticultural Society, established 1808.
The Mechanics' Institute, in Southampton Buildings, established in 1823.
The Royal Astronomical Society, established in 1820.
The Royal Geographical Society, established 1830.
The Royal Asiatic Society, established 1823.
The Zoological Society, established 1829.
The Architectural Society, established 1831.
The Royal Society of Literature, established in 1820.
The Society of Civil Engineers, established in 1828.
The Statistical Society, established 1834.
The Royal Institute of British Architects, established 1835; incorporated by charter 1837.
The London Institution, established 1806.
Sion College, incorporated 1630.
Entomological Society, instituted in 1806.
Phrenological Society.
City of London Literary and Scientific Institution.
College of Physicians, established in 1518.
College of Surgeons.
Company of Apothecaries.
And several medical societies.

Of late years numerous literary and scientific institutions have been established within the metropolis: their general objects are the same, being the communication of useful knowledge by means of lectures, classes, the formation of libraries, and collections of various kinds.

The principal places of public amusement in the metropolis are:—

The Queen's Theatre (Opera House), Haymarket.
The Theatre Royal, Drury Lane.
——— Covent Garden.
——— Haymarket.
The English Opera House, Strand.
The Royal Adelphi Theatre, Strand.
The Olympic Theatre, Wych Street.
The St. James's Theatre.
The Surrey Theatre.

The Victoria Theatre, Waterloo Road.
The City of London Theatre, Norton Falgate.
The Pavilion Theatre, Whitechapel Road.
The Garrick Theatre, Goodman's Fields.
Astley's Amphitheatre.
Sadler's Wells Theatre.
Royal Fitzroy Theatre, Tottenham Court Road.
Vauxhall Gardens.

The places of general recreation are:—St. James's Park, Hyde Park, Kensington Gardens, the Regent's Park, and Greenwich Park, on the banks of the Thames at Greenwich. With the exception of Greenwich Park, they may all be considered to be in London, and are easily accessible to all the inhabitants of the metropolis.

Trade, &c.—The accidental burning of the Custom House of London, in February, 1814, in which the greater part of the trade records of the port and kingdom were destroyed, renders it impossible to give a complete account of the commerce of the metropolis for any preceding period. The relative proportion of the foreign and colonial trade enjoyed by its merchants during the present century will be sufficiently shown by the following statement of the net amount of customs duty, collected at different times from the year 1815, in London and in all the various ports of the United Kingdom, including London:—

Year.	London.	United Kingdom.
1815	£5,536,441	10,521,551
1820	5,342 731	9,837,279
1824	5 731 238	11,327 741
1826	8 829 789	17,280,711
1827	8,790 829	17,894,405
1828	8.918 310	19,295,403
1829	8 524 261	19,129.615
1830	8 576,163	19.360,750
1831	7,916.993	18 124,725
1832	7,876,660	18,341,188
1833	7,662,521	17,597,697
1834	9,576.972	18 494 316
1835	10,601.600	20,522 895
1836	11,088.207	21,448,741
1837	10,190,006	20,553,539

It appears from these figures, which are taken from official returns, that the payments into the Exchequer by the Custom House of London amount to as much as the net receipts of all the other custom-houses in Great Britain and Ireland. It was expected that the opening of the China trade, and the consequent participation of other ports in the tea trade, which had previously been monopolized by London, would have considerably altered the above proportions; but it will be seen that such has not been the result: in fact, the buyers of this article of general consumption still resort to London as the market in which they can select their purchases to the greatest advantage.

The number of ships, with the amount of tonnage, that have frequented the port, give a better idea of the actual amount of its trade than is afforded by revenue accounts, which must vary with the fiscal regulations of the country, and which exclude altogether goods that enter the port and are re-exported or sent coastwise under bond to other ports in the kingdom. The shipping that cleared outwards to foreign parts in 1753 consisted of—

	Ships.	Tons.
British	1219	153,969
Foreign	150	26,281
	1369	180,250

In 1792 the trade was more than double what it was in 1753. The clearances from the port were in that year—

	Ships.	Tons.
British	1078	310,724
Foreign	504	88,325
	1582	399,049

The shipping belonging to the port in the same year (1792) was—

		Tons.
1109	ships under 200 tons burthen . . .	94,952
368	„ between 200 and 300 tons burthen	91,157
268	„ „ 300 and 500 „	92,970
24	„ „ 500 and 750 „	13,984
1769		293,063
	Indiamen	81,160
	Total tonnage . . .	374,223

The number and tonnage of vessels, British and foreign, that entered the port from foreign parts in each year from 1820 to 1837, will show how greatly its foreign commerce has increased during the last half century:—

Years.	British.		Foreign.		Total.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
1820	3,354	655,239	856	122,619	4,210	777,858
1821	3,000	585,994	571	89,073	3,571	675,067
1822	3,230	603,167	597	106,099	3,827	709,266
1823	3,031	611,451	865	161,705	3,896	773,156
1824	3,132	607,106	1,643	264,098	4,775	871,204
1825	3,989	785,565	1,743	302,122	5,732	1,087,687
1826	3,495	675,026	1,586	215 254	5,081	890,280
1827	4,012	769,102	1,534	221,008	5,546	990,110
1828	4,084	767,212	1,303	195,929	5,387	963,141
1829	4,108	784,070	1,300	215,605	5,408	999,675
1830	3,910	744,229	1,268	207,500	5,178	951,729
1831	4,140	780,988	1,557	269,159	5,697	1,050.147
1832	3,274	640,057	886	154,514	4,160	794,571
1833	3,421	678,289	1,061	175,883	4,482	854,172
1834	3,786	735,693	1,280	216,063	5,066	951,756
1835	3,780	740,255	1,057	188,893	4,837	929,148
1836	3,845	772,046	1,465	255,875	5,310	1,027,921
1837	4,079	821,788	1,547	240,135	5,626	1,061,923

The number and tonnage of ships that cleared out from London to different parts of the world in each year from 1831 to 1837 have been as follows:—

	1831.		1832.		1833.		1834.		1835.		1836.		1837.	
To the United States of America ...	95	33,026	91	31,603	87	31,403	96	35,206	95	36,771	108	45,027	79	36,231
,, British N. Amer. Colonies...	243	75,905	215	65,016	219	65,753	254	73.693	282	89,089	256	82,578	220	72,069
,, Cape of Good Hope	25	5,012	29	6,131	28	5,638	36	7,097	26	5,242	47	10,291	45	9,857
,, Australian Colonies.........	65	24,008	73	25,964	67	21,502	74	24,576	94	30,056	91	32.202	100	36,464
Other parts........................	4,184	783,174	3,259	722,124	3,383	639,864	3,707	684,479	3,489	667,243	3,906	749,467	4,016	748,300
	4,612	926,125	3,667	850,838	3,784	764,163	4,167	827,051	3,976	828,401	4,408	919,565	4,460	902,922

The above figures exhibit an amount of activity in the prosecution of foreign trade wholly without a parallel, but these numbers are far exceeded by the coasting trade of the port. The number and tonnage of coasting vessels that entered London from other parts of the United Kingdom, distinguishing those engaged in the trade with Ireland, during the six years from 1833 to 1838, were as under:—

Years.	General Coasters, including Colliers.		Irish Traders.		Total.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
1833	18,242	2,398,653	1,094	118,568	19,336	2,517,221
1834	19.026	2,445 895	1,043	147,962	20,069	2,593,857
1835	19,308	2,604,906	1.163	160,076	20,471	2,764,982
1836	19,717	2,656,869	1,048	154,009	20,765	2,810,878
1837	20,201	2,743,854	1,121	167,882	21,322	2,911,726
1838	20,333	2,727,741	1,259	180,435	21,592	2,908,176

It is not possible to form any reasonable estimate of the quantity of merchandise brought by canal and by land-carriage to London or which is by the same means conveyed thence to the interior of the kingdom, but it must be very great. There is not a town or village of any note in the midland districts which does not keep up a constant commercial intercourse with the metropolis by means of boats or waggons or both, but nothing is known concerning the quantity of goods transported. It would be easy for the proprietors of canals to give an account of their traffic, but all information of this kind is systematically withheld, probably through the fear of exciting competition. The value of foreign and colonial produce and merchandise constantly in the warehouses of the great docks is very great, but as no accurate account of the quantities remaining has been taken at any time since the commencement of the warehousing system, it is not possible to give any more definite information on the subject. [DOCKS.]

The amount of postages collected in London in each year from 1832 to 1837 was as follows:—

	£	s.	d.		£	s.	d.
1832 . .	632,696	17	8	1835 .	664,189	5	2
1833 .	642,871	0	7	1836 .	692,509	19	1
1834 .	660,411	11	4	1837 .	697,567	5	10

During this time there has been no increase in the rate of postage, and the progressive increase in the amount collected is probably not more than equivalent to the increase of inhabitants. The above sums form between a fourth and a third part of the gross produce of the post-office duty in the United Kingdom. The post communications between London and various parts of the United Kingdom have been greatly accelerated by means of the different lines of railway already opened, and as the system is extended, greater improvements in this respect will of course be realized. At present the letter-bags which leave London at eight o'clock in the evening arrive at Edinburgh early on the second morning. Letters for Liverpool despatched at the same time are delivered by eleven o'clock the following morning.

Steam-Vessels.—There is no port in the kingdom which has profited more than London through the application of steam to navigation. A great part of the steam-vessels that arrive and depart carry passengers only, and are therefore not required to make entry at the custom-house, and with regard to such as carry goods no distinction is made at the custom-house between them and sailing-vessels, for which reasons no accurate account of the number of this class of ships that enter and leave the port can be given. Steam passage-boats are passing and repassing at all hours during the day between London and Greenwich and Woolwich, and others start every quarter of an hour during the day from London Bridge and Westminster. To Gravesend boats go at various times during the day, and in the summer there are several departures and arrivals every day to and from Margate and Ramsgate. Between London and Calais, Boulogne, Antwerp, and Rotterdam steam-vessels are passing almost daily in summer and frequently in winter. With various ports in England, Scotland, and Ireland, a constant intercourse is kept up in the same manner.

LONDON CLAY. The most considerable of the tertiary formations of Great Britain is thus designated, from its development in the valley of the Thames under and around the metropolis. It may be viewed in three parts, occupying the following series:—

Upper part.—'Bagshot Sand,' in which several remarkable fishes have been lately noticed by Dr. Buckland.

Middle part, 'London Clay.'—Containing a few bands of sand, nodules of septaria, and multitudes of marine shells.

Lower part, 'Plastic Clays and Sands.'—Various coloured clays and sands, with lignite, and marine, æstuary, and fresh-water shells.

LONDON, NEW. [Connecticut.]

LONDONDERRY, a maritime county of the province of Ulster in Ireland, bounded on the north by the Atlantic Ocean, on the east by the county of Antrim and a portion of Loch Neagh, on the south by the county of Tyrone, and on the west by the county of Donegal. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge, it lies between 54° 38′ and 55° 22′ N. lat., and between 6° 28′ and 7° 24′ W. long.; and, according to the map of the Ordnance Survey of Ireland, extends from the Tyrone boundary at New Bridge on the Ballinderry river on the south to Portrush on the north, 40¼ statute miles; and from the Donegal boundary near Londonderry on the west, to the Antrim boundary at Kilrea Bridge on the east, 34 statute miles. The area, according to the same map, consists of—

	Acres.	r.	p.
Land . .	507,997	1	27
Water . .	10,404	0	3
	518,401	1	30

or 810 square statute miles. In 1831 the gross population was 222,012.

The county is of an irregularly triangular area, of which the eastern side may be considered as formed by the shore of Loch Neagh and the line of the river Bann, the south-western by the Tyrone boundary, and the north-western by the river Foyle and coast-line. From the Bann the surface gradually rises westward for about ten miles, forming a chain of elevations which bound the valley of that river on the west, and constitute the most remarkable feature of the interior of the county. These heights slope with a gentle declivity eastward and northward, but present steep and often precipitous escarpments towards the west, in which direction they overlook an extensive tract of undulating country extending from their bases to the eastern shore of Loch Foyle, and bounded on the south by the mountain range which separates the counties of Londonderry and Tyrone. Between the southern extremity of the first-mentioned range and the shore of Loch Neagh a comparatively level tract is interposed. The country between the rivers Bann and Foyle may thus be conveniently considered as divided into the district of the Bann, the district of Loch Foyle, and the district of Loch Neagh.

The Lower Bann, from Loch Neagh to the sea, a distance of upwards of thirty miles, has a fall of only 48 feet. The sea flows up to the Cutts above Coleraine, a distance of six miles, between low banks, which are encumbered towards the mouth of the river with extensive tracts of sand. The north-eastern liberties of Coleraine here occupy an irregular semicircle of about four miles in radius, surrounding the town [Coleraine] on the eastern side of the river. The general characteristics of this district are similar to those of the north coast of the county of Antrim. The elevations are however inconsiderable, and the general aspect of the country is tame and bleak. On a low rocky peninsula at the extreme north-east of the county is the thriving town of Portrush; and nearer the Bann, on an exposed strand running down between low headlands of basalt is Port Stewart, a well built and fashionable watering-place, but quite unprovided with shelter for any craft above the size of a fishing-boat. West of the sand-banks which occur at the embouchure of the Bann the coast has a bolder outline, rising in a series of precipitous cliffs over the sandy beach. These cliffs extend a distance of rather more than two miles, increasing in height as they trend westward, until at the north-western extremity of the basaltic tract, of which they form the northern boundary, they have an elevation of from 350 to 400 feet. At this point the escarpments which mark the western boundary of the basaltic area commence, and may be traced along the brows of all the heights which have been mentioned as overlooking the district extending from this line to Loch Foyle. Of these heights the most prominent are Benyevenagh, at the northern extremity of the range, which rises abruptly over the sandy flat of Magilligan to a height of 1260 feet; Donald's Hill, nine miles farther south, 1315 feet; Benbradagh, three miles south of Donald's Hill, 1531 feet; and, separated from Benbradagh by the bold amphitheatrical valley of Glenshane, the upper or eastern boundary of which is formed by Carntogher mountain, 1521 feet high, is Craignashock, 1773 feet, with its subordinate heights of Altæglish, 1261 feet, and Tamniarin, 1272 feet, which together form the south-western extremity of the basaltic area, and complete a nearly continuous range of mountain of 24 miles in length from north to south. With the exception of some small streams which form striking cascades in falling over the escarpments of Avish and other minor heights north of Benyevenagh, all the waters which rise in the area included between the western fronts of the above-mentioned mountains and the river Bann take their course in the direction of the latter river. Of these the most considerable are the Macosquin and Agivey rivers, the former of which has its sources in the *slack*, as mountain-passes are here provincially termed, between the mountains of Benyevenagh and Keady, and the latter of which unites the waters of several streams descending from the range of Donald's Hill and Benbradagh. On the road leading from Kilrea on the Bann, westward through the *slack* separating the Donald's-hill range from the group of Benbradagh and the other mountains, which on this side form the valley of Glenuller, is the town of Garvagh. The Clady river, rising from the eastern declivities of Carntogher mountain, also joins the Bann at Portglenone, a point of considerable intercourse between the counties of Londonderry and Antrim. South of this the drainage of the county is towards Loch Neagh, through the rivers Mayola and Ballinderry, the latter of which forms part of the county boundary on this side. The Mayola has its rise at the bases of the mountain groups which form the head of Glenshane and the valley of Ballynascreen, and carries a considerable body of water to Loch Neagh, which it enters at its north-western extremity. The town of

Maghera is situated about midway between the Clady and Mayola rivers, on the road westward from Toome, at which latter place the Lower Bann first issues from the lake. The towns of Castle Dawson, Magherafelt, Tobermore, and Moneymore are situated in the open country between the Moyola and the Ballinderry rivers. This tract is bounded westward by the detached mountain of Slieve Gallion, which rises to the height of 1730 feet, and is in its structure similar to the mountains of the basaltic tract abovementioned, although throughout the wide intervening valley of Ballynascreen there are no traces of any connecting formation. West of the valley of Ballynascreen commences a mountain-chain which with little interruption extends to the valley of the river Foyle, forming the boundary between the counties of Tyrone and Londonderry. The highest of the group is Sawell, which rises to a height of 2236 feet, about midway between Slieve Gallion and the western extremity of the chain. The other chief heights on the range are Muinard, east of Sawell, 2057 feet; Dairt mountain, west of Sawell, 2037 feet; Finglen, east of Muinard, 1875 feet; and Slieve Kirk, which forms the western extremity of the range, 1224 feet. The district included between these mountains and Loch Foyle, constituting the western division of the county, is divided by a central tract of high land into the valleys of the rivers Roe and Faughan. The former, rising in the upper part of Glenshane, is joined by the Owenreagh and Owenbeg rivers at the entrance of that valley, from which it pursues a northern course nearly parallel to the line of abrupt declivities terminating the basaltic region, to Loch Foyle, which it enters by a sharp turn to the west immediately under the base of Benyevenagh. Several streams join the Roe from the comparatively level tract interposed between it and these mountains, rendering it, next to the Foyle and Bann, the most considerable river of the county. The valley of the Roe, especially towards the embouchure of the river, is flat and open, and contains much good and highly improved land. The thriving town of Newtown Limavady is situated on this river about five miles above its mouth, on the high road between Coleraine and Londonderry city, next to which places it is the most important town of the county. Dungiven, also a place of some consequence, occupies a romantic site on the same river near its junction with the Owenreagh, in the opening of the valley of Glenshane. The principal roads from the east to the west of the county pass through these towns, which severally occupy points at which the leading mountain-passes converge. The open rich country of this valley, called Moyroe, or the plain of the Roe, extends westward along the southern shore of Loch Foyle by Muff, and at the lower extremity of the loch opens into the valley of the Faughan. The Faughan river, which springs from the northern declivities of Sawell, after skirting the bases of the several mountains which extend from that point westward and northward to within two miles of the Foyle, makes a sharp turn to the east of north, and runs through a highly improved open valley to Loch Foyle. From the village of Claudy, situated near the sources of the Faughan, to the point where the river turns northward, a distance of twelve miles, the valley is occupied by well-improved grounds and numerous bleach-greens. The fertile vales of Bond's Glen and Glenrandle open from between the mountains forming the county boundary on this portion of the valley of the Faughan. The district between the valleys of the Roe and Faughan is considerably encumbered with moor and mountain. Legavannon, the principal eminence, which occupies nearly the centre of the tract, has an elevation of 1269 feet. Other heights, varying from 600 to 900 feet, spreading southward and westward from Legavannon, form the valleys of Burntollogbt and Faure, from each of which a considerable stream descends to the Faughan.

Between the Lower Faughan and the Foyle is a range of undulating ground crossed by a valley through which the high road from Dungiven is carried to the village of Waterside; from thence a wooden bridge completes the communication with Londonderry city. The city of Londonderry occupies a boldly rising ground on the west bank of the Foyle, along which the county embraces an irregular tract extending from about four miles above the city to a mile below Culmore, where the river expands into Loch Foyle. The distance from end to end of this out-lying portion of the county is ten miles, and its breadth from one to three and a half. It is all arable and in a good state of improvement, as is also the opposite bank of the river. The Foyle here makes a noble appearance, varying in breadth from 300 yards to half a mile, and being capable of floating ships of 800 tons up to the bridge of Londonderry.

The most remarkable feature of the coast-line is the tract which extends from the north-western extremity of the hilly region to the low point of Magilligan and southward to the mouth of the Roe. On this tract is measured the base-line of the trigonometrical survey of Ireland now going on under the superintendence of the Ordnance, 53,200 feet in length. The same tract appears to occupy the greater portion of the bottom of the loch, and rises towards its centre in a bank which confines the navigation to that portion of Loch Foyle lying along the coast of Donegal. The length of the loch, which is of a triangular shape, bounded by the low coast of Londonderry on the east and south, and by the bold shore of Ennishowen on the west, is above 18 miles, and its greatest breadth 10 . The entrance to the loch, between Magilligan Point and Ennishowen Head, is about a mile across, and from this point to Londonderry city is a safe and tolerably sheltered navigation of 23 miles. Eastward of the entrance is a shoal called the 'Tuns,' which renders the loch difficult of access in stormy weather. The safer channel is by the western side of this shoal. Except the small and at present inconvenient harbour of Portrush, there is no other shelter for vessels on the coast of this county. It has been proposed to render the Bann navigable from Loch Neagh to the sea by deepening the channel at Toome, and clearing away the ledges of rock which cross it at Moyvannagher, Portna, and the Cutts. There is however an extensive sand-bar at the mouth of the river, which could not be kept open without constant dredging. Under these circumstances Portrush is likely to continue the port of Coleraine.

The roads throughout the county are in general excellent. The immediate valley of the Bann and the district of Loch Neagh in particular are closely intersected with lines of communication. The western district is not so well opened. The chief lines here are those connecting Newtown Limavady by the southern shore of Loch Foyle and the valley of the Lower Faughan with Londonderry, and that which runs by the Upper Faughan from Dungiven to the same place. One road only crosses the rough country interposed between these lines. The valley of the Roe is well provided with roads, which extend southward by Banagher to Clady, giving ample means of communication to the country between the heads of the rivers Roe and Faughan. The communication southward is chiefly by the valley of the Foyle on one side, and by the head of the valley of Ballinascreen on the other. Besides these there are several passes from Tyrone into Londonderry among the mountain groups which lie between these points.

By a rain-guage, kept with great care at Londonderry, it appears that the maximum annual quantity of rain, on an observation of seven years, was somewhat less than 35 inches, the minimum somewhat less than 26 inches, and the mean 31·1 inches. From the same observations it appeared that on an average of seven years there were in each year 129 days fair, 202 showery, and 34 wet. The climate is by no means favourable to early sowing. The frequency of the showers, rather than the quantity of rain, renders the air more humid than in many districts where a greater quantity of rain falls.

Geology.—The basaltic tract corresponds in all respects to the remainder of the field on the opposite side of the Bann [GIANTS' CAUSEWAY], with this remarkable difference, that the dip of the strata is reversed; the surface, and the masses which compose it, on the Londonderry side of the Bann dipping towards the north-east, whereas their direction on the Antrim side is nearly to the south-west. The basalt, as in Antrim, attains its greatest thickness at the northern extremity of the field, the cap of Benyevenagh measuring upwards of 900 feet. Chalk, lias, limestone, and red sandstone, succeed in descending order, one or more of the members being frequently absent, and constitute the remainder of the system, which throughout reposes immediately on the primitive rock. The geological structure of the district may thus be described as a floor of primitive rock overlaid in part by a field of secondary formations, capped by basalt. The boundary line is marked by the abrupt declivities forming the eastern limit of the valley of the Roe: from the southern extremity of this range it passes across the Mayola river to the east of Slieve Gallion, and so to Loch Neagh, on the opposite side of which it reappears at the mouth of the Glenavy river. The main constituent of the rest of the county is mica slate. This rock covers about 450 square statute miles of the surface of Londonderry. In general the line of demarcation between it and the red sandstone, which is the most prominent member of the secondary field, is well defined. One mass however, that of Coolcoscrahan mountain, which rises nearly 1300 feet above the level of the sea, is wholly composed of this rock, although almost surrounded by the advanced basaltic heights of Craignashock and Benbradagh. Upwards of two-thirds of the mica slate of this district belong to the talcose variety. Primitive limestone is of frequent occurrence throughout this field. At a height of 800 feet above the sea, on the north-west side of Carntogher mountain, it is found with veins of coloured spar, quartz, and green chlorite. It also occurs near Dungiven and Claudy. On the east side of Slieve Gallion there is a granular limestone, which contains quantities of crystallized hornblende: hornblende slate is found at several places in the valley of the Roe; a bed, four hundred yards in extent, occurs near the old church of Dungiven, where it runs parallel to the bed of primitive limestone above mentioned. The structure of the south-eastern extremity of the county is more complex. Slieve Gallion, besides having a cap of basalt, with the usual underlying formations, exhibits towards its base beds of sienite in connection with porphyry. On the north-west side the sienite verges into greenstone. Several masses of greenstone, unconnected with the tabular basalt of the summit, also crop out on the east side of the mountain. All along the western verge of the basaltic region the red sandstone, which forms the lowest member of the field, projects beyond the superior strata in a belt varying from one to two miles in breadth. This is the surface rock of the eastern valley of the Roe, from the head of which it sweeps across the opening of the valley of Ballinderry, and so between Slieve Gallion and the line of basalt into Tyrone. A detached patch of floetz limestone occurs near the outer edge of the sandstone field at Desartmartin, on the north-east of Slieve Gallion, where it is worked for burning. There are no mines worked in this county.

Soil, Agriculture, and Trade.—The soil of that part of the valley of the Bann where the subsoil is hard basalt consists for the most part of a rusty loose grit, without sufficient strength or cohesion for wheat crops. Numerous tracts of bog, interspersed with shallow pools, and frequently separated by craggy knolls of basalt, are scattered over this part of the county. There are however tracts of good land along the banks of the several rivers which traverse the district, and especially at their junctions. In general these superior portions consist of rolled gravel banks: clayey tracts occur in the neighbourhood of Coleraine, beyond which, on the Antrim side of the river, the basaltic soil is of a better quality than in the rest of the tract. The same characteristics mark the basaltic field in the district of Loch Neagh; but between the basalt and the primitive district farther west is a tract of rich open country, extending southward into Tyrone. This is the most extensive tract of good ground in the county. The soil of the basaltic field towards its western border is of a better description than in the immediate valley of the Bann and Loch Neagh. The basalt is here copiously intermixed with zeolite, which renders its detritus comparatively fertile. A soil of this kind covers the summits of Benyevenagh and Benbradagh, forming extensive tracts of sweet pasture. The subjacent valley of the Roe possesses a variety of soils, all of a superior kind. The rich flat of Moyroe, extending from the base of Benyevenagh across the opening of the valley, consists of alluvial deposits, which form a deep loamy soil of considerable strength and fertility. A strip of loamy land, also of alluvial origin, accompanies the windings of the river as high as Newtown Limavady. High gravel banks, rising in a natural terrace on each side beyond these flats, mark the more immediate valley of the river throughout the greater part of its course. The soil of these banks is generally a fertile though not very rich loam. Beyond the eastern terrace commences a tract of red clay, arising from the decomposition of the sandstone, which at this side forms the surface-rock up to the immediate acclivities of the mountains. This clay contains extensive beds of marl, and with good treatment bears excellent grain crops. The schistose district, lying between the valleys of the Roe and Faughan, is to a great extent moory and mountainous. The valleys of Faughan-vale and Muff-glen, running southward from the open tract along the margin of Loch Foyle into the schistose region, have good tracts of fertile land, composed of a mixture of gravel, loam, and strong clay. The main valley of the Faughan river is in its structure and soil similar to the western half of the valley of the Roe, having gravel terraces reaching back to the schistose region at each side. These are well cultivated, and towards the lower part of the valley spread over a considerable tract. Gravel and mica-slate are also the chief constituents of the soil on the opposite bank of the Foyle. A cold blue clay occurs here in a few detached spots. The best improved portions of the county are the district of Loch Neagh, the valley of the Roe, the valley of the Faughan, including the coast of Loch Foyle, between the embouchures of these rivers, and the immediate vicinity of Londonderry on both sides of the Foyle. There is a very general scarcity of timber. The chief mansion-house in the county is that of Down-hill, the residence of Sir James Bruce, Bart., built by the late earl of Bristol, bishop of Derry. It is an imposing architectural pile, situated on the brow of the basaltic field where it rises over the sea, about a mile and a half west of the mouth of the Bann. The cliffs immediately behind the house rise upwards of 100 feet above the beach, and the situation is so bleak that planting could only be effected in the deep ravines which surround the demesne on the landward side. There is here a splendid collection of paintings by the old masters, and of other articles of virtù, removed from the galleries at Ballyscullion when the palace erected by the same prelate there was taken down. Ballyscullion-house, as it stood in 1802, was by much the most magnificent residence in the north of Ireland. The situation, on the bare flat near the point where the Bann issues from Loch Beg, was however extremely unfavourable to the formation of a demesne corresponding to the magnificence of the building. The house was accordingly taken down on the death of the earl, and the materials sold.

The progress of agriculture in this county has been materially forwarded by the establishment of an agricultural school near Muff by the company of grocers of London, who here hold large estates under the crown. There are 130 acres of land attached to the school, for experimental farming; a classical school is likewise connected with the establishment. Oats and barley are the principal grain crops. The system of greencropping is practised by the gentry only. There is but little land in pasture, and the breed of cattle, with the exception of pigs, of which great numbers are reared, is in general not much attended to. The following table exhibits the quantity of grain sold at the chief market-towns, exclusive of Londonderry and Coleraine, in the years 1830 and 1835:—

	Wheat. (tons.)		Oats. (tous.)		Barley. (tons.)		Bere. (tons.)	
	1830.	1835.	1830.	1835.	1830.	1835.	1830	1835.
Newtown Limavady . .	1,113	926	2,227	1,853	..	..	1,113	926
Dungiven .	371	308	742	617	..	..	371	308
Garvagh . .	..	..	340	330	..	..	..	..
Maghera . .	..	..	690	616	114	17	..	..
Moneymore .	47	68	214	251	4	54	..	..
Kilrea . .	..	30	..	300	..	..	..	..
Magherafelt .	300	1,000	1,200	700	..	..	..	..

The condition of the labouring population is superior to that of the same class in most parts of the north of Ireland. The general rate of wages for agricultural labourers is 1*s*. per day for 180 working days in the year. The population are to a considerable extent of Scottish and English descent. Their dwellings and persons are distinguished by a superior air of comfort. Those of the native race occupy the more mountainous and remote districts: they are a simple and interesting people, preserving vivid traditions of early times, and are generally on the most friendly terms with the rest of the population. The Irish language is very commonly in use among them.

The manufacture and bleaching of linens is the staple trade of the county. The most extensive bleach-greens lie along the rivers Roe and Faughan, on the latter of which there is abundant water-power and numerous sites admirably calculated for this branch of the manufacture. In 1831 there were in the county 2543 weavers, 46 reed-makers, 258 flax-dressers, 21 bleachers, 64 cotton-spinners, 3 brewers, 1 distiller, 6 maltsters, 153 coopers, 53 hatters and hosiers, 50 millers, 24 corn-dealers, 18 millwrights, 25 tanners, and 18 tobacconists. The export and import trade of the county is carried on at the ports of Londonderry city and Portrush, the latter being the seaport of Coleraine. The exports of Londonderry city in 1835, including 20,802 tons of corn, meal, and flour, amounted in value to 1,040,918*l.*, and the imports to 708,054*l.* [LONDONDERRY, *City*.] The exports of Coleraine and Portrush in the same year amounted to a value of 105,685*l*, and the imports to 65,900*l.* The quantity of corn meal and flour included in the exports of the latter port in that year was 5137 tons.

Divisions, Towns, &c.—Londonderry is divided into the half barony of *Coleraine*, on the N.E., the barony of *Kenaught*, in the E. and centre, containing the towns of Newtown Limavady (pop. 2428) and Dungiven (pop. 1163), and the village of Ballykelly (pop. 290); *Loughinshelin*, on the S.E., containing part of the town of Moneymore (total pop. 1025), and the towns of Magherafelt (pop. 1436), Kilrea (pop. 1215), Maghera (pop. 1154), Tobermore (pop. 679), Castle Dawson (pop. 674); and *Tyrkerin*, on the W., containing the villages of Muff (pop. 192), Claudy (pop. 180), and Faughanvale (pop. 123). Besides these, there are within the county the liberties of Coleraine, containing the town of Coleraine (pop. 5752) and the village of Portstewart (pop. 475); and the liberties of Londonderry, containing the city of Londonderry (pop. with its suburbs, 19,620).

Coleraine was incorporated by charter of 28th June, 11 James I. The common-council, including the mayor, are the governing body. The corporate authorities have jurisdiction within the borough, similar to that of the lord-mayor and aldermen of London, but the court is now fallen into disuse. Their revenue arises from rents averaging 418*l.* 18*s.* 6*d.* per annum, and tolls averaging 314*l.* 0*s.* 4½*d.* per annum, which income was chiefly applied in 1835 to the reduction of a debt amounting to 1500*l.* The marquis of Waterford is the patron of the borough. Coleraine is now the seat of a most flourishing linen manufacture. [COLERAINE.]

Newtown Limavady was incorporated by charter of 30th March, 11 James I. The corporation is now extinct. The town is remarkably well built, and has a very cheerful appearance. There is a handsome sessions-house; but the market-house is old and inconvenient. It is a place of considerable trade in grain, and is the centre of an extensive linen-bleaching district. The surrounding scenery is highly beautiful.

Magherafelt is also a handsome though small town. It consists of a spacious square with the market-house in the centre, from which the four principal streets diverge. The houses are stone-built and slated. There is a great market for linens and yarns once a fortnight. The linen manufacture is carried on extensively in the vicinity: there are also large brewing and distilling establishments in the town.

Portrush, in consequence of the recent improvements in the harbour, is rapidly rising into importance. Steam-boats ply regularly from hence to Liverpool, Glasgow, and Londonderry. Dungiven is the emporium for the whole of the mountainous district round the sources of the Roe and Faughan. It had formerly a considerable manufacture of linens, but it has latterly fallen off. It has more the air of a rural village than the other towns, and is, from its secluded situation and the primitive manners of the people of the vicinity, a place of peculiar interest.

Prior to the Union, Londonderry sent eight representatives to the Irish parliament, viz. two for the county, two for the city, and two for each of the boroughs of Newtown Limavady, and Coleraine. The representation is now confined to two county members, one member for the city, and one for the borough of Coleraine. In October, 1836, the county constituency consisted of 2331 electors. The assizes are held at Londonderry, and quarter-sessions at Newtown Limavady, Magherafelt, and Coleraine. The police-force of the county, on the 1st January, 1836, consisted of four chief constables, 15 constables, 77 subconstables, and 5 horse, the cost of maintaining which establishment amounted to 3954*l.* 15*s.* 9*d.*, of which 1855*l.* 12*s.* was chargeable against the county. This is the smallest police-force employed in any county of Ireland. The total number of persons charged with criminal offences, who were committed to the county gaol in 1836, was 363, of whom 300 were males and 63 were females. Of these, 125 males and 4 females could read and write at the time of their committal, 112 males and 31 females could read only, and 63 males and 28 females could neither read nor write. The district lunatic asylum for the counties of Londonderry, Donegal, and Tyrone is at Londonderry city, which also contains the county infirmary. There are dispensaries in all the principal towns and villages.

pulation.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	25,007	..	..	..	..	..	..	125,000
1813	Under Act of 1812 . . .	31,287	..	..	..	..	..	..	186,181
1821	Under Act 55 Geo. III. c. 120	34,691	37,557	..	..	..	92,979	100,890	193,869
1831	Under Act 1 Will. IV. c. 19	39,077	41,239	25,009	10,393	5,837	106,657	115,355	222,012

History.—Of the early history of Londonderry county, pending the publication of the 'Ordnance Memoir,' little can be said, although ample materials exist in the native Irish annals similar to those made available in the published 'Memoir of Londonderry City.' At the most remote period it appears to have been possessed by the septs of O'Loughlin and O'Neill, to whom the tribe of O'Cahan, who held the eastern and central districts, was tributary. The antient fortress of Aileach [DONEGAL] was the seat of the first family, who were of the elder and royal branch of the O'Neills. The O'Cahans' chief places of residence were, first at Dunseverick, the antient Dunsobarky, in the present county of Antrim, and afterwards at the 'Dog's Leap,' or Limavady, on the Roe. Soon after the arrival of the English in 1197, John de Courcy marched with a considerable force from Downpatrick to Coleraine, where he erected the castle of Mount Sandal, close to the Cutts' fall, and afterwards, crossing the river, plundered the country of O'Cahan. Peytoun, the English commander, who was left by De Courcy in the newly-built castle, was soon after cut off with his entire force near Faughan-vale, on a predatory excursion. Next year De Courcy again invaded the country of O'Cahan, and proceeded to Derry, which he seized; but Hugh O'Neill, of Tyrone, having made a descent on the Antrim coast at Larne, and routed the English there, compelled him to abandon his conquest. The establishment of an English garrison at Coleraine would appear to have enabled the English very soon after to reduce at least the eastern and central parts of the county into shire-ground, for by various records of the reigns of Edward I. and Edward II. grants appear to have been made and inquisitions to have been taken in Derry in the regular manner, and in the patent roll of the 20th Edward II. is an entry of the appointment of Robert Savage to be sheriff of the county of Coulrath, or Coleraine, as O'Cahan's country was then called. It is probable that the English law continued in force in the eastern parts of the county until the great revolt of the O'Neills in 1333. [BELFAST.] After that period the native Irish continued undisturbed masters of the country until the middle of the sixteenth century, when the rebellion of Shane O'Neill, A.D. 1566, made it necessary to send a force to Derry. Seven companies of foot and a troop of horse were despatched by sea under Captain Randolf, and encamped at Derry in October of that year. An engagement ensued, in which O'Neill was defeated; but Randolf being slain, and an explosion of gunpowder having destroyed the works of the English, the place was soon after abandoned. In the year 1600, Sir Henry Dockura, with a force of 4000 foot and 200 horse, arrived in the river Foyle, and immediately commenced the construction of three forts, one on the western bank of the Foyle at Culmore, where the river opens into Loch Foyle, one on the hill of Derry, and one at Dunnalong, a little higher up on the eastern bank of the river. This was the first commencement of a permanent settlement. The rebellion of Sir Cahir O'Dogherty in 1608, and the flight of Tyrone and O'Donnell in the preceding year, left the entire of this and five other counties at the disposal of the crown. On the 28th January, 1609, negotiations were commenced between the king and the corporation of London for the purpose of settling the terms on which the forfeited lands in this county should be conveyed to the latter for the purpose of planting them with Protestant colonists. It was at first agreed that the Londoners should spend 20,000*l.* on the plantation, in consideration of which the king granted to them the old county and town of Coleraine, with the woods of Glanconkene and Killeightra, and the town and liberties of Derry, excepting the church lands. For the management of these estates, the common-council elected a body of twenty-six, consisting of a governor, deputy-governor, and assistants, of whom one-half retire every year, their places being supplied by a new election.

In 1619 this body was incorporated by royal charter, and their estates erected into one county, to be called the county of Londonderry. The corporation, which is generally known as 'The Irish Society,' still exists as constituted under the charter granted by Charles II. after the Restoration. The division of the county took place immediately after the granting of the first charter. To the company of Goldsmiths were assigned the south-eastern liberties of Derry; the company of Grocers had the precinct of Muff; the Fishmongers, Ballykelly; the Ironmongers, Aghadowey; the Mercers, Moyvanaway; the Merchant Taylors, Moycosquin; the Haberdashers, Booevagh; the Clothworkers, part of Coleraine; the Skinners, Dungiven; the Vintners, Bellaghy; the Drapers, Moneymore; and the Salters, Magherafelt. Of these twelve companies, the Goldsmiths, Haberdashers, Vintners, and Merchant Tailors have from time to time disposed of their proportions in perpetuity. The chief proprietors so introduced are the families of Beresford, Richardson, Ponsonby, Alexander, and Conolly. Of the remaining eight companies, five have under-leased their lands, and the remaining three, namely, the Drapers, Mercers, and Grocers, retain their estates in their own hands, which they manage by resident agents. The lands not assigned to the companies still belong to the Society. The introduction of the new colony changed the entire face of the country, which, up to this period, had been one of the most desolate tracts in Ireland. Artisans, in all the chief branches of trade and manufacture, were brought over by the companies, and habits of industry and independence became at once fixed among the population. The native Irish, returning by degrees, have again increased so far as nearly to equal the descendants of the settlers in number. Although a peaceable and interesting people, they are however still far behind the rest of the population in those habits which conduce to prosperity and comfort.

There are some remains of a Cyclopean fortress at the Giant's Sconce, on the road from Newtown Limavady to Coleraine. Dungorkin, a circular mount surrounded by a wet ditch, near Claudy, is the most remarkable of the numerous earthen fortresses which occur throughout this, as throughout every other Irish county. There are several cromlechs, and other supposed druidical remains, of which the largest is at Slaught-Manus. Artificial caves and tumuli are frequent. Of military edifices the only remaining are the castles of Killoloo, Dungiven, Salterstown, and Muff, erected by the Londoners. The old abbey of Dungiven, which occupies a romantic site on a rock rising 200 feet above the bed of the river Roe, is the most interesting ecclesiastical ruin in the county. It was built A.D. 1100 by O'Cahan, and contains several well-sculptured monuments of that family. The old church of Banagher, in the same neighbourhood, is also a very interesting ruin. Farther down on the Roe is the site of O'Cahan's castle, finely situated on a rock over the river, and surrounded by woods.

The county expenses are defrayed by grand-jury presentments. The amount levied in 1835 was 23,996*l.* 16*s.* 1*d.*, of which 9221*l.* 8*s.* 10*d.* was for roads and bridges, 8702*l.* 11*s.* 10*d.* was for buildings, charities, salaries, &c., and 2066*l.* 17*s.* 6*d.* was for police. For the educational statistics of the county see DERRY diocese.

(*Statistical Survey of Londonderry*, Dublin, 1802; *Memoir of the Chart and Survey of Londonderry*, by the Rev. George V. Sampson, London, 1814; *Transactions of the Geological Society*, vol. iii.; *Concise View of the Irish Society; Ordnance Memoir of Londonderry City*, Dublin 1837; Cox's *History of Ireland; Parliamentary Reports and Papers*, &c.)

LONDONDERRY, a city in the barony of Tyrkerin and county of Londonderry, in 54° 49′ N. lat. and 7° 19′ W. long., on the west bank of the river Foyle, five miles above the point where that river spreads into the harbour of Loch Foyle, and 144 statute miles from Dublin by the present mail-coach roads.

The municipal boundary, by which the jurisdiction of the corporation is virtually limited, includes an irregular area of 37,714 acres, of which 12,615 are on the west and 19,098 acres are on the east side of the Foyle. These limits are considerably restricted by the boundary adopted for parliamentary representation. The site of the city within the walls measures 1273 feet by 635 feet. The area of the hill on which the old town stands is nearly 200 acres.

Derry, antiently called Derry-Calgach, first became a place of note in consequence of the foundation of a monastery there, about A.D. 546, by Columba, the celebrated apostle of the Picts. It is probable that before this time the place had been consecrated to religious purposes, as the oak-grove, which originally covered the hill, and from which it takes its name, continued to be regarded as a sanctified spot for many ages. A small town soon grew up about this church, which stood on the declivity of the hill towards the south-west. Its whole early history consists of the record of successive burnings and pillagings by the neighbouring Irish and by the Danes. In 1162 eighty houses which had encroached on the old Abbey Church were pulled down, and an area was enclosed round the building. A new church, called the Temple More, or great church, was built in the next year by the assistance of Murtagh O'Loughlin, king of Ireland. Derry does not appear to have been a place of any military strength at this time, as it fell an easy prey to the English under De Courcy in 1198. [LONDONDERRY, *County*.] In 1311 King Edward II. granted the town of Derrycolumbkill, as it was then called, to Richard de Burgho; but the great rebellion of the succeeding reign rendered this grant ineffectual until after the inheritance had returned to the crown in the person of King Henry VII. On Sir Henry Dockura arriving here, in 1600, he describes it as 'a place in maner of an iland, comprehending within it forty acres of ground, wherein were the ruins of an old abbay, of a bishopp's house, of two churches, and at one of the ends of it an old castle, the river called Loughfoyle compassing it all on one side, and a bogg, most comonlie wett, and not easilie passable except at two or three places, dividing it from the maine land.' Here the English immediately commenced the construction of a fort, which appears to have occupied the north-eastern declivity of the hill, containing within it a considerable town, and having a straggling suburb reaching from the gate to the river side, where there was a castle for the protection of the wharf. This fort and town were for the most part burned down in the rebellion of Sir Cahir O'Dogherty in 1608, and on the London Companies obtaining their grant in 1613, a more extended plan was adopted for their reconstruction. The new fortress was made to embrace the entire crest of the hill, and was surrounded with a strong wall and rampart protected by seven bastions and three demi-bastions. The four principal streets, leading from as many gates in the several sides of the parallelogram, were laid out at right angles, a handsome square for the corporation-house being left in the centre. The progress of the city was now rapid. In 1622 the town-house was erected. Up to the year 1629 the total expenditure of the London companies in building and fortifying the walls, erecting houses, constructing quays and wharfs, and making roads, was 27,197*l.* In 1633 the cathedral was completed at a further cost of 4000*l.* The cancelling of the company's charter in 1637, and the subsequent breaking out of the great rebellion, put a stop to these improvements. The city now became an asylum for the distressed Protestants of the counties of Londonderry, Tyrone, and Donegal. In 1649 the city was garrisoned for the parliament by Sir Charles Coote, who endured a siege of four months by the royalists under Sir Robert Stewart. The defeat of the Roman Catholic forces under Bishop MacMahon at Skirfolas in Donegal, the following year, left the parliamentarians in peaceable possession until the conclusion of those troubles, for the time, by the restoration of King Charles II. In consideration of the services of the citizens, their charter was renewed by letters patent of the 6th April, 1662, and the city again began to prosper. About 1685 however a great decay took place in trade and commerce, and two years after, on a *quo warranto* brought against the corporation by the government of King James II., the corporation were deprived of their charter. The subsequent proceedings of the government excited universal alarm among the Protestants of Ireland, and a report of an intended massacre having reached the city in the latter end of the year 1688, decided the inhabitants on refusing admission to Lord Antrim's regiment, which had been despatched by the lord-lieutenant Tyrconnell to garrison the place. The gates were closed by some resolute young men of the town, on the 7th of December, just as the advanced guard of the king's forces appeared on the opposite side of the river. The northern Protestants now generally took arms, and Derry became their principal rendezvous. Lord Mountjoy, a Protestant nobleman, holding a commission in the army of King James, was, with some difficulty, admitted by the citizens, who stipulated that one-half of any force he might introduce should be Protestants, and that until their apprehensions should be allayed by a pardon for the late commotion, the citizens themselves should keep the guards. In the meantime arms and ammunition were provided, and applications for assistance urged on the London companies. Lord Mountjoy being despatched to Paris, the command was bestowed on Colonel Lundy, who professed himself strongly attached to the Protestant cause.

On the 12th March, 1690, King James landed at Kinsale, and immediately proceeded to Dublin, where it was resolved to make the reduction of Derry the object of the army's first operations. On the approach of King James, who proceeded on the expedition in person at the head of 20,000 men, Lundy declared the place untenable, and dissuaded some English forces which had just arrived in the bay from landing in the face of the superior force advancing against them. The citizens, indignant at his cowardice, rose tumultuously, seized the gates, and fired upon the advanced guard of the Irish. Lundy having fled from the city in disguise, the citizens elected two new governors, Walker, rector of Donoghmore, and Major Baker, and formed themselves into eight regiments, amounting to 7020 men and 41 officers. Eighteen clergymen of the establishment and seven dissenting ministers, laying aside all sectarian animosities, joined their ranks. The besiegers having seized the fort of Culmore, erected batteries on both sides of the river, and stretched a boom across for the purpose of preventing the arrival of supplies. They then proceeded in their operations against the city by regular approaches on the western side, and pushed some of their works close to the foot of the rampart. The citizens conducted their defence by a vigorous fire from the walls, and by irregular sallies, which were generally attended with success. After the first eleven days of the siege, King James withdrew, leaving the command to Marshal Rosen. On the 30th July, after the inhabitants had been reduced to the necessity of eating dogs, horseflesh, hides, and tallow, and when even these were failing, two ships laden with provisions and convoyed by an English frigate entered the bay. The foremost victualling ship, after passing Culmore and the batteries on either side uninjured, struck the boom and broke it. The siege, which had lasted 105 days, was immediately raised. The garrison lost 3200 men; and, of the 4300 who remained, more than 1000 were unfit for duty. The loss of the besiegers, between the number slain in the siege and retreat, and those who died from disease in their camp, was 8000. On the representations of the heroic Walker, the twelve London Companies advanced 100*l.* each for the repair of the city; wood was supplied by the Society, abatements made in the rents, and the terms of many leases rendered more favourable to the tenants. The town-hall, which had been destroyed during the siege, was rebuilt in 1692. In 1789 a wooden bridge was commenced over the Foyle, where, previously, the only means of passage had been a ferry. The architect was Lemuel Cox, an inhabitant of Boston in New England. The original expense was 16,294*l.* 6*s.* 0*d.* Two years completed the work, which, having been frequently repaired at an expense rather greater than the original cost, is still standing. The length is 1068 feet, and the breadth 40. A turning bridge near the western end of the structure admits the passage of vessels up the river. The greatest depth of the Foyle here at low-water is 31 feet, and the rise of the tide is from five to nine feet. The depth of water at the quays is from 12 to 14 feet at low-water of neap tides. The velocity of the current is from three to four miles an hour in the narrowest part of the channel, and from two to three in the widest.

The charter of the corporation bears date the 11th Jan., 18 Car. II. The governing body is the common-council, consisting of 12 aldermen, including the mayor, 24 chief burgesses, and two sheriffs. The mayor is chosen by the common-council from the aldermen. The freedom is acquired by birth, servitude, marriage, and special favour. The recorder is presented by the corporation and appointed by the crown. The city sessions, to hear and determine felonies, are held three times in the year. A court of record, with civil jurisdiction, unlimited in amount, is held before the mayor or recorder once a week. With the exception of the rent of the market tolls, amounting to 170*l.* per annum, the corporation do not now possess any property not held for special public trusts. In Feb., 1833, they owed a total debt of 66,444*l.* 17*s.* 6*d.*, of which 34,690*l.* 9*s.* 11½*d*, was paid off by a sale of their then remaining property. The balance due has since increased to 32,971*l.* 7*s.* 6½*d.*, to pay which there are not now any funds, save the above rents, available.

Prior to the Union, Londonderry city returned two members to the Irish parliamsnt. Since that time it is represented by one member only. The franchise is now in the 10*l.* householders and freemen. On the 1st April, 1835, the constituency consisted of 724 electors.

The general appearance of the city is highly imposing. The hill on which it stands rises boldly over the Foyle, the banks of which on both sides are steep and wooded. On the summit of the hill, 119 feet above the level of the river, is the cathedral, the spire of which rises to the height of 178 feet from the churchyard. Walker's testimonial—a fluted Doric column, 90 feet high—springs nearly from the same level on the central western bastion. These objects, with the cupola of the town-house, give a very striking outline to the mass of buildings which stretches from the water's-edge up the northern and eastern acclivity of the hill, and spreads westward into an extensive suburb occupying the lower part of the valley which separates the hill and site of the old town from the adjoining eminences. The bishop's palace stands within the walls at the south-western extremity of the town, near the cathedral. Between the cathedral and palace is the court-house, a very handsome edifice, exhibiting a façade of 126 feet, consisting of an Ionic portico of four columns with wings adorned with Doric pilasters, and surmounted by statues of Peace and Justice. The building was commenced in the year 1813, and cost 30,479*l.* 15*s.* Outside the walls, on this side, is the county gaol, a very spacious and strong building, completed at an expense of 33,718*l.* (Irish) in the year 1824. The crown-prison department is somewhat too extensive for the demands of justice in so peaceable a county. Outside the walls, at the opposite extremity of the town, facing the river, is the custom-house, a hollow square of buildings, 170 feet by 130. The quays extend from the bridge northward for rather more than half a mile, and terminate in a patent slip, constructed in 1830 at a cost of 4000*l.* This slip is found to answer all the purposes of a dry-dock for vessels of 300 tons register. A general ship-yard is attached, in which vessels of 200 tons and upwards have been recently built. The walls and ramparts are still kept in repair, and form an agreeable promenade for the citizens. Between 1803 and 1808 the three principal gates were built at a cost of 1403*l.* 3*s.* Bishop's-gate, which forms the entrance at the side occupied by the cathedral and court-house, is a handsome triumphal arch with lateral passages, erected by the corporation in 1789.

The lighting, cleansing, and watching of the city are managed by a committee under the act of 2 and 3 Wm. IV., c. 107. The gas-works which supply the city were established by a joint-stock company in 1830, at an expense of 7000*l.* The supply of water is from a tank on the opposite side of the river. The water is conveyed across the bridge by pipes which close by the operation of the same machinery that opens the turning platform in the bridge for the occasional passage of vessels. Turf-fuel is procured from the bogs of Clondermot, on the eastern bank of the Foyle. The quantity of coal and culm imported in 1835 was 13,966 tons, of the value of 8728*l.*

The port is under the control of a committee acting under the provisions of the 2nd and 3rd Wm. IV., c. 107, which act also regulates the tonnage duties. The quays, which up to 1831 were the property of the corporation, are now in the hands of private individuals and companies. There are twenty-one such quays and wharfs, including two on the waterside bank of the river. The shipping belonging to the port in 1837 consisted of forty sailing vessels of an aggregate tonnage of about 6000 tons, and of six steam-boats of an aggregate tonnage of 1063 tons.

The number of vessels employed in the foreign trade which entered inwards in 1837 was forty-six, of an aggregate tonnage of 8385 tons; outwards fifteen, of an aggregate tonnage of 4886 tons. Coastwise, in the same year, the number inwards was 687, and the tonnage 79,935 tons; outwards 543, tonnage 66,260 tons. These returns, compared with those of 1826, exhibit a considerable decrease in the foreign trade; but a much more than corresponding increase in the trade coastwise, which, within the last ten years, has more than doubled.

Exports of Londonderry in the year 1835 (*exclusive of re-shipments of Sugars*).

Articles.		Quantity.			Estimated value.
		Number.	Tons.	cwt.	
					£
Corn, meal, and flour	cwts.	416,042	20,802	2	120,676
Provisions (including butter) . .	cwts.	85,890	4,294	10	273,566
Flax and tow .	cwts.	81,120	4,056	0	212,940
Feathers . . .	cwts.	8	0	3	15
Spirits . .	galls.	63,480	283	6	10,580
Linen . .	yards	5,035,992	839	6	314,749
Cotton manufactures	yards	968	0	3	24
Oxen and cows .	head	855	285	0	5,130
Horses . .	head	73	36	10	1,440
Sheep . .	head	313	9	10	265
Swine . .	head	11,103	740	4	13,880
Eggs . .	No.	33,056,000	1,180	11	55,094
Hides and calf-skins, untanned . .	No.	22,960	574	0	11,235
Other articles .	value	. .	. .		21,080
					£1,040,774

In the same year the imports amounted to an estimate value of 708,054*l*. The chief articles were sugar, 58,744*l*.; iron, 24,520*l*.; British spirits (chiefly Scotch whiskey), 21,820*l*.; tea, 19,255*l*.; flax-seed, 16,896*l*.; haberdashery and apparel, 13,550*l*.; fish (chiefly herrings), 10,811*l*.; tallow, 9570*l*.; glass and earthenware, 8980*l*.; tobacco, 8213*l*.; and coal and culm, 8728*l*. The customs of the port for the year 1837 amounted to 99,652*l*.

It is estimated that the quantity of goods of all kinds carried annually into the city by inland conveyances is 58,400 tons, of which 37,000 tons are for exportation; and that the total quantity of goods carried out of the city is 67,500 tons, of which 54,400 tons consist of goods imported. The grinding of grain (chiefly oats) is the chief branch of manufacture carried on in the city and suburbs. There are two extensive distilleries, a brewery, copper-works on a large scale, and a metal foundry. In these seven steam-engines are employed, of an aggregate of 116 horse-power. The salmon fishery of the Foyle gives employment to 120 men besides water-keepers. The fish are exported to Liverpool, Glasgow, Bristol, and Dublin, in boxes, packed with ice. The produce has increased greatly within the last ten years, in consequence of the introduction of stake-nets. In 1835 the total number of fish taken in stake and draught nets in the Foyle was 55,906, weighing 143 tons 9 cwt. This fishery belongs to the Irish Society.

In 1618-19 the total number of houses in the city was 92, inhabited by 102 families; in 1814 the number of houses was estimated at 1458, and of inhabitants at 10,570; in 1821 the number of houses was found to be 1329, and of inhabitants 9313. In 1831 the numbers were—houses 1405, inhabitants 10,130, comprising 1972 families: of which number 34 families were chiefly employed in agriculture; 1297 in trade, manufactures, and handicraft; and 641 were not included in either class. According to the Report of the Commissioners of Public Instruction, the numbers in 1834 were—

Within the walls . . .	2,121	
Without the walls . .	11,164	
		13,285

and these appear to be still increasing.

There were, in 1836, in the city, suburbs, and liberties, 31 daily schools, supported wholly by the pupils, educating 748 males and 504 females; and 12 daily schools, supported wholly or in part by contributions and bequests, educating 680 males and 564 females. Gwyn's Charitable Institution has an income of 1870*l*. 13*s*. per annum; in 1836 there were 81 boys on the establishment. The Diocesan and Free Grammar-school has an income of 600*l*. per annum, 567*l*. 6*s*. 2*d*. of which is contributed by the London companies, the Irish Society, and the bishop. The Irish Society also contributes to the support of eight other schools. Two schools, in 1836, were in connection with the National Board of Education. In the city is a public library and news-room, with a collection of about 300 volumes, established in 1819, and in 1824 transferred to a new building now partly occupied by the Chamber of Commerce. There is also a literary society, established in 1834. The savings'-bank, established in 1816, had deposits amounting to 16,226*l*. 15*s*. 6*d*. on the 10th Nov., 1835. The number of depositors was 699. Two weekly newspapers are published in the city.

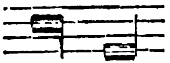
Of the charitable institutions the principal are:—the Mendicity House, established in 1825 by Bishop Knox, and supported by voluntary donations averaging 600*l*. per annum; the Poor-Shop, established in 1821 to provide the indigent with clothing and bedding at prime cost, supported by contributions averaging about 45*l*. annually; and the Ladies' Penny Society, established in 1815, for the relief of sick and indigent room-keepers, supported by subscriptions averaging 200*l*. per annum. There are also a charitable loan-fund, a penitentiary for females, and some minor charities. The district lunatic asylum stands on the north of the city. It was opened in 1829, at a cost of 25,678*l*. 2*s*. 4*d*., and is calculated for 104 patients. The funds for its support are advanced by government, and repaid by the counties of the district. The county infirmary and fever-hospital, opened in 1810, and the dispensary, established in 1819, are supported by annual subscriptions and grand-jury presentments. The annual average of patients relieved in the former is 407, and of those relieved by the latter 1564.

(*Ordnance Memoir of the City and North-western Liberties of Londonderry*, 4to., Dublin, 1837; *Report of Railway Commissioners*, Ireland, 1838; Leland's *History of Ireland*, &c.)

LONG, ROGER, was born in the county of Norfolk about the year 1680. At the age of seventeen he entered Pembroke Hall, Cambridge, took the degree of Master of Arts in 1704, and that of Doctor of Divinity in 1728. The following year he was elected a Fellow of the Royal Society and Vice-Chancellor of the University; in 1749 he was appointed Lowndes' Professor of Astronomy, and in 1751 he was presented to the rectory of Bradwell in Essex, which he held until his death, 16th December, 1770. His principal work is a treatise on astronomy, in two large quarto volumes, the first of which was published in 1742, the other in 1764: a second edition appeared in 1784. This work contains very good descriptions of the apparent motions of the heavens. Besides his astronomy he wrote, under the signature of Dicaiophilus Cantabrigiensis, a pamphlet entitled 'The Rights of Churches and Colleges defended,' 1731, 'Reply to Dr. Gally's pamphlet on Greek accent,' 1755; 'Life of Mahomet,' prefixed to Oakley's 'History of the Saracens,' 1757; 'Music Speech spoken at the public commencement, July 6, 1714,' and other poems, London, 1719, to which is prefixed a short notice of the author's life. With a view to popularise the science of astronomy, he caused to be constructed a hollow sphere, wherein thirty persons could sit conveniently, and on the inner surface of which was a representation of the heavens as they would appear to an observer in north latitude. The keeper of this sphere, who is generally an undergraduate, receives 6*l*. per annum. (*Cambridge Calendar*.) The habits of Dr. Long were peculiarly moderate, his ordinary drink being water; and for some years previous to his death he abstained altogether from eating animal food. By his will he bequeathed 600*l*. for the benefit of his college. (*Biog. Brit.*; *Memoir* of Dr. Wood mentioned above.)

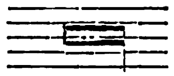
LONG ISLAND. [New York.]

LONG, a character used in old music, formed of a breve with a stem added, thus—



and equal in time, or duration, to two breves, or four semi breves, &c. It is rarely met with in compositions of later date than the middle of the seventeenth century, and is now hardly known, except to the musical antiquary.

Still more obsolete is the LARGE (a word omitted in its proper place), a character nearly in the above form, but the head is much more extended. Ex.



This is the longest note ever used in musical notation, and equal to two longs, four breves, &c.

LONGFORD, an inland county of the province of Leinster in Ireland, bounded on the north-west by the county of Leitrim, on the north-east by the county of Cavan, on the south-east by the county of Westmeath, and on the south-west by the county of Roscommon, from which it is separated by a part of Loch Ree and the river Shannon. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge, it lies between 53° 29′ and 53° 56′ N. lat., and between 7° 19′ and 7° 56′ W. long. According to the map of the Ordnance Survey of Ireland, it extends from the Leitrim boundary at Gulladoo Loch on the north to the Westmeath boundary on the south, 29 statute miles, and from the Shannon at Tarmonbarry bridge on the west to the Inny near Loch Kinale on the east, 22 miles. Its area, according to the same map, consists of—

	Acres	r.	p.
Land . .	255,734	1	10
Water .	13,675	0	23
Total . .	269,409	1	33

or 421 square statute miles nearly. In 1831 the total population was 112,558.

The general slope of the surface is westward and south-westward towards the Shannon, except in the north-eastern angle towards Cavan, where the county embraces a small portion of the basin of Loch Erne. This district, forming the immediate basin of Loch Gownagh, is separated from the remainder of the county by a slightly elevated tract upon the south, and by a series of hills of low elevation on the west. The latter eminences range from 200 to 400 feet above the level of the lake, and form the eastern front of the Cairn Clonhugh group. Loch Gownagh is a very irregular piece of water extending from north to south five miles and a half, and from east to west nearly five miles, but from its being rather a collection of lakes communicating by narrow channels than one sheet of water, it does not in all cover more than about 3000 acres, of which 2278 acres are within this county. Its chief feeders are small streams running from the surrounding hilly country. There are several pretty wooded islands in the lake, and the shores are picturesque and in some places finely planted. The Cairn Clonhugh hills, extending about ten miles from north-east to south-west, occupy the greater part of the district between Loch Gownagh and the Shannon. The chief heights are Crott on the north-east (686 feet) and Cairn Clonghugh near the opposite extremity of the group (912 feet). The general character of these hills is tame and pastoral. They form the southern boundary of the district of Drumlish, a bare tract extending along the southern border of Leitrim, and watered by the Ballinamuck, or Clonard river, which rises from Loch Annagh, in the north of the Cairn Clonhugh hills. Ballinamuck is a small place, and much of the surrounding country is moory and barren: the surface improves towards Drumlish, which is a place of some trade in grain. The angle included between the Shannon and the river Rinn, which flows southward out of Leitrim [LEITRIM], is much encumbered with bog. Between the western termination of the Cairn Clonhugh hills and the Shannon is an open well-cultivated tract, in which the thriving town of Newtown Forbes is situated. Newtown Forbes lies about two miles eastward from the Shannon, which here spreads into a lake three miles long by from a mile and a half to half a mile in width, called Loch Forbes. The intermediate flat, being about two miles every way, is occupied by the extensive plantations of Castle Forbes, the seat of the Earl of Granard. The south-eastern slope of the Cairn Clonhugh hills forms one side of the immediate valley of the Camlin, a considerable river, which, taking its rise in the extreme east of the county, skirts the low range bounding the basin of Loch Gownagh on the south, whence flowing through the small lakes of Killeen and Ballinlough, it runs in a westerly direction, by a winding course of upwards of twenty miles, to the Shannon, which it enters two miles south of Loch Forbes, at Tarmonbarry. The country through which the Camlin flows is open and well improved. The southern bank of the river in particular is beautified by numerous seats and well planted demesnes. On the more elevated portions of the plain, between the sources of the river and Loch Gownagh, is the town of Granard. A little lower down the river is St. Johnstown. Nearer the Shannon is Longford, the assize town of the county, principally situated on the southern bank of the Camlin. Between Longford and the Shannon, the Camlin receives two considerable streams from the south, of which the Keenagh river is the larger. The district intercepted between the Keenagh and the Shannon, which along the south-western boundary of this county expands into the extensive lake of Loch Ree, is very flat and boggy. The arable portion of this district towards the Shannon is low, and along the shores of Loch Ree, which here forms the boundary of the county, is liable to extensive winter-floods. These inundations materially alter the appearance of the coast-line of the lake, submerging several large peninsulas and converting others into islands.

Next to the district of Ballinamuck, this is the least productive part of the county. Along the shore of Loch Ree there are however some handsome demesnes and good tracts of pasture-land. The towns are Cloondara, or Richmond Harbour, at the terminus of the Royal Canal, which traverses this part of the county in a direction nearly parallel to the Keenagh river; and Lanesborough, at the head of Loch Ree, where the Shannon is crossed by the road leading to Roscommon. An inlet of Loch Ree, running about four miles eastward from the main sheet of the lake, bounds this part of the county on the south. Near the shore, in this direction, are the small lakes of Derry and Derrymacar, the latter of which in winter becomes a portion of the enlarged sheet of Loch Ree. The level of Loch Ree in summer is 122 feet and in winter 129 feet above the sea at low water. At the head of the above-mentioned inlet is the confluence of the Inny, which, next to the Suck, brings down a larger body of water than any other tributary of the Shannon. Its sources are in the county of Cavan, where the streams which feed Loch Sheelin have their rise: issuing from Loch Sheelin, it passes through Loch Kinale at an elevation of 212 feet above the sea, in the eastern extremity of Longford; thence, forming for a few miles the boundary between Longford and Westmeath, it enters the latter county, where it expands into the beautiful lake of Derrevaragh; passing from which, through Loch Iron, it again becomes the county boundary for a few miles; then, running under the line of the Royal Canal at Quin's Bridge Aqueduct, near Abbeyshrule, it cuts off a small portion of the extreme south of Longford, and flowing westward, by Ballymahon, enters the Shannon at the head of the eastern inlet of Loch Ree. The valleys of the Camlin and Inny are separated by a low table-land, which rises into only one conspicuous eminence of 650 feet at Slieve Goldry. The remainder of this plain, especially towards the Inny, is much diversified by low ranges of eskers, similar in structure and direction to those of the south of the county of Leitrim. On the side of this plain, towards the Inny, are the towns of Ballymahon and Edgeworthstown. The neighbourhood of Ballymahon is the most highly improved part of the county, being in all respects similar to the rich plain of Westmeath, of which it is a continuation. The only striking natural feature in this part of the line is Glen Loch, a sheet of water about a mile and a half in length, south of Edgeworthstown. The stream issuing from it runs southward to Loch Iron and the Inny. There are numerous other small lakes throughout the county.

The Shannon, between the points where it becomes the boundary of the county, has a coast-line, including windings, of about fifty miles. Above Loch Ree there is no navigation by passenger-boats. The trade-boats plying on the line are barges of from thirty to fifty tons, drawing from 3½ to 4½ feet water. The freight, including tolls, is one penny per mile. The total amount of goods carried in both directions, in the year 1835, was 9770 tons, of which 6760 tons consisted of grain. The Inny offers peculiar facilities for navigation; but as yet there has been no attempt made to remove the slight obstructions which prevent the ascent of boats. The Royal Canal, entering the county at first nearly parallel to the Inny, turns northward at Ballymahon, from which its course is parallel to that of the Keenagh river. At Abbeyshrule, near where it enters the county, its elevation is 223 feet above the level of the sea, and at Cloondara, at its terminus, 139 feet. The intermediate descent of 84 feet is distributed over seven locks. A branch of six miles in length, on one level, is carried from the main line near Killashee, across the Keenagh and Ardagh rivers, to Longford town, where it terminates in a small basin. Fly-boats for passengers have recently been established along the entire line to Dublin, which perform the trip from Longford to Dublin in fifteen hours. The time required by the slow passenger-boats is twenty-two hours. The principal goods conveyed on the Royal Canal are grain, potatoes, pigs and black cattle, turf, bricks, and small quantities of iron from the Arigna works, downwards; the return trade is chiefly in coals, merchandise, and manure. The trade-boats carry from forty to sixty tons, and draw 4½ feet water. The total number of passengers conveyed by fly-boats on the canal, for the year ending 1st of May, 1837, was 18,130, and by slow passenger-boats 28,320. At the time of this return the fly-boat system had not been extended beyond Mullingar. In the year 1837 the number of live pigs conveyed to Dublin by this canal was 34,349; of casks of butter, 3638; of tons of corn-meal and potatoes, 26,024; of tons of merchandise, 6247; of tons of coal and manure, 14,559; of tons of turf, 21,724; and of tons of stones, sand, flags, and bricks, 16,127: making a total tonnage of 84,683 tons, producing a total amount of toll of 10,964*l.* 16*s.* 5*d.* The country is in general well opened with highways, which are kept in good repair by the county.

The climate is not so genial as that of the midland counties in general. There is a considerable extent of wet and marshy surface.

Geology.—The entire district south of the Camlin consists of the floetz limestone of the central plain, with the exception only of two patches of sandstone, one extending across the bed of the river Inny round Ballymahon, and the other constituting the mass of Slieve Goldry, and spreading northward to near the town of Longford. The immediate valley of the Camlin on its southern bank, and the entire tract extending northward from it to the county of Leitrim, consist of clay-slate, constituting a portion of the grauwacke formation of Cavan. Between the western extremity of the clay-slate field and the limestone, which crosses the bed of the Camlin near its junction with the Shannon, and occupies the level country round Newtown Forbes, a belt of yellow sandstone and conglomerate intervenes: this last formation is in connection with a tract of a similar character in the south of the county of Leitrim. The eskers, or low gravel region, which occur so frequently throughout the southern and south-eastern parts of Longford, are also similar in character to those of the last-mentioned county. They contain large quantities of fine calcareous sand and marl. Marly clay also underlies many of the boggy tracts, in some places to a thickness of ten feet between the bog and the limestone rock; but in general the thickness of this bed of clay is one foot only. The average depth of the bogs is thirty feet: they contain the same vegetable matter and subsoil, and are reclaimable by the same means as those of the other midland counties.

A small tract, similar in character to the millstone-grit formation [Leitrim], occurs near Loch Gownagh. The iron-stone is said to be equal to the best Swedish ore, and to be associated with coal-shale; but the traces of coal in this district ought probably to be referred to the detritus of the coal-tract of Loch Allen. Lead ore has been found in the quarries in the limestone district, and exposed in the beds of streams, but no workings have hitherto been attempted. Marble is raised in the vicinity of Ballymahon: it is of a deep grey colour, and polishes well.

Soil, &c.—From the great quantity of bog and surface-water in the western part of the county, the soil in this district is not equal to that of the tract sloping towards the valley of the Inny. Here the characteristics of the limestone plain are found in a rich vegetable mould, producing either heavy grain crops or sweet fattening pasture. The rest of the county is chiefly grazing land. Great quantities of butter are made by the farmers and cottiers. Pigs are reared in great numbers. The feeding of sheep is not much attended to. The returns of the sale of grain in the several market-towns are defective. About 15,600 barrels of oats are annually sold in the market of Granard, and about 2600 barrels at Edgeworthstown. At Ballymahon and Longford are also brisk markets for the sale of wheat, oats, and barley.

The condition of the working population is very low. Sixpence per day, for eighty working days in the year, is the amount of wages stated for agricultural labourers in this county, in the Appendix to the Report of the Commissioners to inquire into the Condition of the Poor in Ireland. The people live almost entirely on vegetable food: they are nevertheless strong and healthy; but want of regular occupation and inefficient return for their occasional employment has added to a spirit of recklessness, the effects of which are apparent in the criminal returns.

The linen manufacture is carried on with some activity in the neighbourhood of Newtown Forbes, where the first Earl Granard took pains to introduce it. The manufacture of coarse flannels and friezes for home consumption is also attended to throughout the county. In 1831 there were in Longford 4 brewers, 104 coopers, 12 hacklers of flax, 15 tanners, and 553 weavers of linen and woollen fabrics.

The only seats of the nobility are Castle Forbes, the residence of the Earl of Granard, and Longford Castle, of the Earl of Longford. Carrickglass, the seat of the Lefroy family, near Longford, on the Camlin river, has an extensive demesne; so also have Cloonfin, Lissard, Fox Hall, Doory Hall, Castlecore, and Newcastle, which three last are in the vicinity of Ballymahon.

Divisions, &c.—Longford is divided into the baronies of *Longford*, on the north-west, containing the towns of Longford (pop. in 1831, 4516), Drumlish (pop. 574), and Newtown Forbes (pop. 537), and the villages of Cloondra (pop. 214) and Ballinamuck (pop. 163); *Granard*, on the north-east, containing the town of Granard (pop. 2069), and the villages of Abbeylara (pop. 316), St. Johnstown (pop. 255), and Bunlahy (pop. 299); *Ardagh*, on the east, containing the town of Edgeworthstown (pop. 1001) and the village of Ardagh (pop. 142); *Abbeyshrule*, on the south, containing only hamlets; *Rathcline*, on the south-west, containing the town of Ballymahon (pop. 1081), and the villages of Lanesborough (pop. 390) and Keenagh (pop. 396); and *Moydow*, on the west and centre, containing the village of Killeshea (pop. 351.)

Prior to the Union, Longford sent ten members to the Irish parliament; two for the county, and two for Longford, Lanesborough, Granard, and St. Johnstown, respectively. The representation is now limited to two members for the county. In 1837 the constituency consisted of 1388 voters. The assizes are held at Longford, and general quarter-sessions at Longford and Ballymahon.

The constabulary force on the 1st of January, 1836, consisted of 4 chief-constables, 23 constables, 117 sub-constables, and 5 horse; the cost of supporting which establishment was 5482*l.* 16*s.* 2*d.*, of which 2678*l.* 13*s.* 10*d.* was chargeable against the county. The number of persons charged with criminal offences, who were committed to the county gaol in the year 1836, was 607, of whom 557 were males and 50 females, being in the proportion of one criminal offender in 185 of the entire population. The district lunatic asylum is at Maryborough, in Queen's County. The proportion paid by Longford towards the expense of its erection is 4987*l.* 8*s.* 3*d.* The county infirmary is at Longford, and there are dispensaries at Granard, Ballymahon, Edgeworthstown, and Keenagh. There are barracks at Granard and Longford, together affording accommodation for 400 men and 200 horses.

Longford town is incorporated by charter of 26th Nov., 20th Car. II. The governing body consists of the sovereign, bailiffs, and burgesses; there is a seneschal's court with jurisdiction to 200*l.*, but no corporate criminal jurisdiction nor borough gaol. The paving and cleaning of the town are under the control of commissioners acting under the 9th Geo. IV., c. 82. The town is not lighted. Longford is principally built on the southern bank of the Camlin: the county court-house and gaol, and the barracks, are on the opposite side of the river. The town is handsome, and has an appearance of cheerfulness and business. There have been extensive stores erected at the basin which terminates the Grand Canal on the southern side, in which direction several new streets are laid out. The Earl of Longford has recently built a butter-market and shambles. There are branches of the Bank of Ireland, the National Bank, and the Agricultural and Commercial Bank, established here.

Lanesborough has also a charter of the 17th Car. I., but the governing body has not exercised any corporate functions since the Union. Its situation, with a bridge over the Shannon, is favourable to trade, and it has a brisk market for agricultural produce. Great quantities of eggs pass through Lanesborough by the Royal Canal to Dublin and the English markets.

St. Johnstown is incorporated by charter bearing date 3rd April, 3rd Carl. I.; but there are now no traces either of the corporate jurisdiction or of the lands bestowed for its establishment.

Granard, erected into a borough by charter of Charles II. in 1678, is a well-built town, consisting chiefly of one wide street, about half a mile in length. The remains of old Granard, a place of great antiquity, are still traceable a little distance to the west of the present town. A lofty earthen fort, the summit of which is 593 feet above the level of the sea, and about 150 above the surrounding plain, stands at the eastern extremity of the present town, and commands a fine prospect over the extended plains of Meath, Westmeath, and Longford.

Ballymahon and Edgeworthstown are rather large villages than towns. Both are centrally situated, and have brisk markets for grain.

The village of Ardagh, containing 142 inhabitants, gives name to a bishop's see in the province of Armagh. The see, which was founded in the sixth century, was united to the bishopric of Kilmore in 1658; and that union being dissolved, was afterwards, in 1742, annexed to the archiepiscopal see of Tuam, the archbishop holding it as a suffragan of the primate. By the provisions of the Church Temporalities Act, the see, on the demise of the present archbishop of Tuam, is to be reunited to Kilmore.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	10,026	..	..	..	..	..	..	50,100
1813	Under Act of 1812 . .	16,346	..	..	..	..	..	..	95,917
1821	Under Act 55 Geo. III., c. 120	18,987	21,650	..	..	..	53,215	54,355	107,570
1831	Under Act 1 Will. IV., c. 19 .	19,418	20,438	15,461	2,553	2,424	55,310	57,248	112,558

History and Antiquities.—The territory at present constituting the county of Longford was originally a portion of the kingdom of Meath, and as such was included in the grant of Meath by king Henry II. to Hugh de Lacy, from whom it came through his son Walter to a female heiress, one of Walter's two daughters. Owing to the negligence of her descendants, who lived in England, the territory was lost to the absentee owners. On the erection of the district into a separate county, in the 11th of Elizabeth, it retained few or no traces of ever having been under the authority of the English law or government. The O'Farrels, who almost exclusively inhabited it at this time, consented, on the 11th Feb., 1570, to surrender their interest, and take back their lands on English tenures. On the 12th of April, 1615, a commission was appointed by king James to inquire into his title to the territory. An inquisition was accordingly taken, by which it was found that, under a proviso in the grant of Elizabeth, the crown was entitled by virtue of the act of absentees. On the 5th of August in the same year a commission was issued empowering the Lord Deputy and others to dispose of the estates, so found to be in the king, to patentees. In the distribution which followed the natives had a preference. Upwards of 13,000 acres were assigned to members of the O'Farrel family, and of the entire residue of the county only 17,904 acres were allotted to the new-comers, the remainder being parcelled out among the old inhabitants. The rent reserved to the crown on the new grants was 3*d.* per acre. The plantation did not take effect to any great extent, as in 1641 the entire county appears to have been seized back by the O'Farrels, excepting only Longford Castle and Castle Forbes. The confiscations which ensued extended over nearly the entire county, and introduced almost a totally new proprietory.

The remains of the old town of Granard possess considerable interest when taken in connection with the neighbouring rampart of Duncla, which runs from Loch Kinale to Loch Gownagh, a distance of nearly eight miles. This work is in all respects similar to the Dane's Cast [DOWN], and probably formed part of the division between the antient kingdoms of Meath and Ulster. On the island of Inch-Clorin, in Loch Ree, are the ruins of seven churches, and the foundation of a round-tower. An abbey was founded here, about A.D. 540, by St. Dermid. There are the foundations of another round-tower at Granard. The Lord Richard Tuite, A.D. 1205, built an abbey at Granard in honour of the Virgin, which was afterwards rifled by the Scots, under Edward Bruce, in 1315. In 1541 Richard O'Ferrall, the last abbot, was made bishop of Ardagh. The abbey at Longford was one of Patrick's foundations. O'Ferrall, or O'Farrel, prince of Annaly, founded a very fine monastery on the site of this abbey, A.D. 1400. The church of the friars is now the parish church. Abbeyshrule was another rich foundation of the same family. In Loch Ree, besides the seven churches of Inch-Clorin, were the monasteries of All Saints, founded by St. Kieran in the year 544, and Innisbofin, founded by a nephew of Patrick about the year 530, on islands bearing these names respectively. There are remains of all the preceding, as also of the religious houses of Moydow, Clonebrone, Clone, Derg, and Innismore, a foundation of St. Columba's, on an island in Loch Gownagh. A few castles are still partially standing; the principal ones are at Castle-Forbes, Granard, Tenallick, Castlecor, Rathcline, and Ballymahon.

The county expenses are defrayed by grand-jury presentments. The amount levied in 1835 was 12,606*l.* 9*s.* 2*d.*, of which 4162*l.* 18*s.* 5*d.* was for roads and bridges; 2209*l.* 6*s.* 2½*d.* for public buildings, charities, salaries, &c.; 2678*l.* 13*s.* 10*s.* for police; and 3556*l.* 10*s.* 8½*d.* for the repayment of loans advanced by government.

(*Transactions of the Geological Society*, vol. v.; *Report of the Railway Commissioners for Ireland*; *MSS. in the Library of the Royal Dublin Society*; Cox's *History of Ireland*; *Parliamentary Reports and Papers*.)

LONGI'NUS, the author of a treatise in Greek 'On the Sublime,' is said to have been born either in Syria or at Athens, but at what time is uncertain. His education was carefully superintended by his uncle Fronto, a celebrated teacher of rhetoric; and he also received instruction from the most eminent teachers of philosophy and rhetoric of his age, especially from Ammonius and Origen. He afterwards settled at Athens, where he taught philosophy, rhetoric, and criticism to a numerous school, and numbered among his disciples the celebrated Porphyry. His school soon became the most distinguished in the Roman empire. After remaining at Athens for a considerable time, he removed to Palmyra at the invitation of Zenobia, in order to superintend the education of her sons. He did not however confine his attention to this duty, but also took an active part in public affairs, and is said to have been one of Zenobia's principal advisers in the war against Aurelian, which proved so unfortunate to himself and his royal mistress. After the capture of Palmyra by Aurelian, A.D. 273, Longinus was put to death by order of the emperor.

Longinus wrote many works on philosophical and critical subjects, now known only by their titles, none of which have come down to us, with the exception of his treatise 'On the Sublime,' and a few fragments, preserved by other writers. There is however some doubt whether the treatise 'On the Sublime' (περὶ ὕψους) was in reality written by this Longinus. Modern editors have given the name of the author of this treatise as 'Dionysius Longinus;' but in the best MSS. it is said to be written by Dionysius, *or* Longinus, and in the Florence MS. by an anonymous author. Suidas says that the name of the counsellor of Zenobia was Longinus Cassius. Some critics have conjectured that this treatise was written by Dionysius of Halicarnassus, or by Dionysius of Pergamum, who is mentioned by Strabo (625, Casaub.) as a distinguished teacher of rhetoric; but the difference of style between this work and the acknowledged works of Dionysius of Halicarnassus renders this conjecture very improbable, and as to the other Dionysius, the conjecture has no foundation. The treatise 'On the Sublime' has for its object the exposition of the nature of the sublime, both as to the expression and the thought, which the author illustrates by examples. As a specimen of critical judgment the work has always maintained a high rank, and in point of style is perspicuous and precise.

The best editions of Longinus are by Pearce (1724), Morus (1769), Toup (1778), and Weiske (1809); the best translations are the German by Schlosser, the French by Boileau, and the English by W. Smith.

LONGIPENNES, Cuvier's family name for the long-winged oceanic birds (Grands Voiliers), such as the *Petrels*, *Albatrosses*, &c. The genera which he includes in this family are *Procellaria*, *Puffinus*, *Halodroma*, *Pachyptila*, and *Diomedea*.

LONGIROSTRES, Cuvier's name for a family of wading birds (oiseaux de rivage), in which he includes the genera *Ibis*, *Numenius*, *Scolopax*, *Rhynchæa*, *Limosa*, *Calidris* and *Tringa*, *Arenaria* (*Calidris*, Vig.), *Pelidna*, *Falcinella* (*Erolia*, Vieill.—*Scolopax pygmæa*, Linn.), *Machetes*, *Hemipalama*, *Eurinorhynchus*, *Phalaropus*, *Strepsilas*, *Totanus*, *Lobipes*, and *Himantopus*,—the greater part of which, as he observes, would come under the great Linnean genus *Scolopax*. He remarks that one can hardly place the *Avosets*, *Recurvirostra*, Linn., in any other position than at the end of the *Longirostres*.

LONGITUDE and LATITUDE. These terms mean different things as applied to a point of the earth, or a star in the heavens; and we must accordingly distinguish between *geographical* latitude and longitude, and *celestial* latitude and longitude.

The latitude of a star in the heavens is its angular distance from the ecliptic, measured on a great circle drawn through the star and pole of the ecliptic. It differs from the Declination only in this, that the ecliptic is used instead of the equator. The longitude of a star is the angle made by the circle on which latitude is measured with the circle which passes through the pole of the ecliptic and the vernal intersection of the equator and ecliptic. Thus a star on the ecliptic has no latitude, and one which lies directly between a pole of the ecliptic and the vernal equinox has no longitude. The use of celestial longitudes and latitudes has in great measure been superseded by those of right ascensions and declinations.

The meaning of the term geographical longitude is the same whether we consider the earth as a sphere or a spheroid. It is the angle contained between the plane of the meridian of the place, and that of some one meridian which is fixed on as the starting-place. Thus we choose the Observatory of Greenwich, and the French that of Paris, as being in the first meridian; and while we express the relative position of the two observatories (in longitude) by saying that Paris is 2° 20′ 24″ east of Greenwich, the French describe Greenwich as 2° 20′ 24″ west of Paris.

It is usual to measure terrestrial longitudes in time [Angle; Time]; the whole circuit of the globe being supposed described (as in the diurnal motion) in 24 hours. It is also usual to reckon longitudes to 180° east or west, without proceeding farther. Thus a motion in longitude of 185° east will bring the traveller into 175° of west longitude. In astronomical writings, however, longitudes (both geographical and celestial) are measured all round the globe.

Supposing the earth to be a sphere, the latitude of a place is the angle subtended at the centre by the arc of the Meridian intercepted between the place and the equator. This angle is equal to the altitude of the pole of the heavens at the place: and the determination of the altitude of the pole is the method usually resorted to for determining the latitude. But the earth not being precisely a sphere, but a spheroid [Geodesy], the zenith line (which is a perpendicular to the tangent plane) does not pass exactly through the centre, and the altitude of the pole is not precisely the angle subtended at the centre by the arc of the meridian. Still however the altitude of the pole is called the latitude of the place; and it must be distinctly understood that a latitude, astronomically determined, is the angle made by a line which is vertical at the place with its projection on the equator. The angle subtended at the centre of the earth by the arc of the meridian is less than the altitude of the pole by a number of seconds equal to

$$\frac{\varepsilon}{\sin 1''} \times \text{sin. twice the latitude,}$$

where ε is the Ellipticity. Assuming this at $\frac{1}{300}$, the above is such a proportion of 11′½ as the sine of twice the latitude is of unity.

The reason why the preceding is not of more importance in the construction of maps lies in this, that when a large portion of the earth is mapped, the scale is necessarily too small to make such an error of any consequence; and when a small portion of the earth is taken, the error is nearly the same in every part of the map, and relative positions are not sensibly affected.

The method of finding longitudes and latitudes is given in the next article. The history of this problem, or rather of that of finding the longitude in particular, divides itself into two portions. The first, or the account of the real progress of the problem, is so mixed up with the history of astronomy and horology, that it would be useless to attempt it within any limits which we could afford: the second is that of the speculators who have misunderstood the problem, and is not worth the recital. Since however there are still persons who imagine that some mysterious *method* is yet attainable, by which the longitude is to be found, and since the conductors of the newspaper press are not all sufficiently aware of the state of the problem to prevent the insertion from time to time of paragraphs which create a most erroneous impression, we shall briefly point out the source of the fallacy which has misled so many persons.

The determination of the longitude requires simply accurate instruments for the measurement of the positions of the heavenly bodies, and one or other of the two following—either perfectly correct watches, or perfectly accurate tables of the lunar motions. The legislature of Queen Anne, which passed an act offering a reward for the discovery of the longitude, the problem being then very inaccurately solved, for want of one or the other, good watches or lunar tables, never contemplated the invention of a *method*, but only of the means of making existing methods sufficiently accurate. And the legislature of George III., which repealed the former act and substituted another, specifically limited the reward to those who should either proceed by improvement of chronometers, or of lunar table. The rewards which were given were to Harrison for the former, and to Mayer's executors for the latter. The latter act is now repealed, and there does not exist any parliamentary offer of a sum of money for further improvements.

Many persons, imagining that, as in the case of the quadrature of the circle, &c., a theoretical difficulty existed, have employed themselves in endeavouring to invent a method, imagining that they should obtain the prize held out by the legislature. Some persons still occupy themselves in this manner; and it is impossible to persuade them either of the repeal of the acts of parliament, or of their having mistaken the nature of the difficulty, which is now, for all practical purposes, entirely conquered. It is impossible to find the latitude of a place without knowing the position of the equator in the heavens, or the longitude without knowing the meridian of Greenwich. The equator has a real existence in the heavens, since its pole is the immoveable point of the heavens, which can be detected (though it is not absolutely occupied by a star) from observation of the motion of the stars, which always preserve their distance from the pole. But the meridian of Greenwich, a purely arbitrary circle of the earth, determined merely by the will of Charles II. that an observatory should be built on a certain hill near London, has no representative in the heavens. The only method then of finding longitude from the heavenly bodies is by finding the hour of the day which it is at Greenwich, at a particular hour on the spot whose longitude is required. It is then known how much of 360 degrees is revolved through by the earth in the period which brings a star from the meridian of the place upon the meridian of Greenwich, or *vice versâ*: and this angle is the longitude. A watch which goes correctly and is set at Greenwich will carry the time at that place all over the world; or a celestial phenomenon, of which the Greenwich time may be predicted, will, if the moment of its happening be observed at any other place, give the difference of times at the moment of observation. Any proposal for finding the longitude *astronomically*, which does not depend on one or the other of these principles, is useless, unless it be that of actually measuring the distance between the given place and Greenwich, the latitudes of both being known. Whether it be *possible* to use any other than astronomical means for the purpose, it would be presumptuous to decide; but there certainly is no other method which offers the most distant prospect of success.

LONGITUDE AND LATITUDE, METHODS OF FINDING. We shall classify the various modes of determining geographical latitude and longitude partly by the instrumental means of the observer and partly by the nature of the phenomena. The problems are of course the same whatever instrument is employed, for the latitude of a place is the altitude of the pole of the heavens at that place, and the longitude is the difference between the time on the first meridian (we shall always suppose Greenwich to be the first meridian) and the time at the place, at the same physical instant.

Determination of the Latitude at Fixed Observatories and Independently.—1. In determining the latitude at fixed observatories which are furnished with accurate circles, mural, transit, or altitude and azimuth circles [CIRCLE], the altitudes or zenith distances of circumpolar stars are observed above and below the pole. When these are properly reduced, the place of the pole (which lies between the places of upper and lower culmination of each star) is known, and hence the latitude is found. The first object of all astronomers is to fix the latitude of their place of observation, and the details of this operation will be found in the beginning of most of the published series of observations. The account of the latitude of Greenwich in the Greenwich Observations for 1836, p. lviii., of Cambridge in the Observations of 1833-4-5, and of Edinburgh, 1834-5, may be consulted by those who wish to know what the process is, with the most perfect means which we at present possess.

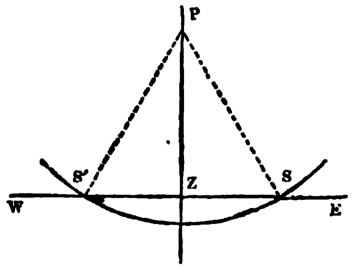
2. Again, if the altitudes or zenith distances of the sun be observed several days before and after the summer and winter solstices, the altitude or zenith distance of the middle point, *i.e.* of the equator, may be deduced. Since the tables of refraction have been perfected by Bessel, these observations give a satisfactory latitude. Both methods may be considered to be independent, as they do not draw their data from other observatories, and no great accuracy is required in the solar tables to reduce the observations of the sun to the solstice. (Pond's *Lat.*, *Greenwich Observations*, part v.)

In the observatories of Europe, and generally where the visible pole of the heavens is tolerably high, the latitude is best determined by circumpolar stars; near the equator an independent latitude must be deduced from circumsolstitial observations.

3. Before the introduction of circles, the latitude in fixed observatories was derived from combining two instruments, the mural QUADRANT and the ZENITH SECTOR. The zenith distances of stars near the zenith, and to the north or south of it, were observed by the zenith sector, and also the distances of the same stars from the pole or the equator by the quadrants; hence the arc between the pole and zenith (the co-latitude), or between the zenith and equator (the latitude), was deduced. The place of the pole was found on the north quadrant from circumpolar stars, and the place of the equator on the south quadrant, from observations of the sun near the solstices, as we have described above. When the present zenith tube was erected at Greenwich, one of its intended uses was to perform the same office for the mural circle as the original zenith sector did for the quadrants.

Determination of the Latitude Differentially.—1. The ZENITH SECTOR, when of the proper size and construction, is perhaps the most accurate instrument for determining latitudes *differentially*, i.e., assuming data which are either known or can be obtained from fixed observatories. With this instrument, the meridian zenith distances of several stars which pass near the zenith may be observed with great certainty; and as the polar distances of those stars are or may be determined at first-rate observatories, the polar distance of the zenith, or the co-latitude, is known. The latitudes for the trigonometrical survey of Great Britain are thus deduced by comparison with Greenwich, the instrument employed being a very fine 8-feet zenith sector by Ramsden. With a better knowledge of the proper motion of the stars, the sector might be used at two places, and the arc between those places obtained from observations of the same stars at two epochs, without reference to any other observations; but at present it is safer, when practicable, to refer directly to corresponding observations made at a fixed observatory.

2. Another differential method has lately been much used (at least by continental astronomers), in which the transit instrument alone is employed. [TRANSIT.] The axis of the instrument is placed north and south, and carefully levelled, in which case its line of sight will describe the prime vertical. In the figure, let P be the place of the pole, Z the zenith, EZW the prime vertical, which is also the line described by the middle wire of the telescope when it revolves. Let a star, of which the polar distance is well known, be observed at S and S′, and the times noted. Then PS, the polar distance of the star, is known, and the angle SPS′ is equal to the time between the observations, and consequently ½ SPS′, or SPZ, is known; hence we have SP and SPZ in the right angled spherical triangle SPZ, and tan PZ = tan PS × cos ∠ SPZ, from which PZ, or the co-latitude, is obtained. This is perhaps the most accurate mode of determining the latitude with moderate instrumental means. The transit should be reversed on alternate nights, so as to get rid of the effect of imperfect collimation or unequal pivots, and the level applied repeatedly before and after the observations. The method depends mainly upon the delicacy of the level and the perfect truth of form in the pivots, and when all precautions are taken the results are surprisingly good. The supports of the instrument must also be perfectly steady during the levelling and the observation. Differences of latitude may be determined by the transit instrument independently, by observing the same stars at the two stations. In this case any error in the assumed polar distance of the stars will not affect the accuracy of the result.



3. If an observer can carry with him a circle, either an altitude and azimuth, or a repeating circle, he may determine the latitude by circumpolar stars independently: but it is better to observe the zenith distances of well known stars several minutes before and *after they* pass the meridian.[*] [CIRCLE; REPEATING CIRCLE.] The reduction to the meridian is easily computed [REPEATING CIRCLE], and the places of the stars inserted in the 'Nautical Almanac' are sufficiently accurate. It is advisable to observe stars at different zenith distances from 70° on each side, to near the zenith, because if there be any fault in the instrument which depends on the zenith distance, the stars will be affected similarly on both sides of the zenith; *i.e.* the zenith distances to the north and south will both be too large or too small. Now as the co-latitude is equal to the zenith distance ± the polar distance when the star is north of the zenith (+ when observed above the pole and − when observed below) and is equal to the polar distance − zenith distance when the star is south of the zenith, it is clear that an error in the zenith distance will have precisely opposite effects on the co-latitude deduced from a north and from a south star. Besides, the coincidence or discrepancy of the observations will afford a tolerable notion of the instrument and the observer, and of the value of the final result. The repeating circle was at one time over estimated, and perhaps at present is not quite rated at its true worth, a careful and intelligent observer will come very near the truth with it, or with the altitude and azimuth circle. Both are rather troublesome to use, and both require either a very solid support, or a second observer to read the level while the first observer bisects the star and

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[*] The number of minutes which it will be prudent to observe depends on several circumstances. If the time is known to one second, which it ought to be, the observations may be commenced when an error of 1^s in the time will affect the latitude 1″. In ordinary cases, and for observers who do not understand the reason of the thing, 10^m on each side of the meridian is a sufficient direction.

notes the time. Neither can they be considered as portable in ordinary circumstances, when large enough for convenient use. The altitude circle should scarcely be less than twelve inches in diameter in either construction. On the whole we are inclined to prefer the repeating circle as a travelling instrument, and the altitude and azimuth for a permanent situation; but it must be confessed that few observers have the patience or skill to get the greatest possible accuracy out of either. The observations should be confined to stars, as neither of these instruments will keep its adjustments well under the sun.

The repeating circle was used by the French astronomers to determine the latitudes in their great survey. Since that time the instrument has been much better made, and the catalogues of stars which have issued from Königsberg, Greenwich, and Cambridge have supplied more accurate and convenient means of using it. If the levels are very good and sensible, we think that the observations of one fine night, everything being favourable, should bring out the latitude within 2″ or 3″.

4. The last class of instruments to be noticed is that of reflecting instruments, including the reflecting circle of Troughton, the repeating reflecting circle of Borda, and the sextant of Hadley. These will be described under the article Sextant, as the title best suited to their essential quality of reflexion. At present we must suppose a general knowledge of their nature. And first we will suppose the observer to have a stand and a mercurial or other horizon. In this case, standard stars should be observed several minutes before and after the meridian passage to the north and south, between the altitudes of 15° and 60°, and as much as possible in pairs, that is, for each star to the north, a star to the south should be observed about the same altitude, or two, one higher and the other lower, so that the mean altitude should nearly correspond. Whatever errors may exist in the division, glasses, &c., will be the same in each star of the pair, and as the error will affect the latitude differently, the mean latitude will be free from the error very nearly. In this way several pairs may be observed, taking the stars of the 'Nautical Almanac,' and the mean of the whole will come out very near the truth. With a good sextant or circle, and a mercurial horizon, we believe that a careful observer would get the latitude within 5″, in one fine night. It is however supposed that everything is favourable, and especially that the instrument is supported on a stand. This is absolutely necessary for the accurate observation of stars, which dance very perplexingly when the instrument is held in the hand and a high power applied. If a stand cannot be afforded, the sun is far the best object to observe with a reflecting instrument. It is always supposed that the observations are made for several minutes before and after the meridian passage, and the time noted for computing the reduction to the meridian. The meridian altitude of the sun, such as it would be if observed on the meridian and freed from instrumental and other errors, is then computed, and as the longitude of the place is known, at least approximately, the declination of the sun at its passage over that meridian may be computed from the 'Nautical Almanac.' The meridian altitude + the south declination of the sun, or − the north declination, is, in the northern hemisphere, the co-latitude of the place. With Troughton's circle, the limbs are alternately observed, to get rid of the sun's diameter, and the number of observations, forwards and backwards, should be equal, so as to get rid of the index error. With the repeating reflecting circle, the observations should also be of the upper and lower limbs alternately, and should be carried quite round the circle, so as to get rid of excentricity. In the sextant the index error should be carefully determined before and after each day's observations, and the alternate limbs observed exactly as with the circles. There is however no way of getting rid of excentricity in the sextant by observing one object, and any fault in determining the index error will vitiate the latitude to half its amount. While the circles will probably give a latitude to nearly 5″, with a very careful series of observations of the sun, the sextant used with equal care might be out 10″ or 15″. It is evident therefore, that where accuracy is an object, the observer ought, if possible, either to use a circle or to mount the sextant upon a stand, and observe stars as we have above described. It is an additional reason to carry a stand, when practicable, that in low latitudes the sun cannot be observed at all for the latitude, nor any object which is elevated 65° or 70°. In this case stars must be used; and without a stand, the observation, using high magnifying powers, is difficult and unsatisfactory. In speaking of the horizon we always mean a mercurial horizon, except another is specified. The glasses of the roof should be truly plane and parallel, but by reversing the horizon for half the observations any error of this kind is destroyed. The mercurial horizon is unfortunately heavy and inconvenient, and troublesome from its tremors wherever there is any motion. Several substitutes have been used. Oil or treacle has been adopted with good success where the shaking from carriages, &c. has prevented the use of mercury. Sometimes a piece of glass is set horizontal by a level applied to its surface, or by a fluid below it, so as to get a reflecting surface, but these generally absorb too much light to be used conveniently for stars, and are not very trustworthy. The best substitute seems to be a piece of speculum metal, ground plane, and laid horizontal by a level. It is certainly the brightest, and therefore the best for stars, but it must be remembered that horizons which are not self-regulated, by being fluid, are scarcely to be trusted under a hot sun. Troughton's reflecting circle is rather heavy, and reading three verniers for every observation is troublesome, especially at night, but it is very accurate, and fewer observations are required. Borda's reflecting circle may be made much smaller and lighter, but demands the most exquisite workmanship, a greater number of observations, and more reduction. The simple sextant is more manageable, but requires greater precautions and checks in its use. But with any of these a skilful observer will get the latitude very nearly. Sextants are made of all sizes from 10 inches radius (which is probably not so good as 8 inches) down to the snuff-box sextant of 1½ inches radius. For travellers who cannot afford to carry much weight, the 3-inch sextant is very convenient. In a recent communication to the Royal Astronomical Society, Mr. Lassell states, that with a 3-inch sextant made by Dollond, which packs up, stand, horizon, and all, in a box 4·3 inches square and 2·7 deep, he found that he could get the latitude within 10″, and the time to $1^s.0$ by observations of stars. The horizon was of speculum metal, ground by himself, and set true by a level. The observations sent with the account completely justify Mr. Lassell's opinion, but one observer differs more from another in sextant observations than in any other class of astronomical instruments; with the snuff-box sextant, altitudes may be got within 1′. The state of the barometer and thermometer must be noted at the time of all observations for the latitude, in order to compute the true refraction. At the same time we may remark, that if the observations be *balanced*, *i.e.* if the altitudes to the north have nearly corresponding altitudes to the south, the refraction will affect the observations like an instrumental error, and the variations depending on the barometer and thermometer will be quite insensible.

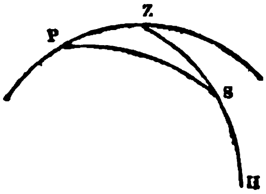
5. Observations of Polaris may be taken at any time for the latitude, and there are tables for *approximate* reduction given in the 'Nautical Almanac' for each year.

6. At sea the sextant is the only instrument which can be used, and the latitude is generally got by observing the altitude of the sun's lower limb when on the meridian, above the sea horizon. This is rather a rude process, but the resulting latitudes are generally true to 1′, or at worst to 2′. The moon, since 1834, the date of the improved and extended 'Nautical Almanac,' may be very conveniently used for finding the latitude at sea, and the brighter planets and stars are often observable on the meridian. The latitude may also be deduced from two altitudes of the sun, and the time elapsed between the observations, or indeed from any two altitudes of two known celestial bodies, one of which is near the meridian, and the other distant from it, as persons not acquainted with spherical trigonometry may satisfy themselves on the celestial globe. There is a considerable difficulty in seeing the sea horizon by night, which is somewhat reduced by getting as near the level of it as you can.

Determination of the Longitude.—The determination of the longitude of any place on the earth's surface, astronomically considered, resolves itself into two parts, the finding the time at the place of observation, and finding the time, at *the same moment*, on the first meridian (we shall always speak of Greenwich), or at any place the longitude of which from Greenwich is well known. It will be more convenient to classify the methods of finding the longitude by the phenomena than by the instruments.

Determination of Time at the Place.—1. This is best and most easily done by a transit instrument, and the time, when found, is kept by a clock or chronometer. [TRANSIT.] The transit however is neither a very portable instrument, nor is a proper situation for it, we mean one sufficiently steady, readily found.

2. The time can also be found from the altitude of the sun, planets, or stars out of the meridian. Thus let P be the pole, Z the zenith, and Z S the zenith distance, or S H the altitude of any heavenly body, the right ascension and declination of which are well known, and consequently the polar distance P S. From these data and P Z the co-latitude of the place, the angle Z P S can be computed, called the hour angle, and this, if the body be the sun, and to the west of the meridian, is the *apparent* time after noon; or if the sun be to the east, the hour angle is the *apparent* time before noon. This apparent time is easily reduced to *mean* time with the data of the 'Nautical Almanac.' When the object observed is a planet or star, the hour angle being added to the right ascension when the body is to the west, or subtracted from the right ascension when the body is east, will give the sidereal time, which can be reduced to mean solar time with only an approximate knowledge of the longitude. The problem therefore of finding the time consists generally in observing the altitude or zenith distance of any known object, and determining the hour angle from it. The repeating or altitude and azimuth circles are very fit for this purpose, but the most usual and portable instrument is a reflecting circle or sextant with its horizon and a chronometer. The observations of altitude should be made as much as possible on the prime vertical, *i.e.* when the object is east or west. Again, to get rid of instrumental error, and also to save computation, the sun should be observed, when convenient and possible, at the same altitude morning and evening. We should also recommend when the sun is observed that both limbs should be observed without moving the index. For instance, if in the morning the sun were about 14° high, set the instrument to 30°, note the instant when the upper limb by reflection touches the upper limb seen in the horizon, read off the angle very carefully, wait till the lower limbs form their contact, and note the time. Then set to 31° 30′ or 32° and proceed as before, and repeat the operation, having again set forward 1° 30′ or 2°. The observer has then several checks without trouble, for the times in which the sun rises through a diameter will be sensibly equal or vary uniformly; and in like manner the times of rising through 1° 30′ or 2° will point out if any of the usual errors have been committed. In the afternoon the same process should be repeated in an inverse order, and the time of apparent noon deduced from each pair.[*] It is to be understood as a universal rule, that the index error is to be carefully determined, and the barometer and thermometer noted whenever observations of altitude for time or latitude are made.



3. The same mode of observing equal altitudes might be applied to stars, but the observations would be extended to very inconvenient hours, and it is *nearly* as accurate to observe two bright stars, one to the east and the other to the west, and if possible at about the same altitudes. Each star will then give an error of the chronometer, and if the altitudes are rightly observed, the *same* error of the chronometer. If the errors do not agree, a mean will come nearer to the truth than either of them separately; but if the stars have not the same polar distance, the effect of a given error in altitude upon the hour angle must be computed for each, and the difference between the chronometer's errors divided in this ratio. Thus, suppose the eastern star gives a chronometer error of $25^s.0$ fast, and the western star an error of $28^s.0$ fast, while an error of 1′ in the altitude of the eastern star causes twice the error in the deduced hour angle that a similar error of 1′ does in the western star; the concluded true error should be $27^s.0$, instead of the mean error $26^s.5$. The reader will see that if the observations are made at exactly the same altitude, any mistake as to the index error, refraction, or any instrumental defect, is thus got rid of without much trouble. But, as has been mentioned before, very perfect observations of stars with reflecting instruments can scarcely be made unless the instrument is mounted on a stand. From good sets of observations of a star east and a star west, the time may be determined to $0^s.3$ or $0^s.4$. The time is required to reduce circum-meridian observations to the meridian for finding the latitude, and again the latitude is required in order to deduce the time from altitudes. An approximate latitude, such as results from the largest observed altitude about the meridian, will give the time near enough for the reduction to the meridian, and then the time may be computed rigorously with the exact latitude. Provision may be made for this revision by taking out the differences of the logarithms at each step of the first computation; but generally speaking, when the altitudes for time are taken near the prime vertical, as they ought to be, a small error in the latitude has so little effect on the hour angle, that the approximate latitude is near enough.

Determination of Greenwich Time astromically.—1. There are two phenomena which are seen at the same moment from whatever part of the earth they are visible, viz. a lunar eclipse and the eclipses of Jupiter's satellites. The first was the only phenomenon from which longitudes were derived previous to the invention of telescopes, but it is not of frequent occurrence, and unfortunately cannot be noted very exactly. It has been proposed to measure equal quantities of the eclipse on each side of the middle, and formerly astronomers were very careful to note the moments when the umbra touched or covered well-defined spots. But at present, lunar eclipses are scarcely regarded, as there are many more accurate means of determining the longitude, and of more frequent occurrence; and lunar eclipses are of no value in the theory of the moon's motions. The eclipses of the satellites of Jupiter, especially of the first satellite, are much more common, and have been of great use in modern geography. The time at which the eclipses take place, *i.e.* when the satellite, passing into the shadow of Jupiter, is lost (immerges), or passing out of the shadow, becomes visible (emerges), are set down in the 'Nautical Almanac' at the time they would be seen at Greenwich if visible. The observer at any other place notes when this phenomenon does actually happen at the place of observation, and the difference between the two times is the longitude of the place from Greenwich; east if the time of the eclipse is later than at Greenwich, and west if it be earlier. Unfortunately this method, so easy in practice, is by no means as accurate as it might at first sight appear. The theory of the satellites is scarcely to be considered as perfect, but this objection might be obviated by comparing corresponding observations, and might be very much diminished by correcting the predictions of the 'Nautical Almanac' by observations made at Greenwich, or any other well known place, about the same time. But the phenomenon is a gradual and not an instantaneous one, and the appearance or disappearance of the satellite varies greatly with the goodness of the telescope, the eye or mood of the observer, the atmosphere at the place of observation, &c., so that a longitude deduced from an eclipse of the first satellite may be considerably wide of the truth. With ordinary telescopes we believe that eclipses of the second satellite are more than twice as uncertain as the first, and that the third and fourth satellites are not worth observing for this purpose, being much inferior to good lunar distances. A large mass of eclipses of Jupiter's satellites made by the same telescope and the same observer, and where the immersions are nearly as numerous as the emersions, will however yield a satisfactory result. The aperture of the object-glass employed, and also the sight of the observer, should correspond as nearly as possible with the telescope and observer at Greenwich, or whatever place is adopted as a standard of comparison. It is not considered advisable to use a smaller telescope than an achromatic of 2¾ inches aperture for this purpose, or one larger than of 3½ aperture.

2. The time at Greenwich is most accurately determined by solar eclipses or occultations of fixed stars by the moon.

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[*] There are tables for this purpose in Schumacher's 'Hülfstafeln,' and in many sets of tables.

The computations are rather long, but not very difficult or abstruse. The beginning and end of the solar eclipse should be observed; the latter is the better marked phenomenon, and if the eclipse be annular, the commencement and breaking up of the annulus. Recent observations have shown that these appearances are not instantaneous, and therefore that longitudes deduced from them are not free from uncertainty. The occultation of a fixed star by the moon is not liable to this objection; and when the star is bright, and both immersion and emersion can be carefully observed, the longitude from an occultation affords perhaps the best determination possible of the longitude between two distant places. Yet even here doubts may arise, at least in some cases. The star may be occulted too early by a lunar mountain, or disappear too late in a lunar valley. The occultation should be observed at both places, which is not often possible, and the star should pass not far from the centre of the moon. If the solar eclipse or the occultation be not observed at Greenwich, or at any well determined observatory, the data of the 'Nautical Almanac' must be corrected by the meridian observations of the moon about the time. The tables of the sun are at present nearly as perfect as observation can make them, but the moon may be out 15″, or even 20″, which might occasion an error of 30^s or 40^s in the deduced longitude, or from an eighth to a sixth of 1°. The solar eclipses, &c., with a map showing in what parts of the globe they are visible, are given in the 'Nautical Almanac,' and the occultations by the moon of all fixed stars to the sixth magnitude inclusive, visible at Greenwich, are also predicted to the nearest minute, with such a description of the relative situation of moon and star as will enable any one to observe them without difficulty. All possible occultations of fixed stars to the fifth magnitude inclusive, visible anywhere, are also set down in that valuable work, with the data necessary for determining whether they are visible at any specified place. We cannot press too earnestly on all persons interested in perfecting geography, the absolute necessity of learning to *observe* an occultation, and to take altitudes methodically with a circle or sextant. The computations may be made at home. It is mortifying to see how very little has been done by English travellers for the exact determination of places on the earth's surface, and to know at the same time how little talent and how small an apparatus are required for making excellent observations. As a nation we have shown abundant zeal and courage, but there has been a lack of elementary knowledge in the directors of our geographical researches, and in the observers selected, which ought to be remedied.

The transits of Mercury over the sun are rare, and the longitudes derivable from them not very accurate.

3. A good and now fashionable method of determining the longitude is by observing with a transit instrument the meridian passage of the moon's bright limb, and of stars which are near her parallel of declination. The 'Nautical Almanac' contains a list of the stars proper to be observed with the moon, and also the variations of the moon's R. A. in one hour of longitude, for computing the longitude.[*] When the place of observation is tolerably near Greenwich, the computation is very simple, *i.e. if the transit is nearly in the meridian and the moon is observed over all the wires.* The error of the chronometer is taken from the neighbouring stars, and the transit of the moon corrected for this error, and for the rate, if sensible. If the place be to the east of Greenwich, the R. A. of the moon is less; if to the west, the R. A. is greater than at Greenwich. Taking the difference between the R. A. at the place and at Greenwich, and dividing by the variation in one hour of longitude, you have the longitude of the place E. or W. in hours and decimals of an hour. But this result requires correction when the corresponding observations at Greenwich, Cambridge, Edinburgh, &c., can be procured; for the R. A. of the moon may be erroneous more than $1^s.0$ from the imperfection of the lunar tables, and the stars may not be perfectly well determined, though that fault is daily disappearing. By using the R. A. of the moon and stars *observed* at Greenwich, the longitude will not be affected by the errors of the tables. It is pretty much the same thing, and at times more convenient, to let the former computation stand, and to compute the longitude of Greenwich, Cambridge, &c., from the observations respectively made there, taking care to note the signs of the resulting longitudes. Then if the longitudes of the known and of the unknown place are both east or both west, the difference will be the true longitude of the unknown place, east or west of the known one. Some telescopes give a larger image of the moon than others, and its apparent diameter is affected by varying the aperture of the object-glass. The resulting errors in the longitude are got rid of by observing the second limb as often, if possible, as the first, and then, keeping the results separate, by taking a mean of the two. There is a mistaken notion among many observers, that there is no need to care for the position of the transit. Now any considerable error in the position of the transit does occasion an equivalent error in the longitude, and though it can be corrected, if there are data for determining the want of adjustment, this gives some trouble in the computation. It is so easy to place a transit very nearly in the meridian, and to adjust it in every respect, at least approximately, that there is no excuse for carelessness in this respect. The observer should always take the transits of a star near the pole, and of all Greenwich stars above and below the moon which pass about the time of her culmination, and it is proper to reverse the instrument on alternate nights. When the place of observation is very distant from Greenwich, it will be necessary, until the quantities *a, b, c, d*, mentioned in the note, be computed, to take a little more trouble. The approximate longitude is calculated as before, and then the R. A. of the moon's bright limb must be computed for the corresponding Greenwich time, from the R. A. of the moon for every hour; the moon's semidiameter in R. A. must also be computed. We have found it on the whole most intelligible, and therefore most safe, to compute the R. A. of the moon's bright limb on two hypotheses of longitude, one the minute above and the other the minute below the approximate value. These results are to be corrected by the Greenwich or other observations for the error of the lunar tables, and then, by simple proportion, the correction is determined for one of the hypothetical longitudes. This is rather a long process, but it is strictly accurate, and the steps are intelligible as the computer proceeds. The method of determining the longitude by transits of the moon and stars is the best for places very distant in latitude or longitude, where the same occultations cannot be seen. It is nearly as good for the most distant as the nearest place, the variation of the error of the lunar tables being the only additional cause of inaccuracy, and the phenomenon presents itself very often. It does however require a very nice and well fixed instrument and a careful observer, as 1^s error in observing the R. A. of the moon will cause an error of nearly 30^s in the resulting longitude, or ⅛ of a degree. A considerable mass of observations of both limbs corrected by corresponding observations will scarcely be more than 2^s or 3^s wrong.

4. But where a transit instrument cannot be carried, or cannot be used, as at sea, the longitude must be found *astronomically* by the distance of the moon from the sun, planets, or fixed stars, measured with a reflecting instrument. This apparent distance is reduced to the true distance, *i.e.* such as it would be, seen from the centre of the earth, and as these distances are computed and set down in the 'Nautical Almanac' for every three hours Greenwich time, as they would be seen from the same place, the Greenwich time corresponding to the time of the observation can be calculated. But the time at the place is always supposed to be known from observation, and hence the difference gives the longitude. The longitude may be determined on shore by lunar observations, and, if a stand be used, with much greater accuracy than at sea. All ships and travellers ought to be well supplied with chronometers, *i.e.* the means of keeping their Greenwich time when by observation they have got it, and then the result of the observation and computation is simply stated to be the error of the chronometer on Greenwich time. The chronometer, if the rate be pretty well known, continues to give the Greenwich time (the correction for error and rate being applied) for several days; and the longitude is found every day, by comparing the

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[*] These data might perhaps be further extended with advantage. Suppose the R. A. of the moon's bright limb on the meridian of Greenwich to be m; on the meridian of any other place the longitude of which is required, m'; the longitude of the place to be l, + when West, and — East; then m' can be thus expressed: $m' = m + al + bl^2 + cl^3 + dl^4$, where a, b, c, and d can be previously computed, l being in decimals of a day. The approximate value of l, from the first term, $= \frac{m' - m}{a}$. Substituting this value for l, let the sum of the other terms $= s$, then the exact longitude $= \frac{m' - m}{a} - \frac{s}{a}$.

actual time at the place of observation with the Greenwich time at the same moment, given by the chronometer. We have spoken as if one chronometer alone were used, but it is mere folly to rely upon one or even two chronometers in a ship, or in important geographical researches.[*] These are to be compared from day to day, to ascertain that they are not suddenly altering their rates, and also whenever any astronomical observation is made which determines the Greenwich time (for that gives the error of each of the chronometers), or the time at the place. In reducing observed lunar distances to the true lunar distances, the altitudes of the sun and moon, or moon and stars at the time of observation are required, and at sea two observers are commonly set to measure these altitudes at the moment the lunar observer gives a signal that he has made the contact; indeed a fourth person is sometimes engaged in noting the chronometer. On shore this profusion of aids cannot always be obtained, nor are they at all wanted. If the time at the place and the latitude be known, the altitudes may be computed, or the observer may proceed thus: 1st, an altitude of the sun, planet, or star; 2ndly, an altitude of the moon's bright limb; 3rdly, three lunar distances; 4thly, a second altitude of the moon; and 5thly, a second altitude of the star or sun, noting the chronometer at each observation. He will then have the means, by simple proportion, of reducing the altitudes to what they would have been at the time of observing the lunar distances.

We should advise observers, who are properly furnished with chronometers, rather to make a large number of observations on a few favourable nights, than to take a few observations on many nights. By observing several lunar distances on both sides of the moon, and from all the stars and planets east and west given in the 'Nautical Almanac,' the errors of the instrument may be in a great measure eliminated, and the error of observation much diminished. It is evident that if two equal distances are taken, one east of the moon and the other west, then any error of the instrument, such as erroneous index error, want of parallelism in the glasses or telescope, excentricity, &c., would be the same in each, and therefore could be got rid of. In like manner, if two observations on the same side of the moon give different longitudes, it is clear that the instrument has some error which is *not* index error. On this subject we shall have occasion to speak again in treating of the sextant. The luni-solar observations are generally preferred by seamen (and they are perhaps the most satisfactory), partly perhaps because the altitude of the sun, by giving time at the place, is immediately applicable to the determination of the longitude. The longitude from lunar distances, however carefully taken, cannot be relied upon to very great nicety. With all appliances, a distance to $10''$, and a longitude to 20^s, or 1-12th of a degree, can scarcely be considered as certain, and the errors of the lunar tables will not unfrequently double this error. At sea it would not be safe to rely on any series of lunar distances for a less quantity than 1^m of longitude, or 1-4th of a degree, but this is quite sufficient for the purposes of navigation in open seas.

The computation of lunar distances is very easily performed by Thomson's tables, which are exceedingly convenient, and require only a little more extension. They are approximate, but near enough for the navigator and the traveller *en route*. As the last accuracy can only be given to the computations after the errors of the lunar tables are corrected, there is no need of much refinement in the previous work.

It has been proposed to determine the longitude on shore by taking altitudes of the moon with the mercurial horizon; and between and near the tropics the method may be a good one. In these low latitudes the motion of the moon in altitude is nearly vertical and very rapid, and this motion is doubled by observing the distance between the moon and its image seen by reflexion. The bright edge of the moon is a good object in reflecting instruments. The calculation may be made thus:—The time at the place must be most scrupulously determined, and the error and rate of the chronometer known, if possible, by equal altitudes of the sun on each side of noon and midnight. Then the error of the chronometer being known at the place and time of observation, assume an approximate value of the longitude, and determine the Greenwich time, the R. A. and declination of the moon, and its apparent diameter and parallax. Each altitude of the moon will, when properly reduced, give an error of the chronometer, which, if the assumed longitude be correct, will agree with the error obtained by the sun or stars. If there be a difference, a second longitude may be assumed, and thus, as has been shown in speaking of transits of the moon, the terms obtained from which, by a simple proportion, the true longitude can be deduced. It is not improbable that the doubling the motion of the moon in observing by reflexion, and the sharpness of the images, may make up for the error committed in ascertaining and keeping the time, but of this the observer must be the judge.

Determination of Greenwich Time by Chronometers.—Hitherto the Greenwich time has been extracted from astronomical phenomena, but where the distance is not great, the time may be brought from Greenwich by chronometers. Suppose, for instance, the longitude of Madeira were required: then having ascertained the errors and rates of several good chronometers at Greenwich, they are carried to Madeira, and their errors on the meridian of Madeira, and their rates, determined there. The Greenwich time is known from each chronometer, supposing the rate during the voyage to be the mean of the rates before and after, and thus each chronometer gives a longitude of Madeira, and the mean of the whole is taken. The voyage back to Greenwich, in like manner, with the errors and rates on arriving at Greenwich, furnish a second longitude; and if the motion at sea has any tendency to alter the rates, this cause will affect the first determination with a certain error, while it affects the second determination with exactly the same error, but in a different sense. If it increases the difference of longitude one way, it diminishes it the other way. By a mean of several such voyages the difference of longitude of places within a week or perhaps a fortnight's journey may be ascertained with considerable exactness. The best determination of this kind which has come to our knowledge is the difference of longitude between Berlin and Altona. (*Berliner Jahrbuch*, 1839.) There are some precautions to be adopted in determining longitudes chronometrically, which ought not to be neglected. It is well known that two observers will sometimes differ several tenths of a second from each other in getting the time at the same place and with the same instrument. Now this *personal equation*, if it exist between the observers at the two places, will affect the longitude by exactly its amount; hence the observers should be reversed for half the time of the experiment, if possible, or their *relative personal equation* found by comparison with each other, or, at least, with a third person. The accuracy of a chronometrical longitude depends on the distance in time between the places compared and the smoothness of the conveyance. It is decidedly the best mode where the distances do not exceed three or four days' journey, and where there are good carriage-roads or steam-boats. At sea, for voyages of moderate length, the Greenwich time may be taken almost entirely from chronometers, and if the number be considerable, and the watches good, there is little occasion for lunar distances, except for the greater caution, and to be assured against any accident affecting all the timekeepers the same way.

Determination of Greenwich Time by Signals.—Another mode of ascertaining differences of longitude is that of conveying the time from one point to another by fire-signals or rockets. Thus if a rocket is fired from a station between two observatories, and the explosion noted *in the time proper to each place*, the difference between the times will be the difference of longitude. A chain of such signals may be extended a considerable distance thus: Let the two points to be connected be A and B, and let an observer with a chronometer be placed at a, and others with rockets at α, β, thus: A, α, a, β, B. Then the observers at A and B note the rockets from α and β in times of their respective observatories. The person stationed at a notes by his chronometer the rockets at α and β (suppose β at 10 minutes after α), and as he observes α at the same physical moment with A, A would see β, if it were visible, just 10 minutes later than he does actually see a, and therefore the explosion of β is known in time proper to A's observatory; but it is also seen by B at the same moment in his time, and therefore the difference of longitude is obtained. In like manner any number of intermediate stations of observers and rockets may be interpolated between two distant points, A and B. The *relative personal equation of the observer* at *A and B* must be taken into account both as astronomers and observers of signals, but the personal equation of the intermediate observer does not affect the observation. In this way the longitude of Paris from Greenwich was determined. (*Phil. Trans.*)

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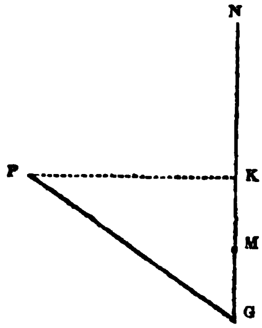
[*] In the first place chronometers are liable to accidents, and secondly, to change their rates, and that sometimes by jumps. With two chronometers evidence is given of error by their discrepance, and with three, the faulty chronometer may be detected. The best two-day box-chronometers may be bought for 40 guineas, and the best gold and silver pocket-chronometers for 40 and 30 guineas respectively. There is an idle opinion that chronometers are not good pocket-watches. They are perhaps a little more liable to injury *when let fall*, than other watches, on account of the heavy compensated balance, but after wearing chronometers for years without any particular care, we believe that three good pocket-chronometers, not larger than common watches, will keep the time for a month, as well as it can be got by lunar distance.

Finally, the longitude and latitude of one place from another may be determined by measurements on the earth's surface, if the figure of the earth be sufficiently well known. The geodesical latitudes and longitudes are in many cases found not to agree with those found astronomically, owing, as it is supposed, to some variations in the density of the earth in the neighbourhood of the place of observation. It is however a convenient way of finding the latitude and longitude of points near a well-established observatory, and connected by trigonometrical survey.



Let the distance P G in feet and the bearing K G P of the point P from the observatory G be known by survey, and G N be an arc of the meridian. Then drawing P K a perpendicular to G N, P K = P G × sin of P G K and G K = P G × cos P G K, when P K and G K are known, in feet. Find the value of ½ K G in seconds of latitude approximately by supposing 1″ to be = 100·8 feet, and add or subtract this, as the case may be, to the latitude of G, which will give the latitude of M, the middle point; call this λ. Then the value in English feet of a degree of latitude at M is

$$362747{\cdot}7 + \text{number the logarithm of which} = \left\{\begin{matrix} 3.5634881 \\ + 2 \log \sin \lambda \end{matrix}\right.$$

and the value of a degree of longitude at the same parallel in English feet =

$$\text{number, log} = \left\{\begin{matrix} 5{\cdot}5625161 \\ + \log \cos \lambda \end{matrix}\right\} + \text{number, log} = \left\{\begin{matrix} 3{\cdot}0863668 \\ + \log \cos \lambda \\ + 2 \log \sin \lambda \end{matrix}\right.$$

With these values of a degree of latitude and longitude the distances G K and P K are readily converted into arcs of latitude and longitude.

On this subject the reader may consult the 'Encyclopædia Metropolitana,' art. 'Figure of the Earth.'

The solution of the problems assumed to be known in the foregoing article may be found in all treatises on astronomy and in most collections of tables of navigation. We have recommended Thomson's 'Tables' as very convenient, and sufficiently accurate for the traveller and navigator, but any tables and methods which a man has become accustomed to will do. It would require too much space to give reasons and explanations for the opinions here advanced, but we will give two or three recommendations which few observers will regret to have followed. The first is to make, when practicable, large masses of careful and unhurried observations, and especially to observe the rules given above for nullifying instrumental error, by making such observations that a given error will have contrary effects in the result. Secondly, to be very careful in selecting their instruments and their timekeepers, which should come from good makers, and be carefully tried before starting, especially at such temperatures as the traveller may expect to meet with. A chronometer which is excellent for a polar expedition may be an indifferent watch on the Tigris or in the interior of Africa, and *versâ vice*. For any overland expedition three pocket chronometers should at least be taken, and the number must be increased according to the length, the difficulty, and the importance of the journey, and a liberal allowance made for stoppages, changes of rate, accidents, &c.: a belt of half a dozen chronometers would scarcely be felt to be an inconvenience. Lastly, if the traveller's object be chiefly that of determining exact positions, he should be careful to determine the longitudes of all his principal points by solar eclipses or occultations of fixed stars by the moon, if he cannot carry and fix a transit. At these points he should determine the rates of his chronometers for a new departure, and determine as much of the country as circumstances will allow by journeys of ten days or a fortnight, returning to the same place. When the principal points are well fixed (we speak of longitudes, for good latitudes may be got with almost any instrument, or by any person), the chronometers will fix every halting-place where the time is observed, and this may be got in a few minutes any fine night or morning or afternoon; and then the itineraries, compass bearings, marches, &c., and all the loose information on which too much of our geography is founded, will furnish valuable details in the proper place. The necessary apparatus is not very expensive or cumbrous, and with a little practice can be managed by a moderately intelligent and methodical person.

LONGLAND, or LANGELANDE, ROBERT, the reputed author of the 'Visions of Piers Plowman.' He was a secular priest, born at Mortimer's Cleobury in Shropshire, and was afterwards fellow of Oriel College in Oxford. He lived in the reigns of Edward III. and Richard II.; and, as Bale assures us, was one of the earliest disciples of Wicliff. Longland, according to the same author, completed the 'Visions' in 1369, when John Chichester was mayor of London. The poem here named consists of 'XX. Passus' (pauses or breaks), exhibiting a series of dreams supposed to have happened to the author on the Malvern Hills in Worcestershire. It abounds in strong allegorical painting, and censures with great humour and fancy most of the vices incident to the several professions of life, and particularly inveighs against the corruptions of the clergy and the absurdities of superstition; the whole written, not in rhyme, but in an uncouth alliterative versification. Of the 'Visions of Piers Plowman' there are two distinct versions, or rather two sets of manuscripts, each distinguished from the other by peculiar readings. Of one, no fewer than three editions were printed in 1550, by Robert Crowley; and one in 1561, by Owen Rogers, to which is sometimes subjoined a separate poem, entitled 'Pierce the Plowman's Crede,' a production of a later date than the 'Visions,' inasmuch as Wicliff, who died in 1384, is mentioned (with honour) in it as no longer living. Of the other version of the 'Visions,' the only edition is that published by Dr. Thomas Dunham Whitaker, 4to., London, 1813, who, in the following year, republished the 'Crede,' from the first edition of that poem printed by Reynold Wolfe, in 1553.

(Bale's *Script. Illustr.*, 4to., Bas. 1559, cent. vi., p. 474; Percy's *Reliques*, edit. 1794, ii. 272; Ellis's *Specim. of Engl. Poet.*, i. 147; Whitaker's edit. of *P. Plouhman, Introd. Disc.*)

LONGOBARDS, LONGOBARDI, or LANGOBARDI, a nation of antient Germany, mentioned by Tacitus (*German.*, 40) as a tribe of the Suevi: he describes them as few in number, but secured by their bravery against their more powerful neighbours. It appears that they lived east of the Elbe, towards the shores of the Baltic Sea. Warnefridus says that they came originally from Scandinavia, and that their name was Viniles, which was afterwards changed into that of Langobards, from two Teutonic words, *lang* and *bart*, 'long-beards.' The Longobards joined Arminius against Maroboduus, king of the Suevi. (Tacit., *Annal.*, ii. 46.)

During the third and fourth centuries of our æra the Longobards followed the general movement of the northern nations towards the south, and came to the banks of the Danube, where we find them acting as allies of Odoacer, king of Italy, whose dominion extended also over Noricum, and bordered on the region then occupied by the Longobards. The Longobards afterwards totally defeated and almost exterminated the Heruli; and about the middle of the sixth century they occupied part of Pannonia, under their king Audoin. Here they came in contact with the Gepidæ, a nation settled in Dacia, on the borders of the

Eastern empire, and which the Longobards, with the assistance of the Avari, a tribe of the Hunni, totally defeated. [ALBOIN.]

In the year 568 Alboin crossed the Julian Alps, near Forum Julii, and led the Longobards to the conquest of the plains of North Italy, which have ever since been called by the name of the conquerors. [LOMBARDY.] Pavia became the capital of the Longobards. Together with the Longobards there came into Italy thousands of men of other tribes, which followed the standard of Alboin, namely, Saxons, Suevi, Gepidæ, Bulgarians, Pannonians, Sarmatians, and others. (Warnefrid., b. ii., ch. 26.) After Alboin's death the chief of the Longobards elected Clefo as his successor, A.D. 573; but on his being murdered by a servant, eighteen months after, the nation became divided among a number of dukes, a duke of Ticino or Pavia, a duke of Friuli, a duke of Trento, a duke of Bergamo, a duke of Brescia, besides thirty dukes in so many other cities. Under these dukes the Longobards penetrated south of the Apennines, and conquered Tuscany, Liguria, Umbria, and part of Campania. The Byzantine emperors retained Ravenna, Rome and its duchy, Padua, Genoa, Apulia, Calabria, Naples, and the southern extremity of Italy with Sicily. 'The government of the dukes,' says Warnefrid, 'was very oppressive to the Roman or native inhabitants, many of whom were put to death, and the rest deprived of part of their property, and obliged to pay tribute for the rest.' After ten years of this disorderly dominion of the dukes, the Longobards chose for their king Autaris, son of Clefo, 586—592. His reign was prosperous: he repulsed the attacks of the Franks on one side, and of the Byzantines on the other; and he carried his arms into southern Italy, where he founded the dukedom of Benevento. After the death of Autaris, his widow Theodolinda, who was a daughter of the king of Boiaaria, or Bavaria, married Agilulfus, duke of Turin, who was acknowledged by the Longobards as their king. Agilulfus, through the persuasion of his wife, became a Catholic, most of his countrymen being Arians, and made peace with Gregory the Great, bishop of Rome. Theodolinda built the church and palace of Monza, where was deposited the iron crown (so called from a nail, said to be from the cross of our Saviour, which is riveted inside of the crown), which has served ever since for the coronation of the kings of Lombardy. Agilulfus took Cremona, Padua, and other towns which still sided with the Eastern emperor. Truces were repeatedly made between the Longobards and the Byzantines of Ravenna. Agilulfus died in 615, and was succeeded by his son Adaloaldus, under the regency of Theodolinda. Adaloaldus, ten years after, having lost his mother, was deposed, as the chroniclers say, because he was insane, and Ariovaldus was elected in his stead. Little or nothing is known of Ariovaldus, except that he reigned twelve years, and died A.D. 636. It was under his reign that Columbanus, the Irish monk and missionary, after passing through Helvetia and Rhætia, came into Italy and founded the monastery of Bobbio, near the Ligurian Apennines, which afterwards became celebrated for its wealth and its collection of MSS.

After the death of Ariovaldus, Rothar, son-in-law of Agilulfus, was elected in his place. Rothar was the first who made a compilation of the unwritten laws and usages of the Longobards, and published them in a kind of barbarous Latin, under the name of Edict, with his own preface and observations. This edict drew a marked distinction between the Longobards and the Roman or subject population, which continued to live under the Roman law. The distinction between the two races, the conquerors and the conquered, seems to have continued until the fall of the Longobard dominion. By a subsequent law of King Liutprand, who made considerable additions to the edict of Rothar, it was enacted that if a Roman married a Longobard woman, the children born from such a marriage were Roman, and followed the condition of the father. The laws of the Longobards resembled in their spirit those of the Burgundians, Franks, and other Teutonic races. Pecuniary compensation was awarded for most personal injuries, assaults, wounds, mutilation, and for homicide. Adultery and theft were punished with death. Emigration was forbidden, and sedition or mutiny was a capital crime. The judges were strictly warned against partiality or corruption, and enjoined to decide causes within a limited number of days. Single combat or duelling was tolerated, though its practice was characterised by Liutprand as absurd. Upon the whole, the laws of the Longobards were among the most rational and equitable of those of the northern nations which divided among themselves the ruins of the Western empire, and as such have received the commendation of Montesquieu, Gibbon, Johann Müller, and others.

With regard to the political system of the Longobards, it may be considered as a federation under an elective king, who was the chief of the nation, something like the subsequent confederation of the German empire. When Autaris was elected king, the dukes in a general assembly agreed to give one half of their revenues for the support of the royal office and state, but in other respects they acted as sovereigns in their respective duchies, each making wars and conquests on his own account, as appears by the chronicles and also by the letters of pope Gregory the Great. We find a duke of Benevento extending his conquests as far as Cotrone, the dukes of Spoleti taking several towns of Sabina, and the dukes of Friuli repeatedly engaged in deadly warfare against the Avari and Sclavonians, without the rest of the Longobards, or the king himself, intervening as parties in these quarrels. The orders and enactments of the king required the sanction of the people, or army (for the two words are used as synonymous) of the Longobards. The king was supreme judge and commander, but not absolute legislator. These relations were maintained with tolerable fairness among the Longobards themselves, but with regard to the treatment of their Roman subjects the case was somewhat different. Several modern writers, Giannone, Muratori, Denina, Bossi, and others, have considered the Italians, or 'Romans,' as they were called, under the Longobard dominion, as enjoying equal privileges with their Longobard masters; but Manzoni, in a very sensible and soberly written disquisition on the subject, has dispelled this delusion. (*Discorso sopra alcuni punti della Storia Longobardica in Italia*, annexed to Manzoni's tragedy of *Adelchi*.)

The 'Roman' or Italian subjects of the Longobards were looked upon as a conquered and subject race, not exactly like the Helots at Sparta, but still they had neither the same political nor civil rights as the conquerors; they had no voice in their assemblies; they had no appeal against the caprice of their Longobard rulers; they lived among themselves according to the Roman law, but in any affairs between them and the Longobards they were judged by Longobard judges and according to the Longobard law.

Rothar, having conquered the towns of the Thuscia Lunensis, or Riviera of Genoa, and defeated the troops of the exarch of Ravenna, died A.D. 653, and was succeeded by his son Rodoaldus, who after five years' reign was killed by a Longobard for having seduced his wife. Aripertus, a nephew of queen Theodelinda, being elected in his place, reigned till the year 661, when he died, and his two sons Pertharitus and Godebertus divided the supreme authority between them. Godebertus however conspired against his brother, who was obliged to run away; but Godebertus himself was killed by Grimoaldus, a chief from Benevento, who took possession of the crown, A.D. 662. Grimoaldus was an able and warlike usurper. He defeated the Franks, who had entered Italy, and had advanced to near Asti. Shortly after, Constans II., emperor of Constantinople, and grandson of Heraclius, having landed with an army at Tarentum with the intention of recovering Italy from the Longobards, took Luceria, and laid siege to Benevento, of which Romualdus, son of Grimoaldus, was duke. Grimoaldus marched with an army to the assistance of his son, and obliged Constans to raise the siege and retire to Naples. Constans afterwards went to Rome, which was still subject to the Eastern emperors, and took away the ornaments of the churches. He then retired by the way of Reggio to Sicily, where he committed many acts of oppression, until at last he was smothered in the bath at Syracuse, A.D. 668. All the records of those times concur to show that those provinces of Italy which were still subject to the Byzantine emperors were much worse governed than the dominions of the Longobards. Under the reign of Grimoaldus, Alseco, or Alseck, a chief of Bulgarians, emigrated to Italy with all his tribe, and put himself under the protection of the Longobard king. The king sent him to his son the duke of Benevento, who assigned to him the towns and territories of Boianum, Sæpinum, Æsernia, and other places in the country of Samnium, which had remained desolate in consequence of the wars. Warnefridus (b. v. ch. 29) adds that the descendants of those Bulgarians continued there in his days, 'and although they spoke Latin, had not lost the use of the language of their ancestors;' a remarkable passage, which shows that the general language of Italy in the time of Charlemagne was still the Latin, and was adopted by the northern tribes which settled in the country.

Grimoaldus added several chapters of laws to the edict or compilation of Rothar, and after a successful reign of nine years died at Pavia, A.D. 671. After his death the exile Pertharitus, who had wandered as far as England, returned, and by universal consent resumed the crown. Pertharitus reigned seventeen years, and died in 688, leaving his son Cunipertus, who had married Ermelinda, an Anglo-Saxon lady. Cunipertus was driven away by Alachis, duke of Tarentum, but he returned, defeated and killed Alachis, and resumed the crown. In the meantime Romualdus, duke of Benevento, took Tarentum and all the neighbouring country from the Byzantines, and annexed it to his dominions. Cunipertus died in the year 700. His infant son Linpertus was put to death by Aripertus, duke of Turin, who assumed the crown. Asprandus, whom Cunipertus had appointed guardian to his son, fled into Boiaria with Liutprand, the son of Asprandus. Nine years afterwards they returned at the head of an army of Bavarians, and after a battle, in which Aripertus was drowned in attempting to cross the Ticinus, Asprandus was acknowledged king of the Longobards; he died soon after, and his son Liutprandus succeeded him by common consent, A.D. 713.

Liutprandus reigned thirty-two years. He was the most illustrious of the Longobard kings. He took Ravenna and the Pentapolis, but afterwards made peace with the Byzantines and restored Ravenna, was friendly with the pope Zacharias and the people of Rome, who at that time were alienated from the Eastern emperors in consequence of the schism of the Iconoclasts; and he was also friendly with Charles Martel, to whom he sent assistance against the Saracens, who had entered Provence in the year 739. Liutprand raised many churches and other buildings. 'He was,' says Warnefrid, 'valiant in war, but fond of peace; of a forgiving disposition; although destitute of learning like most of his countrymen, yet gifted with judgment and perspicacity, and worthy of being compared with philosophers; careful of the welfare of his people, and a legislator.' His laws are joined to those of his predecessors Rothar and Grimoald, in the collection of the laws of the Longobards. Liutprand died in 744, and was succeeded by his nephew Hildebrand, who was deposed a few months after for his misconduct, when Ratchis, duke of Friuli, was elected king. Ratchis, after five years' reign, voluntarily renounced the crown, and went to Rome, and afterwards to Monte Casino, where he became a monk. Ratchis was succeeded by his brother Astolphus. The first years of the reign of Astolphus were peaceful as long as Zacharias, a prudent and upright pope, continued to live. After the death of Zacharias, Stephen II. succeeded him, who began to intrigue with Pepin, king of the Franks, who wished to extend his power into Italy. Astolphus, on his side, having taken Ravenna in 751, and put an end to the dominion of the Exarchs, attacked the duchy of Rome, and aimed at subjecting that city also to his authority. Pepin came twice to the assistance of the pope, and each time defeated Astolphus near Pavia, and obliged him to give up Ravenna, the Pentapolis, and other towns, which Pepin is said to have then bestowed upon the Roman see. This donation however has been a subject of much controversy: the instrument does not exist, but is said to have been lost. Astolphus died in 756, and Desiderius, a Longobard duke, was elected his successor. Desiderius renewed the quarrel of Astolphus with the pope, and not only seized the towns given up by Astolphus, but likewise devastated the duchy of Rome. The pope Adrian I. applied to Charlemagne for assistance. Charlemagne came into Italy A.D. 774, defeated Desiderius, and carried him prisoner into France, where he became a monk. Adelchis, son of Desiderius, fled to Constantinople, from whence he returned to Italy with some troops, and fell in battle. The kingdom of the Longobards ended with Desiderius, and the Longobard nation and its territories became subject to Charlemagne.

The political system of the Longobards was weak: 1st, because their king was elective; 2nd, because the state was divided among so many almost independent dukes; 3rd, because it established a degrading inferiority between themselves and the native cultivators of the soil; 4th, because it never could or would enter into a fair alliance with the hierarchy of Rome, whose power was growing very fast in the opinion of the Italians or 'Romans,' both of the Longobard and other territories of Italy. The popes were in fact the protectors and the hope of the degraded Roman population, and this contributes to explain the facility with which Charlemagne in one single battle overthrew the whole dominion of the Longobards.

LONGOMONTA'NUS. CHRISTIAN SEVERIN, better known as Christian Longomontanus, from the latinized form of his native village, Langsberg, in Denmark, was born in the year 1562. His early education was probably wholly due to his own exertions, as the circumstances of his father, who was a poor ploughman, would scarcely have enabled him to incur much expense on that account; but upon the death of this parent, which took place when he was only eight years old, he was sent for a short time to a good school by his maternal uncle. This improvement in young Severin's condition excited so much jealousy among his brethren, who thought themselves unfairly dealt with, that he determined, in 1577, upon removing to Wiborg, where he lived eleven years, 'working by night to earn a subsistence, and attending the lectures of the professors during the day.' After this he went to Copenhagen and there became known to Tycho Brahé, who employed him in reducing his observations and making other astronomical calculations up to the time of his quitting the island of Hoëne in 1597, when he sent him to Wandenbourg, and thence to his residence at Benach, near Prague. His stay here was not of long duration, in consequence, it is said, of his attachment to his native country, though it is perhaps attributable to the death of his patron, which happened in 1601. [BRAHE', TYCHO.] He returned by a circuitous route, in order to visit the place which had been honoured by the presence of Copernicus, and reached Wiborg about the year 1603, where he was appointed superintendent (recteur) of the gymnasium, and two years after was promoted to the professorship of mathematics in the university of Copenhagen, the duties of which he continued to discharge till within two years of his death. He died at Copenhagen, 8th October, 1647.

The following list of his published works is taken from the 18th volume of the 'Mémoires des Hommes Illustres,' Paris, 1732; 'Theses summam doctrinæ Ethicæ complectentes,' 1610; 'Disputatio Ethica de Animæ Humanæ Morbis,' 1610; 'Disputationes duæ de Philosophiæ origine, utilitate, definitione, divisione, et addiscendi ratione,' 1611-18; 'Systematis Mathematici,' part 1; 'Arithmeticam Solutam duobus libris methodice comprehendens,' 1611; 'Cyclometria è Lunulis reciproce demonstrata, unde tam areæ, quam perimetri Circuli exacta dimensio et in numeros diductio secuta est, hactenus ab omnibus Mathematicis unice desiderata,' 1612, 1627, and 1664; 'Disputatio de Eclipsibus,' 1616; 'Astronomia Danica in duas partes tributa, quarum prima doctrinam de diuturna apparente Siderum Revolutione super Sphæra armillari veterum instaurata duobus libris explicat; secunda Theorias de Motibus Planetarum ad Observationes Tychonis de Brahé, &c. itidem duobus libris complectitur,' 1622, 1640, and 1663 (Gassendi, in his Life of Tycho Brahé, says that this work belongs rather to that astronomer than to Longomontanus, since the tables of the planetary motions were either calculated by Longomontanus under the immediate superintendence of Tycho, or copied by him from those which Tycho had previously caused to be computed); 'Disputationes quatuor Astrologicæ,' 1622; 'Pentas Problematum Philosophiæ,' 1623; 'De Chronolabio Historico,' 1627; 'Disputatio de Tempore trium Epocharum, Mundi Conditi, Christi Nati, et Olympiadis primæ,' 1629; 'Zetemata septem de summo hominis bono,' 1630; 'Disputatio de summo hominis malo,' 1630; 'Geometriæ quæsita xiii. de Cyclometria rationali et vera,' 1631; 'Inventio Quadraturæ Circuli,' 1634 (this work gave rise to a very animated dispute between the author and Dr. John Pell, an English mathematician, who proved that the demonstration there given of the quadrature of the circle was fallacious, but notwithstanding Longomontanus died in the conviction that he had effected that which has since been shown to be impracticable); 'Disputatio de Matheseos Indole,' 1636; 'Coronis Problematica ex Mysteriis Trium Numerorum,' 1637; 'Problemata duo Geometrica,' 1638; Problema contra Paulum Guldinum de Circuli Mensura,' 1638; 'Introductio in Theatrum Astronomicum,' 1639; 'Rotundi in Plano, seu Circuli absoluta Mensura,' 1644; 'Energeia Proportionis sesquitertiæ,' 1644; 'Controversia cum Pellio de vera Circuli Mensura,' 1645. (Hutton's *Dictionary; Biog. Univers.*)

LONGUS is the name of the author, or supposed author, of a Greek pastoral romance, 'The Loves of Daphnis and Chloe,' or, according to the literal version of the Greek title (*Ποιμενικὰ τὰ κατὰ Δάφνιν και Χλόην*), 'Pastoral Matters concerning Daphnis and Chloe,' which has been generally admired for its elegance and simplicity, and is one of the earliest specimens of that kind of composition. We know nothing of the author, who is supposed to have lived in the fourth or fifth century of our æra. The 'Daphnis' of Gesner approaches the nearest of any modern composition to an imitation of the work of Longus. This pastoral has gone through numerous editions, the best of which are: that of Leipzig, 1777, called 'Variorum,' because it contains the notes of former editors; Villoison's, with numerous notes by the editor, Paris, 1778; Schæfer's, Leipzig, 1803; that of Courier, Rome, 1810; that of Passow, Leipzig, 1811, Greek and German; and by Sinner, Paris, 1829. Courier discovered in the MS. of Longus, in the Laurentian library at Florence, a passage of some length, belonging to the first book, which is wanting in all the other MSS. He first published the fragment separately at his own expense and distributed the copies gratis. He afterwards embodied it in his edition of the whole pastoral, of which he published only 52 copies, most of which he sent to distinguished scholars of various countries. He also republished Amyot's French translation of Longus, adding to it the translation of the discovered passage. [COURIER, PAUL LOUIS.]

LONGWY. [MOSELLE.]

LONS-LE-SAUNIER. [JURA.]

LOO-CHOO ISLANDS. [LIEOU-KIEOU ISLANDS.]

LOOE, EAST AND WEST. [CORNWALL.]

LOON (Ornithology), one of the English names for the Greatest Speckled Diver, *Colymbus glacialis*. [DIVER, vol. ix., p. 37.]

LOP, Lake. [TURKISTAN.]

LOPE DE VEGA. [VEGA.]

LO'PHIADÆ, a family of fishes of the order Acanthopterygii. The fishes of this family (which forms the '*Pectorales Pédiculées*' of Cuvier) are distinguished by the bones of the carpus being elongated and forming a kind of arm, which supports the pectoral fins. The skeleton is semicartilaginous. The family contains four genera: *Lophius* (Cuv.), *Antennarius* (Commerson), *Malthe* (Cuv.), and *Batrachus* (Bloch., Schn.)

The extraordinary fish which is not unfrequently met with on our coast, and known by the name of the Angler (*Lophius piscatorius*, Lin.), is an example of the first of the above genera, which is thus characterized:—Skin without scales; the ventral fins situated in front of the pectorals; opercule and branchiostegous rays enveloped in the skin; gill opening situated behind the pectorals; branchiostegous membrane forming a large purse-like cavity in the axilla; two distinct dorsal fins, in front of which are some free rays produced into long slender filaments: head broad and depressed, extremely large in proportion to the body.

The Angler, or Fishing Frog, as it is sometimes called, is thus described by Mr. Yarrell:—'The head is wide, depressed; the mouth nearly as wide as the head; lower jaw the longest, bearded or fringed all round the edge; both jaws armed with numerous teeth of different lengths, conical, sharp, and curving inwards; teeth also on the palatine bones and tongue; three elongated unconnected filaments on the upper part of the head, two near the upper lip, one at the nape, all three situated on the middle line; eyes large, irides brown, pupil black; pectoral fins broad and rounded at the edge, wide at the base; branchial pouches in part supported by the six branchiostegous rays. Body narrow compared with the breadth of the head, and tapering gradually to the tail; vent about the middle of the body; the whole fish covered with a loose skin. The number of fin-rays are:—dorsal, 3 spinous and 12 soft; pectoral, 20; ventral, 5; anal, 8; and caudal, 8. Colour of the upper surface of the body uniform brown; fin membranes darker; under surface of the body, ventral and pectoral fins, white; tail dark brown, almost black.'

The Angler is usually about three feet in length, but has been known to measure five. It lives at the bottom of the water, crouching close to the ground; and, by means of its ventral and pectoral fins, it stirs up the mud and sand in such a manner as to conceal itself from other fishes. The long filament at the tip of the nose is elevated, and the glittering appendage at its extremity is said to attract the smaller fishes as a bait; and when they are sufficiently near, they are seized by this voracious fish.

In the genus *Antennarius* there is the same sort of free rays on the head, the first of which is slender, often terminated by an appendage; the following rays, augmented by a membrane, are sometimes much enlarged, and at others are united to form a fin. The dorsal fin occupies nearly the whole extent of the back; the body is often beset with cutaneous appendages. These fishes, says Cuvier, by filling their enormous stomachs with air, expand themselves like a balloon; their fins enable them to creep on land, where they can live for two or three days, the pectorals, from their position, performing the functions of hind feet. These fishes inhabit the seas of hot climates.

The species of the genus *Malthe* are remarkable for their projecting snout, beneath which the mouth, which is of moderate size and protracted, is situated. The body is studded with bony tubercles, and the dorsal fin is small.

The fourth and last genus of the present family (*Batrachus*) is distinguished by the following characters:—Head horizontally flattened, broader than the body; the mouth deeply cleft; operculum and suboperculum spinous; the ventral fins narrow, inserted under the throat, and containing but three rays, the first of which is broad and elongated. The anterior dorsal fin is short, and supported by three spinous rays; the posterior dorsal is long, and supported by soft rays; the anal fin, which is opposed to the last, is also supported with soft rays. The lips are frequently furnished with filaments. The species of this genus keep themselves hidden in the sand to surprise their prey, like those of the genus Lophius, and the wounds inflicted by their spines are said to be dangerous.

LO'PHIODON, an extinct genus of mammiferous quadrupeds nearly approaching in the structure of the teeth to the Tapirs and Rhinoceroses, and in some respects to the Hippopotamus, separated by Cuvier from *Palæotherium* (with which, as well as *Anuplotherium*, it is closely connected) under the name at the head of this article. M. de Blainville named the genus *Tapirotherium*.

Lophiodon differs from *Palæotherium* in that the lower molar teeth, instead of exhibiting a continuous series of double crescents running longitudinally, have transversal elevations (des collines transversales), more or less oblique. Cuvier gives the following as the generic characters of *Lophiodon*:—

1. Six incisors and two canines in each jaw; seven molars on each side of the upper jaw and six in the lower, with a vacant space between the canine and the first molar: points in which they resemble the Tapirs.

2. A third elevation (colline) on the *last lower* molar, which is wanting in the Tapirs.

3. The anterior lower molars are not furnished with transversal elevations as in the Tapirs, but present a longitudinal series of tubercles, or a conical and isolated one.

4. The upper molars have their transversal elevations more oblique, and in this respect approach the Rhinoceroses, from which they differ by the absence of *crochets* on these elevations.

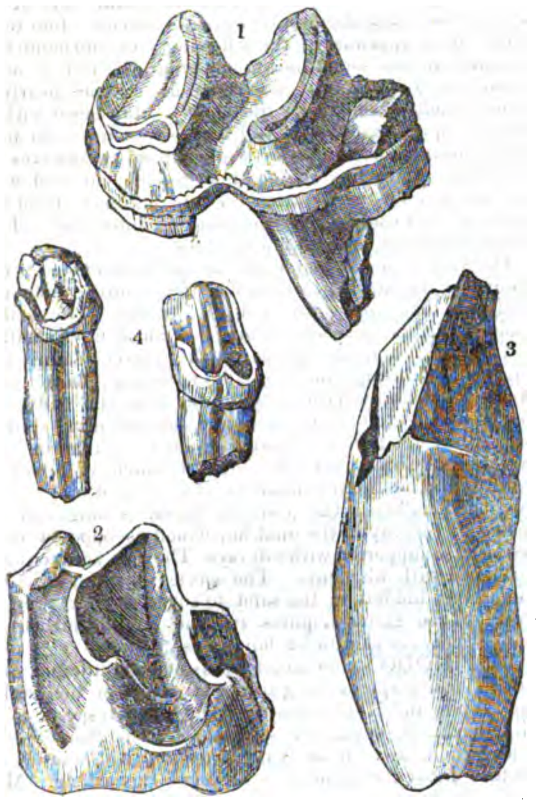
The dental formula of *Lophiodon* then will be:—

$$\text{Incisors } \frac{6}{6}; \text{ Canines } \frac{1-1}{1-1}; \text{ Molars } \frac{7-7}{6-6} = 42.$$

The rest of the osteology of this extinct form indicates the affinities above mentioned; but many parts of the skeleton are still unknown, and particularly those essential portions the nasal bones and those of the feet, the number of toes not being ascertained.

No less than fifteen species are recorded, twelve of which are named. They belong to the first great fresh-water formation of the Eocene Period of Lyell; and if we are to judge from analogy, and the other animal remains (those of reptiles especially) with which they are associated, they must have lived in a temperature suitable to the existence of Crocodiles and fresh-water *Testudinata* (*Emys* and *Trionyx*), creatures which, at present, inhabit warm climates.

The localities are Issel for three species, one of which is also found at Epplesheim and another also at Argenton and Soissons. Argenton for three other species. Buchsweiler for two more. Montabusard for two more, one of which is also found at Gannat. Boutonnet near Montpellier for one. Orenburg,[*] for one (*L. Sibiricum* of Fischer): these species are named. Others have been found at Argenton, in the Laonnois, near Paris, and near Frankfort.



1, lower back molar, from the great species of Lophiodon of Argenton. (Cuv.) 2, upper molar (back) of the same. (Cuv.) 3, canine tooth of the same. (Cuv.) 4, incisor teeth of the same. (Cuv.)

In the 'Règne Animal,' Cuvier places *Lophiodon* between *Palæotherium* and the *Tapirs*.

LOPHORI'NA. [BIRD OF PARADISE, vol. iv., p. 421.]

LOPHO'PHORUS. [PHASIANIDÆ.]

LO'PHOTES, a genus of *Falconidæ* established by M. Lesson; but that term having been previously employed,[†] Mr. Gould and others adopt the generic title, *Lepidogenys*, proposed by Mr. J. E. Gray. Mr. Gould describes a species among his Australian Birds under the name of *Lepidogenys cristatus*. The form is somewhat allied to *Pernis*. Mr. Gould characterized at the same time several new species of *Falconidæ* from New South Wales, and the following new genus from the same locality.

Ieracidea.—Type, *Falco Berigora*. Vig. and Horsf. (*Zool. Proc.*, 1837.)

LOPHOTUS, a name applied by G. Fischer to a genus of *Simiadæ*

LOPHU'RA, a genus of Saurians established by Mr. Gray, but changed by Cuvier for *Istiurus*, because in his opinion the term *Lophura* comes too near to the term *Lophyrus*. The terms are however both in their construction and accentuation sufficiently distinct. [IGUANIDÆ, vol. xii., p. 439.]

LOPHY'ROPA. [BRANCHIOPODA, vol. v., p. 339.]

LO'PHYRUS. [COLUMBIDÆ, vol. vii., p. 377.] The term is also employed by Duméril to designate a genus of *Saurians* (*Agama gigantea*, Kuhl.), and by Latreille as a name for a genus of *Hymenopterous Insects*.

LORANTHA'CEÆ, a natural order of Exogens, referred by most systematical writers to either the polypetalous or monopetalous subclass, but by others regarded as more closely in alliance with the apetalous Santalaceæ and Proteaceæ. They are in nearly all cases true parasites, growing upon the branches of trees, below whose bark they insert their roots, incorporating them with the wood, and feeding upon the vital juices of the plants which they attack. The principal marks of distinction in the structure of Loranthaceæ are a one-celled inferior fruit containing a single erect ovule, a fruit consisting of a peculiar viscid matter resembling birdlime, and a valvate corolla with the stamens opposite the petals. There is but one species, the common mistletoe, Viscum album, found wild in England; a species of Loranthus occurs in the south of Europe; but in the hot dry parts of tropical countries the species abound, swarming over the branches of trees, of which they often form a conspicuous feature, with their long clustered gaily coloured flowers. As in this country the mistletoe does not injure in any considerable degree the plant which it attacks, unless it exists in unusual quantity, so in India, where Loranthi are common, the injury sustained by vegetation is according to the reciprocal size of the parasite and its stock. Mr. Griffith states that a species called Loranthus Scurrula, which is generally attached to Melastoma malabathrica, or other shrubs, frequently destroys them to a considerable extent; others which are minute in comparison with the stock, especially such as grow upon trees, produce no appreciable injury. Although the nature of the pericarp of plants seldom forms a part of their ordinal distinctions, yet it is here employed—for this reason, that the viscidity of the fruit and the parasitical habits of the order are dependent on each other. The seeds sticking by their own glue to the branches on which they fall ensure to the young parasite, when it begins to grow, a suitable substance in which to push its roots; and as the viscidity of the fruit causes the greater part of it to catch upon branches before it falls to the ground, the young plant would die immediately after germination, if it were not a parasite, and thus the race would become extinct.

Mr. Griffith has shown (*Linn. Trans.*, xviii. 71) that in Loranthus and Viscum the ovules are not formed till after impregnation has taken place, a most curious and before unheard-of fact.

LORCA, a town of Spain in the province of Murcia, in the diocese of Carthagena, is built on the north slope of the Sierra de Caño, 40 miles west of Carthagena. It has an old castle, a collegiate church, besides other churches and convents, a royal college, an episcopal palace, two hospitals, several 'alamedas,' or public walks, planted with fine trees, and, according to Miñano, 40,000 inhabitants. It has manufactories of saltpetre, woollen and linen cloths, thread, and lace. The territory of Lorca is very fertile, especially in corn, but part of it suffers from drought. Various means have been tried to supply the deficiency of water, but they have failed through bad management and the political convulsions of the country. (Miñano, *Diccionario Geografico de España*.)

LORD ADVOCATE OF SCOTLAND. This is the peculiar appellation of the attorney-general, or senior standing counsel for the crown, learned in the law, in Scotland. The regular series of such officers cannot be carried to an earlier date than the end of the fifteenth century. Previous to that time, indictments before the lord-justiciar of Scotland seem to have been under the charge and superintendance of the clerk of court, or justice clerk, as he was termed [JUSTICE CLERK]; and for prosecutions before the high court of parliament, we find sometimes the chancellor, sometimes the clerk register, and at other times a special counsel for the crown appointed.

The earliest standing 'Advocate,' and with whom the series properly begins, was Sir John de Ross of Mountgreenan, in the county of Ayr, an individual well known both in the politics and literature of his time: he is one of the Scottish poets commemorated by Dunbar. On the fall of Henryson and Lawson on the fatal field of Flodden, Wishart of Pittarrow was made both king's advocate and justice-clerk; but afterwards those offices were again separated, and when the Court of Session was erected in the beginning of the sixteenth century, Sir Adam Otterburn of Auldhame was king's advocate. On that occasion he was not only privileged to plead within the bar, but actually nominated one of the judges of the court, or a lord of session, as the king's treasurer and justice-clerk likewise were. It was from this circumstance he acquired the style of Lord Advocate, an appellation which occurs in the years 1573 and 1576 (Pitcairn's *Criminal Trials*), and was the fixed designation in 1587. (See the statute, 1587, c. 115.) This was in the time of David M'Gill of Rankielor; and before M'Gill had long left the office, it had the additional style of 'Right Honourable.' (See Act of Sederunt, 17th Nov.,

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[*] Kalkstein im Orenburger Gouvt. Dr Hermann Von Meyer places a note of interrogation after 'Tertiär.'

[†] By Giorna to designate a genus of Acanthopterygious fishes.

1610.) It was however in the time of Sir Thomas Hope (founder of the noble family of Hopetoun, and others) that the office acquired the vast political importance which has in modern times belonged to it. This arose not less from the subtle and ambitious character of that famous person, than from the circumstance of the king's removal to the throne of England, and the consequent remoteness of Scotland from the immediate seat of government.

In M'Gill's time the yearly salary attached to the office was 40*l*. When Hope was appointed in 1628, he had 200*l*. a year; and in the end of last century it was 1500*l*.

It is difficult to define the powers and duties of the lord advocate; they are said to be indefinable. The most prominent however is that of public prosecutor; and in this capacity he has, besides the solicitor-general, four standing deputies of his own appointment, who retire with him on a change of ministry. These deputies assist him in the Court of Justiciary, and are despatched by him to the several circuits of that court to prosecute indictments there. He has also a deputy in the Court of Exchequer; and a deputy or occasional substitute to conduct prosecutions before the sheriff of Edinburgh, or other county court. Every county court has indeed a 'procurator fiscal,' whose duty it is to sue on behalf of the crown in his county; but that officer is not yet placed on a proper footing, being neither of the bar, nor named by the crown or the lord advocate.

LORD-KEEPER (Custos magni Sigilli), an antient officer of the crown, who had the custody of the king's great seal, with authority to affix it to public documents, some of the most important of which have no force till they have been authenticated in this formal manner.

Until the reign of Henry III. the office of keeper of the great seal appears to have been distinct from that of chancellor, and generally subordinate to it. The chancellor, as a high judicial officer, was sworn at his entrance upon his duties, but the functions of the keeper being considered as chiefly ministerial, no oath appears to have been required from him. The chancellor was often elected by the baronage parliament, or great council of the nation, but the custody of the great seal was under the control of the king. The antient entries respecting the appointment of the chancellor generally are—A. B. Cancellarius (or in Cancellarium) Angliæ electus, or a baronagio, or in pleno parliamento, or per regem et parliamentum, constitutus est. Records of the reign of Henry I. and John show that both offices were held simultaneously by different persons under those princes. Sometimes the offices were united in one individual, who was thus both judge and minister. In the 11th year of Henry III., Ralph Nevill was appointed by parliament chancellor for life; and two years afterwards he received the custody of the great seal from the king. In 22 Henry III. the great seal was forcibly taken from Nevill by the king, who delivered it to two persons, Geoffrey the Templar and John Lexington; but as Nevill could not be deprived of his judicial authority by the crown, he continued to hold the office of chancellor until his death. But the great seal was under the control of the chancellor; and when Henry III. demanded it from the bishop of Chester, his chancellor, he answered, that having received the seal by the common council of the realm, he could not resign it to any one without the like common consent. It was matter of complaint against Henry III. that in 1261 he appointed Walter de Merton to be chancellor, 'inconsulto baronagio,' or without the consent of the baronage. In the following year he appears to have removed Hugh le Despencer the chief-justice, and Nicholas de Ely the chancellor, appointed by the barons.

Edward I. took the great seal with him into Flanders, and afterwards into Gascony, leaving his chancellor in England with a temporary seal: and in 6 Edward I. the bishop of Bath and Wells, the chancellor, on going abroad left the great seal in the custody of Sir John de Kirby, with an injunction to despatch the business of the chancelly in his absence. The chancellor cannot now make a deputy, or, as he was formerly called, a lieutenant. In 16 Edw. I., Ayremin, master of the rolls, and his companions, were keepers of the great seal; Burnell, bishop of Bath and Wells, being at the same time chancellor. Among the restrictions imposed on Edward II., in the fifth year of his reign, by the ordeinours elected by the barons and commons in parliament, it was provided that the king should appoint the chancellor and certain other great officers by the advice and assent of his baronage, and in parliament. This seems to have been the last interference with the royal authority over the appointment of chancellor until the time of the Long Parliament. In the more vigorous reign of Edward III. we find by the parliament roll that in 1343 the commons prayed that no alien might be made chancellor, but the king answered, that he could appoint whom he would. In 3 Richard II. the Commons prayed that the chancellor, treasurer, keeper of the great seal, chief chamberlain, and steward of the king's household might be appointed in that parliament. Henry V. had two great seals, one of gold, which he delivered to the bishop of Durham, making him *lord chancellor* of England, and another of silver, which he delivered to the bishop of London to *keep*. The statute of 31 Henry VIII., c. 10, assigned the same rank to the lord chancellor and the lord-keeper, giving to the person holding the one office or the other precedence over all lay peers except those of the blood royal; and in 5 Elizabeth, Sir Nicolas Bacon, lord-keeper, procured an act to be passed (c. 18), which, after reciting that some question had *of late* arisen whether like place, authority, pre-eminence, jurisdiction, and power belonged to the office of lord-keeper of the great seal of England, as belonged to the office of lord-chancellor of England, declares that the keeper of the great seal has always had, used, and executed the same place, authority, pre-eminence, jurisdiction, execution of laws, and all other customs, commodities, and advantages as the lord-chancellor.

Notwithstanding these two statutes the appointment of lord-keeper appears not to have stood so high in the estimation of the public as that of chancellor; and the great seal has been generally delivered with the latter title.

Upon the rupture between Charles I. and his parliament the king took the great seal to Oxford, upon which a new seal was ordered to be made by the parliament. This measure was the subject of severe reproaches from the royalists; though unless the parliament were prepared to submit unconditionally to the king, it is difficult to say how any other course could have been adopted.

(Matth. Paris; *Parliament Rolls*; Coke's 4th *Inst.*; Bohun's *Cursus Cancell.*)

The power and duties of the lord-keeper, as identified with the chancellor, have already been stated. [CHANCELLOR; CHANCERY.]

LORD-LIEUTENANT. It was formerly usual for the crown, from time to time, to issue commissions of array, requiring certain experienced persons to muster and array the inhabitants of the counties to which such commissioners were sent. They were directed to put into military order those who were capable of performing military service, and to distrain such as were not qualified to serve, but were possessed of real or personal property, to furnish armour to their more vigorous countrymen; and they were to erect beacons where necessary. The form of these commissions, after much complaint, was settled by statute, and may be seen at length in the Parliament-rolls of 5 Hen. IV., 1403-4, vol. iii., p. 527.

In the 16th century these commissions of array appear to have generally given place to commissions of lieutenancy, by which nearly the same powers as those of the old commissions of array were conferred on certain persons as standing representatives of the crown for keeping the counties for which they were appointed in military order. In 1545 a commission 'de arraiatione et capitaneo generali contra Francos' issued to the duke of Norfolk, constituting him the king's *lieutenant*, and captain-general of all captains, vice-captains, men-at-arms, armed men, archers, and all others retained or to be retained against the French, in the counties of Essex, Suffolk, Norfolk, Hertford, Cambridge, Huntingdon, Lincoln, Rutland, Warwick, Northampton, Leicester, and Bedford. A similar commission issued to the duke of Suffolk for the counties of Kent, Sussex, Surrey, Hants, Wilts, Berks, Oxford, Middlesex, Bucks, Worcester, and Hereford, and London; and to John Russell, knight, Lord Russell, keeper of the privy seal, for the counties of Dorset, Somerset, Devon, Cornwall, and Gloucester. (Rymer.)

These officers are however spoken of by Camden, in the reign of Elizabeth, as extraordinary magistrates, constituted only in times of difficulty and danger, which was the case with commissioners of array, as appears from the recitals in their commission.

The right of the crown to issue commissions of lieutenancy was denied by the Long Parliament, and this question formed the proximate cause of the rupture between Charles I. and his subjects. Upon the Restoration the right of the crown to issue such commissions was established by a declaratory act, 14 Charles II., cap. 3.

The authorities and duties of the lord-lieutenant and of his temporary vice-lieutenants, and of his permanent deputy-lieutenants, have latterly been fixed and regulated by the militia acts. [MILITIA.]

LORD OF MISRULE, the master of the revels at Christmas in any nobleman's or other great house. 'First in the feast of Christmas,' says Stowe (*Surv. of Lond.*, edit. 1603, p. 98), 'there was in the king's house, wheresoever he was lodged, a Lord of Misrule, or master of merry disports, and the like had ye in the house of every nobleman of honor or good worship, were he spiritual or temporal: amongst the which the mayor of London, and either of the sheriffs, had their several Lords of Misrule, ever contending, without quarrel or offence, who should make the rarest pastimes to delight the beholders. These lords, beginning their rule on Alhallow-eve, continued the same till the morrow after the Feast of the Purification, commonly called Candlemas-day: in all which space there were fine and subtle disguisings, masks, and mummeries, with playing at cards for counters, nailes, and points in every house, more for pastimes than for gain.'

This Lord of Misrule, or revel-master, was sometimes termed a Christmas prince. Warton, in his 'History of English Poetry,' tells us that in an original draught of the statutes of Trinity College at Cambridge, founded in 1546, one of the chapters is entitled, 'De præfecto Ludorum, qui *Imperator* dicitur,' under whose direction and authority Latin comedies and tragedies are to be exhibited in the hall at Christmas; as also 'sex spectacula,' or as many dialogues. With regard to the peculiar business and office of Imperator, it is ordered that one of the Masters of Arts shall be placed over the juniors every Christmas, for the regulation of their games and diversions at that season of festivity. His sovereignty was to last during the twelve days of Christmas, and he was to exercise the same power on Candlemas-day. His fee was forty shillings. In an audit-book of Trinity College in Oxford, for the year 1559, Mr. Warton found a disbursement 'pro prandio *Principis Natalicii*.' A Christmas Prince or Lord of Misrule, he adds, corresponding to the Imperator at Cambridge, was a common temporary magistrate in the colleges at Oxford.

In Scotland, where the Reformation took a more severe and gloomy turn than in England, the 'Abbot of Unreason,' as he was there called, and other festive characters, were suppressed by the legislature as early as 1555. At Rodez, the capital of the province of Rovergne in France, previous to the Revolution, they had an 'Abbé de la Malgouverné,' who corresponded exactly with our Lord of Misrule.

After 1640 we hear nothing of the Lord of Misrule in England.

(Warton's *Hist. Engl. Poetry*, vol. ii., p. 378; Brand's *Popular Antiq.*, vol. i., p. 387-393; Nares's *Glossary*.)

LORDS, HOUSE OF,—one of the two assemblies which form together the Parliament of the United Kingdom. [PARLIAMENT.] The other is the House of Commons, which consists of persons who are elected from time to time to represent the people at large. [COMMONS, HOUSE OF.]

The persons who sit in the House of Lords are of two classes: 1, Lords Spiritual; 2, Lords Temporal.

The Lords Spiritual are the two archbishops and twenty-four bishops of the English Church, and one archbishop and three bishops of the Irish prelacy. Before the reformation of religion, when the monastic establishments which abounded in England were suppressed, the superiors of many of them, under the names of abbots and priors, sat as Lords Spiritual in this assembly. In those times the Lords Spiritual equalled, if they did not outnumber, the Lords Temporal who sat at any given time in Parliament; though now they form but about one-thirteenth of the persons composing this assembly. Six more bishops were added when the abbots and priors were removed.

The Lords Temporal are all the peers of England, being of full age, and not incapacitated by mental imbecility; sixteen representative peers of the Scottish peerage, and twenty-eight representatives of the Irish peerage. The number of the two last-named portions is fixed; but the number of peers of England sitting in the house is perpetually varying, and depends upon the casualties of minorities, and on the will of the king, who has an unrestricted power of increasing the number of peers.

The Scottish representative peers were introduced at the Union in 1707; and the Irish representative peers at the Union with that country in 1800.

The component parts of this assembly admit of being represented thus:—1. Persons sitting there in respect of offices held by them. Such are the spiritual lords of England. 2. Persons who sit in right of inheritance of a dignity of peerage. 3. Persons who have been created peers. 4. Hereditary peers of Scotland (for there can be no creation of peers of that part of the United Kingdom) elected by the whole body of the Scottish peerage to represent them in parliament, at the beginning of every parliament. 5. Hereditary or created peers of Ireland, elected by the whole body of the Irish peerage, and sitting for life, vacancies being supplied as they occur. And 6. Spiritual lords of Ireland, who sit in turns according to a cycle established at the Union. The great body of the house however consists of hereditary Lords Temporal of England, under the several denominations of dukes, marquisses, earls, viscounts, and barons. Each of the individuals of these ranks has an equal vote with the rest; but they are seated in the house in classes, and according to their precedency.

The only material changes which have been made in the constitution of this assembly in the long period of its existence have been: 1. The supposed limitation of the right of all holding lands in chief of the crown to sit therein, by King Henry III. after the battle of Evesham. 2. The removal from it of representatives of the counties, cities, and boroughs, who are supposed to have formerly sat with the lords, and the placing them in a distinct assembly, called the House of Commons. 3. The reduction in the number of the Lords Spiritual, by the suppression of the monastic establishments. 4. The introduction of the Scottish representative peers. And 5. The introduction of the Irish bishops and the Irish representative peers.

This house may be traced to the very beginning of anything like an English constitution. It is in fact the *magnum concilium* of the early chronicles. The bishops are sometimes said to sit there in virtue of baronies annexed to their respective offices; but it is questionable whether baronies are attached to the bishoprics of the new creation by Henry VIII.: and at best it is but a legal fiction, it being evident from the whole course of history that the bishops formed, as such, a constituent part of such assemblies in the Saxon times, and were, as such, among the chief advisers of the sovereign. One of the last acts of king Charles I., before he finally left London and disconnected himself from the Parliament, was to give the royal assent to a bill for removing the bishops from Parliament.

A question has been raised whether as the Lords Spiritual and the Lords Temporal, though sitting together, form two distinct *estates* of the realm, the concurrence of both is not requisite in any determination of this house, just as the consent of the two houses of Parliament is necessary to every determination of Parliament. But it is now understood that the Lords Spiritual and Lords Temporal are but one body, whose joint will is to be collected by the gross majority of voices; and statutes have been made in the absence of all the Spiritual Lords.

The House of Lords has two distinct functions: the legislative and the judicial.

In its legislative character, every new law, and every change in the existing law, must have the consent of a majority of this house, as well as of a majority of the House of Commons.

In its judicial character, it is a court for the trial: 1. Of criminal cases on impeachment by the House of Commons; 2. Of peers on indictments found by a grand jury; 3. For the hearing and determining of appeals from decisions of the Court of Chancery; 4. For the hearing and determining of appeals on writs of error to reverse judgments in the Court of King's Bench; and 5. In hearing and determining appeals from the supreme courts in Ireland and Scotland. The house has the power to require the attendance of the judges to assist it in the discharge of its duties.

A few points in which the House of Lords differs from the lower house of Parliament remain to be noticed. In the chair of the house sits the lord high chancellor of England. When the king (or queen) goes to Parliament he takes the throne in the House of Lords, and the Commons are summoned to attend him there to receive the communication of his will and pleasure. The royal assent to bills, whether given by the king or queen in person, or by a commission appointed by the king or queen, is given in the House of Lords. All bills affecting in any way the rights and dignities of the peerage must originate in that house. The members of the House of Lords have a right of voting on any measure before the house by proxy, the proxy being a member of the house: and, lastly, they have the privilege of entering on the journals of the house their dissent from any measure which has received the sanction of the majority, with the reasons for that dissent. This is called their protest.

LORDSHIP. [Leet.]

LORE'TO, a town of the Papal state in the province of Macerata, near the coast of the Adriatic, 15 miles south by east of Ancona, celebrated for its sanctuary of the Virgin Mary, which is called 'La Santa Casa' (the holy house). It is an oblong quadrilateral building, the walls of which are of brick covered with cement, 40 feet long, about 20 wide, and 25 feet high: it contains only one room, with a door, a chimney, and a window. In a niche there is a statue of the Virgin made of cedar wood. The legend says that this was the dwelling of Mary at Nazareth, where it was often visited by the Christian pilgrims; that in the year 1291, after the Mussulmans took Ptolemais, the last hold of the Christians in Palestine, the house was lifted up and carried away by supernatural power to Dalmatia, where it rested on a hill near the sea-coast, between Tersactum and Fiume, of which district Nicolo Frangipani was the governor. The legend goes on to say that after remaining some time in Dalmatia, and being the object of public wonder and veneration, it was again removed by invisible hands, in December, 1294, and carried across the Adriatic to a hill near Recanati, on ground belonging to a woman of the name of Lauretta, a diminutive of Laura, from which the name of Loreto is derived. Further particulars concerning this tradition are given in the *Teatro Istorico della Santa Casa Nazarena della B Vergine Maria e sua ammirabile traslazione in Loreto*, by Martorelli, bishop of Montefeltro, 2 vols. folio, Rome, 1732, dedicated to Pope Clement XII. This legend has furnished Tasso with the subject of one of his finest lyrics, beginning with 'Ecco frà le tempeste e i fieri venti.' A splendid church was afterwards built round 'the holy house,' and embellished and enriched by successive popes, among others by Leo X., Clement VII., and Sixtus V. The town of Loreto, which is small but well built, and contains 6000 inhabitants, has grown round the sanctuary, which is annually visited by numerous pilgrims. A considerable trade is carried on in beads, rosaries, agni Dei, and other devotional ornaments. Loreto is a bishop's see. The once well-filled treasury of the church of Loreto was in great measure emptied by Pius VI. to enable him to satisfy the demands of the French in 1796. In the following year, when the French took Loreto, they found little to glean. The church and treasury have been again enriched since the Restoration by votive offerings of devotees. (Valéry, *Voyages en Italie*.)

LORENZO DE' MEDICI. [Medici.]

LORICA'RIA. [Cellariæa, vol. vi., p. 405.] The term *Loricaria* is also employed by Linnæus to designate a genus of *Malacopterygious Fishes*.

LORICA'RIA, a subdivision of the Linnæan genus Cellaria, proposed by Lamouroux. [Cellariæa.]

LORICA'TA, the name applied by Merrem and Fitzinger to the *Crocodiles*, *Emydosaurians* of De Blainville. [Crocodile, vol. viii., p. 162.]

LO'RIENT, a town and port of France, at the confluence of the Scorf and the Blavet, in the department of Morbihan, 266 miles west by south of Paris in a direct line, or 288 miles by the road through Alençon, Fougères, Rennes, and Ploërmel.

This town is of modern origin. In A.D. 1666 Louis XIV. granted permission to the French India Company to establish magazines and docks for building vessels on a part of the shore of Port Louis, the name given to the mouth of the Blavet. The establishment thus formed, which continued long in the possession of the company (now dissolved), is at present in the hands of government. From the company's establishment the place took the title of Port L'Orient (Port of the East). In A.D. 1720 the building of the town was commenced: in 1738 the inhabitants amounted to 14,000, in which year the town was incorporated. The India Company had previously established here their annual sale of Chinese and Indian commodities. In 1744 the town was fortified. During the long wars of the Revolution, the commerce and population of the town declined; but since the peace of 1815, commerce has been gradually resuming its former activity.

The town is well laid out, with wide, straight, well-paved, and clean streets: the houses are well built, and there are several pleasant promenades. The bridge over the Scorf, the quays, the theatre, and the covered meat and fish markets are the public buildings most entitled to notice. There is a public 'abattoir,' or slaughter-house. The port is on the east side of the town, from which it is walled off: its length is nearly 4000 feet; its breadth is nearly 2000 feet. The royal dockyard is one of the finest in the kingdom; there were, a few years since, slips for laying down fifteen vessels of war at a time, and the works then carrying on were expected to increase the number to thirty. Among the most remarkable objects connected with the dockyard are the machinery for fixing the masts; the basin for ships under repair; the block-manufactory, worked by steam; the arsenal; the lodgings for military convicts, of whom there are commonly 600; the handsome artillery barracks, capable of accommodating 1800 men; the school of naval artillery, with its library, museums, and drawing-hall; the apartments and gardens of the maritime prefect; and the offices of the various departments of the public service. There is a watch-tower, from which vessels can be discerned 30 miles out at sea.

The population of the commune of Lorient, at the beginning of the present century, was above 22,000; in 1826 it had sunk to little more than 15,000. In 1831 it was 18,322 (of whom 14,396 were in the town); in 1836 it was 18,975. There are some manufactures of hats, linens, braid, and pottery: the trade consists in the export, partly to the colonies, of wax, honey, salt, butter, corn, cattle, and manufactured goods. The sardine fishery is actively carried on. There are three yearly fairs.

About a mile from the arsenal, on the bank of the Scorf, is a powder-magazine; and a mile west, an exercise-ground for the artillery. An hospital has lately been erected on the Island of St. Michel, in the roadstead.

There are in Lorient a subordinate court of justice, custom-house, and stamp and other government-offices; a high school; an establishment for the special instruction of students destined for the navy, or for the great schools of Forestière and St. Cyr and the Polytechnic School; an agricultural society; a society for affording gratuitous instruction in practical geometry and mechanics; a free-school for arithmetic and geometry; a free-school on the monitorial system; and six elementary schools. There are also a well-arranged and well-ventilated prison, and a civil and military hospital, besides that on the Island of St. Michel. The fortifications of this town are in tolerable condition. The environs are exceedingly well cultivated.

Lorient is the capital of an arrondissement, containing an area of 772 square miles: it is subdivided into eleven cantons, or districts, each under a justice of the peace, and 48 communes: the arrondissement had a population, in 1831, of 128,458; in 1836, of 133,307.

LO'RIPES. [Veneridæ.]

LORIS. [Lemuridæ; Nycticebus; Stenops.]

LORN is a district of Argyleshire, bounded on the east and north-east by Loch Linnhe and the Atlantic Ocean; on the south and south-west by Lochs Melfort, Aich, and Awe, and by the district of Argyle; on the west by Perthshire, and on the north by the shire of Inverness, from which it is separated by Loch Leven. It is divided into Upper or Northern Lorn, Nether or Southern Lorn, and Mid Lorn, and lies between 56° 18′ and 56° 42′ N. lat., and between 4° 35′ and 5° 37′ W. long., comprising the 13 parishes of Appin, Andchattan, Dalavich, Glenorchy, Kilbrandon, Kilbride, Kilchattan, Kilchrenen, Kilmelford, Kilmore, Kilninver, Lismore (island), and Muckairn. The above boundary, which differs considerably from that given by several topographers (some of whom make Loch Etive one of the boundaries), is taken from Langland's large map of Argyleshire, published in 1801. The parishes comprised in the district are those enumerated in the Population Returns.

LORRAINE, a province or military government of France before the Revolution, situated on the north-eastern frontier. It was bounded on the north by the duchy of Luxembourg and the electorate of Trèves; on the north-east by the duchy of Deux Ponts, in the Palatinate; on the east by Alsace, from which it was separated by the Vosges; on the south by Franche Comté; on the south-west by the county of Langres in Champagne; and on the west by other districts of Champagne. The length of the province was about 115 miles from north to south; its breadth from east to west 130 miles in the northern and about 70 miles in the southern part. It area was about 6730 square miles. It was watered in the west by some of the feeders of the Aisne and Marne, belonging to the system of the Seine, and by the Meuse; on the east by the Moselle and its tributaries.

Lorraine, in the extended application of the name, corresponding with the bounds and dimensions given above, comprehended the following divisions:—

Larger Divisions.	Subdivisions.	Chief Towns, with population in 1836.
I. The Duchy of Lorraine, containing	1. La Lorraine Propre .	Nanci, 31,445; Lunéville, 12,798.
	2. La Lorraine Allemande, or German Lorraine . . .	Sarreguemines, 4113.
	3. Le Pays des Vosges .	Epinal, 9526; Mirecourt, 5684; Remiremont, 5055; St. Diey, 7906.
II. The Duchy of Bar, or Le Barrois, containing	1. Le Barrois Mouvant	Bar sur Ornain, or Bar le Duc, 12,496 in 1831.
	2. Le Barrois non Mouvant	Briey, 1730.
III. The three Bishoprics, containing	1. Le Pays Messin .	Metz, 42,793.
	2. Le Toulois . . .	Toul, 7333.
	3. Le Verdunois . .	Verdun, 10,577.

A small portion of La Lorraine Allemande was ceded by France to Prussia by the treaty of Vienna, 1815, and has been incorporated in the Rhenish Provinces of that kingdom. The remainder constitutes the departments of MEURTHE, MEUSE, MOSELLE, and VOSGES.

At the time of the Roman Conquest of Gaul under Cæsar, Lorraine was inhabited by the Treveri, or Treviri, the Mediomatrici, the Verodunenses, and the Leuci, all Belgic tribes, whose country, in the subdivision of the Roman province, or, as it was termed in the later period of the Empire, the diocese of Gaul, formed the province of Belgica Prima. This part of Gaul was comprehended in the earlier conquests of Clovis, to whom all France north of the Loire and the Rhône became subject by the close of the fifth century.

In the division of the Frankish empire under the sons of Clovis, Lorraine formed part of the kingdom of Austrasia. In this kingdom the power of the Franks was greater and the military habits of the people were more firmly retained than in other parts of France. It was in this part of France that the Carlovingian family first rose to power under Pepin l'Heristal and Charles Martel.

In the division of the empire of Charlemagne between the children of his son and successor Louis le Debonnaire, that part of France which lies east of the Meuse, the Saône, and the Rhône, became, with other countries as far as the Rhine, and with Italy and Switzerland, the portion of the emperor Lothaire (A.D. 843). In the partition of this prince's dominions, the northern part, comprising the country between the Rhine and the Meuse, was assigned to his son Lothaire the younger. From one or both of these princes the country took the name of the France of Lothaire, in Low Latin Lotharingia, whence the German name Lothringen, and the French Lothierregne and Lorraine. This kingdom existed for a long period, and was united with the imperial crown, so that eastern France became a portion of the empire.

The duchy of Lorraine consisted of a large part of the kingdom of Lorraine. It was established in the tenth century, and was afterwards divided into two parts, Lower Lorraine or Brabant, and Upper Lorraine, which has retained its designation to modern times. The duchy of Upper Lorraine was in the eleventh century conferred by the emperor on Gérard, a noble of Alsace. From this Gérard descended the long line of the dukes of Lorraine who governed the country till towards the middle of the last century. The reigns of Gérard's successors were chiefly occupied with civil dissensions, in which they were engaged with their subject nobility and ecclesiastics. Simon II., who was duke from A.D. 1176 to A.D. 1205, distinguished himself by the repression of internal disorders, and by the protection of the churches and of the poor from the aggressions of the rich. He expelled the Jews from his dominions. He abdicated his duchy to retire to a cloister, where he died shortly after, A.D. 1207. The county, afterwards duchy of Bar, was separated from the duchy of Lorraine in the eleventh century. In the following centuries the dukes were continually engaged in hostilities, either as vassals of the emperors of Germany (who were possessors of the antient kingdom of Lorraine), or on their own account with other potentates, or with the more powerful of their own vassals, especially the bishops of Metz. The connexion of the dukes with France, under the crown of which they held some fiefs, involved them also in the disputes, foreign and domestic, of that kingdom. Raoul, duke of Lorraine, was one of those who fell in the battle of Creci, A.D. 1346, fighting with Philippe of Valois against the English; and Jéan, his son and successor, a mere boy, was taken prisoner after distinguishing himself by his valour at the battle of Poitiers, A.D. 1346. He was again taken prisoner, A.D. 1364, at the battle of Auray in Bretagne, in which Charles de Blois was defeated and slain by Jéan de Montfort, his rival claimant for that duchy. [BRETAGNE.] The duke Jéan of Lorraine was also present at the battle of Rosbecque, in which Charles VI. of France defeated the Flemings (A.D. 1382): he died A.D. 1390.

On the death of Charles le Hardi, the successor of Jéan in the duchy of Lorraine, the succession was disputed by René I., duke of Bar and of Anjou, and Antoine de Vaudemont, nephew of Charles. In the war that ensued René was defeated and taken prisoner (A.D. 1431) by his rival, who was supported by the duke of Bourgogne, while René had the assistance of Charles VII. of France. René ultimately obtained his liberty (A.D. 1436), and set out for Naples, the crown of which had fallen to him during his captivity. Lorraine had been confirmed to him by the decision both of the emperor Sigismund and of the council of Bâle. The life of René was busy. In A.D. 1453, long before his death, he resigned the duchy of Lorraine to his eldest son Jéan, duke of Calabria, who joined in the 'Ligue du Bien Public' against Louis XI. of France (A.D. 1464), and died (A.D. 1470) at Barcelona in an attempt to vindicate his claim to the crown of Aragon. He was succeeded by his son Nicholas, on whose death (A.D. 1473) Lorraine came to René II., grandson, on his mother's side, of René I., and on his father's side, of Antoine, duke of Bar, who had been René's competitor. René II. was seized by Charles le Téméraire, duke of Bourgogne [BOURGOGNE], together with his mother Yolande, almost immediately on his (René's) accession to the duchy, and though released by the interference of Louis XI., was obliged to make an alliance, offensive and defensive, with Charles. Charles soon afterwards again attacked Lorraine, took the capital (Nanci) and other towns, and obtained possession of the whole duchy. The defeat of Charles by the Swiss at Granson (March, 1476) revived the hopes of René. He assisted the Swiss with a body of troops in their second victory over Charles at Morat, in June in the same year; and returning to Lorraine, rapidly reconquered it. Nanci surrendered to him in October; and upon Charles leading an army in the ensuing winter, to recapture the town, he was defeated and slain by René (January, 1477). René subsequently distinguished himself in the wars of Italy; and obtained of Charles VIII. of France the restoration of the duchy of Bar, which had been seized by Louis XI. René died A.D. 1508.

Antoine, the successor of René II. (A.D. 1508), seems to have merited, by his care to promote the happiness of his subjects, the title which he received of '*the Good*.' His reign is chiefly remarkable for his struggle against the peasants of Alsace, whom the excitement of the Reformation induced to rise in vindication of their liberty, but who failed in their attempt; and for the declaration of Lorraine as a free and independent sovereignty by the Germanic body. In the wars of the emperor Charles V. with François I. of France, Antoine preserved a wise neutrality. He died A.D. 1544, and was succeeded by his son François I. The duchy of Lorraine, which thus took rank among the sovereign states of Europe, was not co-extensive with the French province of Lorraine, of which it subsequently constituted only a subdivision, as noticed in the preceding geographical sketch.

François I. reigned only a year. He was succeeded by his son Charles II. (or III.), who during the long period in which he held the duchy (A.D. 1545-1608) did much for its improvement: he acquired regal rights over that part of the duchy of Bar which he held as vassal of the king of France, reserving only the homage due to the latter and the right of appeal. Duke Charles founded a university at Pont à Mousson. He supported the party of the League in France, at the head of which were his kinsmen the princes of the house of Guise. [GUISE.]

Henri II., François II., and Charles III. (or IV.) successively occupied the ducal throne. Charles III. (or IV.) was involved in hostilities with Louis XIII. of France, by whom the duchy was in great part conquered. Duke Charles distinguished himself in the thirty years' war in Germany, and was one of the commanders in the army of the Catholic League at the battle of Nordlingen, A.D. 1634. The treaty of the Pyrenees restored Lorraine to him; and subsequent negotiations (A.D. 1661) with cardinal Mazarin secured also the restitution of the duchy of Bar. The other districts which subsequently made up the province of Lorraine were then in the hands of the French king; and Charles agreed that on his death the whole of his states should fall to the crown of France. But the duke, suspicious of the designs or apprehensive of the power of France, renounced his independent sovereignty, and renewed his allegiance to the emperor. And when, in A.D. 1670, Louis XIV. seized his dominions, an imperial ambassador was sent to Paris to claim exemption from hostilities for them as part of the empire. After two or three years spent in negotiations, hostilities became general on the Continent, and Duke Charles distinguished himself in the imperial service on several occasions, till his death, A.D. 1675. His restless, unquiet, and versatile character had involved him in continual difficulties. He was succeeded by his nephew Charles IV. (or V.), also a distinguished military commander. Finding himself (A.D. 1677) at the head of an army of 60,000 imperialists, he attempted to regain possession of Lorraine, but was baffled by the skill of the French Maréchal Crequi, who had only 30,000 men. At the treaty of Nimeguen, A.D. 1678, the restitution of Lorraine was offered to him, but on conditions which he refused to accept. He distinguished himself afterwards at the head of the imperialists in Hungary against the Turks, and aided Sobieski in the deliverance of Vienna (A.D. 1683). He died A.D. 1690.

Leopold, the successor of Charles, obtained restitution of his states by the treaty of Ryswick, A.D. 1697. He observed neutrality in the war of the Spanish succession, and devoted himself to the improvement of his dominions. He died A.D. 1729, and was succeeded by his eldest son François Etienne, who in 1735 acquiesced in a treaty between France and the empire, by which his duchy was ceded to Stanislaus Leckzinski, ex-king of Poland, whose daughter had been married to Louis XV. of France. It was further agreed that on the death of Stanislaus the duchy should be united to France. François Etienne, who married, the following year, the archduchess Maria Theresa, and was afterwards (A.D. 1745) elected to the imperial crown, received the reversion of Tuscany in exchange for Lorraine. Stanislaus was recognised as duke of Lorraine and Bar, A.D. 1737. He governed the country with wisdom and beneficence, encouraged agriculture and trade, managed his finances with economy, and founded, for the cultivation of science, the Académie of Nanci, of which he became a member. His robe de chambre having accidentally taken fire, he was so severely burned that he died eighteen days after, on the 23rd February, 1766, aged eighty-nine. On his death Lorraine was incorporated with France, to which it has ever since remained attached.

LORRAINE, CARDINAL DE. [GUISE.]

LORY. [PSITTACIDÆ.]

LÖSS, a peculiar loamy deposit in the valley of the Rhine, and extending to some breadth beyond that area, which may be conjectured to be analogous with accumulations in valleys of South America containing the megatherium, and with other 'valley formations' in different parts of the world. It borders the valley plain of the Rhine, reaching, though not continuously, from Schaffhausen to Cologne, enters many of the lateral dales, lies against the hills, and constitutes hills itself. In the line between Basle and Bingen it occupies the left bank by Worms, Oppenheim, Flonheim, &c., and the right bank by the Schwarzwald to Basle. Compared to the usual character of diluvium, the Löss is a fine-grained deposit; fine sand, clay, and calcareous earth, easily pulverized, and containing some nodular concretions, constitute the mass of the deposit. It sometimes (at Heidelberg) alternates with gravel.

Principally in the upper parts of the Löss are found shells of land, fresh-water, and marsh mollusca now living in the vicinity. These sometimes retain their colour. Bones and teeth of quadrupeds usually met with in diluvium occur locally in Löss, as at Weinheim and Bensheim. These bones appear sometimes to have been drifted to their present repositories, as at Rixheim, where upon and in cavities in the fresh-water tertiaries bones of stag, rhinoceros, hyæna, elephant, horse, &c. occurred. Cannstadt yielded bones and teeth of elephant, rhinoceros, tiger, hyæna, wolf, bear, stag, roebuck, oxen, horses, boar, mouse, hare, birds, and remains of vegetables. (Meyer, *Palæologica.*)

Between Strasburg and Sulzbad the Löss reaches 600 French feet above the sea, and on the Kaiserstuhl 1200 feet, an elevation supposed to be explained by the volcanic character of the vicinity. The thickness of the Löss is stated to reach 200 or even 300 feet. Near Andernach, Löss alternates with volcanic sediments ('Trass'), but generally overlies them, and in places fills old craters (as the Roderberg, near Bonn).

The deposition of Löss in the upper Rheinthal has been often viewed as the effect of a lake supposed to have extended from Basle to Mayence, and to have been drained by the opening of the narrow gorge at Bingen; but from the continuation of this deposit below that gorge, the elevation it has attained on the flanks of the Siebengebirge, and other circumstances, Mr. Lyell, who has specially examined the subject, proposes a different hypothesis. He thinks that the whole country drained by the Rhine has undergone changes of level, such that after having formerly stood for some unknown period with nearly its actual height and physical features, it experienced a great and general depression, so as to receive river deposits in great abundance: and that it was again raised, so as to permit the partial re-excavation of the antient valleys, and the removal of much of the fluviatile sediments: what remains is the Löss.

(Meyer, *Palæologica;* Lyell, in *Edinb. Phil. Journal,* 1834; and *Principles of Geology,* last edition, vol. iv.)

LOSTWITHIEL. [CORNWALL.]

LOT, a river in France, belonging to the system of the Garonne. [FRANCE; GARONNE.] It rises on the north-western slope of the Cévennes, not far from Mount Lozère. Its general direction is west, past Mende, Espalion, Cahors, and Villeneuve d'Agen, into the Garonne, which it joins a few miles below Agen. Its length is about 220 miles; for 70 of which, viz. from Entraygues, a few miles below Espalion, it is navigable; but the navigation is difficult and dangerous, especially above Cahors, from the rocks which obstruct the current. Below Cahors the navigation is facilitated by several sluices.

The river is supposed to have been known to the Romans by the name of Oltis, which leads us to Olt as the old vernacular term, a name which also belongs to a small river of Lancashire and to a branch of the Danube. A town on the bank is still called St. Geniès de Rivedolt, or Rive d'Olt, and another is called St. Vincent de Rivedot (Rive d'Old). From the incorporation of the article (L'Olt), the modern name Lot has resulted.

LOT, a department of France traversed by the Lot, is bounded on the north by the department of Corrèze; on the north-east by that of Cantal; on the south-east by that of Aveyron; on the south by that of Tarn et Garonne; on the south-west by that of Lot et Garonne; and on the north-west by that of Dordogne. Its greatest length is from the neighbourhood of the town of Moncuq in the south-west to the bank of the Cère in the north-east, 68 miles; its greatest breadth, at right angles to the length, is from between the towns of Martel and L'Arche (Corrèze) to the neighbourhood of Figeac, 52 miles. The area is estimated at 2034 square miles, being about equal to that of the English county of Norfolk. The population in 1831 was 283,827; in 1836, 287,003, showing an increase in five years of 3176, or rather more than 1 per cent., and giving about 141 inhabitants to a square mile; considerably below the average density of population in France, and very far below that of the English county with which we have compared it. Cahors, the capital, is in 44° 26′ N. lat. and 1° 27′ E. long., 307 miles in a direct line south by west of Paris, or 370 miles by the road through Orléans, Châteauroux, and Limoges.

The department has no very lofty elevations; but hills of moderate height occupy a considerable part of its surface. The principal range is a branch from the central group of Auvergne: it enters the department on the eastern side, and extends through it westward into the adjacent department of Dordogne, separating the basin of the Dordogne from that of the Lot. The south-western part of the department, in the neighbourhood of Cahors, is occupied by the chalk formation; the southern and central parts by the strata which intervene between the chalk and the new red or saliferous sandstone; the eastern side by the formations from the saliferous sandstone (inclusive) to those which repose on the primitive rocks; and the north-eastern part of the department along the bank of the Cère by the primitive rocks. Among the mineral productions are coal and iron; but the whole quantity of coal produced in 1835 was only 60 tons: the iron-works are also unimportant. The hills afford granite, marble of various colours, alabaster, calcareous spar, and stone for millstones and lithography. Crucible-clay and fullers' earth are found in the valleys. There are several mineral springs. There are one or two remarkable caverns in the department; one near the bank of the Selle contains the fossil bones of animals not now found in Europe.

The northern side of the department is watered by the Dordogne, which first skirts the border for two or three miles, separating the department from that of Corrèze, and then flows through the department in a winding channel past the town of Souillac: after again skirting the border for two or three miles, it enters the department of Dordogne. The navigation commences at Mayronne. The southern part of the department is watered by the Lot, which, after dividing it for several miles from the department of Aveyron, crosses it in a very sinuous course from east to west into the department of Lot et Garonne. It is navigable throughout.

The navigation of the Dordogne in this department may be estimated at about fifteen miles; that of the Lot at about eighty-six. There are no canals.

The number of Routes Royales, or government roads, is only four: their aggregate length (Jan. 1, 1837) was 170 miles, of which 115 were in repair, 13 out of repair, and 42 unfinished. The principal roads are those from Paris by Orléans and Limoges to Cahors, and from Cahors to Montauban and Toulouse. These two roads form one line, which crosses the department from north to south. Other roads lead from Cahors eastward to Villefranche and Rodez (Aveyron), and westward along the banks of the Lot and the Garonne to Bordeaux (Gironde). The Routes Départementales were nineteen in number, with an aggregate length of nearly 400 miles, but not half of them were finished. The bye-roads and paths amount to between five and six thousand, with an aggregate of nearly 16,000 miles.

The soil of the department is chiefly calcareous, and nearly half of it is under the plough. More corn is raised than is required for home consumption; and fruit, hemp, tobacco, and saffron are grown. The vineyards occupy about a ninth part of the department: the export of wine is large, and the wines are in good repute, especially those of Cahors and Le Grand Constant. The white mulberry-tree is cultivated in almost all places, in order to the rearing of silkworms, which is much attended to. The woodlands are also extensive, occupying about one-sixth part of the department. The number of sheep reared is great, wool being an important object of attention to the farmer. Poultry, game, and truffles are abundant.

The department is divided into three arrondissements, as follows:—

Arrondissement.	Situation.	Area in Sq. Miles.	Population in 1831.	Population in 1836.	Communes.
Cahors,	S.	860	116,336	117,299	122
Figeac	N.E.	616	87,727	89,778	112
Gourdon	N.W.	558	79,764	79,926	66
		2034	283,827	287,003	300

There are twenty-nine cantons, or districts, each under a justice of the peace.

In the arrondissement of Cahors are Cahors (population in 1831, 10,818 town, 12,050 whole commune; in 1836, 12,417 commune) [CAHORS]; St. Cirq, Vers, La Roque-des-Arcs, Luzech, St. Vincent-de-Rivedot, Castlefranc, Belleye, Prayssac, Crezels, Puy-l'Evêque, and Duravel, on or near the Lot; Cabreres or Cabrerets, on the Celle, a feeder of the Lot; Concots, Beauregard, Lalbenque, Castelnau-de-Montratier (pop. 4053), and Moncuq, in the country south of the Lot; and Catus, St. Médard, Lherin, or Lherm, Les Arques, Cazals, Marmignac, Montelera, and Fressinet, or Fraissinet, in that part of the arrondissement which lies north of that river. Cabreres or Cabrerets is remarkable for a grotto with beautiful stalactites. Castlenau-de-Montratier is on a hill, the base of which is washed by the Latte or Lute, one of the streams flowing into the Garonne. It has some manufactures of coarse woollens for the clothing of the peasantry of the neighbourhood. The church was, before the Revolution, a collegiate church.

In the arrondissement of Figeac are Figeac and Marcillac, on the Celle; Bouillac, Capdenac or Cadenac, and Cajare, on the Lot; Cardaillac and Fons, on two small streams which unite and flow into the Celle; Brétonoux on the Cère, a feeder of the Dordogne; St. Céré on the Bave, that flows into the Cère; and Loubressac, Sousceyrac, and L'Hôpital. Figeac, capital of the arrondissement, owes its origin to a wealthy Benedictine abbey, founded in A.D. 755 by king Pepin le Bref, and afterwards secularized. Figeac was besieged A.D. 1568 by a powerful army of Huguenots; but the assailants, after three months, were obliged to raise the siege. They afterwards took the town by surprise, A.D. 1576, pillaged it, and put many of the Catholics to the sword. They erected a citadel, which was given up in A.D. 1622 to Louis XIII., who demolished it, as well as the fortifications of the city. There are two fine Gothic churches at Figeac. The population in 1831 was 4691 for the town, or 6390 for the whole commune; in 1836 it was 6237 for the commune. Some cotton manufactures are carried on, and there is considerable trade in wine and cattle. Coal is obtained in the neighbourhood, and there is a quarry of excellent freestone. Marcillac had formerly an abbey, the foundation of which was ascribed to Pepin le Bref. There is near the town a remarkable grotto, comprehending several apartments, with stalactites and stalagmites having the forms of columns and statues. Near Cajare are some caverns, denominated 'the Caverns of Waiffre,' from the circumstance of the adherents of Waiffre, duke of Aquitaine, having sought safety in these caverns, where they were discovered and massacred by the soldiers of Pepin le Bref. St. Céré (pop. 2905 town, 3987 whole commune) had, before the Revolution, two religious houses. Hempen cloth is manufactured here, and considerable trade is carried on in raw hemp and hempen thread. Good marble is quarried near the town. At the village of Assier, not far from the Celle, are the remains of a fine castle, built in the time of François I. by Galiot de Genouillac, one of his officers. There is also a church, the architecture of which is remarkable for its lightness.

In the arrondissement of Gourdon are Gourdon and Le Vigan, on the Bloue or Bleu, a small stream which flows into the Ceou, a feeder of the Dordogne; Carennac and Souillac, on the Dordogne; Martel in the country north of that river; Gramat and Rocamadour, on the Alzou, which flows into the Dordogne; Montfaucon, on the Ceou, a feeder of the Dordogne; Degagnac and Lavercantière. Gourdon is on a rising ground: the population in 1831 was 2813 for the town, or 5153 for the whole commune. In 1836 it was 5334 for the commune. There are some manufactures of woollen stuffs and sail-cloth. Coarse-grained granite is quarried in the neighbourhood. Souillac (pop. 2253 town, 3096 whole commune) has a parish church, formerly belonging to an antient Benedictine abbey, and a fine bridge of seven arches over the Dordogne, which is here navigable. There is a royal manufactory of fire-arms; coarse woollens and hats are manufactured; and trade is carried on in wine, leather, salt, and timber. There are near the town two remarkable intermitting springs, called Le Gourg and Le Bouley. Limestone and building-stone are quarried near Martel (pop. 1824 town, 2903 whole commune) and Gramat (pop. 1545 town, 3428 whole commune). Rocamadour had formerly a monastery, the church of which still exists; it was an object of resort to pilgrims, on account of the burial there of St. Amadour, whom some legendary fables confounded with Zaccheus the publican, mentioned in the gospel of St. Luke. Henry II. of England made a pilgrimage to this place: his son Henry was on his way to pillage the church when he died. A sword chained to the walls of this church is affirmed to be that of the chivalrous Roland. There is another church or chapel at Rocamadour cut out in the rock.

The chief manufactures of the department are woollen stuffs of various kinds, linens, and some silks. The chief trade in agricultural produce is corn, flour, wine, and walnut oil and hemp. These goods are sent to Cahors to be sent down the Lot, or to Souillac for embarkation on the Dordogne.

The department constitutes the diocese of Cahors, the bishop of which is a suffragan of the archbishop of Albi. It is in the jurisdiction of the Cour Royale of Agen, in the circuit of the Académie Universitaire of Cahors, and in the eleventh military division, the head-quarters of which are at Bordeaux. It sends five members to the Chamber of Deputies. In respect of education this department is far below the average of France. Of the young men enrolled in the military census of 1828-29, only twenty-four in a hundred could read and write, the average of France being thirty-nine.

In the time of Cæsar this department was part of the territory of the Cadurci, from whom its capital Cahors, originally Divona, derived its name. Uxellodunum, the last place in Gaul which held out against Cæsar, was probably a hill called Puech d'Issolu, on the bank of the Tourmente, a small feeder of the Dordogne in this department. Another town, Varadetum, mentioned in the Peutinger Table, was probably at or near Varaie, a village south of the Lot. Before the Revolution the country included in this department constituted the greater part of Querci or Quercy, a province of Guienne.

LOT ET GARONNE, a department of France, bounded on the north by that of Dordogne; on the north-east by that of Lot; on the south-east by that of Tarn et Garonne; on the south by that of Gers; on the south-west by that of Landes; and on the west and north-west by that of Gironde. Its greatest length is from north-east, near the little town of Sauveterre, to south-west on the border of the department of Landes, between Castel Jaloux (Lot et Garonne) and Roquefort (Landes) 66 miles; the greatest breadth, at right angles to the length, is from near the little town of Duras north west to the neighbourhood of Puymirol south-east, 54 miles. The area is estimated at 2057 square miles, rather less than the average area of the French departments, but rather more than that of the English county of Norfolk. The population in 1831 was 346,885; in 1836 it was 346,400, showing a decrease in five years of 485, and giving 168 inhabitants to a square mile; rather more than the average density of population in France, but not equal to the density of the population of the English county with which we have compared it. Agen, the capital, is on the Garonne, in 44° 12′ N. lat., 0° 36′ E. long., about 330 miles in a direct line south by west of Paris, or 369 miles by the road through Orléans, Limoges, and Perigueux.

The department has no elevations deserving the name of mountains: the hills which divide the valley of the Dordogne from that of the Lot occupy a small portion on the north-east; and the range of high land which, branching from the Pyrenees, divides the basin of the Adour from that of the Garonne, overspreads a small portion on the south-west. The surface of the department is generally undulating, and slopes gently towards the west. The department is wholly occupied by the strata above the chalk. Some iron is procured; and there are marl-pits and gypsum-quarries. Peat and potters' earth are also procured; the first in small quantity, the second abundantly.

The principal rivers are the Garonne, and its tributaries the Lot and the Baise. The Garonne enters the department from that of Tarn et Garonne on the south-east side, and runs west-north-west 27 miles to a little above the junction of the Baise, receiving the Saône on its left and the Gers on the right bank: it then runs 15 miles north by west to below Tonneins, receiving the Baise on the left and the Lot on the right bank: from below Tonneins it flows about 20 miles north-west into the department of Gironde. The length of that part of the river which is in this department may be estimated at 62 miles: the official returns make it 65. The Baise enters the department from that of Gers on the south side; and flows 17 miles north by west by Nérac (where it becomes navigable) to Lavardec; from thence it flows north-east and north 7 miles into the Garonne: its whole course in the department is 24 miles, for about half of which it is navigable. The Lot enters this department from that of Lot, on the eastern side: and flows in a winding course south-west 12 miles to the little town of Penne, where it receives the Bondusson on the left bank; from thence it flows west by north 12 miles to Chasseneuil; and from Chasseneuil 20 miles south-west to its junction with the Lot: its whole course in this department is about 44 miles (the official returns give 51), for the whole of which it is navigable. The Dropt, a tributary of the Garonne, waters the northern part of the department, in which it is navigable for about 16 miles; it unites with the Garonne in the adjacent department of Gironde. The total inland navigation of this department amounts, according to the official returns, to about 150 miles. There are no canals.

There were in 1837 six government roads, with an aggregate length of 223 miles, of which 38 miles were unfinished. The road from Paris by Limoges and Perigueux enters the department on the north and runs southward by Castillonnes, Villeneuve d'Agen, Agen and Astafort to Auch, in the department of Gers. Roads branch off from this at Villeneuve d'Agen by Libos and Fumel, along the bank of the Lot to Cahors (Lot); and from Agen by La Plume and La Monjoye to Condom (Gers). A road from Bordeaux to Toulouse by the bank of the Garonne passes through Bazeille, Marmande, Tonneins, Clairac, Aiguillon (where a road from Villeneuve d'Agen by Temple and La Fate falls into it), Port-Sainte-Marie, Clermont, and Agen (where it intersects the great road from Paris to Auch), into the department of Tarn et Garonne. A branch from this road at Port-Sainte-Marie leads by Lavardec and Nérac along the banks of the Baise to Auch.

The departmental roads were sixteen in number, having an aggregate length of above 270 miles, of which about 55 miles were out of repair, and nearly 100 miles unfinished. The bye-roads and pathways amounted to above nine thousand, with an aggregate length of nearly 8000 miles.

The valleys watered by the Lot and the Garonne are among the richest portions of the soil of France: but the western side of the department is occupied by those dreary wastes, or 'landes,' which overspread so large a portion of this part of France [Gironde; Landes]: they constitute about an eighth of the department. These districts, covered with dry and shifting sand, produce only a little rye or panic, and that by the aid of manure; they are covered in some places by pools and marshes; in other parts by forests of pines or cork-trees, which constitute an important part of the wealth of the department. The northern parts of the department are occupied by a ferruginous clay which yields but a poor return to the cultivator; and the hills between the Garonne and the Lot in the eastern part are little better. These comparatively unproductive soils extend over two-thirds of the department. The valleys of the Lot and Garonne compensate by their fertility for these barren tracts: they produce abundance of wheat, rye, barley, oats, and maize; so that the growth of corn in the department exceeds the consumption. Above half the soil is under the plough. Fruit-trees are numerous, especially plum-trees, which yield excellent prunes for exportation. The vineyards are extensive, and the produce is double the consumption. The wine is high-coloured and rich, well calculated for keeping and for bearing a sea voyage; but in other respects not of the best quality, except the red wines of Thésac, La Rocal, Buzet, and Péricard; and the white wines of Clairac and Aiguillon. Tobacco is cultivated on a large scale, and is the best grown in France; and hemp is of remarkably fine growth and excellent quality. The woods, consisting chiefly of pines, cork-trees, and chesnut-trees, occupy about an eighth of the department. There is a considerable quantity of meadow land, and the heaths and open pastures are tolerably extensive: the breed of oxen is good; and there are large flocks of sheep. Mules and asses are numerous, but horses are not so. Pigs have much increased of late years. Poultry also has been reared in increasing quantity, especially geese and turkeys, of which a great number are sent to other parts of France. Bees are numerous, also game and fish. The Garonne yields the salmon, the trout, and the lamprey, and even some sturgeons. There are wolves, foxes, rats, and moles.

The climate is considered to be one of the finest in France. There are however alternate periods of rain and clear weather of such length as frequently to injure the harvests. The winds are high, especially the north-west wind, which in summer frequently causes violent tempests. In the spring frequent fogs, accompanied with a light hoar frost, and followed by bright and intense sunshine, are very injurious to vegetation. The marshy exhalations of the landes give rise to dangerous bilious and intermittent fevers.

The department is divided into four arrondissements, as follows:—

Name.	Situation.	Area in sq. miles.	Population in 1831.	Population in 1836.	Communes.
Agen	S.E.	390	84,569	84,388	87
Marmande . . .	N.W.	547	104,068	104,172	103
Nérac	S.W.	524	60,661	60,879	78
Villeneuve d'Agen	N.E.	596	97,587	96,961	86
		2,057	346,885	346,400	354

The number of cantons, or districts, each under a justice of the peace, is thirty-five.

In the arrondissement of Agen are Agen, Aiguillon, Port-Sainte-Marie, and Clermont,on the Garonne; Granges on the Lot; Puymirol on and Saint Maurin near the Saône; Beauville and La Sauvetat de Sauvères on the Senne, a feeder of that river; Astafort and Layrac on the Gers; La Roque-Timbaut, Castelautier and Prayssas in the country north of the Garonne; and La Plume, Moirax, Caudecoste, and Cuq, in the country south of the Garonne.

Agen is on the right bank of the Garonne. It is mentioned by Ptolemy, who makes it the capital of the Nitiobriges, a Celtic tribe: it is mentioned also in the Itinerary of Antoninus, in Ausonius, in the Notitia Imperii, and in the Peutinger Table: its Latin name was Aginnum or Agennum. Few towns suffered more severely in the irruption of the barbarous tribes that overthrew the Roman Empire, or in the troubled ages which followed. It was pillaged by Goths, Vandals, Alans, Suevi, and Burgundians; and at a later time by Saracens and Northmen. It was afterwards at different periods subject to the dukes of Aquitaine, the kings of France and England, and the counts of Toulouse: and in the religious wars of the sixteenth century it suffered again. The environs of the town are pleasant, but the town itself is ill built; the squares or open spaces are irregular, the streets narrow, crooked, and dirty: the houses are neither handsome nor convenient. The bridge over the Garonne is tolerably handsome; and the public walks, especially the 'Cours' on the banks of the Garonne, delightful.

The public buildings most worthy of notice are the Church of St. Caprais, the Prefect's Office, and the Hospital of St. Jacques. The population in 1831 was 11,991 for the town, or 12,631 for the whole commune; in 1836 it was 13,309 for the commune. The manufactures are leather, serge, printed cottons and other cotton goods, sailcloth, iron goods, starch, and candles: trade is carried on in these articles, and in corn, flour, wine, and fruit, which are sent to Bordeaux. There are four yearly fairs. There are a public library of 11,000 to 12,000 volumes, a museum, a high-school, a society of arts, sciences, and agriculture; a departmental nursery, a theatre, and baths. Among the eminent natives of Agen are Sulpicius Severus, one of the Christian fathers, Joseph Scaliger, and Lacépède.

Agen is the seat of an antient bishopric; the diocese now comprehends the department: the bishop is a suffragan of the archbishop of Bordeaux. The city is also the seat of a Cour Royale, which has jurisdiction over the departments of Gers, Lot, and Lot et Garonne.

Aiguillon (pop. 2062 town, 4080 whole commune) is in a very fertile valley at the confluence of the Lot and the Garonne. A noble château was commenced here in 1790 by the Duke of Aiguillon and never finished. There are also (or were within the present century) the ruins of an antient castle, once of considerable strength. The inhabitants manufacture stockings, and trade in the produce of the neighbourhood. Port-Sainte-Marie (pop. 1976 town, 3079 whole com.) and Clermont are on the road between Aiguillon and Agen, very near each other.

In the arrondissement of Marmande are Marmande, Meilhan, St. Bazeille, Caumont, Le Mas d'Agenois, and Tonneins on the Garonne; Cocumont and Bouglon in the country south-west of that river; Castel-Moron, La Parade, La Fitte, and Clairac, on the Lot; Souvelat, Allemans, Pardaillan, and Duras, on or near the Dropt; Soumenzac, in the district north of that river, and Miramont, Levignac, Lauzun, Seiches, and St. Barthelemi, Puymiclan, Escassefort, Castelnau-sur-Gupie, Gontaut, and Verteuil, in the country between the Dropt, the Lot, and the Garonne. Marmande is an antient town which was pillaged by the Saracens. It is in a plain on the right bank of the Garonne, fertile rather than picturesque. Though an old town, it is tolerably well built. It has a handsome fountain and a high-school, the buildings of which are worthy of observation. The population in 1831 was 5261 for the town, or 7345 for the whole commune: in 1836 it was 7527 for the commune. The inhabitants manufacture coarse linens, bed-ticking, cordage, leather, and hats; and trade with Bordeaux in corn, wine, brandy, plums, and hemp. There are a public library and an agricultural society. Tonneins consists almost entirely of a long and broad street, lined with good and even elegant houses. The town-hall is in the centre of the town, in a handsome *place* or square, planted with elms, and commanding a view of the river. The inhabitants (3944 town, 6494 whole commune), nearly half of whom are Protestants, manufacture pins, rope, and hempen thread or yarn. Near the town is a snuff manufactory. Considerable trade is carried on. Clairac (pop. 2467 town, 4949 whole commune) was the first town in France which embraced the Reformed religion; it was formerly the rival of Tonneins in trade; its snuff was the most esteemed of any in France.

In the arrondissement of Nérac are Nérac, Moncrabeau, Lavardec, and Viane, or Viannes, on the Baise; Bruch, Francescas, Montagnac, Moncau, and La Monjoye, in the country east of the Baise; Sos and Mezin on the Gelize; Castel-Jaloux, Villefranche, Damazan, Saintraille or Xaintrailles, Lausseignan, and Durance, in the country west of the Baise and Gelize. Nérac consists of two parts, Great and Little Nérac, divided from each other by the Baise, over which is a handsome stone bridge. In Great Nérac is a fine Gothic castle, built by the English, which was for a long time one of the residences of the kings of Navarre. Henri IV. held his court there. In the religious wars of the reign of Louis XIII. it was taken by the duke of Rohan, the Protestant leader, who expelled the magistrates and the partisans of the royalist party; but the town was reoccupied the same night by the royalists, under the duke of Mayenne. Great and Little Nérac are both walled. The market-houses are very large. The population in 1831 was 3566 town, or 6327 for the whole commune: in 1836 it was 6603 for the commune. Among the manufactures of the town are hosiery, leather and starch; there are several corn-mills; the flour is exported or made up into sea-biscuit, or into patties, highly esteemed by epicures. Mezin (pop. 1962 town, 3146 whole commune) has many water-mills in or about the town. Cork-cutting and tanning are carried on, and there is manufacture of coarse earthenware in the neighbourhood. Castel-Jaloux was one of the places which took part with the Huguenots in their struggle against Louis XIII., but was obliged to submit. Paper, leather, and coarse woollens are manufactured; and considerable trade is carried on in cattle, wine, honey, and paper.

In the arrondissement of Villeneuve d'Agen are Villeneuve d'Agen, Fumel, Libos, Penne, Chasseneuil, Sainte-Livrade (pop. 3143), and Le Temple on the Lot; Tournon (pop. 7901) on the Bondusson; Frespech, Pujols, Dolmayrac, and Montpezac or Montpezat, in the country south of the Lot; Sauveterre, Paulhiac, Monflanquin (pop. 5201), La Ledat, Castelnau-de-Combes, Cancon, Montau, or Montaut le Jeune, and Monclar, between the Lot and the Dropt; and Villeréal, Castillonnes, and Cahuzac on the Dropt. Villeneuve d'Agen, or Villeneuve-sur-Lot, has an antient castle, and some remains of the antient town-walls, which have in most parts been replaced by handsome walks. The town, which was built in the thirteenth century, is well laid out. There is an old bridge over the Lot; the principal arch has about 115 feet span, and is 58 high. The population in 1831 was 5934 town, or 10,652 whole commune; in 1836 it was 11,222 for the commune: the inhabitants are engaged in tanning, and carry on trade in corn, wine, plums, cattle, and linen. There are paper-mills and iron-works near the town. There are two yearly fairs. There are a high-school and an agricultural society. Fumel has some paper-mills; and at Penne (pop. 6005) some manufactures of leather and other articles are carried on.

The population of the above places, when not otherwise specified, is that of the whole commune, from the census of 1831.

The chief branches of manufacture are corks, sailcloth, light woollens, quilts and other cotton goods, snuff, earthenware, and gloves. There are also glass-houses, tan-yards, paper-mills, and iron-works. The number of iron furnaces for producing pig-iron is five; charcoal is the principal fuel used: there are twelve forges for the preparation of wrought-iron. The chief trade of the department is in wine, brandy, flour, prunes, hemp, deals, resin and pitch. These articles are sent chiefly to Bordeaux or Toulouse, the conveyance to these towns being facilitated by the navigation of the Garonne.

The department constitutes the diocese of Agen, and is in the jurisdiction of the Cour Royale of that city, and of the Académie Universitaire of Cahors. There are five Protestant consistories in the department, viz. at Clairac, Tonneins, Nérac, Lafitte, and Castelmoron. The department is in the eleventh military division, the head-quarters of which are Bordeaux. It returns five members to the Chamber of Deputies.

The department for the most part formed part of the territory of the Nitiobriges, but it includes probably small portions of the country of the Petrocorii and Vasates. Aginnum (Agen) and Excisum (on the site of Villeneuve d'Agen) were towns of the Nitiobriges. In the Roman division of Gaul, the department was comprehended in Novempopulana, a subdivision of Aquitania. It was afterwards successively under the Visigoths and the Franks; and was exposed to the ravages of the Gascons or Vascons, the Saracens, and the Northmen or Normans. It suffered also in the crusade against the Albigenses; and was ceded to the English by the treaty of Bretigny. It was one of the districts which early received the doctrines of the Reformation. Before the Revolution it constituted part of Agenois and Bazadois, subdivisions of Guienne; and of Condomois and Lomagne, subdivisions of Gascogne.

LOTHAIRE. [GERMANY.]

LOTHARINGIA. [LORRAINE.]

LOTHIANS is a term under which that part of Scotland is comprehended which stretches along the southern shores of the Frith of Forth, and includes the three counties of Haddington, Edinburgh, and Linlithgow. The first of these counties is also called East Lothian, the second Mid Lothian, and the last West Lothian. This region lies between 56° 40′ and 56° 5′ N. lat., and between 2° 24′ and 3° 50′ W. long.

Coast-Line.—The Lammermuir Hills terminate on the east in Berwickshire with the bold and rocky promontory of St. Abb's Head, which attains the elevation of 286 feet above the sea. From this point the coast, trending north of west, continues rocky and steep as far as Fast Castle, and its average elevation is hardly less than 200 feet. Farther west it sinks lower, but still presents precipices and crags to the sea, which rise to about the height of 100 feet. Its character is somewhat changed where Haddingtonshire begins: though it continues to be rocky, the shores rise with a gentle slope to a moderate height; but west of Dunbar Castle craggy cliffs and precipices again appear, which at last disappear under the sands of Belhaven. A low and sandy beach extends on both sides of the mouth of the Tyne; on the north it continues to the mouth of the Peffer, with the exception of the small promontory of Whitberry, which rises to a moderate elevation. But north of the mouth of the Peffer the cliffs are precipitous and rugged, in some places not less than 100 feet high, and overhang the sea. Tantallan Castle stands on a high rock surrounded by the sea on three sides. The coast continues high, but less precipitous, as far as New Berwick: west of that place it is flat and sandy for eight miles; but as we advance farther westward it becomes rocky near Chapel Ness, and in some places almost bold: this character continues to Gulan Ness. The beach of Aberlady Bay is flat and sandy, and so is the remainder of the shores of East Lothian, except some small portions of it near Graigielaw, Boglehill, and west of Preston Pans, where it is several feet high. The shores of Mid Lothian are low and sandy as far as Leith, and some miles farther west; but as we approach the mouth of the river Amond, which forms the boundary between Mid and West Lothian, they are intersected by some hills of moderate elevation. The coast rises somewhat higher west of the Amond, where it attains, on an average, an elevation of between 50 and 60 feet, and so it continues as far as Black Ness, where it begins to lower, until, west of Borrowstounness, it sinks so low that more than 2000 acres are covered by the tide.

Surface, Soil, and Rivers.—Nearly all the high lands in which the rivers originate that flow southward to the Tweed, and northward to the North Sea and Frith of Forth, lie within the Lothians, and the elevated ground which constitutes the northern edge of the basin of the Clyde extends along their boundary. The whole region may be considered as divided by nature into three portions. The most eastern comprehends the whole of East Lothian and a small portion of Mid Lothian, having for its natural boundary a range of hills which constitute the eastern boundary of the basin of the Esk, and extend from Borthwick to Inveresk: they are called, at least towards their northern termination, the Hills of Falside and Carberry. The second portion comprehends the country between this range and the Leith Water, and contains the Pentland Hills. The third division extends from Leith Water to the river Avon, which separates West Lothian from Stirlingshire.

The eastern region comprehends the greater portion of the Lammermuir range, of which the remainder belongs to Berwickshire. These hills constitute within East Lothian a continuous chain, beginning at the Lammerlaw (about 2° 50′ W. long.), and running north-east to the Sayers Law; their course thence to St. Abb's Head is nearly east. The highest summits of this chain are Lammerlaw, about 1700 feet, and Sayers Law, 1739. Towards the north this ridge terminates rather abruptly; but towards the south it sends off several ridges, which extend in a south-eastern direction, and contain several high summits. Spartleton or Spartledown Law is 1620 feet high. That portion of East Lothian which is included within the Lammermuir Hills contains many deep valleys, through each of which flows a river scarcely perceptible in summer, but in winter forming a very considerable torrent. The beds of the rivers are wide, and formed by the débris of the mountains through which they flow. The valleys are rather narrow and of moderate fertility, but they are under cultivation. The hills are mostly covered with muir or moss, but are capable of improvement. This elevated district is sometimes covered with snow for three months.

From the Lammerlaw a series of hills extends southwestward to Fala Hill. They are connected by high ground with one another, and are commonly called the Soutrie Hills, from one of the highest summits. They attain an elevation of near 1060 feet. West of them the watershed between the Gala Water, a tributary of the Tweed, and the Borthwick, is formed by a table-land of an uneven surface, but without any distinct ridge. It extends on both sides of the Gore Water, a tributary of the Esk, and is called Borthwick Muir. Its elevation above the sea is between 500 and 600 feet, and its surface is chiefly covered with moss or heath. The Gore Water runs in a narrow and deep valley of very moderate fertility. In this muir, north-west of Borthwick, rise the Falside and Carberry Hills, which run northward between Crichton and Cranston on the east, and Cockpen and Dalkeith on the west, and terminate two miles south-east of Inveresk. Their elevation varies from 500 to 700 feet.

The country between the Soutrie Hills, Borthwick Muir, and the Carberry ridge partakes much of the character of the muir, but the elevations are higher, being on an average 200 feet above the base, which, near the Soutrie Hills, is 600 feet above the sea, though it lowers considerably farther north. Most of this tract is covered with heath, but other portions are green, though they are intersected with bogs. Along the rivers there are small tracts of good land.

The country skirting the Lammermuir Hills on the north is rather undulating than hilly: its elevations have gentle slopes, and rise hardly more than 100 feet above their base, which varies in height above the sea from about 600 feet near the hills to 250 feet towards the Tyne. The highest hills in this tract are Skimmer Hill near Salton (600 feet above the sea) and Down Hill near Scott (550 feet). This tract does not contain much moorland; and though many parts near the Lammermuir have a sandy and rather sterile surface, the remainder is tolerably fertile, and produces good crops. The northern boundary-line of this tract begins on the east at Broxmouth, east of Dunbar, and follows a low ridge of elevated ground which runs westward near Spott, Stenton, Garvald, and Gifford, whence it passes to Salton.

From this line the country slopes gradually towards the river Tyne, without forming any hills, except the Traprain Hill, in the parish of Preston-kirk, which rises abruptly on all sides, and on the south is nearly perpendicular. This district, which is between two and four miles wide, contains the most fertile lands of East Lothian, and produces very rich crops of wheat and other grains. Along the Tyne there are rich meadow-lands, especially towards the mouth of the river.

The Tyne originates in two branches in the Carberry Hills and on Borthwick Muir. The northern branch, called the Tyne, unites with the southern, called Salton Water, near Salton House: at the junction the latter is the more considerable river. From Salton House the river runs in a general north-east direction with numerous windings to its mouth. At Linton it traverses a ledge of rocks, which formerly caused a waterfall about two feet high, but the rock has been lately cleared away. The tide ascends the river two miles from its mouth. The whole course of the Tyne is about 30 miles.

From the Hills of Falside, south-east of Inveresk, some high ground runs in a north-east direction, being nearly equally distant from the churches of Tranent and Pencaitland. Farther east the churches of Gladsmuir and Adelstanford are built on its highest elevation, and between them are the Garleton Hills, the most elevated part of these high lands. From Adelstanford they extend eastward to the village of Linton, where they terminate with a very gradual descent. The soil on these high lands is of inferior quality; but on the gentle declivities, with which they sink towards the sea and the river Tyne, it is characterized by fertility, especially on the southern slope, which terminates near the Tyne in rich meadows.

The northern slope of this ridge terminates east of the Garleton Hills in the valley of the Peffer. This valley traverses East Lothian from Aberlady Bay on the west to Peffer Sands on the east. The rivulet which traverses it, the Peffer, rises in a swampy meadow east of Congleton, and immediately divides into two branches, of which one flows eastward, and enters the sea north of Tyningham, and the other runs slowly to Aberlady Bay. The former runs about five and the latter about eight miles. Their common source is said to be 25 or 30 feet above the sea. The valley, which is from one to two miles wide, was formerly occupied by swampy grounds, which have been drained and converted into meadows and fields of considerable value.

The tract of land north of the valley of the Peffer is chiefly occupied by some high ground running nearly west and east from Gulan Ness to Tantallan Castle. South-east of New Berwick is the New Berwick Hill, which is 800 feet high. The more elevated portion of this region is not cultivated, but the lower ground produces moderate crops of grain. Some large tracts near the sea-shore are low, and mostly covered with sand.

The south-eastern portion of the *middle* region, which extends from Carberry Hill to Leith Water, may be considered as a continuation of Borthwick Muir, to which it is contiguous. The whole tract between the Borthwick Muir and the two great branches of the Esk is a table-land, on which numerous small hills are dispersed, and which in the southern parts is about 600 feet above the sea; but towards the union of the two Esks, about two miles south of New Battle, it gradually sinks down to a lower level. The higher part of this tract, like Borthwick Muir, is covered with heath or consists of moorland, and contains only narrow strips of land along the rivers suitable for agricultural purposes. The hills which occur along the watershed between the Esk and the tributaries of the Tweed rise between 100 and 200 feet above their base: it is only near the source of Moorfoot Water that they attain a much higher elevation, the Blackhope Scares, east of the course of the river, rising to 1850 feet, and Coatlaw, west of it, to 1680 feet.

The Pentland Hills occupy the greatest part of the country between the Esk and Leith Water. The southern portion of these hills, running along the boundary-line of Mid Lothian and Peebles, is called Cairnedge, and contains the Cairnhill, about 1800 feet high. This ridge runs nearly east and west, and at its eastern extremity is connected with the Bevelaw-edge, the highest part of the Pentland Hills, whose summits in general attain an elevation of from 1300 to 1600 feet. Logan-house Hill is more than 1700 feet high, and Capelaw 1550; Caerketan with which the range terminates, south-east of Collington, attains about 1450 feet. The highest summits occupy nearly the middle of the tract between both rivers, but their declivities and offsets generally extend to the very banks of the streams or to a short distance from them. The base on which the Pentland Hills stand does not appear to exceed 600 feet in elevation; the sides of the hills are steep, and are only used as sheep-walks; in the narrow valleys the arable land, which occurs only in small patches, is of moderate fertility.

The northern declivity of the Pentland Hills terminates on the east at Laswade, and farther west a mile south of Liberton and about the same distance east of Collington. The country to the north of this line and extending to the shores of the Frith of Forth presents in general an undulating surface with a few hills on it, among which Arthur's Seat, near Edinburgh, is the highest. The most elevated part of this tract may be from 250 to 300 feet above the sea, but it lowers gradually as it approaches the Frith, where it terminates in a low shore. It contains the most fertile and best cultivated portion of Mid Lothian, though its soil is far from being of the first quality.

The *western* region, comprehending the western districts of Mid Lothian and the whole of West Lothian, contains in the southern parts extensive tracts covered with mosses and heath. The surface frequently extends in plains, and hills of moderate elevation are not common, except in some places on the watershed between the rivers which fall into the Frith and the tributaries of the Clyde. Some of these hills attain a height of 900 or 1000 feet; and the most western, the Levens Seat, is probably more than 1200 feet above the sea. The rivers do not run in narrow glens, as in the moorlands east of the Pentland Hills, and the arable ground along their banks is much more extensive and more fertile; but the greater portion of the tract is unfit for agricultural purposes. A line drawn from Currie on the Leith Water to Kirknewton and Mid Calder in Mid Lothian, and thence to Livingstone and Bathgate in Linlithgow, may be considered as the northern boundary of this tract.

The country north of this line resembles in soil and surface the tract north of the Pentland Hills, but the differences in the level are much greater, and its descent is far from being so uniform. The greatest portion of this country does not slope towards the sea, but towards the river Amond, which traverses it nearly in the centre. The basin of that river is bordered by higher ground, which in some places rises into hills. Of these hills there are in Mid Lothian the three hills of Dalmahoy and Kaims between Leith Water and Ormiston Water, of which the most southern attains 680 and the most northern 660 feet; and the Corstorphine Hills, west of Edinburgh, which extend two miles from south-east to north-west, and rise to 460 feet; they are steep towards the east and north. The hills which rise on the borders of the basin of the Amond in West Lothian occupy a larger surface. They begin east of Bathgate and run northward under the names of Dumcross Hills, Knock Hills, and Kipp Hills; east of Torpichen is their highest summit, the Cairn Naple, which is 1498 feet high. They terminate south of Linlithgow with the Cocklerue, 500 feet high. From the last-mentioned hill the high ground runs eastward, forming moderate elevations with gentle descents until it terminates a short distance from the mouth of the Amond. The country enclosed by these high grounds contains a greater portion of arable ground than any other part of the Lothians, except the Vale of the Tyne.

The south-eastern portion of Mid Lothian belongs to the basin of the Tweed. Though contiguous to the Muir of Borthwick, it presents a different character, its surface being formed by ridges of high hills, between which the rivers run in deep and mostly narrow valleys. The hills rise probably to 1000 feet; the Tippetknows, on the boundary-line between Mid Lothian and Berwickshire, attains 1323 feet. The arable ground in the valleys is of only moderate fertility, but the hills afford good sheep-walks.

Geology.—The Lammermuir Hills consist of a series of transition rocks. They are almost entirely composed of grauwacke, distinctly stratified, but in various places trap rocks protrude through the strata, and between the ridges old red sandstone occurs, which fills up to a certain level most of the valley, especially along the rivulets. Along the northern declivity the hills are covered by a conglomerate, consisting almost entirely of fragments of grauwacke slate coarsely cemented together, and forming in many places large and elevated mountain-masses. This conglomerate is frequently traversed by rocks of a coarse sandstone and projecting dikes or veins of trap, and extends to some distance from the hills. The lower ridges which skirt the hills are composed of the red sandstone, which extends to the ridge running from Broxmouth to Gifford, and then, at least towards the sea, is followed by a low tract belonging to the coal-formation; for though it is covered with a deep and fertile soil, the cliffs along the shore as far as Dunbar exhibit limestone, clay, ironstone, bituminous shale, and occasionally thin seams of coal, with some organic remains.

In the country north of the Tyne the surface consists of claystone, clinkstone, and limestone, where it is not covered with mould. The upper stratum however is partly traversed by and partly rests on the red sandstone, which forms the regular strata of this district. The sandstone rests on the transition rocks of the Lammermuir Hills, and is in some places covered by the coal-formation of Mid Lothian. In a few places basalt and trap rocks are met with.

On the western extremity of the Lammermuir Hills the coal-formation begins, which extends through the whole of the southern districts of Mid and West Lothian. The great coal-field lies to the east and south of Edinburgh, where it extends about 25 miles in length, its greatest breadth being six miles. It is calculated to cover an area of 80 square miles. Though the coal-formation continues farther westward, it is intersected by extensive tracts of limestone and sandstone, in which only small seams of coal occur. But in the hills near Bathgate the coal-formation again predominates, and beds of coal occur there which are fit for working, and extend westward into Lanarkshire. The country between the coal-formation and the Frith of Forth belongs to the red sandstone, consisting mostly of limestone and sandstone, through which at several places trap and basalt rocks protrude.

Lothian, under the names of Landen, Lodoneia, and Lothian, antiently comprehended all the country lying between the rivers Tweed and Forth as far west as the river Avon, which separates the counties of Linlithgow and Stirling. It consequently included the whole of Berwickshire and part of the counties of Roxburgh, Selkirk, and Peebles, in addition to the three counties of Haddington, Edinburgh, and Linlithgow, which three alone constitute the district now known under the appellation of the 'Lothians.' This fertile district was inhabited by the British until their expulsion by the Saxons about the middle of the fifth century. Soon after the union of the Picts and Scots (A.D. 843) Kenneth Macalpine made incursions into Saxonia, as Lothian was then called, but did not succeed in obtaining any permanent possession. It subsequently became included in the bishopric of Durham, and in the year 1020 was ceded to Malcolm II. by the duke of Northumberland, but Lothian continued to be known as a country distinct from Scotland even as late as the reign of David I. (A.D. 1124). The eastern boundary appears to have been restricted to the Lammermuir hills about the middle of the twelfth century, during the reign of William, surnamed the Lion, and to have been then also first divided into East Lothian [HADDINGTONSHIRE], West Lothian [LINLITHGOWSHIRE], and Mid-Lothian [EDINBURGHSHIRE].

With reference to Edinburghshire, the following table, showing the state of the parish-schools of that county at the end of the year 1825, has been compiled from the Returns made by the parochial ministers to Parliament in 1826. In the parishes of Canongate, College Church, High Church, Lady Yesters, New Grey Friars, New North Church, Old Church, Old Grey Friars, St. Andrew, St. Cuthbert, St. George, St. Mary, Tolbooth Kirk, and Tron Church, there are no parochial schools, but in these, as in most of the other parishes, there are schools established on what is called the 'legal provision,' besides private schools, and the number of scholars attending them is very considerable. (Camden's *Brit.*; Chalmers's *Caledonia*; *Old* and *New Statistical Account of Scotland*, &c.)

Parish.	Salary and Emoluments of Schoolmaster in 1825.	Subjects taught, and School-fees per quarter.	Average No. of Scholars.
	£ s. £ s.		
Borthwick	Salary 20 0, fees 30 0	English reading, writing, and arithmetic 3s. 6d.; Latin 6s, book-keeping and practical mathematics 6s, geography 2s. 6d.	80—90
Mid-Calder	„ 37 0 and house.	English, writing and accounts, Latin, Greek, and French	50
West Calder	„ 350 merks Scotch, fees 25*l*.	English 2s., writing 2s. 6d, arithmetic 3s., Latin 5s.	80
	£ s. £ s.		
Carrington	„ 24 0 „ 30 0	Reading 2s. 6d., writing 3s., arithmetic 3s. 6d., Latin 5s.	55—60
Cockpen	„ 22 0 „ 18 12	English, writing, and arithmetic 3s.	50
Colinton	„ 22 0 „ 30 6	Reading 3s. 2d, writing 4s. 2d., arithmetic 5s. 2d., Latin 7s. 6d.	60
Carstorphin	„ 22 0 „ 16 0	English, writing, and arithmetic 3s 6d.	50
Cramond	„ 22 0 „ 68 0	English 2s 6d., writing 3s., arithmetic 3s. 6d., grammar 4s. 6d. Latin 5s. 6d., French 5s. 6d.	70
Cranston	„ 22 0 „ 20 0	English 2s. 6d., writing 3s., arithmetic 3s. 6d., grammar 5s. 6d.	65
Crichton	„ 19 12 „ 23 0	Latin 5s. 6d. Practical mathematics 5s. 6d.	70
Currie	„ 20 0 „ 20 0	English 2s 6d., writing 3s 6d., arithmetic 5s., Latin 5s.	45
Dalkeith	„ 20 0 „ 67 0	Latin, Greek, and French 10s. 6d.	25
Duddingston	„ 22 0 „ 24 0	English writing, and grammar 3s. 6d., arithmetic, geography, book-keeping, &c. 4s.	45
Fala and Soutra	„ 19 0 „ 45 0	English 2s. 6d., writing 3s., arithmetic 4s., Latin, Greek, and French 6s.	60
Glencarse	„ 22 0 „ 23 0	English 2s. 6d., writing 3s. 6d. arithmetic 4s. 6d., Latin 6s.	45
Heriot	„ 19 0 „ 12 0	English 2s., writing 2s. 6d., arithmetic 3s.	30
Inveresk (Grammar-school)	„ 27 0 ——	Latin, Greek, French, mathematics 10s. 6d.	70
Do. (2 English)	——	English, writing, and arithmetic 5s.	200
North Leith	No return.	English, writing, and arithmetic 4s. 6d., Latin and mathematics 5s.	40
	£ s. £ s.		
South Leith	„ 40 0 „ 120 0	English, reading, and grammar 7s. 6d, Latin 10s. 6d.	140
Liberton	„ 22 0 „ 56 0	English 3s., writing 4s., arithmetic 5s., Latin 7s. 6d.	90
New Battle	„ 22 0 „ 12 0	English, writing, and arithmetic 3s. 6d.	40—45
Newton	„ 22 0 „ 50 0	English 2s. 6d, writing 3s., arithmetic 3s. 6d., Latin 5s.	90
Pennycuick	„ 22 0 „ 15 0	English, writing, and arithmetic 5s., Latin 7s. 6d.	46
Ratho	„ 22 0 „ 36 0	„ 4s 6d. „ 6s.	80
Stow	„ 22 0 „ 18 0	Reading and writing 2s. 6d., arithmetic and Latin 5s.	45
Temple	Salary and fees 60*l*.	English, writing, and arithmetic 3s. 6d.	50

LOTIONS, or washes, termed also epithems, and when intended for the eye, collyria, or eye-washes, are either mixtures of different ingredients, or solutions of various medicinal substances, in water or other menstrua, designed for external application. If the object be to reduce the temperature of a part, they are generally formed of spirituous or other volatile principles, which by their evaporation occasion cold (and such must be applied by means of a very thin single layer of linen), or of saline bodies, which at the moment of their solution cause a reduced temperature, and which should be applied immediately after being mixed, and frequently renewed. Others are composed of stimulating substances, and are intended to impart power to indolent tumours or ulcers, while a different set are designed to allay pain, and are composed of sedative or narcotic principles.

Many of the nostrums sold under the name of lotions are solutions of very active ingredients, and their application is often productive of very serious effects.

LOTTERIES are schemes by which some modern governments have raised a revenue from their subjects, by taking advantage of that feeling of confidence in their own good fortune which is entertained by a large proportion of mankind. The plan upon which lotteries have generally been conducted is that of selling for more than their intrinsic worth a certain number of tickets or chances, and distributing by lot a part only of the money thus collected among a comparatively small number of the purchasers. Lotteries may thus be considered as games of chance, the aggregate number of players in which are sure to lose a part of their venture. During the period in which the English state lotteries were carried on by act of parliament, it was the plan to distribute in prizes of different magnitudes an amount equal to 10*l*. for each ticket or chance that was issued, and the profit to the state consisted of the sum beyond that rate which contractors were willing to give for the privilege of selling to the public the tickets or shares of tickets, which for that purpose they might divide into halves, quarters, eighths, and sixteenths of tickets. The price paid by the contractors for this privilege varied with circumstances, but was usually about six or seven pounds per ticket beyond the amount repaid in prizes, while the price charged by the contractors to the public was generally four or five pounds per ticket beyond that paid to the government, and more than this rate of advance was always required when the tickets were divided into shares, the smaller shares being charged more in proportion than the larger.

The invention of lotteries is ascribed to the Romans. It does not appear that they were resorted to for purposes of revenue, but rather as a means of amusing and gratifying the people, among whom the chances were gratuitously distributed, the prizes being of but little value. The earliest English lottery of which there is any record occurred in 1569, when 40,000 chances were sold at ten shillings each; the prizes consisted of articles of plate, and the profit was employed for the repair of certain harbours. In the course of the following century the spirit of gambling appears to have materially increased in this direction, for *private* lotteries were, early in the reign of Queen Anne, suppressed 'as public nuisances.' In the early period of the history of the National Debt of England, it was usual to pay the prizes in the state lotteries in the form of terminable annuities. In 1694 a loan of a million was raised by the sale of lottery tickets at 10*l.* per ticket, the prizes in which were funded at the rate of 14 per cent. for sixteen years certain. In 1746 a loan of three millions was raised on 4 per cent. annuities, and a lottery of 50,000 tickets at 10*l.* each; and in the following year one million was raised by the sale of 100,000 tickets, the prizes in which were funded in perpetual annuities at the rate of 4 per cent. per annum. Probably the last occasion on which the taste for gambling was thus made use of occurred in 1780, when every subscriber of 1000*l.* towards a loan of twelve millions at 4 per cent. received a bonus of four lottery tickets, the intrinsic value of each of which was 10*l.*

In 1778 an act was passed obliging every person who kept a lottery-office to take out a yearly licence, and to pay 50*l.* for the same, a measure which reduced the number of lottery-offices from 400 to 51.

The immorality on the part of the government, in thus encouraging a spirit of gambling among the generality of the people, became very soon apparent. By limiting the subdivision of chances to the sixteenth of a ticket as the minimum, it was intended to prevent the labouring population from risking their earnings, but this limitation was extensively and easily evaded by means which aggravated the evil, the keepers of these illegal offices (commonly known as 'little goes') and insurance offices requiring extra profits to cover the chances of detection and punishment. All the efforts of the police were ineffectual for the suppression of these illegal proceedings, and for many years a great and growing repugnance was in consequence manifested in parliament to this method of raising any part of the public revenue. At length, in 1823, the last act that was sanctioned by parliament for the sale of lottery tickets contained provisions for putting down all private lotteries, and for rendering illegal the sale, in this kingdom, of all tickets or shares of tickets in any foreign lottery, which latter provision is, to this day, extensively evaded.

The system of state lotteries was very long carried on by the French government, and was the cause of still greater demoralization than in England. Recently, state lotteries have also been abolished in France.

The Hamburg lottery, which is still continued, is established upon a fairer principle than was adopted in France or England. The whole money for which the tickets are sold is distributed among the buyers, except a deduction of 10 per cent. which is made from the amount of the prizes at the time of their payment.

Lotteries have been very common in the United States, and have been sanctioned by the several states, not so much as a means of raising money for state purposes, as with the view of encouraging, as they supposed, many useful objects which could only be effected by raising at once a large sum of money, such as canals, the establishment of schools, and even the publication of a book. The numerous frauds practised in lottery schemes in the United States have perhaps done more to open the eyes of the people to the mischief resulting from them than any investigation into the true principles of lotteries. A distinguished American lawyer, who figured in the New York State Convention about twenty years ago, declared that though 'he was no friend to lotteries, he could not admit they were *per se* criminal or immoral, when authorized by law. If they were nuisances, it was in the manner in which they were managed. In England, if not in France, there were lotteries annually instituted by government, and it was considered a fair way to reach the pockets of misers and persons disposed to dissipate their funds. The American Congress of 1776 instituted a national lottery, and perhaps no body of men ever surpassed them in intelligence and virtue.' These remarks are merely quoted in order to show what a man of high character in America for integrity and knowledge thought of lotteries twenty years ago. The opinions which he expressed were at that time, we can venture to say, shared by a great number. We should be inclined to think that juster views are now prevailing there as to the subject of lotteries: but we have no recent information on the subject.

LOTUS of the Antients. The plant or plants referred to by classical authors under the name of Lotus is a subject which has engaged the attention of numerous commentators as well as of botanists. To the difficulty of ascertaining the identity of a plant but imperfectly described has in this case been added that of the same name having been applied to several very distinct plants. Fée, the latest author (*Flore de Virgile*), enumerates no less than eleven to which the name Lotus was applied: it is unnecessary here to enumerate more than the most remarkable. Of these, some are herbaceous, others perennial. Among the former are the *Lotus sativa* and *sylvestris* of Dioscorides: the first, he states, is also called *trifolium;* it is supposed by some botanists to be *Melilotus officinalis*, and by others to be *M. cærulea.* Dr. Sibthorp has fixed upon *Melilotus messanensis* as the plant.

The *Lotus sylvestris* of Dioscorides, called also *libyon*, a native of Libya, and about two feet high, with leaves like those of Lotus trifolium, and fruit like that of fenugreek, is thought to be the Trigonella elatior of Sibthorp, which he found in Asia Minor and in Cyprus. Both kinds are described by the Arabs under the name of *handachocha*, or *hundkookee*, with *garch* and *thusf* as other Arabic names. From the great number of similar plants of the tribe of Loteæ which are employed by Asiatics as articles of diet or as medicines, it is impossible, without specimens, to identify either of the above, but they are probably allied to the Melilotus.

Lotus ægyptia, or the Egyptian Lotus, is no doubt one of the *Nymphæaceæ*, being described as springing up in Egypt in fields inundated by the river, with a stem like that of the κύαμος, or Egyptian bean (*Nelumbium speciosum*), and a white liliaceous flower, which rises out of the water at sun-rise, and sinks down again at its setting, a capsule like that of the poppy, in which are contained seeds which the Egyptians roast and make into bread, with a root which is likewise eaten, both in a dressed and undressed state. The plant is no doubt the *Nymphæa Lotus* of botanists. But as in the most antient monuments a blue-coloured lotus is likewise represented, there is no doubt that the Egyptians were also acquainted with the *Nymphæa cærulea.* At the present day, the seeds of several Nymphæas roasted in sand are eaten by the natives of India, as are likewise the stalks and the rootstocks, which is said to have been the case with the Egyptian species. As the flowers of the Nymphæaceæ are so highly esteemed by the Hindus, and notices respecting them constantly occur in their poetry and mythology, it is possible that an Eastern legend may have given origin to the metamorphosis of the nymph Lotis, flying from Priapus, into the 'aquatica lotos.' (Ovid, *Metamorph.*, ix. 341.)

The Egyptian lotus however is not so celebrated as another less known tree, to which exaggerated description has assigned a fruit of the most delicious kind, upon which the Lotophagi lived, and which, when strangers had once tasted, they ceased to wish to return to their native country. This is specially described as a tree, but there is no doubt that several have been confounded under this name. One is described both by Dioscorides and Pliny as a native of Italy of great size, forming excellent wood, with fruit about the size of pepper and as resembling that of the cherry. This description applies very closely to the Celtis Australis, or European lote or nettle-tree, which is one of the largest timber-trees of the South of Europe, with wood of considerable hardness and toughness. It produces berries about the size of small cherries and with long stalks like them, eaten both by birds and children.

This however comes far short of the character of the Lotus of the Lotophagi, of which the best description, according to Sprengel, is that of Polybius, who states that it was a moderate-sized thorny tree, with leaves like those of Rhamnus, but broader; that the fruit at first was like the white berries of myrtle, but become as large as an olive, of a reddish colour, and containing a small nut, taste sweetish, resembling that of figs or dates; and that a wine was prepared from it. That this tree was a native of Africa we know from the Lotophagi, who employed the fruit as their chief food, being a people of the African coast near the Syrtes. (Herod., iv. 177.) Arabian authors, in their translation of the works of the Greeks, give the synonyms in both languages, and we have, in the chapter of Serapion, retranslated into Latin, 'De loto arbore,' the name *sidr* or *sidar*, given as the Arabic name of the tree, and *nabach. nibuk*, or *nabk*, as that of its fruit. This name has been long known as that of a species of Zizyphus, and has been applied by botanists to one species, *Z. Napeca*. Dr. Shaw, in his 'Travels in Barbary,' figures a species of Zizyphus, which he calls 'Seedra Arabum, quæ et Lotus veterum.' It is a prickly branching shrub, with fruit of the size of a wild plum, and of a sweetish taste and saffron colour. He found it sold in the markets, cattle fed with it, and a liquor drawn from it. Desfontaines also found this *Zizyphus Lotus* on the same coast, and has fully described it. Mungo Park found a species of Zizyphus in the interior of Africa, which forms a large tree with yellow farinaceous berries of a delicious taste. The natives, he says, convert them into a sort of bread, by exposing them some days to the sun, and afterwards pounding them gently in a mortar, until the farinaceous part is separated from the stone. This meal is then mixed with a little water, and formed into cakes, which, when dried in the sun, resemble the sweetest gingerbread. It may be added, that the fruit of several species of Zizyphus is eaten in India. One kind, commonly known by the name *ber*, forms a moderate-sized tree in a cultivated state, with oval fruit of a yellowish or reddish colour, and about the size or somewhat smaller than a common plum, which is much esteemed. The taste is mild and sweet, with a slight degree of acidity, probably coming nearer to the taste of dates than any other fruit. In Persian works, *berree* and *jharree* are given as its Hindustanee, *kinar* and *khial* as its Persian, and *sidr* as its Arabic name, with *nebbe* for the fruit. The fruit of the wild kind is dried and powdered, as was done with the lotus of the Lotophagi. This powder, in Arabic, is called *savikoon-nebbek*, in Persian, *arud-i-kinar*, and in Hindu, *ber-choonee*.

LOUDE'AC, a town in France in the department of Côtes du Nord, near the river Oust, a tributary of the Vilaine, and on the southern slope of the Menez mountains. The population in 1831 was 6736 for the whole commune; in 1836 it was 6865 for the commune. The principal manufactures are linen-thread and linens, which also constitute the chief articles of trade. There is a monthly fair for linens, horses and cattle. There are an agricultural society and an institution for instruction in drawing. There are some fiscal government offices.

Loudéac is the capital of an arrondissement which contains 551 square miles. It is divided into nine cantons, and fifty-six communes. The population of the arrondissement was 98,604 in 1831; 95,102 in 1836: a considerable number of the inhabitants are engaged in the linen manufacture.

LOUDUN. [Vienne.]

LOUGH DIVER, a provincial name for the bird called the *Smew* (*Mergus albellus*, Linn.).

LOUGHBOROUGH. [Leicestershire.]

LOUGHREA. [Galway.]

LOUIS (Ludwig in German, Ludovicus in Latin) is the name of many kings of France. Louis I., called 'le Débonnaire,' and also 'the Pious,' son of Charlemagne, was made his father's colleague in the empire, A.D. 813, and after the death of Charlemagne, in the following year, he succeeded him as king of France and emperor of the West. Bernard, son of Pepin, elder brother of Louis, had been made by his grandfather king of Italy, or rather Lombardy ('quæ et Longobardia dicitur' are the expressions of the chroniclers), which kingdom was defined in Charlemagne's will as being bounded by the Ticino and the Po as far as the territories of Reggio and Bologna. All to the west of the Ticino and south of the Po was then annexed to the French crown. Bernard, having conspired to supplant his uncle in the empire, was seized by order of Louis, and his eyes were put out, in consequence of which he died in a few days. Louis showed great sorrow for this act of cruelty, to which he had been advised by his courtiers, and he did public penance for it before an assembly of bishops. In the year 820 Louis appointed his son Lotharius king of Italy and his colleague in the empire. To his son Louis he gave Bavaria, Bohemia, and Carinthia, and to his other son, Pepin, he gave Aquitania. In 830 Lotharius and Pepin revolted against their father, on the plea of the bad conduct of their step-mother Judith of Bavaria, a licentious and ambitious woman. At a diet however which was held at Aix-la-Chapelle, the father and sons were reconciled. The sons revolted again in 833, and their father, being forsaken by his followers, was obliged to give himself up to his son Lotharius, who took him as prisoner to Soissons, sent the empress Judith to Tortona, and confined her infant son Charles, afterwards Charles the Bald, the object of the jealousy of his half-brothers, in a monastery. A meeting of bishops was held at Compiègne, at which the archbishop of Rheims presided, and the unfortunate Louis, being arraigned before it, was found guilty of the murder of his nephew Bernard, and of sundry other offences. Being deposed, he was compelled to do public penance in sackcloth, and was kept in confinement. In the following year however Louis, king of Bavaria, took his father's part, his brother Pepin of Aquitania joined him, and they obliged Lotharius to deliver up their father, who was reinstated on the imperial throne. Lotharius, after some further resistance, made his submission and returned to Italy. The emperor Louis now assigned to Charles, son of Judith, the kingdom of Neustria, or Eastern France, including Paris, and Pepin having died soon after, Aquitania was added to Charles's portion. Lotharius had all Italy, with Provence, Lyon, Suabia, Austrasia, and Saxony. But Louis of Bavaria claimed all Germany as far as the Rhine for himself, and invaded Suabia. The emperor Louis marched against him, and a diet was assembled at Worms to judge his rebellious son, but meantime the emperor fell ill, and died in an island of the Rhine near Mainz, in June, 840, after sending to his son Lotharius the imperial crown, his sword, and his sceptre. Lotharius was acknowledged as emperor, and after a war against his brothers, he retained Italy, Provence, Burgundy, and Lorraine. Charles the Bald succeeded his father as king of France, and Louis of Bavaria had all Germany. Thus was the imperial crown separated from that of France. The emperor Louis was a weak prince. It was under his reign that the fiefs were first made transmissible by descent, which hitherto had been held for life only. Louis also allowed the popes elect to take possession of their charge without waiting for his confirmation. (Hénault, *Abrégé de l'Histoire de France*; Dunham, *History of the Germanic Empire*.)

LOUIS II., called 'le Bègue,' or 'the Stammerer,' son of Charles the Bald, succeeded his father on the throne of France in 877. He claimed also the imperial crown against his cousin Carloman, son of Louis the German, but with no success. In France also he was opposed by several great lords, among others by Boson, the brother of his step-mother, Richilda. In order to conciliate them, he followed the example of his father, by parcelling out the domain of the crown into fiefs in favour of his vassals. He died at Compiègne in 879, at the age of 35, leaving three sons, Louis, Carloman, and Charles called 'the Simple.'

LOUIS III. succeeded his father Louis II., together with his brother Carloman. Louis had Neustria, and Carloman Aquitania. Boson founded the kingdom of Arles, which included Provence, Dauphiny, Lyon, Savoy, and Franche Comté. The Normans ravaged the northern coasts of France, where at last they settled. Louis died in 882, and his brother Carloman remained sole king of France.

LOUIS IV., son of Charles the Simple, ascended the throne of France in 936. He sustained several wars against the emperor Otho I. on the subject of Lotharingia or Lorraine, and also against the Normans, whose duke William, son of Rollo, died, leaving an infant son, Richard. Louis's reign was also disturbed by revolts of the great vassals, especially of Hugo, count of Laon, the father of Hugo Capet. Louis died in 954, and was succeeded by his son Lotharius.

LOUIS V., styled 'the Fainéant,' or 'do nothing,' son of Lotharius, succeeded him in 986. He reigned only one year, and died of poison, administered, as it was said, by his wife, the daughter of an Aquitanian lord. With him ended the Carlovingian dynasty, and Hugo Capet took possession of the throne.

LOUIS VI., called 'le Gros,' son of Philip I., succeeded his father on the throne of France in the year 1108. The larger part of the kingdom was then in the hands of the great vassals of the crown, over whom the king's supremacy was but nominal. The king's direct authority extended only over Paris, Orleans, Étampes, Compiègne, Melun, Bourges, and a few more towns, with their respective territories. The duchy of Normandy was in the possession of Henry I. of England, who had taken it from his brother Robert during the preceding reign of Philip I. Henry and Louis quarrelled about the limits of their respective states, and thus began the wars between the English and the French in France, which lasted for more than three centuries. Louis had the worst in several encounters. In 1120 he made peace, but war broke out again, when Henry of England was joined by his son-in-law the emperor Henry V., who entered Champagne, where he was met by Louis at the head of all his vassals, lay and ecclesiastical; even Suger, abbot of St. Denis, was there with the subjects of the abbey. These united forces are said to have amounted to 200,000 men, and the emperor thought it prudent to retire. Louis however could not depend on the same zealous assistance from his vassals in his quarrel with Henry of England as duke of Normandy, because the vassals considered it as their interest not to increase the power of their king. Meantime Henry of England having given one of his daughters in marriage to Conan, son of the duke of Britanny, the latter did homage to Henry for Britanny as a fief of Normandy. (Hénault, *Abrégé de l'Histoire de France.*)

Louis le Gros, assisted by his able minister l'Abbé Suger, succeeded in recovering for the crown some of the power which the great vassals had usurped; he revived the practice of Charlemagne of sending into the provinces commissioners called 'missi dominici,' who watched the judicial proceedings of the great lords in their respective domains, and received appeals and complaints, which they referred to the king for judgment at the great assizes. In most cases however the king had not the power of enforcing his own judgments. But another and a more effective measure of Louis le Gros was the establishment of the communes, for which he deserves to be remembered among the earliest benefactors of the French people. He granted charters to many towns, the inhabitants of which were thereby empowered to choose their local magistrates, and administer the affairs of the community, subject however to the sanction of the king. By this means he began the creation of the third estate, or commons, as a check on the overgrown power of the feudal nobles. A good sketch of the history of the French communes is contained in the 'Exposé des Motifs de la Loi Municipale,' pronounced by M. de Martignac, Minister of the Interior, in the House of Deputies, 9 February, 1829. Louis le Gros died at Paris in 1137, at the age of sixty, and was buried at St. Denis. He was succeeded by his son Louis VII., to whom he gave the following warning on his death-bed: 'Remember, my son, and always bear in mind, that the royal authority is a public charge, of which you must expect to render a strict account after your death.'

LOUIS VII., called 'Le Jeune,' son of Louis le Gros, succeeded his father in 1137. He married Eleanor, daughter and heiress of William, duke of Aquitania, a lady who was handsome and inclined to gallantry. Thibaut, count of Champagne, having revolted against the king, Louis took and burnt his town of Vitry. St. Bernard, abbot of Clairvaux, advised Louis, in order to atone for this cruelty, to go on a crusade; but the Abbé Suger, who was minister of Louis, and had also served the king's father, opposed this project. The zeal of St. Bernard however prevailed, and the king set off with his wife and a large army in 1147. Suger and Raoul, count of Vermandois, Louis's brother-in-law, were left regents of the kingdom. The crusade proved unsuccessful: the Christians were defeated near Damascus, and Louis, after several narrow escapes, returned to France in 1149. His first act after his arrival was to repudiate Eleanor, whose conduct during her residence in the East had been improper; but the bishops, to avoid scandal, dissolved the marriage on the plea that it was not valid because the king and queen were cousins. Suger, who was now dead, had strongly opposed on political grounds the dissolution of the marriage, and the event proved the justness of his foresight, for Eleanor married Henry of England and Normandy, afterwards Henry II., who by this marriage became possessed of Aquitania, Poitou, Maine, and in fact of one-third of France, comprising the whole maritime territory from Dieppe to Bayonne. Louis married Constance of Castile for his second wife. A war now broke out between him and Henry II. of England, which lasted several years, and ended by a peace in 1176, after which Henry as duke of Normandy and peer of France attended the coronation of Louis's son, Philip II., called 'Auguste,' in 1179. Louis died in September, 1180, at Paris, being sixty years of age.

LOUIS VIII., styled 'Cœur de Lion,' succeeded his father Philippe Auguste in 1223. Like his father, he was engaged in wars with the English, from whom he took the Limousin, Perigord, Aunis, and all the rest of the country north of the Garonne. At the request of the pope, he made war against the Albigenses, and laid siege to Avignon, where he died in 1226.

LOUIS IX., called St. Louis, succeeded his father Louis VIII. when he was twelve years of age, under the regency of his mother Blanche of Castile. During the minority of the king, there was a constant struggle between the crown and the great feudatories, at the head of whom were Thibaut, count of Champagne, and the count of Brittany. During this troubled period Queen Blanche displayed much character and considerable abilities. Her son, as soon as he was old enough, putting himself at the head of his faithful vassals, reduced the most refractory lords, and among others the count of Brittany, who came with a rope round his neck to ask pardon of the king, which was granted. Henry III. of England, who supported the rebels, was defeated by Louis near Saintes, upon which a truce of five years was signed between the two kings. During an illness Louis made a vow to visit the Holy Land, and in June, 1248, he set out for the East. He landed in Egypt, and took Damiat, but being defeated at the battle of Mansoura, he was taken prisoner, compelled to pay a heavy ransom, and to restore Damiat to the Mussulmans. From Egypt he sailed to Acre, and carried on the war in Palestine, but with no success, till the year 1254, when he returned to France. The best account of this expedition is by Joinville, who was present, 'Histoire de St. Louis,' edited by Ducange, with notes, folio, 1668. Louis on his return found ample occupation in checking the violence and oppressions of the nobles, whom he treated with wholesome rigour. He published several useful statutes, known by the title of 'Etablissemens de St. Louis;' he established a police at Paris, at the head of which he put a magistrate called prévôt; he classed the various trades into companies called confrairies; he established the college of theology, called La Sorbonne from the name of his confessor; he created a French navy, and made an advantageous treaty with the king of Aragon, by which the respective limits and jurisdictions of the two states were defined. The chief and almost the only fault of Louis, which was that of his age, was his religious intolerance; he issued oppressive ordonnances against the Jews, had a horror of heretics, and used to tell his friend Joinville 'that a layman ought not to dispute with the unbelievers, but strike them with a good sword across the body.' By an ordonnance he remitted to his Christian subjects the third of the debts which they owed to Jews, and this 'for the good of his soul.' (Martennes, *Thesaurus Anecdotorum*, vol. i., p. 980.) This same feeling of fanaticism led him to another crusade, against the advice of his best friends, in which he met his death. He sailed for Africa, laid siege to Tunis, and died in his camp, of the plague, in August, 1270. Pope Boniface VIII. canonized him as a saint in 1297. Louis's brother Charles, count of Anjou and Provence, took the kingdom of Naples from Manfred of Suabia, and established there the dynasty of Anjou. [Anjou.] (Joinville, Matthew Paris, and the French historians.)

LOUIS X., called 'Hutin,' an old French word meaning 'quarrelsome,' son of Philippe le Bel, succeeded his father in 1314. His uncle Charles de Valois had the principal share of the government during his reign, although the king was of age. Louis imprisoned and put to death his wife Margaret in 1315, on the ground of adultery, and then married Clemence of Hungary. He carried on an unsuccessful war against the count of Flanders, to maintain which he increased the taxes, sold the judicial offices, and obliged the crown serfs to purchase their freedom. Louis died, after a short reign, in 1316, not without suspicions of poison. He was succeeded by his brother Philip V.

LOUIS XI., son of Charles VII., succeeded his father in 1461, being then thirty-nine years of age. He had early exhibited a duplicity of disposition, for which his father mistrusted him. He had revolted against his father in

1456, and being defeated, had taken refuge at the court of Philip, duke of Burgundy, who protected him and maintained him for six years, until his father's death. Louis, when king, became the bitterest enemy of Charles, the son of Philip. The principal events of his reign are connected with those of Charles, and are described under BOURGOGNE. The cautious cunning and consummate hypocrisy of Louis gave him the advantage over the rash courage and headlong passion of Charles, which at last caused his ruin and death at the siege of Nanci, in January, 1477. Louis was successful in depressing the power of the feudal nobles, several of whom he put to death, and in rendering the authority of the crown independent of them. He took into his service a body of Swiss, and kept also ten thousand French infantry, whom he paid out of his own treasury. He carried on a war against Maximilian of Austria, who had married Mary of Burgundy, daughter and heiress of Duke Charles, and took from him Artois and Franche Comté: but at last peace was made between them by the treaty of Arras, in 1482. Louis also made peace with Edward IV. of England. Charles of Anjou, count of Provence, bequeathed that province to Louis XI., as well as his claims to the thrones of Naples and Sicily, a bequest which led to the subsequent attempts of the French to conquer Naples. Louis XI. died in 1483, being sixty years of age. He was a strange compound of daring and superstition, of abilities and weakness, of firmness and perseverance in his political views, joined to an abject meanness of sentiment and habit. The taille, or direct taxation, was tripled under his reign. He was the first who assumed the title of 'Most Christian King,' which was given him by the pope in 1469. The best account of Louis XI. is given by his contemporary and confidant Comines, in his 'Mémoires.'

LOUIS XII., son of Charles, duke of Orleans, descended from a younger son of Charles V., succeeded, in 1498, Charles VIII., who had left no children. He had been obliged by Louis XI. to marry his daughter Joan in 1476, but after his accession to the throne he dissolved the marriage, and married Anne of Britanny, the widow of Charles VIII. Louis asserted his claims to the duchy of Milan, which were derived from his grandmother Valentina Visconti, daughter of John Galeazzo, duke of Milan, and sister of the last duke Filippo Maria, who had died without leaving legitimate children. But Filippo Maria left a natural daughter Bianca, who had married the famous condottiere Francesco Sforza, who succeeded his father-in-law as duke of Milan, and the Sforza family had been confirmed in the possession of the duchy by the emperor, Milan being considered as a fief of the empire. Francesco was succeeded by his son Galeazzo, who, being murdered in 1475, left an infant son Gian Galeazzo, whose uncle Ludovico assumed the government during his minority. After the death of Gian Galeazzo in 1494, Ludovico, who was suspected of having poisoned his nephew, was proclaimed Duke, and confirmed by a diploma of the emperor Maximilian I. Louis however marched with an army into Italy and took possession of the duchy of Milan in 1499. In the following year he made Ludovico Sforza prisoner, and carried him to France, where he died in confinement. Emboldened by this success, Louis now put forward the claims of the crown of France to the possession of Naples derived from the Anjous. [LOUIS XI.] These claims had already been asserted by his predecessor Charles VIII., who however, after invading Naples, was obliged to give up his conquest. The Aragonese dynasty had resumed possession of that kingdom; and Frederic of Aragon, who was king of Naples, feeling that he was too weak to resist Lous XII., applied for assistance to his relative Ferdinand the Catholic, king of Spain, who sent him an army under the celebrated commander Gonzalo of Cordova. Louis had recourse to secret negotiations; he proposed to Ferdinand of Spain to dethrone his relative and protegé, and to divide the kingdom of Naples between them. Such a proposal was exactly suited to the character of Ferdinand, and he assented to it. Whilst Louis marched against Naples, Gonzalo, in consequence of secret orders from his master, was occupying in his name the towns of Calabria and Puglia; and a third worthy partner in such a transaction, Pope Alexander VI., gave to Louis the solemn investiture of the crown of Naples, which he had a few years before bestowed upon the unfortunate Frederic. The latter, perceiving the perfidiousness of his Spanish relative, surrendered himself to Louis, who gave him the duchy of Anjou and a pension for life. Louis and Ferdinand soon quarrelled about their respective shares of the spoil, and Ferdinand gave orders to Gonzalo to drive away the French from Naples. The two battles of Seminara and Cerignola, both fought in April, 1503, in which the French were defeated by the Spaniards, decided the fate of the kingdom of Naples, which became entirely subject to Spain. A few years after Pope Julius II. formed a league with Ferdinand and the Swiss to drive the French out of Italy altogether; and after three campaigns, Gaston de Foix, duke of Nemours, being killed at the battle of Ravenna, the French abandoned Lombardy; and Maximilian Sforza, son of Ludovico, supported by the Swiss, assumed the ducal crown of Milan in 1512. Louis sent a fresh army into Italy under La Trimouille, who was beaten at Novara by the Swiss, in June, 1513; and thus, after fifteen years of fighting, intrigues, and negotiations, the French lost all their conquests in Italy. Louis XII. has been styled by courtly historians 'the father of his people;' he was, in fact, kind-hearted towards his subjects, and he reduced the taxes by one-half; but his foreign policy was unjust and imprudent. In order to forward his ambitious purposes he allied himself to the atrocious Borgias and the unprincipled Ferdinand; and the calamities which his troops inflicted upon Italy, the horrors of the storming of Brescia, the cruel execution of Count Avogadro and his two sons because they resisted the invaders, and other atrocities committed by the French commanders, are great stains on the memory of this 'paternal' monarch. Having lost his best troops, he reluctantly gave up his Italian schemes, made peace with Ferdinand and the pope, and, at the age of fifty-three, married Mary, sister of Henry VIII. of England. His young wife made him forget his years and the weakness of his constitution: 'on her account,' says the biographer of Bayard, 'he changed all his mode of life; instead of dining at eight o'clock in the morning, or before, he fixed his dinner-hour at noon; and instead of going to bed at six in the evening, as heretofore, he often sat up till midnight.' He did not live quite three months after his marriage, and died at Paris, in January, 1515, leaving no male issue. He was succeeded by Francis I.

LOUIS XIII., son of Henri IV. and of Mary de' Medici, succeeded his father in 1610, being only nine years age, under the regency of his mother. In October, 1614, he was declared to be of age, and in the following year he married Anne, daughter of Philip III. of Spain. Concino Concini, maréchal d'Ancre, a Florentine, the favourite minister of the queen-dowager, had, by his insolence and his intrigues, excited the jealousy of many of the high nobility, with the prince of Condé at their head, who left the court and began a civil war. Louis XIII., who was impatient of the rule of his mother, and of the favourite, but had not spirit enough to shake it off, consulted with a young courtier called Luines, and by his advice ordered Vitri, an officer of his body-guard, to arrest the marshal. Vitri stopped him on the drawbridge of the Louvre; the marshal attempted to defend himself, upon which Vitri killed him. The people of Paris made great rejoicings at his death, dragged his body through the streets, cut it to pieces, and threw it into the river. The parliament of Paris declared him to have been guilty of treason and sorcery, and on the same grounds sentenced his wife, who was also a Florentine, named Galigai, to be beheaded, and her body burned, a sentence which was executed on the 8th July, 1617. This trial and sentence are amongst the most disgraceful of the old French judicature. The queen-dowager was sent to Blois under arrest. Luines now became the ruling favourite; for Louis was totally incapable of governing himself during the whole of his life. Some years after the queen-dowager escaped from Blois, and being supported by several nobles, the civil war broke out again; but Armand du Plessis, bishop of Luçon, known afterwards as Cardinal de Richelieu, acted as mediator between the king and his mother, in consequence of which he obtained a cardinal's hat, and in 1624 became minister, and lastly prime-minister, which he continued to be till, his death in 1642. Richelieu was certainly one of the greatest ministers of France under the old monarchy; fertile in resources, firm, sagacious, and unscrupulous, he succeeded in humbling and weakening the feudal nobility, and thus paved the way for the absolute government of Louis XIV. He checked the ambition of the house of Austria by assisting, first secretly and afterwards openly, the German Protestant states and the Swedes, by which means France acquired a considerable influence in the affairs of the Empire. In 1628 Richelieu took La Rochelle, the great stronghold of the Protestants of France, which had often withstood the kingly forces under the former reigns. The French armies took an important part in the thirty years' war; they acted on the Rhine in concert with the Swedes, whilst another French army carried on the war in Italy against the Spaniards, a third army was fighting in Flanders, and a fourth on the frontiers of Catalonia. The French were generally successful: they took Roussillon, Alsace, the duchy of Bar, and other provinces. In December, 1642, Richelieu died at Paris, being 58 years of age. His great object had been, during all his ministry, to render the government of the king absolute, and he succeeded. Richelieu at the same time patronized learning and the fine arts; he established the royal press; he embellished Paris; he was magnificent and high-minded: his ambition was not a selfish or a vulgar one. Among his agents and confidants there was a Capuchin, called Father Joseph, whom he employed in the most secret and important affairs, and who seems to have equalled his master in abilities.

Louis survived his minister only a few months; he died in May, 1643, leaving his son Louis XIV. a minor, under the regency of the queen-mother.

(Hénault, *Abrégé de l'Histoire de France; Vie du véritable Père Joseph;* Coxe and the other historians of the Thirty Years' War.)

LOUIS XIV. succeeded his father in 1643, being then hardly five years old. His reign, including his minority, lasted seventy-two years, a long and important period, marked by many events and vicissitudes all over Europe, in most of which Louis took an active part. The history of such a reign requires volumes, and has been written or adverted to and commented upon by numerous historians who have treated of that age. But the best works for making us acquainted with the character of Louis and of his government, and the condition of France under his reign, are the contemporary memoirs of St. Simon, Dangeau, Louville, Noailles, Cardinal de Retz, Madame de Motteville, and others, and above all the writings of Louis XIV. himself, especially his *Instructions pour le Dauphin,* which reveal his most secret thoughts. Cardinal Mazarin, an Italian by birth and a pupil of Richelieu, but inferior to his master, was the minister of the regency during the minority of Louis. He continued the war against Spain and the emperor of Germany in conjunction with the Swedes. Turenne, the marshal of Grammont, and the duke of Enghien, afterwards the great Condé, distinguished themselves in those wars. The treaties of Münster and Osnabruck (1648) put an end to the thirty years' war, and Mazarin had the satisfaction of concluding this peace, called that of Westphalia, by which France acquired Alsace, the Suntgau, and the seigniory of the bishoprics of Metz, Toul, and Verdun. The same year however that the war in Germany was terminated the civil war of La Fronde broke out in France. [FRONDE, LA.] The parliament of Paris and several of the high nobility revolted against the authority of the cardinal. Louis, then ten years of age, the queen regent, and Mazarin, were obliged to leave the capital in January, 1649, and this humiliation seems to have made a deep impression on the mind of Louis, and to have contributed to render him mistrustful, arbitrary, and stern. After some fighting, peace was made, and the court re-entered Paris in the month of August. This was the same year in which Charles I. was beheaded in England and the monarchy abolished. The prince of Condé, who had been the means of appeasing the civil war, having given offence to the queen and the cardinal, was arrested, and Turenne and other Frondeurs began again the civil war in the following year (1650). [CONDÉ, LOUIS DE.] In 1651 the queen ordered the release of Condé; Turenne made his peace with the court, and Mazarin was exiled by a sentence of the parliament of Paris. Condé however continued the war, and being joined by the duke of Orleans, took possession of Paris, which the court had left again. In October, 1652, an arrangement took place, the king re-entered Paris, Condé emigrated to join the Spaniards, the cardinal de Retz, one of the chief actors in the disturbances, was put in prison at Vincennes, and Mazarin himself returned to Paris in February, 1653, and resumed the ministry. In 1654 Louis XIV. made his first campaign in Flanders against the Spaniards. In the following year he concluded a treaty of alliance with Cromwell against Spain. The war continued that and the next year with various success; Turenne commanded the French troops, and the prince of Condé fought on the side of the Spaniards against his own country.

In 1567 the emperor Ferdinand III. died, and Mazarin intrigued to prevent the election of his son Leopold, and to obtain the imperial dignity for Louis XIV. He began by supporting, through his agents at the Diet, the pretensions of the elector of Bavaria, and representing and exaggerating the danger to the liberties of Germany which would attend another election of an Austrian prince to the imperial throne. It was soon found however that the elector of Bavaria was not likely to be nominated, and Mazarin then intrigued separately with the electors in favour of Louis. He bribed, by actual disbursements of money and ample promises of territorial aggrandisement, the archbishops electors of Treves and Cologne, as well as the elector-palatine, and even the elector of Brandenburg. Had he succeeded in gaining over the elector of Mayence, John Philip de Schœnborn, chancellor of the empire, Louis XIV. would have succeeded. Louis himself repaired to Metz, his army being cantoned in that neighbourhood, as if to support his pretensions.* The cardinal sent to the Diet at Frankfort the marshal of Grammont and M. de Lyonne to further his object. In his instructions he empowered them to offer to the elector of Mayence 300,000 livres, besides a revenue of 90,000 more for his relations, and, if necessary, to send at once to Frankfort the value of 1,200,000 livres in plate and other valuable objects as a security. (*Instructions adressées de Stenay, le* 29 *Juillet,* 1657, *par Mazarin, à Messrs. de Grammont et de Lyonne,* quoted by Lemontey among the *Pièces Justificatives* of his *Essai sur l'Etablissement Monarchique de Louis XIV.*) The elector of Mayence however adjourned the election to the following year, and wrote to Leopold of Austria, king of Hungary and Bohemia, son of Ferdinand, promising him his vote. The other electors kept the money they had received from Mazarin, and turned also in favour of Leopold, who was unanimously elected in 1658. From that time began the bitter animosity of Louis against Leopold, which lasted half a century, and was the cause of three long and bloody wars.

Meantime the war with Spain was brought to a close in November, 1659, by cardinal Mazarin, by the treaty of the Bidasoa, in which the marriage between the Infanta Maria Theresa, daughter of Philip IV. of Spain, and Louis XIV., was concluded. Spain gave up the Artois and Roussillon, and stipulated for a free pardon to the Prince of Condé.

The new queen was married and made her entrance into Paris the following year (1660). She brought with her half a million of crowns as a dowry. She was extremely weak in her intellect and childish in her habits, but harmless and good-natured. Louis XIV. always behaved to her with considerate regard, but never felt any affection towards her, and he resorted to the society of a succession of mistresses, of whom Mademoiselle de la Vallière, Madame de Montespan, and Madame de Maintenon are the most known.

In February, 1661, Mazarin concluded at Vincennes a third and last treaty with Charles, duke of Lorraine, by which Strasburg, Phalsburg, Stenai, and other places were given up to France. Nine days after this treaty Mazarin expired, at fifty-nine years of age, leaving a large fortune to his nieces Mancini, and to his nephew, whom he made duke of Nevers. Mazarin was more successful at the close of his career, in his treaties of peace, than he had been in his wars and former negotiations. The following satirical epitaph, published at the time, expresses the common feeling in that respect:—

> 'Enfin le cardinal a terminé son sort;
> Français! que dirons-nous de ce grand personnage?
> Il a fait la paix, il est mort;
> Il ne pouvoit pour nous rien faire davantage.'

With the death of Cardinal Mazarin began the real emancipation of Louis XIV., who from that moment took the reins of the government entirely into his hands. He dismissed and imprisoned Fouquet, the superintendent or minister of finance, and had him tried on the charges of peculation and treason by an extraordinary commission, which condemned him to banishment; but Louis aggravated the sentence by shutting him up in the castle of Pignerol, in the Alps, where he died in 1680. In appointing Colbert in the room of Fouquet, Louis made a good choice, and much of the splendour of his reign is due to that able minister. [COLBERT, JEAN BAPTISTE.] The ruling principle of Louis XIV. was pure absolutism. The king, according to him, represented the whole nation; all power, all authority, were vested in him. 'L'état, c'est moi!' was his well-known expression. This form of government, he said, was the best suited to the character of the nation, its habits, its tastes, its situation. In his written instructions to the dauphin he tells him that 'all which is found in the extent of our dominions, of whatever nature it be, belongs to us. The monies in our treasury, as well as those which are in charge of the receivers and treasurers, and those which we leave in the hands of our subjects for the purposes of trade, are all alike under our care. You must be convinced that kings are absolute lords, and have the full and entire disposal of all property, whether in the possession of the clergy or of laymen, and may use it at all times as wise economists. Likewise the lives of their subjects are their own property, and they ought to be careful and sparing of them. . . He who has given kings to men has ordered them to be respected as his lieutenants, reserving to himself alone the right of examining their conduct. It is his will that whoever is born a subject should obey without discrimination or reservation. . . . The essential defect of the monarchy of England is that the prince cannot raise men or money without the parliament, nor keep the parliament assembled without lessening thereby his own authority.' (*Œuvres de Louis XIV.*, vol. ii., Paris, 1816.)

Louis XIV. completed the work begun by Richelieu: he changed France from a feudal monarchy into an absolute one. Ximenes, Charles V., and Philip II. had effected the same change in Spain; but they had the clergy and the Inquisition to support and share their power, and the absolutism of Spain stood longer than that of France. Louis enticed the high nobility from their rural mansions, attracted them to court, employed them about his person, gave them pensions or placed them in his regular army, and completely broke down their former spirit of independence. With regard to the church, he distributed its temporalities to his favourites, both clerical and lay, bestowed livings and pensions and abbacies in commendam on courtly abbés, and thus rendered the clergy docile and subservient to the crown. He had several disputes with the court of Rome, in which he treated the pope with great asperity; twice he braved the pontiff, through his ambassador, in the middle of Rome [ALEXANDER VII.; INNOCENT XI.]; twice he seized upon Avignon, and twice he obliged the papal court to make him humble apologies. In his old age he became very devout, intolerant, and superstitious, and yet he mistrusted the papal court: 'You know,' he wrote to his ambassador, 'that the court of Rome always seeks for opportunities and pretences to extend its authority; that whatever concession it obtains from other states through the necessities of the times and political expediency it afterwards considers as its own right; and that when at last a king takes up the defence of his own prerogatives, he finds himself involved in much more serious disputes than if he had stood out against encroachment at first.' (*Lettre du Roi au Cardinal d'Estrées*, 27 *Mai*, 1703.)

After the death of Mazarin, Louis admitted no more ecclesiastics into his council. The spirit of jealousy of the Gallican church made it less dependent on Rome and more subservient to the crown; and the hostility of the magistracy against the clergy furnished the king with an arm always ready to check any mutinous disposition in the clerical body. Louis XIV. made the throne support the church, but did not look to the church for a support to the throne. He endeavoured to stop the increase of monks and monasteries, whom he describes, in his 'Instructions pour le Dauphin,' as 'useless to the church and burthensome to the state.'

The parliaments were also subdued, like the nobility and clergy, by the absolute will of Louis. When only seventeen years of age, in 1655, the parliament of Paris having made some remonstrances against an edict of the king concerning the coinage, he rode from Vincennes to Paris, entered the hall of the parliament, booted as he was, holding his whip in his hand, and, addressing the first president, told him that the meetings of that body had produced calamities enough, and that he ordered them to cease discussing his edicts. 'And you, Mr. President,' said he, 'I forbid you to allow it.'

In 1657 Louis issued an edict forbidding the parliament of Paris from making any remonstrances concerning the royal edicts before registering them, and not until eight days after it had obediently registered them, after which the parliament might address him written remonstrances. From that time and to the end of his reign the parliament offered little or no impediment to the royal authority; it withdrew itself from state affairs, and confined itself to its judicial functions.

Having destroyed all opposition from the only orders which enjoyed any consideration in the state, Louis took care to make it known to the tiers état, or commons, that it was not for its advantage that he had humbled the privileged classes. In fact, he did not consider the tiers état as forming a class, but as an ignoble crowd of roturiers who were doomed to work for him and to obey his mandates, and from amongst whom he deigned from time to time to select some individuals as objects of his favour. In his celebrated edict of 1679, concerning duels, he speaks with the most insulting contempt of all persons 'of ignoble birth' who are 'insolent enough' to call out gentlemen to fight; and in case of death or serious wounds resulting therefrom, he sentences them to be strangled and their goods confiscated, and awards the same penalties to those gentlemen who shall presume to fight against 'unworthy persons and for abject causes.' This law, most offensive to the great mass of the French people, was confirmed after Louis's death by the edict of February, 1723, and continued in vigour till the fall of the old monarchy.

Louis established that system of centralization in the administration which has been followed and rendered more complete by the various governments that have succeeded each other till our own days, and which renders France the most compact power in Europe, and in which the action of the executive residing at Paris is felt at every step by every individual in the most remote corners of the kingdom. He at the same time began the first labours for a regular system of legislation, by issuing separate ordonnances for civil and criminal process, for commercial matters, for the woods and forests, and for the marine, and which with all their imperfections formed the basis of distinct codes. The education of Louis had been very imperfect, and he was himself in great measure uninformed; but he encouraged science and literature, for which he was rewarded by numerous flatteries. His reign was a brilliant epoch of learning in France. With regard to the arts, he had more pomp than taste; he felt a pride in conquering obstacles, as the millions he lavished on Versailles, in a most unfavourable locality, amply testify.

Louis XIV. hated the Protestants, not so much from religious bigotry as because he considered them as rebellious subjects; he wanted uniformity in everything, in religion as well as politics. This led him to that most unjust and disastrous measure, the revocation of the edict of Nantes, in 1685, by which Protestantism was proscribed in France. France lost thousands of its most industrious citizens, who repaired to England, Switzerland, Holland and Germany, carrying with them their manufacturing skill, and all the efforts of Colbert to encourage French industry were rendered abortive by that cruel and fanatical act, of which the revolt of the Cévennes and the war of extermination which followed were remote consequences. The persecution of the Jansenists was another consequence of Louis's intolerance.

The foreign wars of Louis XIV. proceeded in great measure from the same ruling principles or prejudices of his mind. He disliked the Dutch, whom he considered as mercantile plebeians, heretics, and republicans, 'a body formed of too many heads, which cannot be warmed by the fire of noble passions' (*Instructions pour le Dauphin*, vol. ii., p. 201); and he carried his antipathy to the grave, without having succeeded in subjecting that small nation, whose wealth excited enemies against him everywhere. It is impossible not to be struck with the similarity of prejudices in two men, however dissimilar in some respects, Napoleon and Louis XIV. The hatred of Napoleon against England, which he designated as a nation of shop-keepers, was like that of Louis against the Dutch, and it produced similar results to his empire. The same determination of establishing uniformity in everything; the same mania for a unity and singleness of power, which both mistook for strength; the same ambition of making France the ruling nation of Europe under an absolute ruler, were alike the dominant principles, or rather passions, of the 'legitimate and most Christian king,' and of the plebeian 'child and champion of the Revolution.' Several of the plans and schemes of Louis XIV., relative to foreign conquests, were found in the archives, and were revived and acted upon by Bonaparte.

The first war of Louis XIV. against the emperor Leopold, Holland, and Spain, was ended by the treaty of Nymegen, 1678. Louis kept the Franche Comté and part of the Spanish Netherlands. The war broke out again in 1689, between Louis on one side, and the Empire, Holland, and England on the other. Louis undertook to support James II. in Ireland, but the battle of the Boyne and the capitulation of Limerick put an end to the hopes of the Stuarts, and James II. passed the rest of his life in exile at St. Germain-en-Laye, where he died a pensioner of the French king. In Germany Louis XIV. caused one of the most atrocious acts recorded in the history of modern warfare. This was no less than the devastation of the Palatinate by his commanders, A district of more than thirty English miles in length, with the towns of Heidelberg, Manheim, Speyer, Oppenheim, Crutzenach, Frankenthal, Ingelheim, Bacharach, Sinzheim, and others, was ravaged, plundered, and burnt, in cold blood, under the pretence of forming a barrier between the French army and its enemies. A cry of indignation resounded throughout all Europe at the disastrous news. It was just about this time that James Stuart solicited, from his exile at St. Germain, the assistance of the emperor against William of Orange, in the name of legitimacy and the Catholic religion. Leopold in his answer observed, 'that there are no people who injure so much the cause of religion as the French themselves, who on one side support the Turks, the enemies of all Christendom, to the detriment of the Empire; and on the other, have ravaged and burnt innocent towns, which had surrendered by capitulations signed by the hand of the Dauphin: they have burnt the palaces of princes, plundered the churches, carried away the inhabitants as slaves, and treated Catholics with a cruelty of which the Turks themselves would be ashamed.' (*Letter from the Emperor Leopold to James II.*, 9th April, 1689, in the *Mémoires de Jacques II.*, vol. iv.) In 1693 the unfortunate town of Heidelberg, which had been partly restored by the inhabitants, was taken again by the French marshal De Lorges, the women were violated, the churches set on fire, and the inhabitants in general, 15,000 in number, stripped of every thing and driven away from their homes. On these news a 'Te Deum' was sung at Paris, and a coin struck, which represented the town in flames, with the inscription, 'Rex dixit et factum est!' The treaty of Ryswick, in 1697, terminated the war, by which Louis gained nothing, acknowledged William III. as king of Great Britain, and restored the duke of Lorraine to his dominions.

The third war of Louis was that of the Spanish succession. It began in 1701 and lasted 13 years, convulsed all Europe, and was terminated at last by the peace of Utrecht in 1713. Louis succeeded in establishing a Bourbon dynasty in Spain, but this was the only advantage he gained; his armies had been repeatedly defeated by Eugene and Marlborough, his best generals were dead, his treasury was exhausted, his subjects were tired of war and of taxes, and he himself was broken down in health and spirits, a mere shadow of what he had been. He lingered about two years more, during which he legitimated his numerous natural children; made his will, by which he appointed his nephew, Philip Duke of Orleans, regent during the minority of his great-grandson and heir Louis XV.; fell ill in August, 1715, and died the 1st of the following September, 77 years of age.

After divesting the character of Louis XIV. of the exaggerated praise bestowed on him by flattery or national vanity, after animadverting upon his numerous faults, and even crimes, it must be fairly acknowledged that he was a remarkable prince, and had many valuable qualities. He was active, intelligent, and regular in business; quick in discovering the abilities of others, an able administrator himself, endowed with a constant equanimity in adversity as well as prosperity, and a perfect self-command; a kind master, he was not prone to change his servants capriciously, was not harsh in rebuking them, and was ever ready to encourage merit, and praise and reward zeal for his service. Hence he had many faithful and devoted servants. His manner was noble, and his appearance imposing; he acted the king, but he acted it admirably, at least to the then taste of the people; he had a lively sense of decorum and outward propriety, which never forsook him. What he knew he learnt by himself: his natural gifts and the experience of his youth, passed among civil wars, made up for his want of learning and of study. If he carried his notions of absolutism to an extreme, he was evidently persuaded of his supposed right, and acted as much from a sense of duty as from inclination. In his reign of seventy-two years he reared the fabric of the absolute monarchy in France, which continued for seventy-two years more after his death; and when it was shaken to pieces in the storms of the Revolution, still the ruling principles of his administration, uniformity and centralization, survived the wreck, and France is still governed by them.

Louis XIV. raised the revenue of France to 750 millions of livres, or about 30 millions sterling, an enormous sum considering the then poverty of the country. The taille, or direct tax, was very unequally assessed. The evils of the system of taxation under his reign are exhibited in a book, printed in 1694, called 'A Compendious History of the Taxes in France.' Louis spent 3865 millons of livres for his two last wars, that which ended by the peace of Ryswick, and the war of the Spanish succession, and he left at his death a debt of more than two thousand millions. He set up the fatal example of those enormous permanent armies which the other powers of Europe were obliged to imitate in their own defence, and thus gave that mistaken impulse towards making France a nation of soldiers, which has been the occasion of much mischief ever since. (*Mémoires Complets et Authentiques du Duc de St. Simon sur le Siècle de Louis XIV.*, 21 vols. 8vo., Paris, 1829-30; Lemontey, *Essai sur l'Etablissement monarchique de Louis XIV., et sur les Altérations qu'il eprouva pendant la Vie de ce Prince*, forming the 5th vol. of the 'Œuvres de P. E. Lemontey,' Paris, 1829; Hénault, *Abrégé Chronologique de l'Histoire de France*; Voltaire, *Siècle de Louis XIV.*; and the other French historians.)

LOUIS XV., born in February, 1710, was the only surviving son of the duke de Bourgogne, eldest son of Louis the Dauphin, son of Louis XIV. The Dauphin died in 1711, and his son the duke of Bourgogne died in 1712. The younger brother of the duke of Bourgogne was Philip, duke of Anjou, afterwards Philip V. of Spain, who, except his nephew Louis XV., was the only legitimate descendant of Louis XIV. who survived that king. The mother of Louis XV. was Maria Adelaide of Savoy, who died in 1712. Philippe d'Orléans, son of Philippe de France, brother of Louis XIV., and the head of the actual Orléans branch of the Bourbons, was appointed regent. Louis XIV. had by his will appointed a council of regency, at the head of which was the duke of Orleans, but the parliament of Paris acknowledged the duke as sole regent. In gratitude the Regent issued, on the 15th September, a declaration, in the name of the king, restoring to the parliament the right of making remonstrances on the royal edicts, letters patent, and declarations, before it registered them.

The duke of Orleans had acquired an unfavourable reputation as a man of licentious habits, and as destitute of religious and moral principles. This corruption was partly ascribed to the Abbé Dubois, an unprincipled man, who had been his preceptor, continued to be his favourite, and was afterwards his minister. Vicious as the duke was, he was accused of crimes of which he was guiltless. The sudden death of the children and grandchildren of Louis XIV., at short intervals from each other, had given rise to horrible suspicions, which have been since generally rejected. The 'Mémoires de St. Simon,' already quoted, which include the period of the regency, contain the most correct sketch of the character of the duke of Orleans, a character not rightly understood till the publication of that work.

The Regent began well: he reformed several of the most outrageous abuses of the late reign, he liberated a number of individuals who had been for years immured in the Bastille; he enforced economy, reduced the army, supported the general peace of Europe, courted the friendship of England, concluded the triple alliance of the Hague in 1717, between France, England, and Holland, and gave up altogether the cause of the Pretender. Unfortunately for him and for France, the disorder in which he found the finances, and the fearful deficiency in the revenue, made him listen to the wild schemes of Law, which ended in disappointment and the ruin of thousands of families. [Law, John.]

Philip V. of Spain, or rather his minister Alberoni, ha-encouraged a conspiracy against the duke of Orleans, the object of which was to excite a revolution against him, to deprive him of the regency by a resolution of the three estates of the kingdom, and to place Philip himself at the head of the regency. The plot was discovered, several of the leaders, who were chiefly in Britanny, were punished by death, and in 1719 the Regent declared war against Spain. The war however did not last long, Alberoni was dismissed and banished by his sovereign, and Philip of Spain made peace with France in 1720. [ALBERONI.] In 1722 Dubois, who had been made a cardinal, became prime minister of France.

In February, 1723, Louis XV., having completed his fourteenth year, was declared of age, and the regency of the duke of Orleans terminated. The same year Dubois died, and was followed to the grave by the duke of Orleans a few months after. The duke de Bourbon Condé was made prime minister, and governed France until 1726. It was proposed to marry Louis XV. to Mademoiselle de Sens, the duke's sister, who was a rare instance of virtue, beauty, and modesty united, in those times, but she refused, and preferred a life of retirement to a throne. Louis married, in 1725, Maria Leczinska, daughter of Stanislaus, ex-king of Poland, and in the following year the duke of Bourbon was dismissed from the ministry, and the Abbé de Fleury, the king's preceptor, and afterwards cardinal, was substituted for him The seventeen years of Fleury's administration, which ended with his death in 1743, were the best period of the reign of Louis. [FLEURY, ANDRE HERCULES.] Fleury restored order in the finances, and credit and commerce revived. In 1733 the war of the Polish succession broke out, by the death of king Augustus II., when Louis XV. took the part of his father-in-law Stanislaus, the old rival of Augustus, against Austria and Russia, who supported the son of Augustus. [AUGUSTUS III.]

The war was carried on between France and Austria both on the Rhine and in Italy. In the latter country the French, being joined by the Spaniards and the king of Sardinia, obtained great success. Don Carlos, son of Philip V., conquered the kingdom of Naples and Sicily, and thus a third Bourbon dynasty was founded in Europe. Peace was made in 1736, by which the duchy of Lorraine was given to Stanislaus for his life, to be united after his death to the crown of France. Francis, duke of Lorraine, had Tuscany in exchange. In 1741 the war of the Austrian successor broke out, in which France took part, against the advice of Fleury, who was overruled by the king and the courtiers. In 1743 Fleury died, and Louis declared that he would govern by himself, and without any prime minister. The war continued till 1748, when it was terminated by the treaty of Aix-la-Chapelle. France derived no advantage from this murderous and expensive war, and Maria Theresa remained in possession of her father's dominions. Louis XV. was present at the battle of Fontenoi, in May, 1745, between the English, commanded by the Duke of Cumberland, and the French, commanded by Marshal de Saxe, in which both armies fought with the greatest obstinacy and suffered most severely; the French however claimed the victory.

In 1755 hostilities were begun by the English against the French in America, in consequence of disputes concerning the boundary-line between Canada and the English settlements. In the following year war was formally declared between the two powers. This war connected itself with the war in Europe called the Seven Years' War. The English were the allies of Frederick of Prussia, whilst the French joined the empress Maria Theresa. This war proved most unfortunate to France. The French were beaten at Rosbach by Frederick, in 1757, and were defeated again at Minden by the Duke Ferdinand of Brunswick, with the loss of 8000 men, cannon, baggage, military chest, &c. In America they lost Canada. A project of invasion of England by means of six thousand flat-bottomed boats, by which landings were to be effected on various points of the coast was revealed to the English ministry by an Irishman called Macallister, and was abandoned. At last by the peace of Paris, February, 1763, France formally ceded Canada, Nova Scotia, and its other North American colonies, besides Granada, Dominica, and Tobago in the West Indies; its navy never after recovered from its losses, its finances were exhausted, and its commerce destroyed. This was the last war of Louis XV., a war which was undertaken rashly and terminated in a disastrous and humiliating manner. The feeling of disgrace resulting from it sunk deeply into the heart of a people so vain and sensitive as the French, and it completely did away with the former popularity of Louis, which had once obtained him the title of 'Bienaimé,' or beloved. The king had now abandoned himself to gross licentiousness, and had become careless of state affairs. The mad attempt of Damiens made him still more alienated from his people. [DAMIENS.] After the death of his mistress, the Marchioness of Pompadour, an ambitious intriguing woman, but who had still some elevation of mind, he became attached to more vulgar women [BARRY, MARIE JEANNE], and at last formed a regular harem after the fashion of the Eastern sultans, but more odious from its contrast with European manners, which was called the Parc aux Cerfs, and upon which vast sums were squandered. The minister of foreign affairs, Choiseul, who had remonstrated with the king upon his degradation, was dismissed in 1770. He was the last man of some merit who served Louis XV. [CHOISEUL, ETIENNE FRANÇOIS, DUC DE.] The state of the finances was the most obvious difficulty of ministers, to whose remonstrances, urged sometimes in a tone of appalling and ominous seriousness, Louis used to answer, 'Try to make things go on as long as I am to live; after my death it will be as it may.'

Louis died at Versailles, on the 10th May, 1774, 64 years of age. Two sons whom he had had by his wife were both dead: the eldest, the Dauphin, died in 1765, and left by his wife, a Saxon princess, three sons, who have been in succession kings of France, namely, Louis XVI., Louis XVIII., and Charles X. Louis XV. had also by his wife several daughters, besides illegitimate children.

It was under Louis XV. that the corruption of morals and principles spread in France to an alarming extent among all classes, being encouraged by the materialism and sensual philosophy which were taught by several men of letters. Both these causes, added to the general poverty, national humiliation, and ruined finances, prepared the way for the explosion which took place under his unfortunate successor. (Lacretelle; Fantin des Odoards; Voltaire, *Vie Privée de Louis XV.*)

LOUIS XVI., grandson of Louis XV., succeeded him in 1774, being then twenty years of age. He had married in 1770 Marie Antoinette, archduchess of Austria, sister of Joseph II. He chose for his minister of finance Turgot, an honest and enlightened man, who, in concert with his colleague Malesherbes, perceiving the temper of the times, wished the king to take the reform into his own hands, by abolishing the corvées and other feudal exactions, equalizing the direct taxes all over the kingdom, granting liberty of conscience and recalling the Protestants, reforming the criminal code, compiling a uniform civil code, giving freedom of trade, rendering the civil power independent of all ecclesiastical jurisdiction, suppressing the greater part of the convents, and establishing a new system of public instruction. These were the real wants of France; if they could have been satisfied, the revolution would have become unnecessary. But the clergy and the nobility strongly opposed these projects, the parliaments themselves were averse to changes which would reduce their own importance, and the old count de Maurepas, who was also one of the cabinet, dissuaded the young king from them. Turgot was dismissed. Louis however, following his own natural disposition, effected much partial good; he abolished the corvées and the practice of torture, granted liberty of trade in corn in the interior of the kingdom between one province and another, made many reforms in the administration, established a system of economy and order, and gave the first example of it himself in his own household. He also granted toleration to the Protestants. But all these were little more than palliatives, and did not strike at the root of existing evils. The deficiency in the treasury, and the debt of four thousand millions of livres left by Louis XV., were the great stumbling-block of Louis's administration. He however went on for some years, during which he engaged in a war against England, which was very popular with the French, humbled as they had been in the preceding struggle with that power. The object of this war was a singular one for an absolute monarchy to embark in; it was in support of the revolted colonies of North America, which had declared their independence of Great Britain, and it has been since considered by many as a political blunder on the part of the French monarch. On the 6th February, 1778, a treaty of commerce and alliance was signed at Paris between the French cabinet and Franklin and Silas Deane on behalf of the United States, by which the latter were acknowledged by France as an independent community. In the following May a French fleet under count d'Estaing sailed for America, in June the first hostilities took place at sea, and on the 10th July France declared war against England, and 40,000 men were assembled in Normandy for the invasion of England. This plan however was not carried into effect, because the French and Spanish fleets, which were to protect the landing, were dispersed by contrary winds. In America the French auxiliary troops, joined to the Americans, were successful against the English. [Fayette, La.] At sea many engagements took place between the French and English, both in the Atlantic and the Indian seas, without any very decisive advantage on either side; but on the 12th April, 1782, the French Admiral De Grasse was completely defeated by Admiral Rodney off the island of Dominica, with the loss of five ships of the line, and was taken prisoner. In September of the same year the attack of the French and Spaniards upon Gibraltar failed. [Arçon.] In September, 1783, peace was concluded at Versailles; England acknowledged the independence of the United States, and gave up to France Tobago and the coast of Senegal.

Meantime the financial embarrassment of the French government went on increasing. Necker, a Genevese banker, wealthy and retired from business, having become minister of finance in 1776, made many reforms, effected a new and more equitable assessment of the direct taxes, established provincial assemblies of notables, who apportioned the taxes, and put an end to the enormous gains of the fermiers-généraux. [Farmers-General.] After five years of war his 'compte rendu' showed a surplus of ten millions of livres; he had borrowed 530 millions at a less interest than had ever been known in times of war; the discount on exchequer-bills, which had been sixteen per cent., was reduced to eight, and all this without any addition to the burthens of the people.

In November, 1783, by a court cabal Necker was dismissed, and Calonne, a more pliant and courtly person, was substituted. He managed to go on a little longer, involved himself in a dispute with the parliament of Paris, and at last, being unable to proceed any further, he proposed to the king to call together an assembly of the notables selected by the king from the various provinces, to consult upon the means of supplying the deficiency in the revenue, which Calonne stated to amount to 110 millions of livres. This assembly met at Versailles in February, 1787, rejected Calonne's proposal of laying additional taxes upon property (the notables themselves were all landed proprietors), and proposed instead several measures, among others a loan on life annuities, and the formation of a council of finance. The king adopted their measures, and then dissolved the assembly. A paper-war now took place between Necker and Calonne on the respective merits of their administrations, and Calonne, being detected by the king in a falsehood, was dismissed. Several successive ministers followed for short periods, but they could do nothing to retrieve the ruinous state of affairs, and at last Necker was recalled. He stated to the king that the only resource left was to call together the states-general of the kingdom, which had not been assembled since 1614. The king convoked them at Versailles in May, 1789. These states had always consisted of the three orders, clergy, nobility, and the third estate, or commons. Every order formed a separate house, in which it discussed the measures proposed by the government, and decided by a majority of votes. By this means any project of law displeasing to the two privileged orders was sure not to pass those two houses, and was therefore lost. Necker, to obviate this difficulty, proposed to give to the third estate a double vote, so as to balance the votes of the other two houses. The king, after some hesitation, gave this double vote to the third estate, and this was in fact the beginning of the Revolution. It is remarkable that Monsieur, the king's brother, afterwards Louis XVIII., was one of those who supported this organic change.

On the 5th of May, the three estates having assembled in the common-hall, the king opened the session by a temperate speech, which was much applauded, after which the clergy and nobility withdrew to their separate rooms to deliberate among themselves. The third estate remained in the common-hall, and in the following sittings proposed that the three orders should assemble and deliberate together, which the other two refused. On the 10th the third estate elected Bailly for their president; and on the following day they were joined by several deputies of the clergy. On the 17th, on the motion of the abbé Siéyes, the third estate, joined by many of the clergy, constituted themselves as a national assembly, and resolved that as soon as that assembly should be prorogued or dissolved, all taxes not sanctioned by it should cease to be legal. The court was alarmed at these innovations, and the king announced that he was going to hold a royal sitting. Meantime the doors of the hall of the assembly were closed, and a guard placed there to prevent the deputies from entering. Bailly led them, on the 20th, to the 'Jeu de paume,' where they swore not to separate until they had framed and enforced a new constitution for the kingdom, and the redress of existing grievances. On the 23rd the king convoked the three estates in the common-hall, and after qualifying the resolutions of the 17th preceding as illegal, ordered the estates to leave the hall, and withdraw each to their appropriate chamber, to deliberate there upon certain subjects which he laid before them. After the king's departure, the third estate, joined by part of the clergy, refused to leave the hall, and when the grand-master of the ceremonies came to enforce the king's order, Mirabeau answered him, that they were there to fulfil their duty towards their constituents, and that force alone should disperse them. On the 25th, part of the deputies of the nobility joined the third estate, and the name of national assembly was publicly recognised. The events that followed rapidly are too numerous and too generally known to be inserted in this article. The national assembly, by the constitution it formed, changed the old French monarchy into a representative republic, with a single chamber, and an hereditary magistrate, with the name of king, whose power however was rendered insignificant and nugatory. They suppressed not only the feudal jurisdictions, but also the manorial dues and fees; the titles of nobility; the tithes, convents, and the corporations of trades; they confiscated the property of the church; they abolished the old division of the kingdom by provinces, and ordered a new one by departments: they changed entirely the social relations of the country, so that even Mirabeau was startled at the rapidity with which they were legislating, and began to express ominous doubts of the result. (Dumont, *Souvenirs de Mirabeau.*) 'It is easy to destroy,' he said, 'but we want men able to reconstruct.' Paine's pamphlet on the supposed 'Rights of Man' was gravely assumed by that assembly as the basis of their political theory. Meantime insurrections broke out in Paris and in the provinces: not only the abominable Bastille was taken and destroyed, July, 1789, but the châteaux, or manorial residences of the nobility, all about the country, were attacked and burnt, with many acts of atrocity. On the 6th October the palace of Versailles was entered by a mob from Paris, the body-guards were murdered, the royal family were in great danger, and at last the king consented to remove to Paris, whither he was escorted by the armed populace. On the same day the famous club of the Jacobins began its meetings at Paris. [Jacobins.] The emigration of the nobles had already begun: several members of the royal family repaired to Germany and Italy. The year 1790 was passed amidst alarms and insurrections in the interior, and rumours of foreign war, amidst which the assembly continued its labours for the new organization of France. It passed a law requiring of all the clergy the oath of fidelity to the new constitution: the pope forbade the oath as schismatic, and many of the French clergy refused to take it, but they were dismissed from their functions and replaced by others more docile, who however had not the confidence of the more religious among their flocks. Thus religious schism was added to civil feuds. The king himself was obliged to send away his chaplains. He had by this time become weary of being a mere puppet in the hands of the assembly, which had despoiled him of almost every royal prerogative, even of the right of pardoning; the 'veto,' or power of suspending for a time the passing of an obnoxious law, had also become illusory, for whenever he attempted to exercise it, an insurrection broke out, which, by frightening the court, obliged the king to submit.

In June, 1791, Louis, with his consort, his sister, and his children, endeavoured to escape from France, but was stopped at Varennes, and brought back to Paris. In the following September the assembly, having completed the new constitution for France, presented it to Louis, who, after making some remarks on what he conceived to be its deficiencies, swore to observe it. This act acquired him a few moments' popularity; and the assembly, having stated that the object for which it had met was completed, closed its sittings on the 30th September. The assembly consisted of 1118 members, of whom 272 were barristers and solicitors, 90 were judges and other magistrates, 208 belonged to the parochial clergy, 241 were gentlemen of noble birth, 48 archbishops and bishops, 35 abbots and canons, 176 merchants and landed proprietors, and the rest physicians and men of other professions. If that assembly committed errors, they were errors of judgment, for the majority were certainly sincere in wishing to maintain the kingly office, which they thought compatible with democratic institutions. Through a mistaken delicacy however they committed a very serious blunder before they parted; for they resolved that no member of that assembly should be eligible to the next assembly of the representatives of the nation, which became known by the name of the legislative assembly, and which was composed of much worse materials. The majority in the legislative assembly were men hostile to the monarchical principle altogether; they were divided between Girondins and Jacobins. [GIRONDINS.] They began by sequestrating the property of the emigrants; they issued intolerant decrees against the priests who would not swear to the constitution, and by these means obliged them to run away from France; they treated the king with marked disrespect, dismissed his guards, provoked the war against Austria and Prussia, encouraged republican manifestations in various parts of the country, and even in the army, established extraordinary courts to judge the emigrants and other people disaffected to the new order of things (the word 'incivisme' was invented to designate this new offence), and issued an enormous quantity of paper money, which quickly becoming depreciated, added to the general misery. [ASSIGNATS.]

The king endeavoured, by the use of his 'veto,' to check this headlong career. An insurrection in June, 1792, was the consequence; the palace of the Tuileries was assailed and entered by the mob, which treated the royal family with the greatest insolence, threatened their lives, and obliged the king to put on a red cap and show himself at the window to the crowds below. A second insurrection, better organized, with the avowed object of abolishing the kingly office, was supported by a party in the legislative assembly. The mob again attacked the Tuileries on the 10th of August, and after a desperate defence by the Swiss guards, entered it and massacred all the inmates. The king and royal family had time to escape and take refuge in the hall of the legislative assembly. The assembly deposed the king, sent him and his family prisoners to the Temple, proclaimed a republic, and convoked a national convention to exercise the sovereignty in the name of the people. In September the massacres of the political prisoners began; the cry of 'aristocrat' became a sentence of death against any obnoxious person. On the 21st September the national convention opened its session, and shortly after prepared to bring the king to trial. The principal heads of accusation were, his attempt to dissolve the states-general in 1789, his escape to Varennes, and other acts previous to his accepting the constitution of 1791. Since his acceptance of it there was no charge that could be substantiated against him, except the exercise of the prerogatives given to him by the constitution, such as the 'veto,' and changing his ministers. The rest were mere insinuations and surmises of having bribed deputies, corresponded with the hostile powers, &c. The trial was opened in December. The Girondins and the Jacobins united against Louis, and he was found guilty of 'treason and conspiring against the nation.' The sentence was pronounced on the 16th January, 1793. Of 721 members present who voted in the convention, 366 voted for death unconditionally, 288 voted for imprisonment and banishment, and the rest voted for death, but with a respite, hoping thereby to save his life. The majority which sent Louis to the scaffold was only five.

On the 21st January, 1793, Louis XVI. was taken in a coach to the Place Louis XV., where the guillotine was fixed. He appeared silent and resigned, and engrossed by religious thoughts. Having ascended the scaffold, he attempted to address the people, but Berruyer, the commander of the national guards, ordered the drums to beat. Louis then gave up the attempt, took off his coat and cravat, and laid his head on the block. He was beheaded at ten o'clock in the morning. His consort Marie Antoinette was tried, condemned, and beheaded in the following October. The character of that unfortunate princess has been rescued from unmerited obloquy and the malignity of her enemies by Madame Campan in her 'Mémoires sur la Vie privée de Marie Antoinette,' London, 1823. Louis left one son, styled Louis XVII., and one daughter, who married her cousin the duke of Angoulême.

(*Nouvelle Continuation de l'Abrégé Chronologique de l'Histoire de France* par le Président Hénault, vols. v. and vi., Paris, 1822.)

LOUIS XVII., duc de Normandie, second son of Louis XVI., styled Dauphin after his elder brother's death in 1789, remained in prison in the Temple after the death of his parents, and there he died of disease in consequence of ill treatment and privation, on the 9th of June, 1795. He was then ten years of age. He had been styled Louis XVII. by the royalists after his father's death.

LOUIS XVIII., Stanislas Xavier, count of Provence, born in 1755, was also styled 'Monsieur' during the life of his brother Louis XVI., who, just before his death, wrote to him, appointing him regent of France. After the death of his nephew, Louis XVII., in 1795, he assumed the title of king of France and of Navarre, although he was then an exile, and he was acknowledged as king by the Royalist emigrants, who composed a small court around his person. He had shown his liberal disposition in favour of rational reforms in France in the first period of the Revolution, but the violence of the Jacobins obliged him to emigrate in 1791. He lived for some time at Verona, in the Venetian territories, which he was obliged to quit when Bonaparte invaded Italy in 1796. He resided successively in various parts of Germany, and at last settled at Warsaw, but in 1803 removed to Mittau in Courland, under the protection of Russia. By the peace of Tilsit, 1807, he was obliged to leave the Continent, and he repaired to England, where he fixed his residence at Hartwell in Buckinghamshire till 1814, when events in France opened the way for his return to the throne of his ancestors. He landed at Calais in April of that year, and proceeded to St. Ouen, from whence he issued a proclamation acknowledging himself as a constitutional, and not an absolute king; promising the speedy publication of a charter, a total oblivion of all the past, and guaranteeing all the possessors of what was called national property. On the 4th of June he laid before both the senate and legislative body a charter which he had drawn up with the assistance of his ministers, and which was unanimously accepted, and became the fundamental law of the kingdom, and such it remains to this day, with a few alterations introduced in 1830.

Louis was sincere in his professions, but he was surrounded by disappointed emigrants and old royalists, whose imprudence injured him in the public opinion; whilst on the other side he had against him the Bonapartists, a formidable body, including the greater part of the army. A conspiracy was hatched against Louis, Bonaparte returned from Elba, and Louis, forsaken by all, retired to Ghent. [BONAPARTE, NAPOLEON.] The battle of Waterloo, June, 1815, opened again to Louis the way to Paris; but this time he appeared as an insulted and betrayed monarch. Those officers who, in spite of their oaths to Louis, had barefacedly favoured Bonaparte's usurpation, were tried and found guilty of treason: some were shot, and others exiled. The new Chamber of Deputies, which was elected under the excitement of this second restoration, proved ultra-royalist in principle, and went further than the sovereign. They banished all those who had voted in the convention for the death of Louis XVI., as well as those who had accepted office under Napoleon after his return from Elba. Meantime sanguinary reactions took place in various parts of France, especially in the south, where the old animosity of the Catholics against the Protestants was revived by political feuds. At last Louis himself saw the danger to which the violence of his pretended friends exposed him, and he dissolved the chamber, which was styled 'La Chambre Introuvable.' In the new elections the moderate constitutional party regained the ascendancy, and the king, in 1818, appointed a liberal ministry, at the head of which was Count Decazes. But the assassination of his nephew the Duke of Berry, by a fanatical republican, in February, 1820, again alarmed the court, and restored the influence of the ultra-royalists. Decazes was dismissed, and Villèle was placed at the head of the ministry. The law of election was altered, the newspapers were placed under a censorship, and other measures of a retrograde nature were adopted. No open violation of the constitution however was committed. In 1823 Louis, in concert with the Northern powers, sent an army into Spain under his nephew the duke of Angoulême, to rescue Ferdinand from his state of thraldom. [FERDINAND VII.] The expedition was successful; it restored Ferdinand to the plenitude of his power; but it did not succeed in restoring to Spain order and good government. In September, 1824, Louis XVIII. died, having been a long time ill and unable to walk: he retained to the last his mental faculties and his self-possession. He left no issue, and was succeeded by his brother Charles X. Louis had a cultivated mind, considerable abilities, and a pleasing address: his ideas were enlightened and liberal, and in ordinary and settled times he would have proved an excellent constitutional king; as it was, he managed to steer tolerably well between extreme opposite parties, and in a most critical period. He published, in 1823, the account of his emigration, 'Relation d'un Voyage de Paris à Bruxelles et Coblenz,' which is curious. (See also *Mémoires de Louis XVIII., par le Duc D.*' an assumed title, Paris, 1832.

LOUIS, or LOUIS D'OR, a gold coin in the old system of France, first struck under Louis XIII., in 1641. Kelly says, 'the Louis d'ors coined before 1726, which passed then for 20 livres, were coined at the rate of 36¼ per French mark of gold, 22 carats fine; the remedy in the weight was 14 grains per mark, and the remedy in the alloy one-fourth of a carat. These ceased to be a legal coin in France as far back as 1726; but they still continued to circulate through many parts of Germany and Switzerland, where they had a fixed value, and were known by the name of "the old Louis d'ors;" they are mentioned under that name in all the editions of Kruse, Ricard, and in other books on exchange printed before 1786.' 'From the year 1726 till 1785 Louis d'ors were coined at the rate of 30 to the mark of gold 22 carats fine, and with a remedy of 15 grains in the weight, and $\frac{12}{32}$ of a carat in the alloy; thus at least $30\frac{180}{1531}$ pieces were coined from a mark $21\frac{20}{32}$ carats fine. These ceased to be current in France in 1786.' 'In Holland, Germany, &c., they were called "new Louis d'ors," to distinguish them from those last mentioned.' 'In 1785 and 1786 all the gold coins in France were ordered to be brought to the mint to be melted down; and a new coinage then took place at the rate of 32 Louis d'ors to the mark, of the same degree of fineness, with the same allowances for remedy as above; thus at least $32\frac{180}{1531}$ pieces were coined from a mark of gold $21\frac{20}{32}$ carats fine. The intrinsic value of this new Louis d'or (allowance being made for the remedy) was 18*s.* 9¼*d.* sterling; and 1*l.* sterling = 25 livres 10 sous Tournois in gold.' Louis d'ors were considered as a current coin in most parts of the Continent; though in England they were sold only as merchandise, where at different periods, according to the demand, their price fluctuated from 18*s.* 6*d.* to 21*s.* sterling. Upon the return of the Bourbon family, the twenty-franc pieces struck by Louis XVIII., in imitation of the Napoleons, received the name of Louis, or Louis d'or; a designation which is likewise given occasionally to the same coin struck by King Louis Philippe, but which are more ordinarily called twenty-franc pieces.

The old Ecus, coined before 1726, were called LOUIS-BLANCS, and LOUIS D'ARGENT.

(Furetière, *Dict. Universelle;* Kelly's *Universal Cambist*, edit. 1811, vol. i., pp. 146, 147; ii., 202.)

LOUIS, ST. [MISSOURI.]

LOUISBOURG. [CAPE BRETON.]

LOUISIADE ISLANDS is the name of an extensive group of islands situated in the Pacific, south-east of the great island of Papua, or New Guinea, between 8° and 12° S. lat. and 150° and 155° E. long. It is generally supposed that this group was discovered by Bougainville in 1768, but it is more probable that Torres found these islands in 1600, after having traversed the strait between Australia and New Guinea, which still bears his name.

Few islands of the Pacific have been less visited by European vessels than New Guinea and Louisiade, and our information respecting them is accordingly extremely scanty. We do not even know the number of the islands which belong to the last-mentioned group, but it is certain that they are very numerous. They occupy a space of more than 300 miles from north-west to south-east, but none of them appear to be large. So far as a rough conjecture may be formed, there is not one that exceeds forty miles in length. Some of them rise to a considerable elevation; they generally appear to be very fertile. The inhabitants belong to the race of the warlike Papuas, and are very averse to any intercourse with foreign vessels which visit the dangerous sea that washes the southern coast of these islands. It is supposed that they are cannibals. The inhabitants make large pirogues, or canoes, and use shields as a defensive armour.

(Bougainville, *Voyage round the World;* D'Entrecasteaux, *Voyage round the World.*)

LOUISIANA, the most south-western of the United States of North America, comprehends the countries on both sides of the Mississippi between 28° 56′ and 33° N. lat., and 88° 50′ and 94° 30′ W. long. The Gulf of Mexico washes its shores on the south for about 400 miles. The Sabine river separates it on the west from the Mexican province of Texas. This river constitutes the western boundary-line for 200 miles; the remainder of the line, about 69 miles, runs along the meridian of 94° 30′ to 33° N. lat. On the north the parallel of 33° N. lat. constitutes the boundary-line between Louisiana and Arkansas for 172 miles. Between 33° and 31° N. lat. the Mississippi separates Louisiana from the state of Mississippi, the course of the river between these parallels being 235 miles. The remainder of the boundary between these states lies along 31° N. lat., between the Mississippi and Pearl rivers, and then along the last-mentioned river to its mouth; the former distance is 106 and the latter 60 miles. The area of Louisiana is calculated at 48,220 square miles, or only about 2000 miles less than that of England.

Surface and Soil.—Louisiana presents a great variety of surface, though it is a plain country, and only in a very few places rises into hills of moderate elevation. But the plains are on different levels, a circumstance which causes a great variety in soil, climate, and agriculture, and gives to the different regions entirely different features.

The delta of the Mississippi extends along the shores of the Gulf of Mexico from Atchafalaya Bay on the west (91° 40′ W. long.) to the Pass de Marianne (89° 15′ W. long.) and Lake Borgne on the east, and comprehends a coast-line of above 250 miles. From Lake Borgne its boundary runs westward through the lakes Pontchartrain and Maurepas, and then along the Amite and Iberville to the place where the last-mentioned river, or rather channel, leaves the Mississippi. It then follows the course of the Mississippi to the great bend above the mouth of the Homochitto river, about 31° 15′ N. lat. Hence it crosses the Mississippi westward, and continues along the course of Red River to the neighbourhood of the rapids. At this place begins the western boundary of the delta, which follows the course of the Bayou Bœuf up to its union with Bayou Crocodile. Farther south the river Teche up to its influx into the Atchafalaya branch of the Mississippi may be considered as the boundary-line, and afterwards the Atchafalaya to its mouth in Atchafalaya Bay. The whole country contained by these boundary-lines, and comprehending about one-fourth of the state, or more than 10,000 square miles, is for six months of the year either covered with water or a swamp. The swamps extend along the sea, and are called the marshes; the inundated region lies north and west of the marshes.

The marshes are nearly on a level with the sea at high tide. They are destitute of trees and shrubs, but covered with grass, which however is quite useless, as the swamps can only be traversed in boats by following the numerous watercourses which intersect them. Between the mouth of the Atchafalaya and La Fourche branches of the Mississippi the marshes extend only about twenty miles inland, and terminate on the southern border of the elevated tract called Terre Bonne, the only part of the delta which exhibits any considerable extent of surface not subject to inundation: the larger portion of the Terre Bonne is a prairie. Between La Fourche Bayou and the Mississippi the marshes extend much farther inland to the shores of Quacha or Barataria, and the great bend of the Mississippi south-east of New Orleans. East of the Mississippi only a small tract south of Lake Borgne is not marshy; but along Lake Pontchartrain the marsh does not occupy much more than the peninsula which separates Lake Borgne from Lake Pontchartrain. The cultivated part of this marshy region is confined to the very narrow banks of the watercourses, and even there settlements are only formed on the northern borders of the marshes, on account of the great unhealthiness of this region.

The inundated region comprehends more than two-thirds of the delta. It may be divided into two portions, the

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deeply inundated, and the less deeply inundated tract. All that part of the delta which is west of the Mississippi and of the Bayou la Fourche, with the exception of a tract west of Baton Rouge, is deeply inundated from February to August, during which period it forms an immense lake. Not even the banks of the Atchafalaya are free from inundation. The common depth of the water is six feet, but in many parts, especially where the Red River joins the Mississippi, it is much more. During the remainder of the year it is dry and the soil firm. The whole region is covered with high and valuable forest-trees, but no settlements have been formed in this country. It may be compared with the immense inundated plains on the southern banks of the Amazon river.

The country east of the Mississippi and of the Bayou la Fourche, as well as the tract of higher ground west of Baton Rouge, is only inundated to the depth of three or four feet, and the inundation ceases a month or six weeks sooner. The banks of the rivers also are several feet higher than in the country farther back, so that they are at most only slightly inundated. The greatest part of this country is indeed covered with trees, but there are also tracts without wood. As the more elevated banks of the rivers extend in width from a quarter of a mile to a mile, numerous settlements have been formed on them. The most valuable are those along the Bayou la Fourche and the Mississippi Proper. On the former they begin about twenty miles from the sea, and on the latter at Fort St. Philip, about 50 miles from the mouth of the river. To protect the cultivated ground from the annual inundation a bank of earth, called *levée*, has been formed on each side of the Mississippi. It begins at Fort St. Philip (29° 25′ N. lat.), and extends to the higher grounds of Baton Rouge (30° 30′), a distance of 130 miles. In some places above New Orleans this embankment is fifteen feet high and thirty wide at the base, but generally it does not exceed twelve feet at the base and five in height.

If we compare the delta of the Mississippi with that of the Ganges, the marshes correspond to the Sunderbunds, except that they are not covered with trees. The inundated portion of the American delta has however this disadvantage, that its waters do not run off in a straight course, but are deflected by the high grounds along the prairies of Opelousas and Attakapas, and farther on by the high land of the Terre Bonne. This circumstance retards their efflux, which is still further retarded by the extremely small slope of the inundated tract. The tide of the Mexican Gulf, though it does not rise above three feet, unless it is impelled by southerly winds, ascends the Atchafalaya to the influx of the Courtableau, a distance of more than 100 miles. Thus the water becomes nearly stagnant in the greater part of the inundated country, and produces many dangerous diseases. This circumstance, added to the difference of climate, renders it very doubtful if the delta of the Mississippi ever can acquire a population and a degree of cultivation approaching that of Bengal.

The country west of the delta to the Sabine river is likewise bordered by a broad belt of marshes along the sea. They extend hardly ten miles inland along Cote Blanche Bay and Vermillion Bay, but from 20 to 30 miles inland west of Vermillion Bay. These marshes however are not quite destitute of trees: several clumps of live oak occur in them, especially on both sides of Mermentou river. North of the marshes the country rises considerably, and extends in open prairies, which are generally destitute of trees, but covered with grass. The prairies are traversed by numerous rivers, whose narrow bottoms are overgrown with trees, and contain fertile tracts. A few settlements have been made on these bottoms, but the prairies themselves are almost entirely inhabited by the tribes of the Attakapas and Opelousas, the Bayou Queite Tortue constituting the boundary between these tribes. The prairie of the Attakapas extends in a narrow strip south-eastward between the marshes along Vermillion and Cote Blanche Bay and the river Teche. The banks of the last-mentioned river form the western boundary of the inundated country, but they are above the line of the inundation, and contain many rich cultivated tracts. To the west and north-west of the prairies of Opelousas lies an extensive wooded region, which on the Sabine extends to 30° 10′, and terminates not far from the marshes. It occupies the country about the northern half of the course of the Calcasiu river, and approaches the inundated country of the delta on the Bayou Bœuf, a branch on the Courtableau. The whole of this extensive tract is covered with pine-forests, and the soil is of very indifferent quality. It is an undulating plain, except at the most north-western angle of Louisiana, between the upper course of the Sabine river and the Red river, where it rises into high hills.

Red River may be considered as the boundary of this wooded region. Where it enters Louisiana, high grounds covered with pine-trees approach to the margin of the river on both sides, but about 60 miles lower down a remarkable depression of the surface extends from north-north-west to south-south-east, and is about 60 miles long with a mean width of eight miles. It terminates at Grand Ecor, 4 miles above Natchitoches. On entering this low tract the river divides into numerous branches, presenting a most intricate maze of islands, inlets, channels, and lakes, of every size from one to thirty miles in length. Lake Bistineau is 40 miles long and from one to three wide, and Lake Bodeau 30 miles long and from one to ten wide. The whole of this low region is inundated from one to twenty feet during the months of February, March, and April, but in summer the lakes and low grounds are nearly dry, and in October and November they become meadows covered with a carpet of green and succulent herbage. There are yet no settlements in this country, though it seems better adapted to them than the lower part of the delta. Below Grand Ecor the inundation of Red River appears not to extend beyond its bottom, which is rather wide, and the higher grounds which skirt it as far as the rapids near Alexandria have rather a fertile soil: numerous settlements have been formed below Natchitoches.

The country extending from Red River on the west to the Mississippi river on the east consists mostly of elevated woodland, especially that portion which lies west of the Washita or Ouachita river. In this region, east of Lake Bistineau, is the highest land of Louisiana. It consists of numerous hills rising from 100 to 200 feet above their base they are covered with trees, chiefly pine and oak, thinly interspersed with ash, hickory, and dog-wood, and produce a luxuriant herbage in summer and spring. Farther east these hills sink into a plain, which extends to the Washita and river Bœuf, a confluent of the former. This plain is nearly a level, has a sandy soil, and is mostly covered with pine-forest; but the river bottoms are wide, and have a fertile soil. The settlements are still few, and do not extend beyond the bottoms. Where however the rivers Washita and Bœuf approach one another, an extensive tract of fertile land occurs, on which the settlements increase rapidly. The country on both sides of the Black River, which is formed by the junction of the river Bœuf with the Washita, resembles in every respect the less inundated part of the delta. But between the river Bœuf and the Mississippi, and especially along the banks of the latter, is a low tract traversed by the river Tensas, a confluent of Black River, which is likewise inundated by the water which issues from the Mississippi in the first half of the year. Narrow strips along the river become quite dry in the second half of the year, but the greater part of this tract is a swamp, which produces fine timber-trees, especially cypress. From these forests New Orleans is supplied with lumber and fuel.

Along the east bank of the Mississippi extends an elevated country, broken by numerous streams. Its projections, worn away by the action of the river, are known by the name of Bluffs. They rise more than 100 feet above the alluvial plains near the Mississippi. These hills continue eastward for 15 or 20 miles from the banks, and lie scattered about in wild confusion. They are overgrown by mingled forests of oak, sweet gum, poplar, tulip-tree, hickory, and some pine, and have an almost uniformly productive soil. By degrees the hills disappear, and are followed by a plain which is considerably elevated above the delta. This plain has a sandy sterile soil, and is entirely overgrown by pitch-pine. On the south it does not extend to the lakes of Maurepas and Pontchartrain, but begins imperceptibly to lower, at a distance of about ten miles, until it advances to the river Amite and the lakes, where it terminates in narrow swamps, which line the banks of the river and lakes. On this declivity of the more elevated plain the number of settlements is greater than in any other part of Louisiana of equal extent. The soil, though light, is well adapted to the cultivation of cotton, and the extensive pine-forests produce abundance of pitch and tar.

Rivers and Lakes.—The Mississippi enters Louisiana at its most north-eastern corner, 33° N. lat., but receives no accession of water from the right until it has attained 31° N. lat., where it is joined by the united waters of Red and Black rivers, which together probably drain a tract of 100,000 square miles, and bring down an immense body of water during the spring months. A mile and a half below the mouth of Red River the Mississippi sends off its first great branch, the Atchafalaya, which, flowing in a southern and south-eastern direction, traverses the lowest part of the delta, enters the south-eastern part of lake Chetimaches, and issuing from it, passes through the marshes into Atchafalaya Bay. [ATCHAFALAYA.] Lake Chetimaches, or Grand Lake, is about 40 miles long and from two to five wide; at its southern extremity it is 40 feet deep. It is connected with the Atchafalaya by several natural channels, which traverse the intervening country, and divide it into many islands, making a kind of net-work.

From the Atchafalaya the Mississippi flows in a general south-eastern direction, but with many great bends. About 30° 20′ N. lat. the river sends off the second great branch, the Iberville, which runs eastward, and joins the Amite river. The united stream, preserving the latter name, falls into Lake Maurepas, a circular sheet of water about 8 miles in diameter. This lake is united to the lake of Pontchartrain by the Pass of Manchac. Lake Pontchartrain is in the form of an ellipse 20 miles by 32, and from 18 to 20 feet deep. This lake is connected with Lake Borgne by two channels, of which the southern is called Chef Menteur, and the northern the Rigolets. Lake Borgne, though denominated a lake, is really a bay of the Gulf of Mexico, and connected with it by the Pass de Marianne. The Iberville river, before its union with the Amite, has but three feet water, and that only during three months of the highest overflow. A few miles below the efflux of the Iberville, the Mississippi sends off another branch to the west, the Plaquemines, which is only six miles long, and joins the Atchafalaya. Though it has only water during the high flood, it is important for the internal navigation. Farther down occurs the last great efflux of the Mississippi, the La Fourche (the Fork). It leaves the principal river at Donaldsonville, and flows in a south-eastern direction for 90 miles; it has 9 feet water on its bar, and admits vessels drawing 4 or 5 feet to within 30 miles of its efflux; but the upper part of its course is very shallow from September to March. From the efflux of the La Fourche the Mississippi flows east to the town of New Orleans, and thence to the sea in a south-eastern direction. Shortly before it reaches the Gulf of Mexico it divides into six branches, called the West, South-west, South, East, North-east, and L'Outre Pass. The most frequented is the East Pass, with 12 feet water at ordinary tides; the South-west Pass is nearly as deep as the East Pass. The other passes have from 5 to 8 feet water, but they are rarely frequented. The depth of the water increases rapidly in the channels, so that it is upwards of 30 feet within a mile from the bars, and still greater farther upwards. For further particulars see MISSISSIPPI. In the inundated tract there is a great number of lakes of different sizes. The largest is lake Quacha or Barataria, south-south-west of New Orleans, which is 22 miles long and six wide. As these lakes are united, either with one another or with the chief branches of the Mississippi, some of them facilitate the internal navigation, especially Lake Palourde and Lake Verret, which are united with one another and with the Atchafalaya and La Fourche, branches of the Mississippi.

Red River, which rises in the Rocky Mountains, traverses Louisiana with a general south-east course of 200 miles, but by the windings of the river of above 300 miles. The navigation is interrupted only by the rapids in 31° 20′ N. lat., where two ledges of rocks extend across the channel about three-quarters of a mile from each other; but when the the water is high the rocks form no obstruction to the passing of boats. In the low country above Natchitoches, where the river divides into many branches, the navigation is intricate and troublesome.

The other rivers of Louisiana are unimportant as channels of navigation. The Sabine, which divides the country from Texas, rises in the last-mentioned country. Its general course is nearly south, with an elliptical curve to the east: it flows upwards of 300 miles. Before it enters the sea it flows into a shallow lake 30 miles in length, and from three to five wide. In ordinary tides there is not above three feet water on its bar. East of the Sabine is the Calcasiu, which rises in the angle between the Red River and Sabine, flows parallel to the last-mentioned river at a distance of about 35 miles, expands near its mouth likewise into a large but shallow lake, and has also only three feet water on its bar. Its course is upwards of 200 miles. The Mermentou, which flows to the east of the Calcasiu, is properly only the channel by which Lake Mermentou discharges its waters into the Gulf of Mexico. This lake is of considerable extent, and receives most of the waters which originate on the prairies of Opelousas, but the different streams unite before they enter the marshes in one river, which receives the name of Mermentou, and soon afterwards falls into the lake. It is not better adapted for navigation than the Sabine and Calcasiu. Sixty miles east of the mouth of the Mermentou are two large bays, Vermillion Bay and Cote Blanche Bay, which are united by several passes with the Gulf of Mexico. The bays have twelve feet of water, but the passes only five or six feet. Vermillion Bay receives the river of the same name, which rises on the prairies of Opelousas, 30° 30′ N. lat., and runs in a general southern course about 80 miles. It is navigable for vessels of five feet draught to a considerable distance.

Climate.—The opinion of Volney, that the countries along the Mississippi have a much milder climate than those along the Atlantic, is now known to be incorrect. On the contrary, it has been proved by many observations that the mean temperature of the latter, under the same parallel, is from two to three degrees higher than that of places west of the Appalachian Mountains. It is found that the seasons are milder at Charleston, South Carolina, 32° 42′ N. lat., than at New Orleans, in 30° N. lat. A considerable difference is observed between the climate of the low and high lands of Louisiana. In the low lands it seldom snows, and frost is not frequent, but in the winter of 1814 the ponds and lagoons near New Orleans were frozen so as to admit half-grown boys to skate or play on the ice. (Darby.) This extreme cold however is a rare occurrence, the thermometer commonly not sinking to the freezing-point. In summer the heat is great, and lasts from the beginning of July to the close of September; the thermometer then ranges between 75° and 85°, and sometimes rises to 90° and even 96°. At this time the inundation ceases, and the decomposition of animal and vegetable matter infects the air, and produces dangerous diseases, especially fevers. The mean temperature of the year at New Orleans, according to Darby, does not exceed 63°, or about 13° above that of London, which is 21 degrees nearer the pole. On the higher grounds, especially on the open prairies of Opelousas, the climate is much more severe. In 30° 30′ N. lat. the snow has fallen to a depth of 11 inches, and remained for several days on the ground. It seems that frost occurs there every winter, and even sometimes in April and September, so that at Natchitoches it does great injury to the cotton and tender plants. In July there are heavy rains and thunder, and in August sometimes hurricanes blow from the south, which cause great damage by forcing the water of the Mississippi into the adjacent level country. In winter the north-western gales, which are very cold, produce great and sudden changes in the temperature.

Productions.—The species of grain chiefly cultivated for food are rice and Indian corn. The rice forms an article of export. Wheat, rye, barley, and oats are more cultivated towards the north than in the southern districts, but nowhere to any great extent.

Sugar succeeds very well south of 31°; farther north its cultivation is less advantageous and more expensive, as the plants are destroyed by the cold, and must annually be replaced. Cotton, which is the staple article, succeeds everywhere, and is of excellent quality. Good tobacco is raised in different places, but its cultivation is on the decrease. The mulberry-tree is indigenous. The cultivation of indigo, which was formerly carried on to some extent, has generally given way to that of cotton. Vegetables are not extensively cultivated, with the exception of the sweet potatoe. The orange-tree and the purple fig do not succeed farther than 30° N. lat. The pomegranate-tree, the peach, and vine, succeed wherever they are cultivated, but the apple only in the northern districts.

By far the greatest part of the surface of Louisiana is covered with forests. The pine-tree, which is most abundant, covers the northern and western sandy districts, and is extensively used in the manufacture of tar and pitch. On the declivities by which the prairies or wooded regions descend to the inundated grounds, the forests mostly consist of oak, sweet-gum, poplar, tulip-tree, and hickory, of various species; the same trees occur on the broken country east of the Mississippi: the chincapin grows on the borders of the inundated lands.

Immense herds of cattle are raised on the natural meadows of Opelousas and Attakapas, as likewise horses and mules. The bison or buffalo is at present only met with towards the northern and western border, especially between the Sabine and Red River, where also wild horses are found. Deer is only plentiful in the prairies of Opelousas and in the pine-forests. Bears, lynxes, the American panther, and beavers are rare, but wolves are numerous. Locusts infest the prairies, and numerous serpents the woods and lowlands. The alligator occurs in all the rivers, but is most numerous in the bays and lakes of stagnant water: it is not dangerous, except when attacked or wounded. The Mississippi and its branches abound in fish. The forests swarm with birds, among which are the wild turkey, the paroquet, the pelican, the flamingo, and the humming-bird. Swans, geese, and ducks are very numerous on the lakes and stagnant waters along Red River.

Clay occurs in the alluvial soil of the delta, at a depth of from ten to thirty feet along the Mississippi. There are salt springs in the northern districts, on the high grounds from the Mississippi to Sabine river, and several of them are turned to advantage. Coal exists in the same places, and iron-ore is found in the north-western corner, between the Sabine and Red River.

Inhabitants.—The inhabitants of European and African origin amounted in 1820 to 153,407 individuals, of whom 73,867 were whites, 10,476 free coloured persons, and 60,064 slaves. A considerable part of the population are the descendants of French settlers; and some newspapers were a few years ago, and probably still are, printed both in the French and English languages. According to the census of 1830 the number of free people was 106,130, and that of the slaves 109,630. The great increase of the slave population is to be ascribed to the increased culvation of cotton and sugar.

The native tribes are not comprehended in this census; but their number probably does not exceed a thousand individuals. On the prairies are the Attakapas and Opelousas, but these tribes are far from being numerous; they have no fixed habitations, and live mostly from the produce of the chase. The Chocktaws, on the Washita and Red River, are more numerous. They have adopted agriculture, and their villages are not much inferior to those of the other inhabitants; they chiefly cultivate Indian corn and the sweet-potatoe. The Tensas, between Bœuf and Tensas river, towards the northern boundary of Louisiana, are few in number.

Political Geography.—For political and civil purposes Louisiana is divided into thirty-one parishes. The present capital and seat of government is the town of Donaldsonville, situated at the efflux of the La Fourche branch from the Mississippi: it has much increased since the seat of government was removed to it. The largest town of Louisiana, and one of the most commercial towns of the United States, is New Orleans [ORLEANS, NEW], on the left bank of the Mississippi, 105 miles above its mouth. All the other places are inconsiderable. Baton Rouge, on the Mississippi, contains only 1200 inhabitants; and Alexandria, on the Red River, hardly more. Natchitoches, on the last-named river, has not 2000 inhabitants: it is at the head of the steam-boat navigation on Red River, and the centre of the trade to Mexico.

The United States granted to Louisiana 46,000 acres of land for the endowment of a college, and 873,000 acres for the support of schools: the State annually appropriates about 46,000 dollars for the support of parish schools. The college of Louisiana, which has an annual allowance of 7000 dollars from the state, is at Jackson; and a college has been incorporated at Opelousas.

Commerce.—Besides the valuable produce of its own soil, the productions of all the states and settlements within the extensive basin of the Mississippi river which are destined for a foreign market must pass through this state, because all the branches by which the river enters the sea are within its boundaries. As to this commerce see ORLEANS, NEW. The internal communication between the dispersed settlements and New Orleans is entirely carried on by water, as there is no carriage-road in Louisiana, with the exception of that which runs along the Mississippi on the Levée. Boats from 15 to 60 tons are conveyed from New Orleans by the Plaquemine into the Atchafalaya. Those destined for the lower part of Attakapas descend the latter river and enter their points of destination by the Teche. Those bound to the central parts of Attakapas descend the Atchafalaya about 20 miles, and are thence transported by an outlet and Lake Chetimaches to the Fausse Point landing. Here is a portage of 10 or 12 miles to S. Martinsville, the seat of justice for the parish of S. Martin's or Upper Attakapas. Vessels for the higher or central parts of Opelousas ascend the Atchafalaya to the mouth of the Courtableau, and thence by the latter stream to Larrell's Landing, six miles, or into Bayou Carron, four miles from the village of S. Landré. (Darby.) The settlements on the Lower Teche communicate with Donaldsonville and New Orleans by the lakes of Palourde and Verret, and by the inlets which connect these lakes with the Atchafalaya and La Fourche branches of the Mississippi.

History.—The Mississippi river was discovered by land. The Spaniards navigated the Gulf of Mexico for two centuries without being aware that one of the largest rivers of the globe falls into it. This fact may be explained from the circumstance that a low, flat, and dangerous coast extends on both sides of its mouth to a great distance. The French, after their establishment in Canada, got some information as to this river about 1660, but did not find its mouth before 1699, when M. de Iberville founded the first colony. The city of New Orleans was built in 1717, about which time the colony began to be of some importance. The French remained in possession of Louisiana up to 1763, when they ceded it to Spain. The colony was much neglected by the Spaniards, and improved very slowly, notwithstanding its numerous natural advantages. In 1800 the Spanish government re-ceded Louisiana to France, but the French government fearing that Louisiana would be taken from them, during the war that followed the peace of Amiens, by the superior naval force of England, sold it to the United States in 1803 for 15,000,000 dollars. At the time of the sale the inhabitants were chiefly French and descendants of French, with a few Spanish creoles, Americans, English, and Germans: the whole population did not exceed 90,000 inhabitants, of whom about 40,000 were slaves.

Louisiana comprehended all the country included in the present state of Louisiana, with the exception of that tract which extends on the northern shores of the river Amite, and the lakes of Maurepas and Pontchartrain, and in addition, the immense tract of country included between the Mississippi river and the Rocky Mountains. The country was then divided into several territories, of which *Louisiana* first rose to a state. In 1811 its population had increased to the number required by the federal constitution, and Louisiana was formed into a state in 1812. The legislative authority is vested in a house of representatives and a senate. The members of both houses are elected by all free white male citizens who have attained the age of twenty-one years. The senate consists of seventeen members, elected for four years; the number of representatives is at present fifty members, who are elected for two years. The executive power is vested in a governor. Louisiana sends two senators and three representatives to Congress.

At the time of the union of Louisiana with the United States, the civil laws of Spain, and also the Roman law to some extent, were in force. Some changes were immediately introduced for the purpose of bringing the condition of its inhabitants nearer to that of the other United States. Accordingly juries and the Habeas Corpus were introduced; but the antient laws still remained in force. Their defects were however so evident, that the legislature formed a new civil code, which was published in 1824. At the same time Mr. Edward Livingston was entrusted with the preparation of a new penal code, of which the first project was published in 1824, and the code itself was promulged in 1833.

LOUISVILLE. [KENTUCKY.]

LOULE', a town of Algarve, in a broad and fertile valley, 8 miles north of Faro, which is on the sea-coast. [ALGARVE.] It contains 1600 houses and about 8000 inhabitants, several churches and monasteries, one of which is for poor ladies of good families, in which they manufacture very neat baskets with the fibres of the aloe (*Agave Americana*), prepared and dyed for the purpose, and which are sent all over Portugal, as well as artificial flowers and other similar articles. The town of Loulé is surrounded by walls and has a garrison: its territory is very fertile and well watered, and produces corn, wine, oil, and fruits. A number of fine carob-trees grow in the neighbourhood. Loulé has the title of a Marquisate, which is borne by the representative of a Portuguese family, allied by marriage to the present royal family. (Miñano; Link.)

LOURDES. [PYRENEES SUPERIEURES.]

LOUSE. [PEDICULUS.]

LOUTH, a maritime county of the province of Leinster in Ireland; bounded on the north by the county of Armagh and Bay of Carlingford, which separates it from the county of Down; on the east by the Irish Channel; on the south and south-west by the county of Meath; and on the west by the county of Monaghan. According to the map of Ireland published under the superintendence of the Society for the Diffusion of Useful Knowledge it lies between 53° 43′ and 54° 7′ N. lat., and between 6° 6′ and 6° 41′ W. long. According to the map of the Ordnance Survey of Ireland it extends from the Mattock river on the south to the Armagh boundary on the north, 25 statute miles; and from Dunany Point on the east to the Meath boundary on the west, 15 statute miles. From the sea at the bridge of Dundalk, however, to the Monaghan boundary, its breadth is only 6½ miles. The surface, according to the latter map, consists of

	Acres.	r.	p.
Land . .	202,336	2	36
Water . .	813	0	4
Total . .	203,149	3	0

or 317⅜ square statute miles, being the smallest county in Ireland. In 1831 the gross population was 107,486.

From the Boyne to the river of Dundalk, comprising more than three-fourths of the county, the surface is of the same character with that of the great central plain of Ireland, of which it forms the north-eastern portion. The only eminences in this division at all conspicuous are in the southern part of the county, which they cross in a direction nearly east and west, forming a continuation of the hilly group which occupies the north-eastern angle of the county of Meath. The highest ground here is Belpatrick, near the county boundary, 789 feet. East from Belpatrick rises the round-backed hill of Collon, or Mount Oriel, wooded to the top, and forming a striking object for a distance of several miles in all directions. Near this is the very handsome though small town of Collon, adjoining the extensive demesne of Oriel Temple, the residence of Lord Ferrard. From Collon a low hilly range extends eastward, attaining its highest elevation in the hill of Tullyesker, 616 feet, and terminating in the promontory of Clogher-head, which rises 181 feet above the Irish Channel. The heights belonging to this range are cultivated to the top, and present no abrupt or striking outlines. Between them and the Boyne the country, except along the immediate valley of the river, possesses few features of interest. Near the coast, about midway between the Boyne and Clogher-head, is the village of Termonfeckin, situated on a stream running eastward from Tullyesker to the sea.

On the other side the Mattock river, rising between Tullyesker and Collon, runs southward by Mellifont to the Boyne, forming the boundary between Louth and Meath. The northern slope of the hilly range above mentioned spreads into an open gently undulating plain, almost wholly under tillage, which extends without any remarkable eminence as far as the river of Dundalk. This level district is crossed from west to east by various streams, which, uniting as they approach the sea-coast, form three moderately sized rivers; the Dee, the Glyde, and the Fane. The Dee rises in the north-east of Meath, and passing through the town of Ardee, which is, next to Dundalk, the most considerable place in the county, proceeds in a direction nearly from west to east until within four miles of the sea, where it receives the White river, running north-eastward past Dunleer, which direction the united stream preserves through the remainder of its course. The Glyde, formed by the junction of the Lagan, which rises in Meath, with a stream descending from the Monaghan border, passes for the first five miles of its course through a bare and uninteresting tract bordering on the latter county. Eastward from this the appearance of the country rapidly improves: a series of demesnes, of which Louth Hall, the seat of the earl of Louth, is the most extensive, occupies both banks of the river for several miles of its course through the rich tract north of Ardee: the remainder of its progress to Castlebellingham, a remarkably pretty village on the great northern road leading from Drogheda to Dundalk, is through low marshy meadow lands. At Castlebellingham it turns southward, and winding through a well-improved tract bordering on the coast, meets the Dee, with which it has a common embouchure at Anagassan. The course of the Fane is nearly parallel to that of the Glyde, and the character of the country through which it runs is similar, the more highly improved portion being towards the coast, where for two miles of its course it skirts the demesne of Clermont, and then enters the sea at the village of Lurgangreen. A dead flat, beginning south of Lurgangreen, continues to Dundalk, the county town, which stands on the extreme verge of the plain, at the head of a creek formed by the embouchure of the Castletown river. The surrounding country is in a high state of cultivation: the level lands towards the sea, in particular, are laid out with great regularity and on an extended scale.

Beyond the Castletown river, which runs out of the county of Armagh in a direction from north of west to south of east, the surface is of quite a different character. A group of mountains, ranging from 1000 to 1900 feet in height, and extending over a district fifteen miles long and five miles broad, stretches across the Armagh border, and extends eastward into a great peninsula forming the northern boundary of the Bay of Dundalk and the southern limit of the Lough of Carlingford and basin of the Newry river.

The general direction of these mountains is from north-west to south-east: the group is divided into two nearly equal portions by a ravine traversing it from north to south, and forming a direct line of communication between Dundalk and Newry. Through this defile the great northern road is carried at a considerable height above the bed of a mountain-stream, which has been taken advantage of in the formation of a pretty sheet of water in the demesne of Ravensdale, a romantic seat of the late Sir Harry Godericke. The steep declivity of the mountain, which rises about 1500 feet above the level of the glen in which the mountain stands, is clothed with wood to a height of several hundred feet; and this hanging screen of foliage is prolonged on the south by a succession of similar plantations extending as far as the bay of Dundalk. A remarkable wooded eminence, called Trumpet-hill, rising between the main mountain-range and the shore, forms a prominent feature in this scene, which, to the traveller approaching Dundalk from the north, is one of peculiar variety and grandeur: this effect is considerably heightened by the bleakness and monotony of the boggy tract of Killeavy, through which the road passes for several miles before entering the defile. The mountains lying to the west of this ravine are situated chiefly in the county of Armagh, and consist of the Slieve Gullion and Forkhill groups. The latter lie immediately along the boundary of Louth, and are distinguished by the extreme ruggedness of their outline, a feature more or less characteristic of all the heights of the range. The Kilcurry river, descending from the southern declivities, joins the Castletown river a short distance above the bridge of Dundalk. The glens and vales which lie along this border of the mountain-region possess much picturesque beauty. On the eastern side of the pass of Ravensdale the chief heights are Clermont, 1462 feet; Clermont Cairn, 1674 feet; and Dorlargy, 906 feet. Trumpet-hill rises 465 feet, but from its extreme steepness appears to be much higher. From the eastern side of Ravensdale the mountains stretch back to the river of Newry and bay of Carlingford, which they overhang in masses rising almost immediately from the water's edge. The chief heights here are Corrakite, 1869 feet, and Carlingford mountain, immediately over the town of Carlingford, 1935 feet. Towards the extremity of the peninsula and along that side bounding the bay of Dundalk the mountains leave a considerable margin of level land between them and the sea. This open tract is several miles in width at the extremity of the peninsula, where it terminates in the low point of Ballagan, forming the southern boundary of the bay of Carlingford. A considerable valley, watered by two streams called the Big and Little Rivers, penetrates the mountain-region on this side, running up between the heights of Barnavave, 1142 feet, on the east, and Slieve Nagloch, 1024 feet, on the west. On the north the plain is contracted to a narrow strip along the shore of Carlingford Loch and valley of the Newry river by the mountain-group above mentioned. The town of Carlingford, a place of considerable antiquity and historical interest, stands at one extremity of this tract, and the castle of Narrow-water at the other. The latter however, being built on the opposite side of the river of Newry, is in the county of Down. The harbour of Carlingford is described under the article DOWN. The only other harbour, with the exception of a shallow creek at Anagassan, and a small fishing-pier at Clogher-head, is that of Dundalk. Clogher-head is the only bold feature of the coast between Dundalk and the mouth of the Boyne. A broad sandy beach, in some places extending at low-water to a distance of two miles, skirts this part of the coast at every other point. The danger of these great sandy shoals is however much diminished by the prevalent direction of the wind, which for nine months of the year is off shore.

Geology.—The level portion of the county south of the river of Dundalk belongs generally to the extensive clay-slate formation, which follows the northern margin of the limestone plain from the Irish channel on the east to the verge of the Upper Shannon on the west. One considerable patch of carboniferous limestone, skirted with a narrow belt of yellow sandstone and conglomerate, is included within the county boundary to the west of Ardee, and minor deposits of the same rock occur in several other localities through the west and north-west of the southern division; but the greatest extent of this formation within the county is in the district north of Dundalk, where the level space between the declivities of the mountains and the shore, from the town of Carlingford to the bridge of Dundalk, and thence westward on both sides of the Castletown river to its junction with the Kilcurry, is occupied by a limestone formation, which, as it is surrounded on the landward side by transition and primitive rocks, may probably be in connection with that part of the great central field which is known to be overlaid by the waters of the Irish Channel farther south. The structure of the mountainous region is similar to that of the group of Mourne, consisting of a nucleus of granite supporting the clay-slate and limestone of the surrounding field on its flanks; the clay-slate near the line of contact being altered, and passing into greenstone slate. A great protrusion of crystalline greenstone trap occurs at the eastern extremity of the range, constituting the central mass of the mountains between the Big River and Carlingford. On the northern declivities of these heights the clay-slate re-appears, skirting the southern shore of the bay of Carlingford. Iron and lead ore are the only minerals which have been observed, but nowhere in sufficient quantity to warrant mining operations.

Soil, &c.—The soil of the southern division of the county, although not so rich as that of the limestone plain of Meath, is well calculated for every kind of grain-crop. Wheat is grown in large quantities in the district round Ardee; oats and barley are the chief crops raised off the tillage lands of the rest of the southern district. The tract north of the bay of Dundalk, between the mountains and the sea, also produces heavy wheat crops. Farming in general is carried on in a superior manner. Green crops are grown by almost all the gentlemen farmers. The fences are usually of quickset, and the lands well drained. In the mountain-district the condition of the people is much inferior, and the improved system of husbandry unknown. Spade-cultivation is here very general, and the old slide car without wheels is still in use. The dwellings and appearance of the peasantry inhabiting the dreary tract through which the northern road passes before entering the defile of Ravensdale contrast strongly with the comfortable habitations and decent dresses of the rural population of Down. The condition of the peasantry throughout the southern district is however considerably better in all respects than in most of the counties of Leinster. The rate of wages for agricultural labourers varies from 8*d.* to 10*d.* per day, for 210 working days in the year.

There is no regular return of the sales of grain in the several market-towns. The sales in Dundalk in 1835 were—

Wheat	242,100 cwts.
Barley	377,074 „
Oats	146,037½ „

The sale of oats at Ardee in the same year is estimated at 73,400 cwts., and at Castlebellingham 3500 cwts. The wheat and barley of the above return are chiefly the produce of Louth and Monaghan; the oats, of Cavan, Monaghan, and Fermanagh. The greater part of the oats produced in Louth is used for home consumption.

The linen manufacture is carried on with some activity at Ravensdale and Collon, where there are large bleach-greens, but chiefly in Drogheda and its neighbourhood, where the trade is generally very brisk. In Drogheda there is a steam-power mill for spinning flax, which employs 450 spinners. The quantity of linen made in the town is 1500 webs weekly, six-sevenths of which are manufactured from yarns spun in the town and neighbourhood, or imported from Belfast, and the remainder of British yarns. The number of persons employed in the linen manufacture in the county in 1831 was as follows: bleachers, 20; flax-dressers, 6; reed-makers, 2; weavers (including some woollen weavers) 972. In the same year there were in the county 6 brewers, 7 maltsters, 30 tanners, 64 coopers, 14 corn-dealers, 60 millers, and 15 millwrights. A pin manufactory was established at Drogheda, in 1836, by a Manchester house, who were unable to procure a sufficient number of hands at their English establishment. The hands employed are children, who earn about 4*s.* per week. In 1838 there were 260 employed, and the proprietors were looking out for the site of another establishment in a populous part of the county. The fisheries off the coast give occasional employment to 13 decked fishing-boats, 11 half-decked ditto, one open sail ditto, and 313 open sail-boats, having an aggregate tonnage of 1765 tons, and manned by 1315 fishermen.

There is a rather numerous resident gentry. The only nobleman permanently resident is Lord Viscount Ferrard. The Earl of Roden has a mansion and fine park adjoining Dundalk, but is usually resident in the county of Down. The other principal proprietors are Sir Patrick Bellew, Sir Allan Bellingham, Sir Richard Robinson, and the families of Fortescue, Balfour, Taaffe, Chester, &c.

Divisions, Towns, &c.—Louth is divided into the baronies of *Lower Dundalk*, on the north-east, containing the town of Carlingford, population (in 1831) 1319; *Upper Dundalk*, on the north-west, containing the town of Dundalk (pop. of borough and town 13,078); *Louth*, in the centre, containing the town of Louth (pop. 613); *Ardee* on the south-west and centre, containing the towns of Ardee (pop. 3975) and Castlebellingham (pop. 611), and the village of Anagassan (pop. 235); and *Ferrard*, in the south, containing the towns of Collon (pop. 1153), Dunleer (pop. 710), and Clogher (pop. 592), and the villages of Termonfeckin (pop. 470) and Baltray (pop. 428).

Dundalk, the assize town of the county, has had various charters of incorporation. The governing charter bears date the 4th March, 1674. The corporation consists of a bailiff, 16 burgesses, and an indefinite number of freemen. The governing body is the corporation at large. The freedom is acquired by special favour of the governing body. There is no criminal jurisdiction beyond that of a justice of the peace, which rank, for the borough, the bailiff and recorder hold *ex-officio*. The court of record is disused. The average revenue is 80*l.* per annum, and the expenditure 150*l.* The corporation in 1835 were 1126*l.* 10*s.* in debt. The patron is the Earl of Roden, who is proprietor of almost the entire site of the town. The present boundary of the borough comprises an area of 445 statute acres.

Prior to the Union, Dundalk returned two members to the Irish parliament. It is now represented by one member in the imperial parliament. The right of election formerly lay with the corporation. It is now, by the 2nd Wm. IV., c. 88, vested in the resident freemen and 10*l.* householders. The number of voters at the last general election was 376.

Dundalk is a place of a very remote antiquity, being the *Dundalgan* of the Irish Ossianic poems, the residence of the hero Cuchullin. It is extremely probable that some earthen and stone works in the neighbourhood of the present town formed a portion of the old *cahir* or city. The situation of the place, on the lowest ford of the Castletown river, in the direct road to Ulster, rendered it early a port of importance to the English. It was here O'Hanlon opposed the march of De Courcy northward in 1179, on which occasion a great number of the Irish were drowned in the fords. The result of the battle was doubtful, but Dundalk remained in the hands of the English. The site and vicinity of the town were afterwards bestowed on Bertram de Verdon, to whom probably the present town owes its origin. On Edward

Bruce's invasion of Ireland in 1315, Dundalk was among the first places that fell into his hands, and here in the succeeding year he caused himself to be crowned king of Ireland. Bruce, after ravaging the south of Ireland with various fortune, returned to the neighbourhood of Dundalk in the latter end of the year 1318. Here he was encountered at the Faughart, a height on the northern side of the Castletown river, by Lord John Bremingham. In this battle Bruce was slain, and his predatory army entirely dispersed. Bremingham for his services was created earl of Louth, and had the manor of Ardee bestowed on him. During the rebellion of Shane O'Neill, in the reign of Elizabeth, Dundalk was besieged by the insurgents, but without success. On the breaking out of the rebellion of 1641, Sir Phelim O'Neill took it without opposition, the garrison having surrendered on the first summons. On the 26th of March, 1642, Lord Moor and Sir Henry Tichbourne, after having driven the Irish from before Drogheda, and retaken Ardee, advanced against Dundalk, which after some resistance they carried by storm, having broken open the main gate with pickaxes. After the capture of Drogheda by Cromwell in 1649, Dundalk surrendered to the parliamentarians. In the war of the Revolution it was evacuated by the forces of James II. on the advance of the army of King William, who took possession of it before he proceeded to the Boyne.

The main street of [illegible]dalk is built along the line of the great northern road, and runs nearly north and south: the other leading streets run eastward from the main street, and parallel to one another, occupying the extreme verge of the plain along the southern bank of the creek, where the Castletown river expands into the sea. At the northern extremity of the main street is the bridge, and south from it the linen-hall and church. The market-house, a decent brick building, and the county-court house, a very handsome edifice of cut stone, are situated nearly in the middle of the main street. The county infirmary, a brick building in the Tudor style, stands at its southern extremity. The demesne of Dundalk-house, a residence of the earl of Roden, skirts the western side of the main street through its entire length. An extensive cavalry barrack terminates the town eastward. The general appearance of Dundalk is highly respectable. The provisions of the lighting and paving act were put in force here in 1832. The amount of the assessment for lighting, paving, and watching for the year 1836 was 696*l* 8*s*. 11*d*.

The corn-trade is very extensively carried on. In the town are a steam-power mill for grinding wheat, a large distillery, and two breweries. Dundalk is the chief point of export for the counties of Cavan, Monaghan, and Fermanagh. The exports of agricultural produce in 1835 consisted of

	Cwts.
Wheat	142,097
Wheat, meal, and flour . .	16,280
Barley	56,280
Malt	53,875½
Oats	229,542½
Oatmeal	129,260

There is also a large export of butter and eggs, collected principally from the counties of Monaghan, Cavan, and the northern parts of Longford. The butter exported is about 550 tons for the season: the number of eggs exported in 1835 was 2,410,800; of yards of linen 60,000; of lbs. of wool 15,680; of heads of cows and oxen 3932; of horses 100; of sheep 7266; and of swine 48,183. Total value of the exports for that year 452,813*l*. In the same year the imports amounted to 107,953*l*., of which the chief items were for coal, culm, and cinders 19,021*l*.; cotton manufactures 13,800*l*.; woollen manufactures 10,500*l*.; haberdashery 6500*l*.; iron 8960*l*.; fish (herrings) 7000*l*.; oak-bark for tanners 4,800*l*.; sugars 2100*l*.; and teas 1400*l*. Two steam-vessels, each of 200 tons register, the property of a Dundalk company, ply regularly between the port and Liverpool. Since the establishment of these, there has been a considerable increase in the amount of imports. The port, although it has not much depth of water, is considered a safe one. A freight will be taken for it in an English port at a less charge than for either of the ports of Newry or Drogheda. There are no harbour dues.

Dundalk is the head of an excise district, embracing Newry and Warrenpoint in the county of Down, Ardee in Louth, and the entire county of Monaghan. The amount of excise paid in the district in 1835 was 112,189*l*. 18*s*. 7½*d*. The customs paid for the port of Dundalk, in the same year, amounted to 3598*l*. 5*s*. 7*d*. A branch of the bank of Ireland is established here.

Ardee is an antient corporation, at present governed by charter of the 28th of February, 1712. The corporation consists of a portreeve, burgesses, and freemen. The governing body is the common-council. There is no criminal jurisdiction beyond that of the portreeve, who is a justice of the peace *ex officio* within the borough. The civil court of the recorder is now disused. It is asserted by the inhabitants that corporate estates to the value of 1000*l*. per annum have been spoliated. The present income of the corporation is 125*l*. [Ardee.]

Dunleer is incorporated by charter of the 3rd of August, 1678. The corporation is virtually extinct. The town itself is inconsiderable.

Carlingford is an antient corporation, having been, during the existence of the English pale, a place of considerable importance, as commanding the only pass at that time practicable between Dundalk and Newry. The governing charter is dated 19th of August, 1619. The corporation is virtually extinct.

Prior to the Union, Louth returned two county members and two for each of the above boroughs. The representation is now limited to two county members, and one for Dundalk. The county constituency, at the end of 1836, consisted of 1194 voters. On the 1st of January, 1836, the police force of the county consisted of 4 chief constables, 22 constables, 107 subconstables, and 5 horse of the constabulary, supported at a cost of 5121*l*. 13*s*. 5*d*., of which 2469*l*. 18*s*. 8*d*. was chargeable against the county; and of 1 magistrate, 21 constables, 70 subconstables, and 2 horse of the peace-preservation police, the cost of supporting which establishment was 4400*l*. 16*s*. 5*d*. In the same year the total number of persons charged with criminal offences who were committed to the county gaol was 321, of whom 288 were males and 33 females. Of these 91 males and 4 females could read and write at the time of their committal, 137 males and 20 females could read only, and 60 males and 9 females could neither read nor write. The assizes for the county are held at Dundalk, and general quarter-sessions at Dundalk, Drogheda (a county in itself), and Ardee, in which last place is a court-house and bridewell. The district lunatic asylum is at Dublin. This asylum was originally built in the year 1815, by parliamentary grant, for admission of all pauper lunatics throughout Ireland. It was created a district asylum by act of 11 Geo. IV., c. 22, and is now annexed to the district formed by the counties of Wicklow, Dublin, Meath, Louth, and the counties of the city of Dublin and of the town of Drogheda. The county infirmary at Dundalk is a very extensive and complete establishment. There are dispensaries in all the minor towns. There is no local newspaper.

Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	Families not included in the preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	11,545	. .	. .	. .	. .	. .	. .	57,750
1821	Under Act 55 Geo. III., c. 120	18,138	19,891	. .	. .	. .	49,363	57,648	101,011
1831	Under Act 1 Will. IV., c. 19	18,834	19,811	12,028	3,970	3,813	52,439	55,042	107,481

Louth, at the coming of the English, formed a portion of the territory of Orgial or Oriel, by which name it afterwards came itself to be known in contradistinction to the more western parts of the territory. The native families of chief authority in the territory at this time were the O'Kervaills, or O'Carrols, and the MacMahons. Donchad O'Kervaill, prince of Orgial, was the founder of several religious houses in the present county of Louth, about the middle of the twelfth century: among these was the Cistercian abbey of Mellifont, the consecration of which, in A.D. 1157, was attended by a great assemblage of the Irish nobility. Among those who bestowed gifts on the new establishment on that occasion was Devorgilla, wife of O'Rourk, whose elopement with Dermot MacMorrogh shortly after led to the English invasion. The eastern part of Orgial, constituting the present Louth, having been conquered by De Courcy between 1179 and 1180, was erected into a county by King John, A.D. 1210. Being at the time accounted a portion of Ulster, it formed part of the grant to De Courcy, and after his time to De Lacey, by whom it was divided among inferior barons. The families of De Verdon, Pippard, Taaffe, Bellew, and Gernon were among those introduced at this period. During the decay of the English authority, in the fourteenth and fifteenth centuries, Louth remained attached to the government. The preservation of the county from the general spirit of defection then abroad was owing, in a great measure, to the institution, by act of the 12th Edw. IV., of the Brotherhood of St. George, a military fraternity composed of thirteen of the chief nobility and gentry of the counties of Kildare, Dublin, Meath, and Louth, and having for its object the protection of the pale from the neighbouring Irish, and the arrest of outlaws and rebels within the above counties. The subsequent history of Louth, which was not considered a portion of Leinster until the reign of Elizabeth, is in great measure that of Drogheda and Dundalk. [DROGHEDA.] The forfeitures consequent on the rebellion of 1641 and the ensuing civil wars extended over nearly the entire county. Those which followed the war of the Revolution of 1688 embraced 22,508 acres, of an estimated value, at that time, of 82,310*l*, 3*s*.

The numerous antiquities which occur throughout Louth have been made the subject of a volume entitled 'Louthiana,' published at Dublin in 1758. Earthen mounds and entrenchments are of very frequent occurrence. The most remarkable in the county is that of Castle-Guard at Ardee. Its perpendicular height is nearly 90 feet, the depth of the main trench between 30 and 40, the circumference at the top 140, and round the base upwards of 600 feet. The mound and building called *Fahs na ain Eighe*, or 'the one night's work,' near Dundalk, is a curious combination of the earthen *rath* with the stone *cashiol*, and is probably coeval with the Dundelgan of the Ossianic romances. Stone circles and other supposed Druidic remains are also numerous. The most remarkable are at Ballirckan and Ballinahatry, near Dundalk. At Ballymascanlan is a cromlech, the covering-stone of which measures 12 feet by 6, and weighs upwards of thirty tons. Round towers formerly stood at Louth and Drogheda, and two are still remaining at Dromiskin and Monasterboyce. The last is one of the finest specimens in the kingdom: it is 110 feet high, but has lost the greater part of its conical covering. In the churchyard near the tower stand two beautifully sculptured stone crosses. The larger, called St. Boyne's Cross, is 18 feet high. On the base of the smaller, which is 16 feet in height, is an inscription, on which 'Pray for Muredoch' is legible in very antient Irish characters. The arms of these crosses are enclosed in circles, and the entire surface of each is covered with rich tracery and allegorical sculpture. St. Boyne is probably a corruption of the name of St. Buas, the founder, who died A.D. 521. Muredoch, by whom the other cross was probably set up, died A.D. 836. The ruins of the abbey of Mellifont occupy a beautiful site on the bank of the Mattock river, near the Boyne. They consist of a gate-tower, part of a chapel, and the lower story of an octagonal chapter-house. The ornamental part of the doorways and arches of the two latter buildings are formed of blue marble, and have been highly gilt. There are some very antient ruins on the hill of Faughart, where Edward Bruce is said to be buried, connected with the old cell of St. Brigid. Of the various feudal buildings throughout the county the chief are the castle of Carlingford, erected by King John, Rohe's Castle, north-west of Dundalk, Torfeckan or Termonfeckin Castle, a residence of the archbishops of Armagh, inhabited last by Primate Ussher, and Castletown, still kept in habitable order, on the south bank of the Castletown river near Dundalk.

Louth lies partly in the diocese of Clogher, but chiefly in that of Armagh, which extends into the counties of Armagh, Londonderry, Tyrone, Louth, and Meath. The number of parishes in this diocese is 98, constituting 88 benefices, and having 88 churches of the Establishment, 11 other places of Protestant worship in connection therewith, 68 Presbyterian meeting-houses, 44 meeting-houses belonging to other Protestant Dissenters, and 120 Roman Catholic chapels. In 1834 the total population of the diocese was 500,636, of whom there were 103,012 members of the Established Church, 84,837 Presbyterians, 3340 other Protestant Dissenters, and 309,447 Roman Catholics, being in the proportion of 3 Roman Catholics to 1·88 Protestant, of whatever denomination. In the same year there were in this diocese 623 daily schools, in which 44,606 young persons received instruction; being in the proportion of 8·10 per cent. of the entire population under daily tuition, in which respect Armagh stands fourteenth among the 32 dioceses of Ireland. Of the above schools, in 1834, there were sixty-seven in connection with the National Board of Education.

The county expenses are defrayed by grand-jury presentments. The amount levied for the year 1835 was 11,247*l*. 2*s*. 8*d*., of which 2749*l*. [illegible] 7*d*. was for roads and bridges, 4509*l*. 6*s*. 10*d*. for buildings, salaries, charities, &c., and 3988*l*. 1*s*. 3*d*. for police.

(Wright's *Louthiana*; *Report of the Railway Commissioners for Ireland*; Cox's *History of Ireland*; *Parliamentary Reports and Papers*, &c.)

LOUTH. [LINCOLNSHIRE.]

LOUTHERBOURG, PHILIP JAMES DE, a distinguished landscape painter, born at Strasburg, October 31, 1740, was the son of a miniature painter who died at Paris in 1768. He at first studied under Tischbein, afterwards under Casanova, whose name as an historical painter was then in great vogue. While his own peculiar forte lay in landscape, he was enabled by his education to give to that branch of the art a greater compass and range of subjects than usual, as in his various battle and hunting pieces, besides others that claim to be considered as strictly historical in subject; for instance, his 'Storming of Valenciennes' and 'Lord Howe's Victory in June, 1794.' His works are stamped by great vigour and mastery of pencil, and by excellent management in regard to composition. After having obtained considerable reputation at Paris by the works which he exhibited at the Louvre, and having been admitted a member of the Academy there in 1768, Loutherbourg came over to England (where he was afterwards elected a royal academician) in 1771, and was engaged as scene-painter at the Opera House. His vigorous style of execution, his poetical imagination, and his perfect knowledge of scenic effect, well qualified him for a department of art which demands them all, and which is held to be a subordinate one chiefly because its productions are soon laid aside and entirely forgotten. Soon after his settling in this country, Loutherbourg got up, under the name of the *Eidophusikon*, a novel and highly ingenious exhibition, displaying the changes of the elements and their phenomena, in a calm, a moonlight, and a sunset and a storm at sea. Of this very interesting pictorial contrivance, which may be said not only to have anticipated, but in some respects to have surpassed our present dioramas, although upon a smaller scale, a tolerably full account is given in Pyne's 'Wine and Walnuts.'

Loutherbourg etched several of his own compositions. He died at his residence at Hammersmith-terrace, March 11, 1812.

LOUVAIN (the French name of *Leuven*), a very antient town in South Brabant, in 50° 54′ N. lat. and 4° 39′ E. long. It stands on the Dyle, 16 miles east from Brussels, and about the same distance south-east from Mechlin, or Malines, and north-west from Tirlemont. The system of railroads from Ostend, Bruges, Ghent, Antwerp, and Brussels, which unite at Malines, is continued through Louvain and Tirlemont to Liege, and will be further continued through Aix-la-Chapelle to Cologne, and eventually to Bonn, where its further progress will be impeded by natural difficulties. Louvain was surrounded by walls in 1156, and was for a long time the residence of the dukes of Brabant. In those times Louvain was the largest, the richest, and the most commercial city in the country. Its principal trade consisted in woollen manufactures, which are said to have been prosecuted to such an extent at the beginning of the fourteenth century as to give employment to 150,000 workmen; but this number appears to be exaggerated. The weavers, in 1382, revolted against the duke of Brabant, and for a time desolated the province, but were speedily reduced to obedience; and the ringleaders being exiled, the greater part of them came to England, where they introduced the manufacture of broad-cloth. The walls of Louvain are nearly seven miles in circumference; but a great part of the space enclosed is no longer occupied by houses, which have been succeeded by gardens and vineyards. The population is now about 27,000, or only one-sixth of what it was 500 years ago.

The manufacture of woollens and lace is now carried on in Louvain to a small extent. There are several breweries in the town, and the beer of Louvain enjoys a high reputation, and has a great sale in other parts of Belgium. There is also a trade to some extent in agricultural produce.

The university of Louvain was established in 1426 by John, the fourth duke of Brabant, and long enjoyed a high celebrity. It was suppressed by the French in 1793, and the building converted into an hospital, but was restored in 1817, and is again a flourishing institution with 60 professors and 500 students: it has a botanic garden and zoological and mineralogical museums.

The town-hall, which is a fine Gothic building, erected in 1440, contains some good paintings. The church of St. Peter is one of the finest religious edifices in Belgium; the tower, which fell down in 1604, is said to have been 533 feet high. The town is in general not well built.

LOUVIERS, a town in France in the department of Eure, is on the river Eure, and on the road from Evreux to Rouen, 12 miles from Evreux and 17 from Rouen. This town was antiently fortified. In the religious wars of the sixteenth century the townsmen embraced the party of the League, and afforded an asylum to the parliament of Rouen, when driven out of the city by the Protestants; but they submitted to Henri IV. after the battle of Ivry. The town is handsomely built, and situated in a fertile plain: it has an antient church of Gothic architecture, and promenades round the site of the ramparts. The population in 1831 was 8627 town, or 9885 for the whole commune; in 1836 it was 9927 for the commune. The chief manufacture is of fine woollen cloths and kerseymeres, first introduced in 1681, and now the most important of the kind in France: there are upwards of forty factories. Other woollen goods also are made. There are mills for spinning woollen, linen, and cotton yarn, moved by water; there are also dye-houses for cotton and wool, linen-bleaching establishments, tan-yards, soap-houses, sugar-refining houses, and workshops for making the machinery employed in the various factories and mills. There are a subordinate court of justice, several government offices, a public library, and a theatre. There are four yearly fairs. The fine cloths are sent chiefly to Paris; the remainder are exported. The wool is chiefly brought from Spain. The arrondissement of Louviers contains 302 square miles, and is divided into five cantons and 118 communes. It had a population of 68,942 in 1831; and of 69,402 in 1836.

LOUVRE. [Paris.]

LOVE-APPLE, a fruit-bearing annual, also called Tomato, is the Solanum Lycopersicon of botanists, a plant much cultivated for the sake of its berries, from which are obtained various preparations used for culinary purposes. It is a native of Peru and Brazil, whence it has been carried into North America and the Old World; and it has become, as it were, naturalized in some parts of India. The common love-apple has depressed round lobed irregular berries, varying in size from one to three or four inches in diameter, and in colour from dull red to yellow. When raw they have a singular flavour, not unlike that of cooked meat, but they are never brought to table except stewed or in the form of sauce. The only directions for the cultivation of the Tomato which it is necessary to give are, that it should be treated like a tender annual, and when planted out have a southern bank or wall, or some trellis, over which the branches may be disposed. In this climate the summers are too short to ripen the fruit unless assisted by reflected heat. Many varieties are known, which some botanists consider distinct species; they principally differ in the form, colour, and size of their fruit. They all are at variance with the usual character of the genus Solanum, in having a fruit with an irregular number and arrangement of its cells, on which account they have been collected by Dunal into a particular genus, to which he gives the name of Lycopersicon, distinguishing eleven species, and calling the common garden love-apple *L. esculentum*.

LOW COUNTRIES, or NETHERLANDS, a district in the north of Europe, lying between 49° 30′ and 53° 40′ N. lat., and between 2° 40′ and 7° 10′ E. long., comprehending the kingdoms of Holland and Belgium, and grand-duchy of Luxemburg. It is bounded on the east by the Rhenish provinces of Prussia and the kingdom of Hanover, on the north and the west by the North Sea, and on the south by the kingdom of France.

LOWER GREEN-SAND. [Cretaceous Group.]

LOWTH, WILLIAM, born 1661, died 1732, the elder of two divines of the Church of England, father and son, both distinguished by eminent attainments in biblical literature and by their useful publications. The elder is the less eminent, though he is supposed to have been the profounder scholar; but he lived less in the public eye, and attained to none of the dignities which were bestowed on the son. Early in life he became chaplain to Mew, bishop of Winchester, who gave him a prebend in the cathedral of Winchester, and the rectory of Buriton in that diocese, where he lived, died, and was buried. He had been a pupil of Merchant Taylors' School, from whence he had passed to St. John's College, Oxford.

If we would form an idea of the extent of his laborious reading, we must look rather to the works of other persons than his own, and particularly to Potter's edition of the works of Clemens Alexandrinus, and Hudson's edition of the works of Josephus. To both these editors he communicated valuable notes. Of his own writings, those which are now most read are his 'Directions for the Profitable Reading the Holy Scriptures,' which was first published in 1708, and has been often reprinted, and his 'Commentary on the four greater Prophets.' This last-named work usually accompanies Bishop Patrick's Commentary on the other books of Scripture, to which it was prepared as a supplement.

LOWTH, ROBERT, born 1710, died 1787, a prelate of the English Church, son of the Lowth last named, and, like his father, distinguished by his knowledge of the books of Scripture and his valuable writings in the illustration of them. He was also an elegant scholar, and an inquirer into minute and curious history. There are a few poems of his, chiefly in the nature of academical exercises, which in their day were greatly admired.

He was educated in the school of Winchester founded by William of Wickham, from whence he passed to New College, Oxford, which was also founded by the same munificent prelate. He went abroad with members of the Dartmouth and the Devonshire families, who, especially the latter, favoured his advancement in the church; and having the good fortune to secure also the patronage of Hoadly, bishop of Winchester, he rose by regular gradations till he became bishop of London, and in a situation to decline the offer which was made to him by King George III. of the archbishopric of Canterbury. A few dates of his preferments may suffice. Early in life he had the rectory of Ovington; in 1750 he was made archdeacon of Winchester; in 1753 rector of East-Woodhay in that diocese; in 1766 he became bishop of St. David's; in the same year he was translated to Oxford; and in 1777 was made bishop of London.

In speaking of the writings with which Bishop Lowth has enriched the literature of his country, we shall pass over his minor tracts, even those which belong to his controversy with Bishop Warburton, arising out of a trifling difference of opinion respecting the Book of Job. The controversy was conducted on both sides with a virulence rarely witnessed in these days in the disputes of literary men, and the pamphlets may be recommended to any one who can relish angry disputations seasoned by learning and wit. Writings on which we can dwell with greater satisfaction are his 'Life of William of Wyckham,' first published in 1758, an admirable specimen of the results to be attained by curious and recondite biographical research; and his 'Lectures on the Poetry of the Hebrews,' which were delivered by him in the University when he was professor of poetry. These lectures may be said to have opened an almost new subject, little attention having been previously paid to the laws of Hebrew poetry, or even to the fact that large portions of the books of the Old Testament are poems, in the strict and proper sense of the word, though presented to the English reader in a mere prose version, and as if there was no difference between them and the parts of those Scriptures which are really prose. They were received, when published, with great respect by the learned, not of England only, but of the Continent, where they were reprinted, with a large body of valuable notes by the learned biblical scholar J. D. Michaelis. These lectures were published by Lowth in Latin, the language in which they were delivered, but there is an English translation of them by Dr. Gregory, published in 1787. In 1778, the year after he was promoted to the bishopric of London, he published a 'Translation of the Prophet Isaiah,' distinguishing the poetical from the parts written in prose, and exhibiting the various forms of Hebrew parallelisms which occur in that prophet, and which he had explained and illustrated in his lectures. He gave a large body of valuable notes. These were his greater works; but he published also an 'Introduction to English Grammar,' which was thought valuable at the time, and was often reprinted, but is now nearly superseded and forgotten.

A volume containing memoirs of his life and writings was published soon after his decease.

LOXA, or **LOJA**, a town of Spain, in the province of Granada, 30 miles west of Granada and 40 north-east of Malaga, at the north base of a ridge of hills and in a valley watered by the river Genil. It has manufactories of printed cottons and paper, three parishes, a clerical college, two hospitals, and 13,000 inhabitants. The territory is fertile and well watered, and produces corn, maize, pulse, oil, and abounds in oak-trees. (Miñano.)

LOXI'ADÆ, Mr. Vigors's name for a family of birds placed by him as the extreme of the tribe of *Conirostres*, which is the third tribe of his *Insessores*, or perching birds, and intervenes between the *Dentirostral* and *Scansorial* tribes in his system.

Mr. Vigors remarks, that notwithstanding their inferiority of size, some species of the family may be observed to equal even the *Hornbills*, allowance being made for their relative proportions, in the extreme enlargement of the bill. 'The curved and serrated bill of the latter family' (*Hornbills*), says Mr. Vigors, 'perceptibly shortening itself, as we have perceived in *Momotus*, is still carried on to a corresponding group in the present, the *Phytotoma*, Gmel., where these characters are preserved, though the curve is slighter and the serration less strong. United to that genus by some intermediate but uncharacterised species, the *Coccothraustes*, Briss., conducts us to several groups, among which *Pitylus*, Cuv., *Strobilophaga*, Vieill., the true *Loxia* of authors, and *Psittirostra*, Temm., may be distinguished; from whence we pass to the shorter-billed groups, among which *Colius*, Linn., and *Cissopis*, Vieill., may be particularised. These are but few of the natural genera which abound in this extensive family. Many intervening species, possessing strong genuine distinctions, may be introduced among these groups, which at length terminate in some of the shorter and stronger-billed species of the Linnean *Tanagers*. These, it will be remembered, commenced the present tribe (*Conirostres*) by their union with the *Fringillidæ*: and thus here also the circular succession of affinities extends uninterrupted through the whole subdivision.' ('Natural Affinities that connect the Orders and Families of Birds,' *Linn. Trans.*, vol. xiv.)

Mr. Swainson (*Classification of Birds*) appears to reject the family altogether; for we find *Phytotoma* among the *Phytotomina*, a subfamily of *Musophagidæ*; *Coccothraustes* under the subfamily *Coccothraustinæ*; *Pitylus* under the subfamily *Tanagrinæ*; *Strobilophaga* under the 'Generic names not adopted;' *Loxia* and *Psittirostra* in the subfamily *Pyrrhulinæ*; *Colius* in the subfamily *Colinæ* (family *Musophagidæ*); *Cissopus* (Cissopis) cancelled; and the *Tanagers* under the subfamily *Tanagrinæ*; the subfamilies, with the exception of the two placed under the *Musophagidæ*, being arranged under the family *Fringillidæ*. Mr. Swainson's *Conirostres* (his second tribe of *Insessores*) consist of the families *Corvidæ*, *Sturnidæ*, *Fringillidæ*, *Musophagidæ*, with their subfamilies, and *Buceridæ*.

Having given the reader a sketch of the views of the ornithologists above quoted, we shall confine ourselves in this article to Brisson's genus *Loxia* only, of which M. Temminck remarks that its characters exclude all other species, being proper to the *Crossbills* only. Illiger, he observes, in his *Prodromus* is also of this opinion.

Loxia. (Crossbill.)

Generic Character.—Bill moderate, strong, very much compressed; the two mandibles equally curved, hooked, and the elongated points crossing each other. *Nostrils* basal, lateral, rounded, concealed by hairs directed forwards. *Feet* with three toes before and one behind, anterior toes divided. *Wings* moderate, the first quill longest. *Tail* forked.

M. Temminck, who gives the above generic character, records two species, *Loxia Pytiopsittacus* and *L. curvirostra*, in his second edition (1820), and *L. leucoptera*, in his third part of that edition (1835). The same three species, the first under the name of *L. pinetorum*, are recorded by Mr. Swainson.

Geographical Distribution of the Genus.—The north both of Europe and America. One species however, *L. curvirostra*, is found in Japan as well as in Europe.

Example, *L. curvirostra*, the *common Crossbill.*

Before we go into the history of this species, it will be well to call the reader's attention to the curious organization of the *bill* in this genus. Buffon, who, as we have too often been obliged to repeat, frequently saw deformity where all was harmony and symmetrical adaptation, does not lose this opportunity of misconstruing what he did not clearly understand. He speaks of the bill in these birds as an error and defect in nature—a deformity. If he had ever kept these birds in a cage, he would soon have found that no instrument could have been better adapted to the work required of it; and if they had ever visited his orchards he would have been convinced to his cost of its efficacy in splitting fruits for the purpose of getting at the kernels.[*]

Mr. Yarrell has well illustrated the structure and moving power of this organ, which, conjoined with the peculiar tongue, will be found a most perfect and beautiful piece of mechanism for attaining the end in view.

'The beak of the Crossbill,'[†] writes the author last mentioned, 'is altogether unique in its form; the mandibles do not lie upon each other with their lateral edges in opposition, as in other birds, but curve to the right and left, and always in opposite directions to each other. In some specimens the upper mandible is turned to the right, the lower mandible curved to the left; in others, the position of the mandibles is reversed as to their direction. In the specimen I examined the upper mandible curved downwards and to the left, the under portion turned upwards and to the right. When holding the head of this bird in my fingers, I found I could bring the point of the under mandible in a line underneath and touching the point of the upper, but not beyond it towards the left side; while on its own side the point passed with ease to the distance of 3-8ths of an inch. The upper mandible has a limited degree of motion on the cranium, the superior maxillary and nasal bones being united to the frontal by flexible bony laminæ.'

Mr. Yarrell then proceeds to the details of the anatomy, which he illustrates by the seven figures copied below. He first notices the peculiarity of the form, as well as of the magnitude of the processes of some of the bones of the head in this bird, and points out that the pterygoid processes of the palatine bones are considerably elongated downwards (*fig.* 3, *a*) to afford space for the insertion of the large pterygoid muscles. The os omoideum (*fig.* 3, *b*) is strongly articulated to the os quadratum (*fig.* 3, *c*), affording firm support to the moveable portion of the upper mandible. The jugal bone (*fig.* 3, *d*, *d*) is united to the superior maxillary bone in front, and firmly attached by its posterior extremity to the outer side of the os quadratum. Thus, when the os quadratum is pulled upwards and forwards by its own proper muscles, the upper mandible is elevated by the forward pressure of that bone.

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[*] Buffon, after noticing the deformity, remarks that it is 'cette espèce de difformité qui seule distingue cet oiseau du gros-bec,' &c.; 'car il est l'unique qui ait ce caractère ou plutôt ce défaut; et la preuve que c'est plutôt un défaut, une erreur de nature, qu'un de ses traits constans c'est que le type en est variable,' &c.; and yet he was aware of the use which the bird makes of it, in part at least; for he further says, 'Mais comme il n'existe rien qui n'ait des rapports et ne puisse par consequent avoir quelqu' usage et que tout être sentant tire parti même de ses défauts; ce bec difforme, crochu en haut et en bas, courbé par ses extrémités en deux sens opposés, paroit fait exprès pour détacher et enlever les écailles des pommes de pin et tirer la graine qui se trouve placée sous chaque écaille.' Buffon then describes how the operation is performed, and adds, 'On lui verra exécuter cette manœuvre en suspendant dans sa cage une pomme de pin mure:' for this he quotes Frisch, and goes on to notice the use of the bill made by the bird in climbing about the cage. He does not however appear to have kept the Crossbill so confined himself, or he would hardly have called it 'plus bête que les autres oiseaux,' nor should we have found in his index 'sa stupidité,' nor in his text 'Il n'a nulle impatience dans la captivité.'

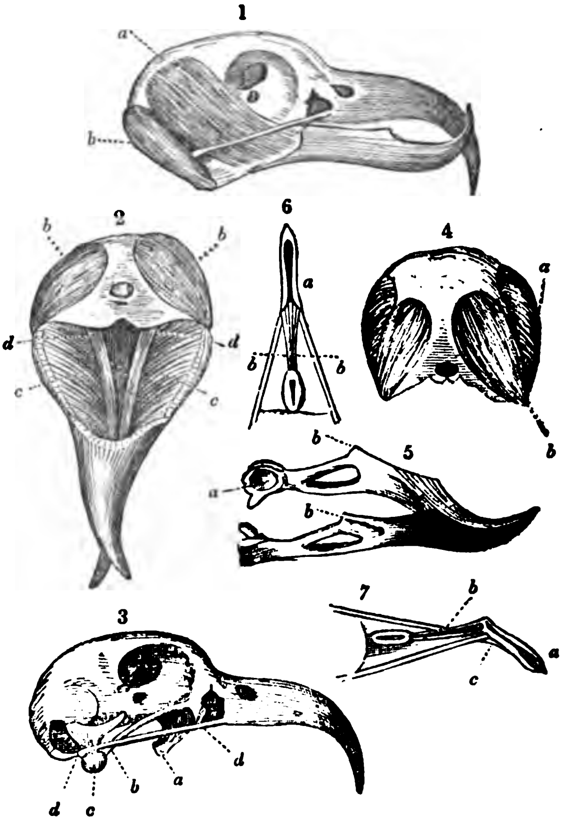
[†] Loxia curvirostra.

In most other birds the inferior projecting process of the os quadratum, to which the lower jaw is articulated, is somewhat linear from before backwards, and compressed at the sides, permitting vertical motion only upwards and downwards; but in the crossbill these processes are spherical (*fig.* 3, *c*), and the cavity in the lower jaw destined to receive the process is a circular cup (*fig.* 5, *a*): from the union of these two portions there results an articulation with all the motion and flexibility of the mechanical ball and socket joint.

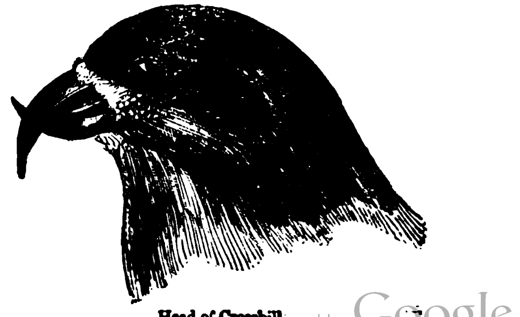
The lower jaw is very strong and the sides or plates are elevated; the coronoid processes (*fig.* 5, *b*, *b*) are prominent, and to these, as well as to the whole outer side of the plates, the temporal muscle is attached. In a head of this bird which had been divested of all the soft parts, Mr. Yarrell found that, on sliding the lower jaw laterally upon the other, as performed by the bird, before the coronoid process is brought into contact with the pterygoid process on its own side, the extreme points of the mandibles were separated laterally to the extent above-mentioned (3-8ths of an inch).

The right side of the head was that to which the lower jaw inclined in the specimen examined by Mr. Yarrell, and on that side the temporal and pyramidal muscles were considerably larger than those on the left (*figs.* 1, 2, 4, *a*, *b*), indicating by their bulk the great lateral power which the bird is capable of exerting. The pterygoid muscles (*fig.* 2, *c*, *c*), on each side were unusually large, the great distance to which the articulated extremities of the lower jaw were removed affording ample space for them, and as the food of the bird consists of small seeds, a narrow pharynx is sufficient for the purposes of deglutition. For depressing the lower mandible three muscles are called into action; but only one of these, the great pyramidal (*figs.* 1, 2, 4, *b*), which covers two other small ones, the triangular and square muscles, is visible. All three have their origin on the occipital portion of the cranium, and are inserted by strong tendons on the under and back part of each extremity of the lower jaw, behind the centre of motion; they consequently, by their simultaneous contraction, raise the point to which they are attached, and depress the anterior part of the mandible. The lower parts of the ossa quadrata are pushed rather forwards by this compression, with the help of two small muscles (not figured), but whose situation may be explained by a reference to *fig.* 3. One of these, a small flat muscle, arises from the septum of the orbits behind the small aperture in the septum, and passes downwards for insertion upon the projecting styloid process of the os quadratum; the second is a small pyramidal muscle, arising also from the septum, anterior to the other muscle; and, passing downwards and backwards, is inserted upon the os omoideum: both these, when they contract, pull the os quadratum forwards, and so elevate the other mandible. Thus the depressors of the lower jaw, and the elevators of the upper jaw, act together to separate the mandibles. To close them, the temporal and pterygoid muscles elevate the lower jaw, assisted by the slender slips (*fig.* 2, *d*, *d*), which, extending forwards to the superior maxillary bones, act in concert by bringing them down. To work the lateral motion, the great pyramidal muscle on the right side pulls the extremity of the lower jaw, to which it is attached, backwards, the pterygoid muscles of the left side at the same time powerfully assisting by carrying that side of the lower jaw inwards.

Mr. Yarrell then quotes Mr. Townson, to show the adaptation of these parts to the wants of the bird in feeding. 'The great pine-forests, such as the Hartz in Germany,' says Mr. Townson, 'are the natural places of residence of the Crossbeaks, and the seed of the cones of these trees their food; and it is to pull out the seeds from between the squamæ, or scales of the cones, that this structure is given them. Their mode of operation is thus:—they first fix themselves across the cone, then bring the points of the maxillæ, from their crossed or lateral position, to be immediately over each other. In this reduced compass they insinuate their beaks between the scales, and then opening them, not in the usual manner, but by drawing the inferior maxilla sideways, force open the scales or squamæ.' It is at this stage of the proceeding, observes Mr. Yarrell, that the aid of the tongue becomes necessary; and here again we have another instance of beautiful adaptation. There is articulated to the anterior extremity of the os hyoides, or bone of the tongue, an additional portion, formed partly of bone, with a horny covering (*figs.* 6, 7, *a*). This is narrow, and about ⅜ths of an inch in length, extending forwards and downwards, with the sides curved upwards, and the distal extremity shaped like a scoop somewhat pointed and thin on both edges, the proximal extremity ending in two small processes elongated upwards and backwards above the articulation with the bone of the tongue, each process having inserted upon it a slender muscle (*figs.* 6, 7, *b*) extending backwards to the glottis and attached to the os hyoides; and these muscles, by their contraction, extend and raise the scoop-like point. 'Underneath the articulation of this horny grooved appendage,' continues Mr. Yarrell, 'is another small muscle (*c*, *fig.* 7), which is attached at one extremity to the os hyoides, at the other to the moveable piece, and by its action, as an antagonist to the upper muscles, bends the point downwards and backwards; whilst therefore the points of the beak press the shell from the body of the cone, the tongue, brought forward by its own muscle (genio-hyoideus) is enabled, by the additional muscles described, to direct and insert its cutting scoop beneath the seed, and the food thus dislodged is transferred to the mouth: it will be seen by a reference to the first figure, that when the mandibles are separated laterally in this operation, the bird has an uninterrupted view of the seed in the cavity,



1. Skull of Crossbill, side view; *a*, temporal muscle; *b*, great pyramidal muscle. 2. Head viewed from below; *b*, great pyramidal muscle; *c*, *c*, pterygoid muscles; *d*, *d*, graciles muscles. 3. Head viewed from the side; *a*, pterygoid process; *b*, os omoideum; *c*, os quadratum; *d*, *d*, os jugale. 4. Head viewed from behind; *a*, right temporal muscle; *b*, great pyramidal muscle. 5. Lower jaw, side view; *a*, cavity for articulation; *b*, *b*, coronoid processes. 6. Tongue seen from above; *a*, horny scoop; *b*, *b*, extensor muscles. 7. Tongue, side view; *a*, horny scoop; *b*, extensor muscles; *c*, flexor muscle. (Yarrell, *Zool. Journ.*, vol. iv.)



Head of Crossbill.

with the eye on that side to which the under mandible is curved.' So much for Buffon's 'error and defect of nature, and deformity.'

Description of Loxia curvirostra.—Adult and Old Male.—Principal colours of the plumage ash strongly tinged with greenish; front, cheeks, and eyebrows grey, with yellowish and whitish spots; back, small coverts of the wings, and scapulars, greenish; rump yellow; lower parts yellowish-green; abdomen grey, with deeper spots; wing and tail-feathers blackish, bordered with greenish; great and lesser coverts bordered with yellowish white; iris and feet brown; bill horn-colour. Length, about 6 inches.

Male from its first moult to the age of one year.—All the upper and lower parts of the body brick-red, more or less tinged with greenish and yellowish; wing and tail-feathers black, bordered with reddish-green; lower coverts of the tail white, with a great brown spot in the centre.

Young of the year.—Upper parts grey-brown, clouded with greenish; rump yellowish; lower parts whitish, with longitudinal brown and black spots.

Female.—In all ages, differing but little from the *young;* the plumage is clouded with greenish and yellowish tints. Neither in this species nor in *L. Pytiopsittacus* does the female ever assume the red livery, which is only peculiar to the male after its first moult up to the age of one year.

Such is M. Temminck's description in the second edition of his 'Manuel' (1820); but in the third part (1835), he states that the principal tints under which the *male* presents itself are more or less of a brick or vermillion-red, the middle of the belly being whitish. The *males of a year old* are of a tarnished red, of a yellowish-red, of a greenish-yellow, or tarnished yellow clouded with reddish. The *old females* have the upper part of the body deep grey, the rump of a yellowish green, the lower part of the body of a bright grey clouded with greenish. M. Temminck adds that he has seen *males* with the summit of the head, belly, and rump of a beautiful yellow, with a large brown band behind the eyes, and the rest of the plumage like the old female. M. Temminck says (in the same part) of the genus generally, that the red or reddish livery of the males is not, as had been erroneously believed, peculiar to a limited period of life, but is the perfect state of plumage in the male sex: after quoting M. Brehm's proofs of the nidification, M. Temminck goes on to state that the old males have a red plumage; the young a reddish plumage, reddish-yellow, or yellowish; the females a yellowish-green, and the young a grey or greyish plumage.

Mr. Gould (*Birds of Europe*) observes that in the minds of many naturalists some doubts still exist, and that they existed till lately in his own, as to whether the rich rosy-red colouring assumed by this bird is characteristic of the breeding season, or the permanent livery of the adult male He states that during his recent visit to Vienna he had an opportunity of observing both sexes in every stage, an examination of which afforded him abundant proofs that the red plumage is acquired during the first autumn, for he saw many lately fledged that had their plumage thickly spotted; others that had partially lost their spotted appearance, and had partly assumed the red colouring; and others that had their feathers entirely tinted of this colour; while the adults, as most ornithologists have stated, were characterised by a plumage of olive-green, which appears to be permanent.

This bird is *Loxia curvirostra* of Linnæus; *Becco in croce, Crocione* and *Crosiero* of the Italians; *Bec croisé* and *Bec croisé commun* of the French; *Fichten Kreuzschnabel* or *Kreutzschnabel* and *Mittlerer Gebirgs und Fichten-Kreutzschnabel* of the Germans; *Kruisvink* of the Netherlanders; *Mindre Korsnabb* of the Scandinavians; *Crossbill, Common Crossbill*, or *Shell-Apple* of the modern British; and *Gylfingroes* of the antient British.

Habits, Reproduction, &c.—Willughby, who notices its change of colour, says that it is a most voracious bird; much delighted and feeding very fat with hemp-seed. 'It also,' he adds, 'loves fir-kernels. ... They say, that with one stroke of its bill it will in a trice divide an apple in halves, that it may feed upon the kernels, by that means doing a great deal of mischief in orchards.' Mr. Townson, who kept some, states that the degree of the lateral power of these birds is surprising, that they are fond of exercising it for mere amusement, and are therefore not a little mischievous. 'My pets,' says the last-mentioned author, 'would often come to my table whilst I was writing, and carry off my pencils, little chip-boxes in which I occasionally kept insects, and other similar objects, and tear them to pieces in a minute. Their mode of operation is by first pecking a little hole; in this they insert their bill, and then split or tear the object by the lateral force. When I treated them, as I often did, with almonds in their shells, they got at the kernel in the same manner; first pecking a hole in the shell, and then enlarging it by wrenching off pieces by the lateral power.' Mr. Yarrell,—who, in his paper in the 'Zoological Journal,' from which we have taken the organization of the bill, observes that notwithstanding Buffon's assertion to the contrary,* they can pick up and eat the smallest seeds, and shell or husk hemp and similar seeds,—gives the following interesting account of the habits of a pair in captivity. We must premise that Willughby also remarked that when kept in cages they climb up and down the sides with their bills and feet, after the manner of parrots. 'My friend Mr. Morgan,' says Mr. Yarrell, 'kept a pair of these birds for some time, and had opportunities for observing their curious habits. They were impatient under confinement, and restless, climbing over the wires of their cage, by the use of their beak and claws, like parrots. One of their principal occupations was twisting out the ends of the wires of their prison, which they accomplished with equal ease and dexterity. A short flat-headed nail that confined some strong net-work was a favourite object on which they tried their strength; and the male, who was usually pioneer in every new exploit, succeeded by long continued efforts in drawing the nail out of the wood, though not without breaking off the point of his beak in the experiment. Their unceasing destruction of cages at length brought upon them sentence of banishment. During the period of their captivity a complete change took place in the colour of their plumage, without the shedding of a single feather.'

The *nest* is generally placed in the fork of a lofty branch in fir and other trees; it is built of moss, lichens, and other such materials, and lined with feathers. *Eggs* four or five, greyish or dirty white, with irregular bright blood-red patches at the larger end, and smaller specks dispersed over the remaining portions. Temminck says that in Livonia it builds in the month of May, but the general period of nidification mentioned by authors is during the winter or very early in spring. Whilst they are at work on the fir-cones their note is a gentle twitter, and they may be seen climbing about the branches like *Parrots;* but they are said besides to have a pleasant song, which is only poured forth in the winter months, or at the season of incubation.

M. Brehm declares that the nidification and laying of eggs takes place in all seasons, and he attributes this peculiarity to the comparative abundance or scarcity of food. It appears to be certain that *Crossbills* make their nests in December, as well as in March, April, and May.

Localities.—Germany, Poland, Sweden, &c., America (?)† and Japan, in which last locality it is called Isuga. The Prince of Musignano (C. Bonaparte) notes it as very rare and accidental, appearing only in the coldest winters near Rome; but as not rare in Philadelphia in the winter.‡ It can only be considered as an occasional visitant to the British Islands. Willughby says, 'Sometimes they come over to us, and in the western part of England, especially Worcestershire, make bad work, spoiling a great deal of fruit in our orchards.' About the commencement of the present century a large flight came to the south of Ireland in the autumn, and did much damage to the apples, &c.; numbers of these birds were taken and kept in cages at that time. Mr. Selby notices the immense flocks that visited England and Scotland in 1821. They spread themselves through the country, and were to be seen in all woods and plantations where the fir-tree abounded. Their first appearance was in the early part of June, and the greater part of the flocks seemed to consist of females and the young of the year (the males possessing the red plumage assumed from the first moult to the end of that year). Many of the females killed by Mr. Selby showed plainly, from the denuded state of their breasts, that they had been engaged in incubation some time previous to their arrival; which circumstance, he observes, agrees with the account given of the early period at which they breed in higher latitudes. They continued in Britain till towards the autumn, but kept moving northward, for Mr. Selby found them in September particularly abundant in all the fir-tracts of Scotland after they had nearly disappeared south of the Tweed. Since that time (he writes in 1825) none had come under his observation. He alludes to the great havoc they commit in the apple and pear orchards in their occasional visits to the south, by splitting the fruit in halves for the sake of the enclosed pips. Mr. Hoy, of Stoke Nayland, in Suffolk, who gives an interesting account of the habits of these birds, says that from 1821 to the middle of May, 1822, Crossbills were very numerous in that county, and, he believes, extended their flights into many parts of England. (Loudon's *Magazine of Nat. Hist.*, January, 1834.) Mr. Knapp notices its occasional visits in small parties, and the damage it does to the orchard. He says that a pair was brought to him very early in August, and the breast of the female being nearly bare of feathers, as is observed in sitting birds, he thinks it is probable that she had a nest in the neighbourhood. There are a few instances recorded of its breeding here.

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* Buffon's words are, 'Les deux pointes ne pouvant se rencontrer, l'oiseau ne peut ni becqueter, ni prendre de petits grains, ni saisir sa nourriture autrement que de côté.'

† But note: Mr. Gould, at a meeting of the Zoological Society of London. showed that the Crossbill of North America is very distinct from that of Europe, the Loxia curvirostra, Linn. It is one-third less in all its proportions, and is somewhat less brilliant in colouring. ('Zool. Proc.,' 1834.)

‡ Such is the prince's statement in the 'Specchio Comparativo;' but in his recent and valuable 'Geographical and Comparative List of the Birds of Europe and North America' (London, 1838), he corrects this, and, confining *Loxia curvirostra* to Europe generally, gives *Loxia Americana* as the American form.

Utility to Man.—The flesh of the Common Crossbill is well flavoured. Mr. Gould saw in the bird-market of Vienna multitudes of Crossbills exposed for sale with swallows, martins, and many others of the smaller birds, for the purposes of the table; of these the Crossbill appeared to be especially in request from its superiority of size and its sweet and well-tasted flesh, to the good qualities of which Mr. Gould bears testimony. The same author notices it as seeming to be of all the small birds the least distrustful of man, and states that when flocks arrive in this country numbers are taken by a bird-limed twig attached to the end of a fishing-rod.

Loxia curvirostra, male: upper figure, young of the year; lower, adult.

LOXODROMIC SPIRAL (λοξός, oblique, δρόμος, course), the curve on which a ship sails when her course is always on one point of the compass. It is called in English works the RHUMB LINE.

LOYOLA. [JESUITS.]

LOZE'RE, a department in the south of France, bounded on the north-east by the department of Haute-Loire, on the east by that of Ardèche, on the south-east and south by that of Gard, on the south-west and west by that of Aveyron, and on the north-west by that of Cantal. The form of the department is nearly oval; its greatest length is, from north-west to south-east, from the banks of the little river Bès, which separates this department from that of Cantal, to the neighbourhood of St. Jean de Gard [GARD], 64 miles; its greatest breadth is, from the banks of the Borne, which separates this department from that of Ardèche, to the junction of the Jonte and the Tarn, 57 miles. The area of the department may be estimated at 1992 square miles, being considerably under the average size of the French departments, and rather less than the English county of Norfolk. The population in 1831 was 140,347; in 1836 it was 141,733, showing an increase in five years of 1386, or less than one per cent., and giving 71 inhabitants to a square mile, less than one-half the average density of population in France, and about equal to the density of population in Westmoreland, the most thinly peopled of the English counties. Mende, the capital, is in 44° 31′ N. lat. and 3° 29′ E. long., 302 miles in a direct line south by east of Paris, or 335 miles by the road through Montargis, Nevers, Moulins, Clermont, and St. Flour.

The department is altogether of a mountainous character. The Cévennes cross it in the south-western part; Mont Lozère, one of the loftiest mountains of this range, is 4885 feet high (Malte Brun), and gives name to the department: the Roc de Malpertus in the immediate neighbourhood of Lozère (if indeed it be not one of the peaks of Lozère itself) is 5508 feet high. The chain of La Margeride, which branches off from the Cévennes at Mont Lozère, and unites that mountain-range with the volcanic group of Auvergne, extends through the department in the direction of its length; and the mountains of Aubrac overspread the eastern part, and extend into the adjacent department of Aveyron. The mountain-ranges of the Cévennes and La Margeride determine the watershed of the department, and divide it between three of the great river-basins of France. The small portion on the south-east, separated from the rest by the crests of the Cévennes, belongs to the basin of the Rhône; the rest of the department is divided by the mountains of La Margeride, between the basin of the Loire in the north and that of the Garonne in the west: the part comprehended in the basin of the Garonne is considerably larger than either of the others.

The department is chiefly occupied by the primitive rocks which constitute the mass of the Cévennes and the connected mountains. On the south-eastern slope of the Cévennes, towards the basin of the Rhône, the granites and other primitive rocks are covered with the strata of later formation which intervene between the chalk and the saliferous sandstone. The same strata overspread a considerable portion of the western side of the department on the banks of the Tarn and the Lot, and in the country between them. One or two extinct volcanoes have been observed within the limits of this department; but they are not so numerous as in the adjacent departments of Haute-Loire and Cantal.

The mineral wealth of the department is not great: lead, silver, antimony, copper, and iron ore are procured. There is not however any coal, nor are there any works for smelting or working iron. Marble, freestone for building, and gypsum, are quarried; and there are some mineral springs, of which the most frequented are those of Bagnols les Bains near Mende.

The rivers are all small in that part of their course which lies within the department. To the basin of the Rhône belong the Cèze, which rises in Mont Lozère, and brings down particles of gold; the Gardon d'Alais, the Gardon de Mialet, and the Gazizan, which unite their streams in the adjacent department of the Gard, on the eastern border of which all these rivers join the Rhône. The Chassezac and the Borne water the east side of the department, and flow by the Ardèche into the Rhône. To the basin of the Loire belong the Allier, which rises in the north-eastern slopes of La Margeride, and for some distance separates this department from the adjacent departments of Ardèche and Haute-Loire; the Chapeauroux and the Ance, which also rise on the same slope and flow northward into the Allier. To the basin of the Garonne belong the Lot and the Tarn. The Lot rises in the south-western slope of La Margeride, not far from Mont Lozère, and flows west by Mende and Chanac into the department of Aveyron: nearly 40 miles of its course belong to this department. It receives the Coulanges and some other small streams: the Coulagnet and some others fall into the Coulanges. The Trueyre, or Truyère, a more important tributary, rises in the slope of La Margeride, and flows north-west; it does not join the Lot till far beyond the boundary of this department. The Bès, a tributary of the Truyère, forms the boundary between the departments of Lozère and Cantal; it rises in that of Lozère. The Tarn rises on the western side of Mont Lozère and flows westward to Sainte Enimie, and then south-west into the department of Aveyron. In one part of its course (the Pas-de-Souci) the Tarn passes between two precipitous rocks which nearly meet over head and form a natural bridge. It receives the Tarnon, the Jonte, which separates the department of Lozère from that of Aveyron, and several smaller streams: about 45 to 48 miles of its course belong to this department.

Entirely destitute of inland navigation, the department is very indifferently provided with roads. There are five government roads, having an aggregate length of 239 miles; but of these only 88 miles were in 1837 in repair, 23 miles were out of repair, and 128 were unfinished. The principal road is that from Paris by Moulins and Clermont to Narbonne and Perpignan. It enters the department from that of Cantal on the north, and runs by St. Chely, Aumont, Marvejols, and Chirac into the department of Aveyron. The road from Paris to Mende branches off from this at St. Chely, and a branch road from Mende rejoins the great Perpignan road just before it leaves the department. Other roads run from Mende by Langogne to Le Puy (Haute Loire); by Villefort to Le Pont St. Esprit (Gard) on the Rhône; and by Ispanhac and Florac to Nîmes (Gard). A cross-road from Langogne leads by Villefort to Alais (Gard) and Nîmes (Gard).

The departmental roads are 21 in number, with an aggregate length of 370 to 380 miles; but more than two-thirds of the whole length are out of repair; the bye-roads and paths amount to nearly two thousand five hundred, with an aggregate length of more than 2000 miles.

The general elevation of the soil renders the climate colder than from the latitude would be otherwise expected. The mountains are covered with snow during a great part of the year. The western slopes of the Cévennes and mountains of La Margeride and the north-eastern slopes of the latter have a moist rainy atmosphere: on the south-eastern slope of the Cévennes there is less rain; and droughts of such length as to injure vegetation are not uncommon. The heat of summer in the department is rarely great; but tempests are frequent at that season. In the mountainous districts little grain is grown; and indeed throughout the department the quantity of arable land is less than usual in France, and the corn grown is insufficient for the consumption of the department. Chesnuts and potatoes, both which are much cultivated, form the principal food of the peasantry. Flax, hemp, and hay are grown. Many plants used in medicine, in tanning, or in dyeing, are found; among them is madder. On some of the steep slopes on the south-east side of the Cévennes the industry of some of the cultivators has succeeded in raising the olive, the vine, and the mulberry. The vineyards occupy from 2000 to 2500 acres. Woods occupy about a twelfth part of the surface; the beech is the principal forest-tree. The forests are infested by wolves. The meadow lands occupy about a fifteenth of the department; but the heaths and open wastes are very extensive, and serve for the pasturage of cattle, and of numerous flocks of sheep. Many mules are reared for carrying goods across the mountains, or for exportation to other parts of the south of France or to Spain. Game is abundant; and trouts and eels are numerous in the rivers and ponds.

The department is divided into three arrondissements, as follows:—

	Area in square miles.	Population in 1831.	Population in 1836.	Communes.
Mende, N.E. & E., . . .	688	45,440	46,192	62
Florac, S., ...	646	41,525	41,439	51
Marvejols, N.W. & W., .	658	53,382	54,102	75
	1992	140,347	141,733	188

It is divided into 27 cantons, or districts under a justice of peace.

In the arrondissement of Mende are Mende and Le Bleymard on the Lot; Villefort near Mont Lozère; Langogne on the Allier; Châteauneuf de Randon on the Chapeauroux, and Grandrieu on a small river of the same name which joins the Chapeauroux. Mende is first mentioned by Gregory of Tours, who calls it Mimmate. It was formerly the capital of the province of Gevaudan. It is in a dreary and mountainous district; but the immediate neighbourhood of the town, which is in a valley watered by the Lot, is pleasant, being studded with gardens, meadows, and orchards, in which are apple and pear trees, producing excellent fruit, and many fine walnut-trees. The town occupies a site nearly triangular, and is at an elevation of above 1800 feet above the level of the sea. It is surrounded by a small boulevard. The streets are ill laid out, narrow, crooked, and dirty; the houses, which are roofed with slate, are ill built. The cathedral is a very inferior building; though its steeples are praised by some writers for the lightness and boldness of their architecture. The former episcopal palace, now the prefect's house, has a handsome gallery and saloon with some good paintings. There are several public fountains. Around the town are many small country-houses. The population of Mende was, in 1831, 4558 for the town, or 5822 for the whole commune; in 1836 it was 5909 for the commune. A considerable quantity of serge is manufactured in and about the town for exportation to foreign lands; there are two considerable yearly fairs. There are a high school, a public library, a theatre, and an agricultural society. There is in the immediate neighbourhood of Mende a mountain which rises to the height of 1020 feet above the town; on the slope of this mountain, more than half-way up, is the hermitage, the dwelling of St. Privas, hewn in the rock. About five miles east of the town are the warm sulphurous springs of Bagnols, which are in high repute for rheumatic and cutaneous disorders, and for wounds. It is estimated that 2000 invalids resort to them yearly. There is also at Lanuéjols, or La Nuéjols, near Mende, an antient tomb, erroneously supposed by some to be that of Munatius Plancus, who built Lyon. Pope Urban V. was born near Mende.

At Le Bleymard the manufacture of serges and other woollens is carried on. Villefort is the centre of a district in which wine and chesnuts are grown. Lead and copper mines are wrought in the neighbourhood, and trade is carried on in horses and cattle. At Langogne (pop. 2309 town, 2720 whole commune) much serge and other woollens are manufactured, and there are copper-works. Châteauneuf de Randon is a small town of perhaps 500 inhabitants: it has a good market. It was in besieging this little town, then (A.D. 1380) in the power of the English, that Bertrand du Guesclin died. The governor of this place, who had agreed, if not succoured, to surrender to him, laid the keys of the place on Du Guesclin's coffin.

In the arrondissement of Florac are Florac, on the Tarnon, a feeder of the Tarn; Pont de Montvert, Ispanhac, and Sainte Enimie on the Tarn; Meyrueis on the Jonte; and Barré and St. Germain near the highest ridge of the Cévennes. Florac is in a narrow valley, and consists chiefly of one street on the road which runs from Mende to Nîmes. The population in 1831 was 1796 for the town, or 2194 for the whole commune; in 1836 it was 2246 for the commune. There is little trade, but the neighbourhood of the town is fertile. Ispanhac, or Espagnac, is delightfully situated in a pleasant valley. Some cotton manufactures are carried on. At Sainte Enimie serges, like those of Mende, are manufactured. Near Meyrueis are some curious caverns, and some beds of coal, which are not worked.

In the arrondissement of Marvejols are Marvejols and Chirac, on the Coulanges; Balsièges on and La Canourgue near the Lot; Serverette and Malzieux on the Truyère; St. Alban on the Limaniol, a small feeder of the Truyère; St. Chely d'Apalche, on another small feeder of the Truyère; and Aumont between St. Chely and Marvejols.

Marvejols was taken in A.D. 1586 from the Huguenots, by the duke of Joyeuse, who commanded the troops of Henri III., and in violation of the capitulation the town was pillaged and burnt, and the walls were razed to the ground. Six years afterwards Henri IV. aided the inhabitants in rebuilding the place; it is now a well laid out and handsome town. It had before the Revolution several monastic establishments. The population in 1831 was 3796 for the town, and 3885 for the whole commune; in 1836 it was 4025 for the commune. There are several mills on the Coulanges, and some dye-houses. Serges and other woollens are manufactured at Balsièges, La Canourgue, Serverette, Malzieux, St. Alban, and St. Chely. Red granite is quarried near St. Alban; there is in the town a château now converted into an hospital for insane females. At St. Chely (pop. 1555 town, 1651 whole commune) are two weekly markets, at which a good deal of business is done in cattle: considerable trade is also carried on in woollen stuffs.

The chief manufacture of the department is that of serges and other woollen stuffs; spinning cotton-yarn is also carried on to some extent. Chesnuts are prepared for sea-stores in considerable quantity. But the different branches of industry are not sufficient to give employment to the inhabitants, a number of whom emigrate yearly to the more southern departments to obtain work as mowers and reapers. The trade of the department is trifling; the want of navigable rivers and the labour of the conveyance over the mountains are great impediments. The exports are cattle, chesnuts, and woollen stuffs.

The department constitutes the diocese of Mende, the bishops of which are suffragans of the archbishop of Alby. It is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Nîmes. It is in the ninth military division, the head-quarters of which are at Montpellier. It returns three members to the Chamber of Deputies. In respect of education it is below the average of France; the number of young men enrolled in the military census of 1828-29 who could read and write was twenty-seven in every hundred, the average of France being thirty-nine.

This department formerly constituted the territory of the Gabali, a Celtic people. Their capital was Anderitum, afterwards called Gabali, from the name of the people, now Javols, a village between St. Chely and Mende. Several antiquities have been discovered at Javols; such as the ruins of columns, statues, and buildings; coins, medals, and vases. Traces of the Roman road from Lugdunum (Lyon) to Tolosa (Toulouse) have been observed in this department. Some of the Celtic monuments called dol-mens are yet in existence.

Before the Revolution this department constituted for the most part the province of Gévaudan in Languedoc. Portions of the district of Le Velay and of the diocese of Uzès, both also in Languedoc, are included in the present limits.

LÜBECK is situated in 53° 51′ N. lat. and 10° 50′ E. long., on a long eminence between the rivers Trave and Wakenitz. Its territory is bounded on the east by Mecklenburg Strelitz, on the west by Oldenburg and Holstein, and on the south by Lauenburg; the northern part, between Holstein and Mecklenburg, extends to the Baltic. Its territorial possessions were formerly very scattered; some detached portions were in Holstein, some in Lauenburg, and others in Mecklenburg. By the decision of the diet in February, 1803, modified in 1804 by a treaty with Oldenburg, it obtained, in exchange for many of its distant districts, a continuous tract on the Trave. It is very uncertain at what time a town was first erected on this spot. There is evidence that a flourishing commercial town existed here in the eighth century, which was built by the Wilzen, a Slavonian tribe, as a place of arms, on the banks of the Schwartau. This was Old Lübeck, which was however soon taken by the Obotriti, whose king, Henry, chose it for his residence. In 1139 the Rugians took the place and totally destroyed it, upon which Adolphus II., count of Holstein, founded the present city of Lübeck on the banks of the Trave in 1140. He peopled it with fugitives and settlers from Westphalia and the Netherlands, and merchants from Bardewick; but Henry the Lion, duke of Saxony, being jealous of the rapid rise of Lübeck, to the detriment of Bardewick, did his utmost to interrupt its commerce by land. In 1157 the city was nearly destroyed by fire. In 1158 Adolphus ceded it and its territory to Henry the Lion, who rebuilt the town, surrounded it with walls, gave it magistrates of its own, granted it several privileges, allowed the northern nations a free trade to it, and gave it the celebrated code of laws called *das Lübische Recht*, which was subsequently adopted by so many countries and cities. In 1163 the see of the bishopric of Oldenburg, founded in 952 by the Emperor Otho I., was transferred, at the instance of Bishop Gerold, to Lübeck. This proved a great advantage to the city. The churches of St. Mary and St. Peter were already built, and the cathedral was founded by Bishop Gerold in 1170. Henry the Lion being put under the ban of the empire, Lübeck was forced to submit to the emperor Frederick I., during whose absence in the Holy Land, Henry returned from England, and recovered it, but had held it only three years when it was taken by Adolphus III., count of Holstein (1192). Ten years later it was taken by Woldemar, brother of Canute, king of Denmark. The Danes proved very oppressive masters, and the citizens, taking advantage of some favourable circumstances, expelled the Danish garrison in 1226, and placed themselves under the protection of the emperor Frederick II., who confirmed all their privileges, and made Lübeck a free imperial city.

The citizens had many contests to maintain with their jealous and powerful neighbours, but their valour and prudence triumphed on every occasion. The wealth and power of Lübeck increased, and it joined the Hanseatic League, of which it became the head. [Hanse Towns.] Its fleets commanded the Baltic; Gustavus Wasa found an asylum in its walls against Christian II., and Lübeck's voice decided in the affairs of the kingdoms of the North. As an evidence of the prosperity of Lübeck during the flourishing period of the Hanseatic League, it may be stated that the dreadful pestilence called the 'black death' is said to have carried off in five months, in 1350, between 80,000 and 90,000 persons, without depriving the city of more than half of its population. This number is presumed however by some writers to be far above the truth; yet it appears that, 200 years later, in April, 1580, between 50,000 and 60,000 citizens able to bear arms were numbered, which would certainly imply a population of 200,000 souls. From the dissolution of the Hansa in 1630 to the present day, Lübeck has passed through numerous vicissitudes. The storms of the French revolution fatally affected Lübeck. The occupation of the city by Blücher after his retreat from the battle of Jena, and his brave but unsuccessful defence against 70,000 French soldiers, led to the plunder of the town during three days, when many of the defenceless citizens were murdered, and property to an immense amount was carried off or wantonly destroyed. Lübeck, like Hamburg, was incorporated with the French empire in 1810, and so remained till it recovered its freedom after the battle of Leipzig in 1813.

Lübeck, in its present state, is no longer a fortified town; the old ramparts are converted into public walks, and the city, being on a moderate eminence between the Trave and the Wakenitz, is very pleasantly situated, and is very clean and cheerful. The interior is more regular than in most of the old German towns, it being intersected by several broad and straight streets. The houses are built of stone. A great number of the houses are in the old-fashioned style, with the gable ends towards the street, but the more modern are in better taste. Besides the cathedral, which contains valuable paintings and remains of antiquity, there are five parish churches, of which that of St. Mary is celebrated as one of the finest Gothic churches in northern Germany. It is 340 feet long, and the middle nave 152 feet high (so stated by Zeitz) and 45 wide. The church contains valuable paintings by Holbein, Vandyck, Perugino, Aldderfor, and other masters, a very curious astronomical clock, a 'Dance of Death,' a fine organ, and a remarkable altar by Guillinus of Antwerp, &c. The other churches are much inferior to St. Mary's. Lübeck is celebrated for its charitable institutions, which are numerous and admirably conducted. The other public establishments and buildings are the gymnasium, the commercial institution, the patriotic society, the mechanics' school of design, the Roman Catholic chapel, the Calvinist church, and many others. The senate-house, an antient Gothic building, contains the hall where the deputies of the Hansa formerly met.

The territory which we have already described, including the detached district and those which it possesses in common with Hamburg [Hamburg], is about 130 square miles in extent, with a population which may now be estimated at 46,500, that of the city being 26,000 at the most, that of Travemunde 1100, and of Bergedorff and its district 5300. The manufactures are of very various kinds, but none on a large scale.

The commerce of the city is beginning to be of considerable importance. It has 80 ships of its own, and the arrivals are above 900 annually. At the moment that this article is written, a question of vital importance is pending. Between Hamburg and Lübeck there has always been a great transit trade; the route is partly through the Danish territories, and has hitherto been free from all tolls. But in defiance of antient and still subsisting treaties between Denmark and the two cities, the Danish government has lately imposed a very heavy duty on all goods going from Hamburg to Lübeck, and *vice versâ*. It is singular that the duty on the first is fixed at double that on the second. It almost seems as if this were in a spirit of hostility to England, as the goods, chiefly British colonial produce and manufactured articles, sent from Hamburg to Lübeck, amount to above a million sterling annually, while the Russian and Swedish goods from Lübeck to Hamburg do not exceed 200,000*l*. The two cities have appealed to the diet of the German confederation, whose decision is anxiously expected. For some years past there has been a regular communication by steam-boats between Lübeck and St. Petersburg: the voyage is generally made in three and a half or four days. (Hassel, *Geog.*, vol. v.; Stein, *Geog.*; Zeitz, *Ansichten von Lübeck.*)

LÜBECK (Principality). [OLDENBURG.]

LUBIENIETSKI (Latinized *Lubieniecius*). There are five persons of this name (one Andrew, two Christopher, and two Stanislaus), all distinguished in the Polish Socinian controversy. A list of their several writings may be found in Sandius, 'Bibl. Antitrin.,' Freistadt, 1684. The subject of the present article is Stanislaus the younger, son of Christopher, who was born at Cracow, August 23, 1623, and died in exile at Hamburg, May 18, 1675. He was minister of a church at Lublin, until driven out by the arm of power for his opinions. He died, as is stated, by poison; a fact borne out by the death of his two daughters, and the serious illness of his wife, after eating of the same dish, and by the neglect of the Hamburg magistracy to institute the investigation usual in cases of sudden death.

The theological works of Lubienietski are numerous, and may be found in Sandius, with the exception of the 'Historia Reformationis Polonicæ,' published in 1685, at Freistadt, with a Life prefixed. But the work which makes his reputation more European, and entitles him to a place here, is his 'Theatrum Cometicum.' This work was published at Amsterdam in 1667 (Sandius and Weidler), but a copy in our possession has a Leyden title-page, and the date 1681. This change of titles in different parts of the same edition was formerly not uncommon, and has caused much confusion. A pictorial frontispiece has the following anagram for Stanislaus Lubieniecius: 'Satis in ulna Jesu lucebis.'

The 'Theatrum Cometicum' consists of three parts. The first contains the correspondence of the author with men of science throughout Europe on the subject of the comets of 1664 and 1665; and has in it communications from Vossius, Oldenburg, Hevelius, Kircher, Bouillaud, Von Guericke, &c. &c. The second part contains an elaborate account of all the comets (415 in number) recorded in history down to the year 1665. It is written in support of the hypothesis that comets portend both good and evil, in opposition to the prevailing notion that they were harbingers of misfortune only; and this opinion is supported by history, it being clearly shown that public events of both characters usually followed close upon comets. Thus he points out that though the comet of 323 strengthened the heresy of Arius, it also brought about the council of Nice; and this, from Lubienietski, was not a little satirical. We are in doubt whether to conclude that the author maintained his hypothesis in good faith, or to suspect that he chose his line of argument as the best practical mode of attacking the prevailing terrors. And our doubt becomes stronger when we see that in the third part, called 'Theatri Cometici exitus,' he rather widens his hypothesis; and whereas he had before maintained that comets foretell both good and evil, he now asserts the dilemma that they predict *both or neither*, but still cautiously.

In the late discussions about Halley's comet this work of Lubienietski was freely cited in proof of one and another former appearance, or presumed appearance, of that memorable body. It seems to have been taken for granted that the mere mention of a comet by this author is sufficient evidence of its having really appeared. It may be useful therefore on future occasions to recommend those who would prove a comet from the 'Theatrum Cometicum' (and the same caution may be given with respect to Riccioli's list), first to examine the authority on which the fact rests. Lubienietski has collected every instance, and gives his originals; but this, though done with care and great learning (exhibiting a mass of research which will appear wonderful when we remember that the investigator was driven from country to country, and engaged in continual theological controversy), should only serve to enable the reader to discriminate. Many of the authorities cited are worthless, and it even happens that the original historian of one of Lubienietski's comets was born many hundred years after the phenomenon for the appearance of which he is made sufficient evidence.

LUBLIN, a woiwodschaft, or province, of the kingdom of Poland, is composed of the circles of Lublin, Chelm, Josefow, and Zamoski, which formerly belonged to the kingdom of Galicia, and were ceded by Austria in 1810 to the grand-duchy of Warsaw. It lies between 50° 17′ and 51° 43′ N. lat., and 21° 45′ and 24° 7′ E long., comprising an area of 6650 square miles, with a population of 500,000 inhabitants. It is bounded on the north by Podlachia, on the east by Russia, on the south by Galicia, and on the west by Sandomir. The Vistula separates it from Sandomir, the Bug from Russia, and the Wieprz (which flows through it) for some distance from Podlachia. This province has extensive forests, and in some parts morasses, but likewise contains tracts of good arable land, and pasturage with a fine breed of cattle. There are no metals except bog-ore. It is divided into four circles (in Polish *obwod*), viz. Lublin, Zamosz, Hrubieszow, and Krasnistaw.

The principal towns in the circle of Lublin, besides the capital, are the following: Lubartow, on the Wieprz, has a fine castle, three churches, a Capuchin convent, and 3190 inhabitants. Kurow, on the Kurowka, has a fine palace of Count Potocki, two churches, and 1920 inhabitants. In 1816 a mineral spring was discovered, the waters of which resemble those of Pyrmont: Pulawy, on the Vistula, was once the residence of Prince Czartoryski, whose splendid palace, with its library of 60,000 volumes, many MSS., a collection of rare Polish antiquities, and countless treasures of art, was celebrated throughout Europe. The park was the finest in Poland, with the famous temple of the Sibyl, the country-seats of Marynke and Parchatka, and the Dutch dairy-farm in an island of the Vistula, the banks of which were covered with pretty country-houses. Such was Pulawy, but all is now desolate; the Russians laid the whole waste in 1831, during the ill-fated Polish revolution, when the treasures of art were destroyed, despoiled, or carried away, the estate confiscated, and the noble owner driven into exile. Zamosz, the capital of the circle of that name, a very strong fortress, is situated on the Wieprz. It was founded in 1588 by John Zamoyski, after his victory over the archduke Maximilian of Austria. The houses were built in the Italian style; and a high school with a considerable library, which was long celebrated, was founded in 1665. The Cossacks and Swedes besieged it without success. On the partition of Poland, it fell to the share of Austria. In 1809 the Poles took it; and in 1813 the Russians. In 1820 the Polish state bought the town and environs of Count Stanislaus Zamoyski, who received for it above fifty estates belonging to the state. Hereupon the place was still more strongly fortified, and was deprived of its extensive suburbs. It has however still above 4000 inhabitants, with the fine extensive palace of Count Zamoyski, several considerable buildings, among which are the arsenal, four churches, the town-hall, two convents, and a theatre. All the learned institutions are abolished. Hrubieszow, situated on the Hulzwa, in the midst of marshes, has three churches, a convent, and 3900 inhabitants. Krasnistaw, on the Wieprz and a lake, is a walled town; it has a palace, formerly the see of the Romish bishop of Chelm, who now resides at Lublin, several churches, and 2952 inhabitants, among whom are many Jews. Chelm, in this circle, the see of a Greek bishop, has a castle on a high hill, several Greek and Romish churches, a Piarist college, a gymnasium, and 2000 inhabitants.

LUBLIN, the capital of the government and of the circle, is in 51° 16′ N. lat. and 22° 30′ E. long. It is situated on an eminence on the river Bystricza, and is surrounded with walls, ditches, and great lakes; it is divided into the upper and lower town, of which the latter is chiefly inhabited by Jews. It has a dilapidated castle on a hill, and is the seat of a bishop and court of appeal. The most considerable buildings are the fine town-hall, eighteen churches, of which the cathedral, dedicated to St. Michael, and the churches of the Ex-Jesuits, the Visitandines, the Dominicans, and the Carmelites, are worthy of notice; there are twelve monks' and six nuns' convents (some of which have been suppressed), a Piarist college, a synagogue, a gymnasium, an academy of sciences, an agricultural society, and several hospitals and charitable institutions. The town has three annual fairs, which were frequented by great numbers of German, Greek, Russian, Armenian, and Turkish merchants, and it had a great trade in woollen cloths, corn, and Hungarian wines; but the late events have doubtless had an injurious effect on the trade of the town, as they have had on the manufacture of woollen cloths, which was just beginning to flourish. The population is 12,500.

LUC, DE. [De Luc.]

LUCA'NUS, MARCUS ANNÆUS, was born at Corduba (Cordova), in the province of Bætica, in Spain, A.D. 38. He was the son of M. Annæus Mela, who was the brother of the philosopher Seneca, and was carefully educated at Rome under the most eminent philosophers and rhetoricians of the time. His poetry recommended him to the notice of Nero, who treated him with distinguished honour, and bestowed upon him the dignity of quæstor and augur. Lucan did not however remain long in the imperial favour. Nero was ambitious of being considered the best poet of his age; and Lucan was foolish enough to enter into competition with his imperial master, and to receive the prize for the best poem in a literary contest with the emperor. Lucan was accordingly forbidden to publish any more poems; and simply, as it appears, on account of this prohibition he entered into a conspiracy with Piso and many others to assassinate Nero. (Tac., *Ann.*, xv. 49.) This conspiracy was detected, and Lucan, being condemned to death, opened his veins, and died repeating some of his own verses, which described the death of a wounded soldier in consequence of loss of blood. (Tac., *Ann.*, xv. 70.) He died A.D. 65, in the twenty-seventh year of his age.

Lucan wrote many poems, which have not come down to us; which were entitled respectively, 'Catacausmos Iliacus,' 'Catalogus Heroidum,' 'Hectoris Lyra,' 'Orpheus,' 'Saturnalia,' 'Silvarum libri x.,' 'Medea,' an unfinished tragedy, 'Satiricæ Fabulæ xiv.,' &c. The only work extant is a poem on the civil war between Cæsar and Pompey, entitled 'Pharsalia,' which gives an account of the war from its commencement to Cæsar's visit to Cleopatra in Egypt. The poem is comprised in ten books at present; but since the tenth book leaves off abruptly in the midst of a narrative, it is probable that some part has been lost, or that the poet had not finished the work at the time of his death. The first book opens with the most extravagant adulation of Nero, in which the poet even exceeds the base subserviency of the poets of the age of Augustus. The 'Pharsalia' contains many vigorous and animated descriptions, and the speeches are characterised by considerable rhetorical merits, but the language is often inflated, and the expressions extremely laboured and artificial; the poem is also deficient in that truth to nature, and in those appeals to the feelings and the imagination, which excite the sympathy of every class of readers. Still great allowance must be made for the youth of the author, who, if he had lived longer, would probably have cured himself of those faults and defects which are now so conspicuous in his poem.

The best editions of Lucan are by Burmann (1740), Bentley (1760), Weber (1831), and Weise (1835). Among the numerous translations of the 'Pharsalia' those most deserving of notice are—in French, by Marmontel (1766), and Brébeuf (1795); in English, by Rowe (1718), and by May (1627), who also published in 1630 a continuation of the poem to the death of Julius Cæsar, which he afterwards translated into Latin verse (1640); and in Italian, by Cristoforo Bocella (1804).

LUCAS, PAUL, born at Rouen in 1664, first travelled in the Levant as a jeweller, after which he entered the Venetian service against the Turks. In 1696 he returned to France, bringing with him a collection of antient coins, engraved stones, and other curiosities which were purchased for the king's cabinet of medals. In 1699 he went to Egypt, and ascended the Nile as far as the cataracts. He afterwards visited Cyprus, Syria, Armenia, and Persia, but was at last plundered at Bagdad of most of the objects of curiosity which he had collected in his journey. He returned to Paris in 1703, and published the narrative of his journey, 'Voyage au Levant,' 1704, which contains numerous exaggerations and absurd stories. Lucas was not deficient in observation, but he did not always tell the truth; perhaps he thought that a dash of the marvellous would enhance his narrative, or perhaps he listened credulously to the stories of others. In 1705 he was sent by Louis XIV. to the Levant again, for the purpose of making collections, and he visited Asia Minor, Macedonia, Syria, and Barbary, and returned to France in 1708. He published the narrative of this second journey in 1710: 'Voyage dans la Grèce, l'Asie Mineure, la Macedoine, et l'Afrique.' This work contains some interesting memoirs by other travellers concerning Cyrenaica and Tunis. Louis XIV. sent him out again in 1714, when he visited most of the same countries which he had seen in the preceding journey, for the purpose of correcting his former observations. He returned to Paris in 1717, and in 1719 published an account of this third journey: 'Voyage dans la Turquie, l'Asie, Syrie, Palestine, Egypte, &c.,' which is the best of the three, though it also contains some strange stories. Lucas travelled once more in the Levant, and at last died in Spain, in 1737, having gone thither for the purpose of examining the antiquities of that country.

LUCCA, DUCHY OF, a small state in Italy, south of the Apennines of Modena and between them and the sea, is bounded on the north by the territories of Modena, on the east and south by the grand-duchy of Tuscany, and on the west by the sea. It is watered by the river Serchio, which rises in the Apennines of Garfagnana and enters the Mediterranean a few miles north of the Arno. Its area is about 320 Italian square miles of 60 to one degree of latitude. (Serristori, *Saggio Statistico.*) Its population is 152,000, being the most densely inhabited state of Italy.

The territory of Lucca is naturally divided into three regions: 1st, the mountainous districts among the Apennines, including the valley of the Lima, an affluent of the Serchio; 2nd, the valley of the Serchio, including the fine plain of Lucca, which is cultivated like a garden; 3rd, the flats near the sea, which are in part marshy, but produce good pasture for cattle. The people are very industrious and shrewd; many of them emigrate to foreign countries, where they work as plasterers and image-makers, and others from the mountainous districts repair every winter to the maremme of Tuscany and other neighbouring states to work in the fields, whence they return home in the summer.

The country is divided for administrative purposes into eleven 'Comuni,' namely, Lucca, Viareggio, Capannori, Villa Basilica, Camaiore, Montignoso, Borgo, Coreglia, Bagni, Gallicano, Minucciano. At the head of each commune is a political officer called Gonfalonière, and likewise a judge called Commissario Giusdicente. In the town of Lucca are the civil, criminal, and commercial tribunals for the whole duchy. There is also a Lyceum with 28 professors, attended by about 180 students, and with a library of 16,000 volumes, two clerical seminaries, and a college for 60 boarders, besides 16 grammar-schools, in the whole duchy, attended by 427 pupils, and 102 elementary schools, 39 of which are gratuitous, attended altogether by 2310 pupils. For female education there are the Institution of Maria Luisa, the Conservatorio, and an Ospizio for the poorer class, the whole of which board about 524 girls. The clerical establishment consists of one archbishop (of Lucca), 4 chapters, 230 parish-incumbents, 625 priests, and 429 clerici having the minor orders only. There are also 12 convents of men with 391 inmates, and 11 convents for females having altogether 453 nuns. The military consists of one battalion of infantry, one company of artillery, and a body of gendarmes, in all 750 men, besides 2000 militia. The public revenue is 1,900,000 Italian livres, or francs. The chief heads of the expenditure are, 396,000 livres for the duke's civil list; 281,000 for the military; 1,223,000 for the expense of the administration. The communes tax themselves for their local expenditure, which amounts to about 150,000 livres altogether.

There are nearly 40,000 landed proprietors in the whole duchy, or about one to every four individuals; 6300 persons employed in trade and manufactures; 1270 employed in the civil departments under government, and 450 seamen. Viareggio, with 6000 inhabitants, is, next to Lucca, the principal town of the duchy; it has a roadstead which it frequented by coasting vessels, both native and foreign, which take in cargoes of oil, timber, beans, and other minor articles. The value of the oil exported is about 600,000 livres, and that of sik is 200,000. The principal article of importation is salt fish. The manufactures of the country consist of silks, which employ 2500 workmen; woollens, which give employment to 900 persons; paper, glass, iron and copper works, linen and cotton cloths, and hats.

The present duke of Lucca is Carlo Ludovico, son of Ludovico, prince of Parma, and of Maria Luisa of Spain. Carlo Ludovico was born in 1799, and he succeeded to the sovereignty after the decease of his mother in 1824. He then reduced his own civil list by one third, namely, 198,000 Italian livres, and has since made other useful reforms and improvements in his little state.

LUCCA, the capital of the duchy, is situated in a rich plain watered by the Serchio, and surrounded by mountains: it is twelve miles from the sea, and about ten miles north-east of Pisa; its circumference is a little more than three miles, and it contains 22,000 inhabitants. Lucca is surrounded by ramparts, which are planted with trees, and form a very pleasant promenade. The town is well-built, and is supplied with good water, and the streets are well paved and clean.

Lucca, like most other Italian cities, is rich in churches: the cathedral, which belongs to the eleventh century, is adorned with several good paintings, and still more with statues and monuments by the native sculptor Civitali. The archiepiscopal archives and those of the chapter contain a vast mass of historical documents, parchments, and MSS., some as old as the seventh century, the oldest probably in Italy. The other remarkable churches of Lucca are, St. Frediano, which has some fine Roman columns; St. Francesco, with the tomb, indicated by a simple inscription on the wall, of the greatest man that Lucca has produced, Castruccio Castracani; St. Cristoforo, with the tomb of the sculptor Civitali; St. Michele; St. Paolino; St. Giovanni, with its baptistery; St. Maria in Corte Landini, which contains several good paintings; the annexed convent belongs to the 'Chierici Regolari della Madre di Dio,' an order founded at the end of the sixteenth century by Giovanni Leonardi, a native of Lucca, which has produced many learned men. It has a library of 20,000 volumes. The ducal palace is vast, but unfinished; it has a gallery of valuable paintings by the great masters, and a library of 25,000 volumes. The palazzo Pretorio, or town-house, which belongs to the fifteenth century, is a massive sombre building. The palace Guidiccioni, where the public archives are kept, and that of the Marquis Bernardini, are also worthy of notice.

The academy of letters and sciences of Lucca, instituted in 1817, which consists of thirty-six members, holds its meetings once a month in a hall of the Lyceum, and has published several volumes of 'Atti,' or memoirs. The duke is perpetual president.

Lucca ('Luca') is mentioned in antient history as a town belonging to the Etruscans after they had conquered the country between the Arno and the Macra and taken it from the Ligurians. It afterwards became a Roman colony. There are still remains of a Roman theatre, and of an amphitheatre.

Lucca in the middle ages was a republic, often at war with Pisa and Florence. It was at one time with Pisa at the head of the Guibeline party [CASTRUCCIO CASTRACANI]; it afterwards fell under the yoke of the Visconti of Milan, was restored to its liberty by the emperor Charles IV. in 1370, was subject successively to several tyrants, and at last settled gradually into a narrow aristocracy. One of its citizens, Burlamacchi, about 1546, being made gonfalonière, attempted a revolution for the purpose of restoring the popular government, not only at Lucca, but in all the other Tuscan cities. Being discovered, he was arrested and given up to the imperial governor of Milan, who put him to death. [BURLAMACCHI, FRANCESCO.] In 1556 a law was passed at Lucca, on the proposal of the gonfalonière Martino Bernardini, by which only a certain number of families were eligible to office: this law, which was called 'Martinian,' established a close aristocracy like that of Venice. In 1600 the privileged families were 160; in 1797 they were reduced to 88, the others having become extinct. From among these families was elected a 'Signoria,' or executive of nine 'Anziani,' or elders, and a gonfalonière, a senate of 36 members, and a great council of 90. In this manner Lucca was administered for more than two centuries in peaceable obscurity. In 1799 the French, under General Serrurier, entered Lucca, placed a garrison in it, emptied the arsenal, carried away all the brass cannon from the ramparts, and exacted two millions of francs, besides supplies of provisions, professing all the time to have the greatest regard for the antient republic of Lucca. Meantime the democratic party, supported by the French, demanded a change in the form of government; the Martinian law was abolished, and a constitution after the then prevalent fashion, with two councils and a directory, was proclaimed. In 1805 Napoleon, having re-established monarchy both in France and Italy, gave Lucca to his sister Eliza as a principality, with new constitutional laws.

In 1814 the Congress of Vienna gave Lucca to Maria Luisa of Spain and her son, the widow and child of the Prince of Parma; the latter duchy being given to Maria Louisa of Austria, Napoleon's consort, for her life. It was also stipulated that after the death of Maria Louisa, the present duchess of Parma, the duke of Lucca should have again his ancestral duchy of Parma and Piacenza, and Lucca should be united to the grand-duchy of Tuscany, with which, geographically speaking, it is naturally connected. (Valéry, *Voyages en Italie; Botta, Storia d'Italia; Memorie e Documenti per servire all' Istoria del Ducato di Lucca*, 4 vols. 8vo., Lucca, 1818; Lucchesini, *Storia Letteraria di Lucca.*)

LUCERN. [LUZERN.]

LUCERN (*Medicago sativa*), a plant of the Linnæan class Diadelphia and order Decandria, with a papilionaceous flower, and of the natural family of the Leguminosæ. There are many species of the Medicago, of which one is supereminent as an artificial grass in temperate climates, and a most valuable plant for feeding cattle. It was in high repute among the antients. The authors *De Re Rustica* speak of it with enthusiasm, and all over the continent of Europe, wherever husbandry has made any progress, it is in high reputation. Lucern is a plant which will not bear extreme frost nor superabundant moisture, and its cultivation is therefore restricted to mild climates and dry soils; but where it thrives, its growth is so rapid and luxuriant, that no other known plant can be compared to it. In good deep loams lucern is the most profitable of all green crops; when properly managed, the quantity of cattle which can be kept in good condition on an acre of lucern, during the whole season, exceeds belief. It is no sooner mown than it pushes out fresh shoots, and wonderful as the growth of clover sometimes is in a field which has been lately mown, that of lucern is far more rapid. Where a few tufts of lucern happen to be, they will rise a foot above the surface, while the grass and clover, which were mown at the same time, are only a very few inches high.

Lucern, sown in a soil suited to it, will last for many years, shooting its roots downwards for nourishment till they are altogether out of the reach of drought. In the dryest and most sultry weather, when every blade of grass droops for want of moisture, lucern holds up its stem, fresh and green as in a genial spring. The only enemies of this plant are a wet subsoil and a foul surface. The first is often incurable; the latter can be avoided by good cultivation.

It is useless to sow lucern on very poor sands or gravel, or on wet clays. The best and deepest loam must be chosen, rather light than heavy, but with a good portion of vegetable earth or humus equally dispersed through it. If the ground has been trenched, so much the better; and if the surface is covered with some inferior earth from the subsoil, it will be no detriment to the crop, for it will prevent grass and weeds from springing up, and save much weeding. The lucern will soon strike down below it. It is not a bad practice to cover the lucern-field with a coat of coal-ashes or poor sand, merely to keep down the weeds, where this can easily be done.

The soil in which it is intended to sow lucern-seed should be well prepared. It should be highly manured for the two or three preceding crops, and deeply ploughed if not trenched. It should be perfectly clean, and for this purpose two successive crops of turnips are most effectual. The turnips should be fed off with sheep. In the month of March, the land having been ploughed flat and well harrowed, a very small quantity of barley, not above a bushel to the acre, may be sown, or rather drilled on the ground, and at the same time from 30 to 40 lbs. of lucern-seed sown broad-cast, and both harrowed in and lightly rolled. If the land will not bear to be laid flat without water-furrows, it will be useless to sow lucern in it.

As the crop comes up it must be carefully weeded: no expense must be spared to do this effectually, for success depends upon it. When the barley is reaped, the stubble, which will probably be strong, should be pulled up by the hand-hoe, or by harrowing, if the plants of lucern be strong, and, at all events, the ground must be cleared of weeds. It must not be fed off with sheep; they would bite too near the crown. Lucern should always be cut as soon as the flower is formed. If it is kept clear of weeds the first year, there will be little difficulty with it afterwards, when the roots have become strong. The second year the lucern will be fit to cut very early, and in a favourable season it may be cut four or five times. After each cutting it is useful to draw heavy harrows over the land, or an instrument made on purpose resembling harrows, the teeth of which are flat, and cutting the soil like small coulters. It will not injure the plants, even if it divide the crown of the root, but it will destroy grass and weeds. Liquid manure which consists of the urine of cattle and drainings of dunghills is often spread over the lucern immediately after it has been mown, and much invigorates the next growth; but if the land is rich to a good depth, this is scarcely necessary. The lucern will grow and thrive from seven to twelve years, when it will begin to wear out, and, in spite of weeding, the grass will get the upper hand of it. It should then be ploughed up, all the roots carefully collected and laid in a heap with dung and lime to rot, and a course of regular tillage should succeed. The same land should not be sown with lucern again in less than ten or twelve years, after a regular course of cropping and manuring.

Cattle fed upon lucern thrive better than on any other green food. Horses, in particular, can work hard upon it without any corn, provided it be slow work. Cows give plenty of good milk when fed with it. In spring it is apt to purge cattle, which, with a little attention, is conducive to their health. If it is given to them in too great quantities, or moist with dew, they run the risk of being hoven. These inconveniences are avoided by giving it sparingly at first, and always keeping it twenty-four hours after it is cut, during which time it undergoes an incipient fermentation, and the juice is partially evaporated: instead of being less nutritive in this state, it is rather more so.

An acre of good lucern will keep four or five horses from May to October, when cut just as the flower opens. If it should get too forward, and there be more than the horses can consume, it should be made into hay; but this is not the most profitable way of using it, and the plant, being very succulent, takes a long time in drying. The rain also is very injurious to it in a half-dry state; for the stem is readily soaked with moisture, which is slow in evaporating. The produce in hay, when well made, is very considerable, being often double the weight of a good crop of clover hay.

Many authors recommend drilling the seed of lucern in wide rows, and hoeing the intervals after each cutting. This is the best way with a small patch in a garden, and when only a little is cut every day; but in a field of some extent, the lucern, when once well established and preserved free from weeds by hand-weeding the first year, will keep all weeds down afterwards, and the heavy harrows with sharp tines, used immediately after mowing, will pull up all the grass which may spring up. No farmer ought to neglect having a few acres in lucern on his best land.

LUCERNA'RIA, a genus of soft zoophyta, established by Müller (*Zoologia Danica*). It is much allied to Actinia, Linn., and includes one or perhaps two living species from the North Sea and English Channel. [ZOANTHARIA.]

LUCIA, SAINT, one of the Lesser Antilles, situated in 13° 50′ N. lat. and 60° 58′ W. long., about 40 miles north of St. Vincent. Its extreme length from north to south is 32 miles, and its extreme breadth about 12 miles. This island is of volcanic origin, and several of the mountains terminate at their summits in craters of extinct volcanoes. One of these, called La Souffrière, at the south-west side of the island, has the appearance of a vast lime-pit, and some severe earthquakes, which are still remembered, are attributed to the convulsions within this mountain. Saint Lucia comprises two districts: of one of these, Basseterre, the lowest part is well cultivated, but abounds in swamps and marshes, which have a bad effect on the health of the inhabitants. The other district, called Capisterre, consists of a succession of abrupt fantastically shaped mountains, covered to their summits with forest-trees and underwood, and intersected by numerous ravines containing stagnant water and masses of vegetable matter in every stage of decomposition. Under these circumstances it may well be believed that this island is very unhealthy. It appears from a Report drawn up by Captain Tulloch, of the War-office, and presented to parliament, on the sickness and mortality among the troops in the West Indies, that in the twenty years from 1817 to 1836 the average number of deaths in each year out of each 1000 white soldiers stationed at St. Lucia was 122. The greatest number of deaths occurred in 1822, when 392 out of every 1000 were carried off; the smallest number, 56 in 1000, occurred in 1832. The deaths among the black troops during the same twenty years did not average more than 43 in each 1000, and varied from 75 in 1819 to 12 in 1827. The fort in which the greater part of the troops are stationed is on the summit of a steep hill called Morne Fortuné, about 850 feet above the level of the sea, and having many swamps in the low land in the neighbourhood.

Castries, the only town on the island, lies at the bottom of a long winding bay in a low marshy spot, surrounded by an amphitheatre of hills, which greatly impede ventilation.

The population of the island in 1836 consisted of—

	Males.	Females.	Total.
Whites . .	503	487	990
Coloured persons	6,645	7,695	14,340
Aliens and resident strangers . .			786
Total .			16,116

Of this number about 3300 reside in the town, the rest are located on the plantations throughout the cultivated part of the island. The chief productions are sugar, coffee, and cocoa. In 1835 there were produced of these articles—from 4,087 acres planted with sugar-cane, 5,861,379 lbs. of sugar, 144,684 gallons of molasses, and 101,028 gallons of rum; from 460 acres planted with coffee, 104,888 lbs.; and from 199 acres planted with cocoa, 38,908 lbs.

There were besides 5522 acres cultivated as provision grounds, and 5090 acres of pasture land. The number of stock consisted of 736 horses, 2511 horned cattle, 1668 sheep, and 692 goats.

The total value of imports in 1835 was 51,807*l.*, about three-fourths of which consisted of British manufactures, and about one-fourth of maize, salt fish, and lumber. The exports in the same year were valued at 79,872*l.*, and consisted of the above-mentioned kinds of produce.

St. Lucia is so called from having been first discovered on St. Lucia's day. This was about the year 1635, when a settlement was attempted by a party of English, who were soon after driven off by the Carribs. About 1650, the French effected a settlement. The island was taken in 1664 by the English, but was evacuated by them in 1666, when the French immediately returned, but were in turn driven out by the Carribs. In 1718 the French again succeeded in forming a settlement, and its possession was again disputed by the English. In 1731 the two nations agreed that the island should be evacuated by both. In 1765 England gave up all claim to possession in favour of France, with which country it remained till 1779, when it was taken by the English, but it was restored at the peace of 1783. In 1794 the English again took it, but in the following year the French inhabitants rose upon and overpowered the garrison, and kept possession until May, 1796, when the island was again taken by General Abercromby. At the peace of Amiens it again reverted to France, but was taken once more in 1804 by the English, and has since remained subject to the British crown.

The government is administered by a lieutenant-governor and an executive council. The French laws are nominally in force, but being dispensed by English functionaries, are made to give place to the English practice whenever an adherence to the French code would be contrary thereto.

LUCIAN (Λουκιανός), a celebrated Greek writer, was born at Samosata, a city on the west bank of the Euphrates, in the Syrian province of Commagene. We possess no particulars respecting his life on which any reliance can be placed, except a few scattered notices in his own writings. From these it appears that he was born about the latter end of Trajan's reign, that he lived under both the Antonines, and died in the reign of Aurelius Commodus, or shortly afterwards. His parents, who were in humble circumstances, placed him with his maternal uncle, a sculptor, in order to learn statuary; but he soon quitted this trade, and applied himself to the study of the law. He afterwards practised at the bar in Syria and Greece; but not meeting with much success in this profession, he resolved to settle in Gaul as a teacher of rhetoric, where he soon obtained great celebrity and a numerous school. He appears to have remained in Gaul till he was about forty, when he gave up the profession of rhetoric, after having acquired considerable wealth. The greater part, if not all, of his dialogues appear to have been written after this time; but most of his other pieces, such as his 'Hercules,' 'Hesiod,' 'Herodotus,' 'Zeuxis,' 'Bacchus, the 'Dipsades,' &c., were probably written during the time that he taught rhetoric in Gaul. During the remainder of his life we find him travelling about from place to place, and visiting successively Macedonia, Cappadocia, Paphlagonia, and Bithynia. The greater part of his time however was passed in Athens, where he lived on terms of the greatest intimacy with Demonax, a philosopher of great celebrity, and where most of his works were probably written. Towards the latter part of his life he held a lucrative public office in Egypt, which was bestowed upon him by the emperor Commodus. The account of his being torn to death by dogs, for having attacked the Christian religion, rests on no credible authority, and was probably invented either by Suidas or some other Christian writer of similar character.

The dialogues of Lucian are written in remarkably pure and elegant Greek, and are free from the false ornaments and artificial rhetoric which characterise most of the writings of his contemporaries. Modern critics have usually given him his full meed of praise for these excellencies, and have also deservedly admired the keenness of his wit, his great talent as a writer, and the inimitable ease and flow of his dialogue; but they have seldom done him the justice he deserves. They have either represented him as merely a witty and amusing writer, but without any further merit; or else they have attacked him as an immoral and infidel author, whose only object was to corrupt the minds of his readers, and to throw ridicule upon all religion. But these opinions appear to us to have arisen from a mistaken and one-sided view of the character of Lucian. He seems to us to have endeavoured to expose all kinds of delusion, fanaticism, and imposture; the quackery and imposition of the priests, the folly and absurdity of the superstitious, and especially the solemn nonsense, the prating insolence, and the immoral lives of the philosophical charlatans of his age. (See his *Alexander*.) Lucian may, in fact, be regarded as the Aristophanes of his age, and, like the great comic poet, he had recourse to raillery and satire to accomplish the great objects he had in view. His study was human character in all its varieties, and the age in which he lived furnished ample materials for his observation. Many of his pictures, though drawn from the circumstances of his own times, are true for every age and country. As an instance of this we mention the essay entitled 'On those who serve the Great for Hire.' If he sometimes discloses the follies and vices of mankind too freely, and occasionally uses expressions which are revolting to our ideas of morality, it should be recollected that every author ought to be judged of by the age in which he lived, and not by a standard of religion and morality which was unknown to the writer. The character of Lucian's mind was decidedly practical; he was not disposed to believe anything without sufficient evidence of its truth; and nothing that was ridiculous or absurd escaped his raillery and sarcasm. The tales of the poets respecting the attributes and exploits of the gods, which were still firmly believed by the common people of his age, were especially the objects of his satire and ridicule in his dialogues between the gods and in many other of his works. That he should have attacked the Christians in common with the false systems of the Pagan religion will not appear surprising to any one who considers that Lucian probably never took the trouble to inquire into the doctrines of a religion which was almost universally despised, in his time, by the higher orders of society. Lucian's statements have sometimes had an historical value assigned to them which he does not appear to have intended: the story of Herodotus reading his history at the Olympic games is one of these. [HERODOTUS.] Lucian had a taste for art, which he has shown by his descriptions in his 'Aetion,' 'Zeuxis,' 'Eikones,' &c.

The best editions of Lucian's works are by Hemsterhusius, who only edited part of the first volume, and Reiz (4 vols. 8vo.), by Lehmann (Leip., 9 vols. 8vo.), and the edition published by the Bipont Society; the best translation of Lucian in German is by Wieland (6 vols. 8vo.); there is an English translation by Tooke (Lond., 2 vols. 4to., 1820).

LUCIAN, SAINT, presbyter of Antioch, is said by some writers, but without sufficient authority, to have been born at Samosata; he suffered martyrdom during the reign of Diocletian, A.D. 312, and was buried at Helenopolis in Bithynia. He is frequently mentioned by ecclesiastical writers as a man of great learning and piety. Eusebius calls him a 'person of unblemished character throughout his whole life' (*Hist. Eccl.*, viii. 13); and Chrysostom, on the anniversary of Lucian's martyrdom, pronounced a panegyric upon him which is still extant. Jerome informs us, in his 'Catalogue of Ecclesiastical Writers' (c. 77), that 'Lucian was so laborious in the study of the Scriptures, that in his own time some copies of the Scriptures were known by the name of Lucian;' and we learn from another part of his works (*Præf. in Paralip.*, vol. i., p. 1023), that Lucian's revision of the Septuagint version of the Old Testament was generally used by the churches from Constantinople to Antioch. Lucian also made a revision of the New Testament, which Jerome considered inferior to his edition of the Septuagint.

There were extant in Jerome's time some treatises of Lucian concerning faith, and also some short epistles; but none of these have come down to us, with the exception of a few fragments.

There has been considerable dispute among critics respecting Lucian's belief in the Trinity. From the manner in which he is spoken of by most of the Trinitarian Fathers, and from no censure being passed upon his orthodoxy by Jerome and Athanasius, it has been maintained by some that he must have been a believer in the Catholic doctrine of the Trinity; but on the other hand Epiphanius, in his 'Anchoret' (xxxv., vol. ii., p. 40, D), speaks of the Lucianists and Arians as one sect; and Philostorgius (who lived about A.D. 425, and wrote an account of the Arian controversy, of which considerable extracts are preserved by Photius) expressly says that Eusebius of Nicomedia and many of the principal Arians of the fourth century were disciples of Lucian. It is probable that Lucian's opinions were not quite orthodox, since he is said by Alexander (in Theodoret, *Hist. Eccl.* i., c. 4, p. 15, B) to have been excluded from the Catholic Church by three bishops in succession, for advocating the doctrines of Paul of Samosata. It is however usually supposed that he returned to the Catholic communion before his death.

LU'CIDA, a name formerly given to the brightest star in any constellation: thus we have Lucida Hydræ, Lucida Lyræ, &c.

LU'CIFER, bishop of Cagliari in Sardinia, is principally known in ecclesiastical history for refusing to hold any communion with the clergy who had, during the reign of Constantius, conformed to the Arian doctrines, although it had been determined in a synod at Alexandria, A.D. 352, to receive again into the church all the Arian clergy who openly acknowledged their errors. In consequence of the decision of the synod at Alexandria, Lucifer eventually left the Catholic church, and his followers are spoken of by ecclesiastical writers as a distinct sect under the name of Luciferians. The number of this sect was always inconsiderable; Theodoret says that it was extinct in his time. (*Hist. Eccl.*, iii., c. 5, p. 128, D.) Their opinions however excited considerable attention at the time when they were first promulgated, and were advocated by several eminent men; among others by Faustinus, Marcellinus, and Hilarius. Jerome wrote a work in refutation of their doctrines, which is still extant.

Augustine remarks, in his work on Heresies (c. lxxxi.), that the Luciferians held erroneous opinions concerning the human soul, which they considered to be of a carnal nature, and to be transfused from parents to children.

Lucifer is acknowledged by Jerome and Athanasius to have been well acquainted with the Scriptures, and to have been exemplary in private life; but he appears to have been a man of violent temper and great bigotry. Being banished from Sardinia by Constantius, in consequence of his opposition to the Arian doctrines, he resided for many years in Syria; but after the death of this emperor he returned to his diocese, where he died about A.D. 370.

The writings of Lucifer were published by Tillet, Paris, 1568; they consist of—'Two books addressed to the Emperor Constantius in defence of Athanasius;' 'On Apostate Kings;' 'On the Duty of having no communion with Heretics;' 'On the Duty of dying for the Son of God;' 'On the Duty of showing no mercy to those who sin against God;' and a short Epistle to Florentius.

LUCI'LIUS, CAIUS, was born at Suessa Aurunca (*Sessa*), a town in the north-western part of Campania, B.C. 148. He belonged to the equestrian order, and, by the female side, was grand-uncle to Pompey the Great. In his sixteenth year Lucilius served, together with Marius and Jugurtha, under Scipio Africanus at the siege of Numantia. (Velleius, ii., 9, 4.) He is said to have died B.C. 103, in his forty-sixth year; but the expression of

Horace (*Sat.* ii., 1, 34), in which Lucilius is called *old* (*senex*), seems to imply, as Mr. Clinton has remarked (*Fast. Hell.*, vol. iii., p. 135), that he lived to a later date.

Lucilius is expressly said by Horace (*Sat.* i., 1, 61) to have been the first writer of Roman satire; by which we must not understand that no Roman writer had composed any satirical compositions before him, since the satires of Ennius and others are frequently mentioned by antient authors; but that Lucilius was the first who constructed it on those principles of art which were considered in the time of Horace as essential requisites in a satiric poem. The satires of Lucilius were very popular even in the Augustan age; and to his writings some of the most eminent satirists of antiquity, Horace, Juvernal, and Persius, appear to have been indebted in no small degree for many of their most striking thoughts and expressions.

In addition to his satires, which were divided into thirty books, Lucilius also wrote a comedy entitled 'Numularius,' epodes, and hymns, none of which are extant, with the exception of a few fragments from his satires, which were collected and published by Douza, Leyden, 1597. Scanty as these fragments are, they enable us to form some idea of the style of Lucilius, which appears to have been distinguished by great energy and power of expression, but to have been deficient in elegance and clearness. Horace compares his poetry to a muddy stream, and complains that his versification was rugged and uncouth (*Sat.* i., 4, 8-11); but Quintilian (*Inst. Or.*, x. 1), on the other hand maintains that Horace has not given a fair estimate of the poetry of Lucilius, and that his satires were distinguished by great learning and abundance of wit. Pliny (*Præf. Hist. Nat.*), Cicero (*De Orat.*, i. 16; ii. 6), and Gellius (*N. A.*, xviii. 5), also speak in high terms of the style of Lucilius. Juvenal (i. 20) calls him *magnus Auruncæ alumnus*.

Lucilius attacked vice with such severity, that Juvenal (i. 165) speaks of the guilty as trembling at the vehemence of his rebukes. He did not however confine his satires to the vices of mankind in general, but also attacked private individuals, like the writers of the old comedy among the Greeks, and among other persons, contemporary and preceding poets, as Ennius, Cæcilius, Pacuvius, Accius, &c. (Gell., *N. A.*, xvii. 21.) The powerful protection of Scipio and Lælius, with whom he was on the most intimate terms of friendship (Hor., *Sat.* ii. 1, 70-75), enabled him also to attack with impunity some of the most eminent political characters in Rome; among whom we find the names of Quintus Opimius, conqueror of Liguria, Cæcilius Metellus, and Cornelius Rufus, who was at that time Princeps Senatus.

LUCI'NA (Conchology). [VENERIDÆ.]

LU'CIUS I. succeeded Cornelius in 252 as bishop of Rome. Little is known of him; he survived his election only a few months; some say he was banished, others that he died a martyr. He was succeeded by Stephen I.

LUCIUS II. succeeded Celestinus II. in 1144, and being wounded by a stone thrown at him in an affray of the people of Rome, died shortly after, and was succeeded by Eugenius III.

LUCIUS III., Cardinal Ubaldo, a native of Lucca, was elected by the cardinals after the death of Alexander III. in 1181, and was consecrated at Velletri, the people of Rome being opposed to him. He died in 1185, shortly after having an interview with the emperor Frederic Barbarossa at Verona. He was succeeded by Urban III.

LUCKNOW, the capital of the kingdom of Oude, stands on the south bank of the Goomty river, in 26° 51′ N. lat. and 80° 50′ E. long. It was a large and populous place in the time of Abul Fazl, but was not made the residence of the court until the accession of Asoph ud Dowlah in 1775, upon which event it was considerably enlarged, and after a few years became one of the wealthiest cities of Hindustan.

Lucknow consists of three distinct quarters: the first, or oldest part, is made up of narrow and dirty streets, and is said to contain at least 300,000 inhabitants; the second quarter consists of one handsome street, with a well-built market-place in the centre, and with smaller streets branching from it at right angles. The greater part of the houses in this quarter are the property of the king, and are occupied by branches of his family or persons attached to the court A space between this street and the river contains the royal palace and gardens, furnished and laid out in imitation of European fashions. The dwelling of the British resident adjoins the palace. The remaining quarter of the city is built in a purely Oriental style, for which reason it has the most interest for European visitors; it contains many splendid houses and religious edifices, erected by Asoph ud Dowlah, and an unfinished palace begun by Saadet Ali. This is not the only structure in the city which has been left in an unfinished state through a prejudice universally felt by the Mohammedans in India against completing any unfinished undertaking of a deceased person. The English have cantonments to the east of the Goomty, and a few miles distant from Lucknow. Besides the persons connected with the British residency there are many English and other Europeans and their descendants living in the city, who are in the pay of the king of Oude. Lucknow is distant from Benares 189 miles, from Agra 202 miles, from Delhi 280 miles, and from Calcutta 650 miles, all travelling distances.

LUCON. [VENDE'E.]

LUÇON. [PHILIPPINE ISLANDS.]

LUCRETIA. [BRUTUS, M. J.]

LUCRE'TIUS, with his full name **TITUS LUCRETIUS CARUS**, was born B.C. 95, and died B.C. 52, in the forty-fourth year of his age. We possess no particulars respecting his life, but he appears to have been born at Rome, was probably of equestrian rank, and is said to have put an end to his own life.

The poem of Lucretius, entitled 'De Rerum Natura' (*On the Nature of Things*), contains a development of the physical and ethical doctrines of Epicurus. Notwithstanding the nature of the subject, which gave the poet little opportunity for those descriptions of the passions and the feelings which generally form the chief charm in poetry, Lucretius has succeeded in imparting to his didactic and philosophical work much of the real spirit of poetry; and if he had chosen a subject which would have afforded him greater scope for the exercise of his powers, he might have been ranked among the first of poets. Even in the work which has come down to us we find many passages which are not equalled by the best lines of any Latin poet, and which, for vigour of conception and splendor of diction, will bear a comparison with the best efforts of the poets of any age and country. In no writer does the Latin language display its majesty and stately grandeur so effectively as in Lucretius. There is a power and an energy in his descriptions which we rarely meet with in the Latin poets; and no one who has read his invocation to Venus, at the beginning of the poem, or his beautiful picture of the busy pursuits of men, at the commencement of the second book, or the progress of the arts and sciences in the fifth, or his description of the plague which devastated Athens during the Peloponnesian war, at the close of the sixth, can refuse to allow Lucretius a high rank among the poets of antiquity.

The object of Lucretius was to inculcate the great doctrine of Epicurus, so frequently misunderstood and misrepresented, that it is the great object of man's life to increase to the utmost his pleasures, and to diminish to the utmost his pains; and since the happiness of mankind was chiefly prevented, in his opinion, by two things, superstition, or a slavish fear of the gods, and a dread of death, he endeavours to show that the gods take no interest in and exercise no control over the affairs of mankind, and that the soul is material and perishes with the body. In the first three books he develops the Epicurean tenets respecting the formation of all things from atoms which existed from all eternity; and also maintains the materiality of the soul, which he supposes to be compounded of different kinds of air inhaled from the atmosphere; in the fourth book he inquires into the origin of sense and perception, and the nature and origin of dreams, which leads to a long digression on the folly and miseries of unlawful love; in the fifth he gives an account of the origin and laws of the world, and describes the gradual progress of mankind from a state of nature to civilization, as well as the origin and progress of the arts and sciences; and in the sixth he attempts to account for a number of extraordinary phenomena, such as waterspouts, hurricanes, earthquakes, volcanoes, and pestilential diseases.

The poetry of Lucretius does not appear to have been highly estimated by the majority of his countrymen. Ovid certainly speaks of it in the highest terms (*Amor.*, xv. 23); but Quintilian mentions him rather slightingly (*Just. Orat.* x. 1); and Cicero does not praise him without considerable reservation (*Epist. ad Quint.*, ii. 11). The nature of his subject and the little taste which the Romans in general manifested for speculations like those of Lucretius, may perhaps account for his poetry being estimated below its real merits.

In modern times the 'De Rerum Natura' has been frequently attacked on account of its philosophical doctrines; and among the works that have been written against it is a long Latin poem, not without considerable merit, by the Cardinal Polignac, entitled 'Anti-Lucretius, sive de Deo et Natura,' in nine books, addressed to Quintius, an atheist.

The best editions of Lucretius are, by Lambinus, whose commentary is very useful, 1563, 1570; Havercamp, 1725; Wakefield, 1796-97; Eichstädt, 1801; and Forbiger, 1828. The 'De Rerum Natura' has been translated into most European languages; the translations most worthy of notice are, the English by Creech (frequently printed), and by Mason Good, with the Latin text, and numerous notes of little value, in 2 vols. 4to., 1805; the French by Lagrange, with the Latin text, 1799; the German by Meinecke, 1795, and by Knebel, 1821; and the Italian by Marchetti, 1717, frequently reprinted.

LUCRINE LAKE. [Averno.]

LUCU'LIA, a genus of the natural family of Rubiaceæ, suborder Cinchonaceæ, tribe Cinchoneæ, and subtribe Eucinchoneæ, thus indicating the close affinity of this genus to that of the trees yielding Peruvian bark, or true Cinchonas, in which indeed the only known species, *L. gratissima*, was placed by Dr. Wallich and figured in his 'Tent. Fl. Nepal,' t. 21. It is found in great abundance on Nag-Urjoon and some of the other smaller hills in the Valley of Nepal; also at Bechiaco and Koolakan. It delights in exposed, rather naked situations, blossoming, according to the situations where it is found, nearly the whole year round. It is also found on the Pandooa Hills in Silhet, flowering in the month of September. As seen by Dr. Wallich it attains a height of sixteen feet, but he was informed of its growing to a larger size. It has been introduced into and has flowered in this country; but from the nature of the climate where it is indigenous, it is only suited to the greenhouses of England. Its locality and affinity are interesting, particularly when coupled with the prevalence in the same mountains of two other genera, Hymenodictyon and Hymenopogen, belonging to the same subtribe Eucinchoneæ, and therefore equally allied to the true Cinchonas; all indicating the part of the Indian territory where these valuable plants might most certainly be grown, and yield a profitable article of commerce. 'It is impossible to conceive anything more beautiful than this tree, when covered with its numerous rounded panicles of pink-coloured, very fragrant, large blossoms.' (Wallich, l. c., p. 30.)

LUCULLUS, LU'CIUS LICI'NIUS, descended from a distinguished Roman family, was born about B.C. 115, and served under Sulla in the Marsian war. Sulla had a very high opinion of the talents and integrity of Lucullus, and employed him, though he was very young, in many important enterprises. Whilst Sulla was besieging Athens (B.C. 87), Lucullus was sent into Egypt and Africa to collect a fleet; and after the conclusion of the war with Mithridates, he was left in Asia to collect the money which Sulla had imposed upon the conquered states. So great was the regard that Sulla had for Lucullus, that he dedicated his Commentaries to him, and in his last will made him guardian to his son.

In B.C. 74, Lucullus was elected consul, and was appointed to the command in the war against Mithridates. During the following eight years he was entirely engaged in conducting this war; and in a series of brilliant campaigns completely defeated Mithridates and his powerful son-in-law Tigranes. In B.C. 73 he defeated Mithridates at Cyzicus on the Propontis, and in the following year again conquered him at Cabiri, on the borders of Pontus and Armenia. In B.C. 69 he marched into Armenia against Tigranes, who had espoused the cause of his father-in-law; and completely defeated his forces near Tigranocerta in Armenia. He followed up his victory by the capture of Tigranocerta, and in the following year also took Nisibis in the north part of Mesopotamia; but was not able to derive all the advantages he might have done from his victories, in consequence of the mutinous disposition of his soldiers. Lucullus never appears to have been a favourite with his troops; and their disaffection was increased by the acts of Clodius, whose sister Lucullus had married. The popular party at home were not slow in attacking a general who had been the personal friend of Sulla, and who was known to be a powerful supporter of the patrician party. They accused him of protracting the war on account of the facilities it afforded him of acquiring wealth; and eventually carried a measure by which he was removed from the command, and succeeded by Pompey, B.C. 66.

The senate, says Plutarch, had looked forward to Lucullus as likely to prove a most powerful supporter of the patrician order; but in this they were disappointed; for Lucullus on his return to Rome took no part in public affairs, and passed the remainder of his life in retirement. The immense fortune which he had amassed during his command in Asia he employed in the erection of most magnificent villas near Naples and Tusculum; and he lived in a style of magnificence and luxury which appears to have astonished even the most wealthy of his contemporaries. Lucullus was a man of refined taste and liberal education; he wrote in his youth the history of the Marsian war in Greek (Plutarch, *Luc.*, c. i.; compare Cic. *Ad Att.*, i. 12), and was a warm supporter of learning and the arts. His houses were decorated with the most costly paintings and statues, and his library, which he had collected at an immense expense, was open to all learned men. He lived on intimate terms with Cicero, who has highly praised his learning, and inscribed one of his books with the name of his friend, namely, the fourth book of his 'Academical Questions,' in which he makes Lucullus defend the philosophical opinions of the Old Academy.

It is said that during the latter years of his life Lucullus lost his senses, and that his brother had the care of his estate.

(Plutarch's *Life of Lucullus*; Livy's *Epitomes*; Appian's *Mithridatic War*; Cicero's *Acad. Quæs.*, iv.; Clinton's *Fasti Hellenici*.)

LUDLOW, a corporate town and parliamentary borough of Shropshire, 138 miles north-west by west from London. It is locally within the hundred of Munslow, and is agreeably situated on the eastern bank of the Teme, a branch of the Severn, over which river there is a handsome stone bridge of three arches. The charters date from the first year of the reign of Edward IV. to the first of James II. The property of the corporation consists chiefly of houses and lands in Ludlow and its immediate vicinity. The income derived from this source amounted, in the year ending September 29, 1833, to 3010*l.*; the expenditure during the same period was 2476*l.* The town council is composed of four aldermen and twelve councillors.

The streets of Ludlow are broad, well paved, and lighted with gas, and the houses are in general well built. The inhabitants are amply supplied with water, which is partly drawn from three springs situated about a mile and a half from the town, and thence conveyed in leaden-pipes, and partly raised by machinery from the river Corve. The ordinary police, consisting merely of the chief constable and eight others appointed by the leet, is said to be effective. The borough gaol, erected in 1764 at the expense of the corporation, is commodious, and contains separate wards for the classification of the prisoners. The manufacture of gloves was formerly on a large scale, but of late years it has much declined, in consequence, it is said, of the competition of the manufacturing towns of Liecestershire and Nottinghamshire. The parish church, dedicated to St. Lawrence, is in the diocese of Hereford, and the living, a rectory in the patronage of the crown, is valued at 160*l.* per annum.

The free grammar-school, founded by Edward VI., is conducted by a master and usher, whose salaries are respectively 100*l.* and 60*l.* All boys duly qualified by residence within the borough, and able to read tolerably, are admitted upon application. The number of free scholars in 1835 was under thirty. Besides the grammar-school, there is the national school, connected with the church, which is liberally supported by voluntary donations, and affords instruction to 100 girls and 150 boys. There are also two schools established by the Independents and Wesleyan Methodists, which are numerously attended. In 1831 the population of the borough was 5253. Ludlow has returned two members to parliament continuously from the reign of Edward IV. (*Boundary Reports; Municipal Corporation Reports*, &c.)

LUDLOW ROCKS. The upper part of the 'Silurian system' of Mr. Murchison is thus designated. They include the following three terms:—

Upper Ludlow Rock.—A thick mass of laminated arenaceous deposits, seldom acquiring considerable hardness, and suggesting the notion of having been deposited as a muddy sediment; from which circumstance it has also been called 'mudstone' by Mr. Murchison. Very rich in fossils.

Aymestry Limestone.—A concretionary and polypiferous limestone, of local occurrence and small thickness, merely separating the other terms. Many fossils.

Lower Ludlow Rock.—Chiefly an argillaceous, shaly, and flaggy deposit, with a few calcareous nodules, yielding shells.

The limestone of Wenlock and Dudley lies below.

LUDLOW, EDMUND, was born at Maiden-Bradley in Wiltshire, about the year 1620. His father, Sir Henry Ludlow, a considerable landed proprietor in that county, and its representative in the Long Parliament, was an advocate of the democratic cause, which was likewise eagerly espoused by his son. Edmund Ludlow volunteered in Essex's army, and first engaged the king's forces at the battle of Edge-hill (1642): from this time, with only occasional interruptions, he filled such stations, military or civil, as rendered him an important partisan. He denounced the misgovernment of the king, and sought the destruction of the monarchy and the establishment of a commonwealth. He was one of the most active assistants in Col. Pride's purge, one of the foremost of the king's judges, and one of the most eager voters for the annihilation of the House of Peers. His independence rendered him obnoxious to Cromwell, who, to impair his influence, sent him to Ireland with a military command (1650), an expedient which must be acknowledged to have been most politic; for when Cromwell assumed the authority of Protector, Ludlow loudly protested against his elevation, and if he had been in England might possibly have impeded it. Consistent in his advocacy of an equal commonwealth, he refused, when he left Ireland, to yield Cromwell an unqualified submission. He was regarded with great jealousy on account of this refusal, and security was required that he should not act in hostility to the government. His brother, Thomas Ludlow, privately furnished the security, and Ludlow retired into Essex, where he resided until Oliver Cromwell's death. He then resumed his public course; was active in parliament in the Committee of Safety, in the council of state, and again received a command of troops in Ireland. Accusations were afterwards brought against him by the council of officers; he was called an opponent of the interests of the army, and charged with high treason. In consequence of these charges he travelled to London, resumed his seat in parliament, and there offered to enter on his defence; but such was the state of confusion at this time, Monk and his forces being daily expected in London, that he was neither heard nor were the proceedings against him advanced any further. When the king was restored, Ludlow, justly estimating his insecurity, fled the country; and after narrowly escaping capture, landed at Dieppe, in September, 1660. From Dieppe he went to Switzerland, and having visited Geneva and Berne, resided principally at Vevay. In 1689, wearied with exile, he returned to England, hoping that his offences as a republican were either forgotten or forgiven; but he was disappointed; an arrest was threatened, and he was compelled again to fly to Vevay, where he died in 1693, aged seventy-three years. His memoirs were written in Switzerland, and first printed at Vevay, two volumes in 1698, and a third in the following year. (Ludlow's *Memoirs*.)

LUDOLPHUS, JOB (the Latinized form of his real name Leutholf), was born at Erfurt, the 15th June, 1624, and was educated at the university of Leyden, where he principally studied jurisprudence and the Oriental languages. After leaving Leyden, he remained for some time in Paris as tutor to the sons of the Swedish ambassador. In 1652 he removed to the court of the duke of Saxe-Gotha, in order to superintend the education of the duke's children. During the latter part of his life he resided at Frankfort-on-the-Main, where he died on the 8th April, 1704.

Ludolph was one of the most eminent Oriental scholars of his age, and appears to have been the first European who acquired a knowledge of the Ethiopic language, which he learnt with the assistance of a native of Abyssinia. He published at London, in 1661, a dictionary and grammar of this language; but a much improved edition of the dictionary appeared at Frankfort in 1698, and of the grammar in 1702. Ludolph also paid great attention to the Amharic language, of which he published a dictionary and grammar in 1698.

The most important of Ludolph's other works are: 'Historia Æthiopica, sive Descriptio Regni Habessinorum, quod vulgo male Presbyteri Johannis vocatur,' Frankfort, 1681; 'Ad Historiam Æthiopicam Commentarius,' Frankfort, 1691 (there is an English edition of the 'History of Ethiopia'); 'Relatio Nova de hodierno Habessiniæ statu ex India nuper allata,' Frankfort, 1693; 'Appendix Secunda ad Historiam Æthiopicam, continens Dissertationem de Locustis,' Frankfort, 1694; 'Epistola Æthiopice ad universam Habessinorum gentem scripta,' Frankfort, 1683; 'Epistolæ Samaritanæ Sichemitarum ad Ludolphum,' with a Latin translation and notes, 1688; and a translation of the Psalms into Ethiopic, Frankfort, 1701.

LUGANO. [TICINO.]

LUGO. [GALICIA.]

LUKE, ST., the Evangelist. Respecting the birth and early life of this evangelist we have no certain information; of his later history we learn something from his own work, the *Acts of the Apostles*. [APOSTLES, ACTS OF.] A considerable knowledge of the Greek language is displayed in his writings, especially in the introduction to his Gospel, which is written in elegant Greek. On the other hand, his language contains many Hebraisms, and he was evidently well acquainted with the religious rites of the Jews, whose mode of computing time he follows. (*Luke*, xxii. 1; *Acts*, ii. 1; xii. 3, 4; xx. 6, 16, &c.) Hence it has been much disputed whether he was a Jew or a Gentile before he embraced Christianity. The difficulty is best explained by the opinion of Bolten, confirmed by a tradition current in Jerome's time, that Luke was a Greek by birth, but became a proselyte to Judaism early in life. This opinion is supported by *Acts*, xxi. 28-31, and *Coloss.*, iv. 11, 14. From the former passage we learn that the Jews accused Paul of defiling the temple by bringing into it a Greek, Trophimus of Ephesus. Luke was then with Paul (*Acts*, xxi. 17, 18), and the accusation would have regarded him also, if he had not been looked upon as a Jew *by religion*. In the latter passage Paul distinguishes Luke from other individuals 'who are of the circumcision,' which seems to show that Luke was not a Jew *by birth*; unless indeed the Luke here mentioned be another individual, which we have no reason to suppose. Of the period of his conversion to Christianity we know nothing. Cave and Mill have supposed that he was converted by Paul at Antioch; but they are not supported by any antient writer: nor is it likely that Luke would have passed over such an event in writing the *Acts*.

From the passage quoted above (*Col.*, iv. 14), and from the testimony of Eusebius, Jerome, and other early writers, it appears that Luke was a physician. Another tradition makes him a painter, but this statement is generally allowed to deserve no credit; and the opinion of Grotius and Wetstein, that he was a slave during part of his life, seems equally unfounded.

Luke's native country is unknown. Eusebius and Jerome say that he was a native of Antioch; but this statement is not found in Irenæus, Clement, Tertullian, or Origen, nor in any writer before the time of Eusebius. Eichhorn has conjectured that this tradition arose from confounding the Evangelist with Lucius of Cyrene, who is mentioned as living at Antioch, in *Acts*, xiii. 1. Many writers however entertain the opinion, which is as old as the time of Origen, that this Lucius and the evangelist Luke were the same person. This conjecture is ably maintained by Mr. Charles Taylor, the editor of Calmet.

Some early writers, but of no very high authority, affirm that Luke was one of the seventy disciples sent forth by Christ, whose mission he alone of the Evangelists records. (*Luke*, x.) Others mention him as the companion of Cleopas in the journey to Emmaus, recorded in *Luke*, xxiv. 13. It is alleged that the mention of Cleopas, while his companion's name is withheld, the fullness and general character of the narrative, and especially the notice of minute circumstances which none but an eye-witness could record, prove that the traveller was the Evangelist himself. Other reasons are adduced for believing him to have been in Jerusalem at this time; namely, that the latter part of his Gospel and the earlier chapters of the *Acts* have every mark of being written by an eye-witness of the facts he narrates, and that all the appearances of Christ after his resurrection mentioned by him took place in the neighbourhood of Jerusalem. To this it is objected that we can only understand the preface to his Gospel (i. 1-4) as a distinct assertion that St. Luke was not an eye-witness himself, but that he derived his information from others who were eye-witnesses.

In *Acts*, xi. 28, the Cambridge MS. has a various reading, 'and when we were gathered together, there stood up,' &c., which, if admitted, would prove that Luke was connected with the Church at Antioch about A.D. 42: but this reading is not usually accounted of any great authority.

The first distinct mention of Luke in the New Testament is in *Acts*, xvi. 10, 11, where, in relating the vision which Paul saw at Troas, the writer suddenly begins to use the first person plural, whence it is inferred that Luke here joined the Apostle (about A.D. 53), whom he accompanied to Philippi (ver. 12). He seems to have remained at Philippi during Paul's journey to Athens and Corinth; for he drops the first person at ver. 17, and does not resume it till he relates Paul's return to Philippi (xx. 5, 6). From this time it appears from the *Acts* that Luke was Paul's constant companion till his arrival at Rome (about A.D. 61 or 63), where he remained with the Apostle for some time, probably during Paul's first imprisonment. He is mentioned more than once in Paul's Epistles written during this period. (*Col.*, iv. 14; 2 *Tim.*, iv. 2; *Philem.*, v 24.) Some suppose him to be 'the brother whose praise is in all the churches,' mentioned in the Epistle to the Corinthians (viii. 18; xii. 18). Besides his intimacy with Paul, he is said by Irenæus, Eusebius, Jerome, and other early writers, to have had a considerable acquaintance with the rest of the Apostles: indeed, they often speak of Luke and Mark as disciples of the Apostles, as distinguished from John and Matthew, who were disciples of Christ.

Respecting the end of Luke's life, the tradition is, that after Paul's liberation from his first imprisonment, he retired to Achaia, where he resided some few years, wrote his Gospel and the Acts of the Apostles, and died at an advanced age (some say 80, others 84 years), probably by a natural death, as we have no mention of his martyrdom.

* **LUKE, ST., THE GOSPEL OF**, is a narrative of the life of Jesus Christ, written by the evangelist Luke, and one of the canonical books of the New Testament.

The genuineness and authenticity of this Gospel are attested by the unanimous voice of the early Christian writers, and confirmed by internal evidence, and by the passage in *Acts*, i. 1, compared with this Gospel, i. 4. Michaelis has indeed objected to its canonical authority, and to that of St. Mark's Gospel also, chiefly on the ground that these books are not the production of Apostles. But such an argument cannot be admitted in opposition to the universal opinion of the primitive Christians, nor have we any proof that inspiration was confined to the Apostles. The genuineness of parts of the Gospel has been called in question, especially of the 1st and 2nd chapters. But these chapters, being in all existing MSS., are supported by a weight of external evidence which no internal difficulties can overthrow.

Many of the early writers state that St. Luke composed his Gospel under the superintendence of St. Paul. Irenæus says that 'Luke put down in a book the gospel preached by Paul;' Tertullian, that 'Luke's digest is often ascribed to Paul.' In all probability St. Luke would not neglect St. Paul's assistance in so important a work, but the idea that the Gospel is really St. Paul's, and that St. Luke was little more than his amanuensis, is not sustained by any striking agreement in the style of the two writers.

The most probable date of St. Luke's Gospel is about A.D. 63 or 64. It is closely connected with the Acts of the Apostles, and was probably written not long before that book. (*Acts*, i. 1.) Some writers place it in A.D. 53. Theophylact asserts that it was written fifteen years after Christ's ascension.

With respect to the place of its composition the common tradition is that it was written in Greece; Jerome says in Achaia and Bœotia.

Like the Acts of the Apostles, this Gospel is dedicated to Theophilus. The conjectures of critics respecting this personage are as numerous as is usual on such points; the conclusion at which Kuinoel arrives is that he was a converted Gentile, living without the bounds of Palestine. This dedication, the testimony of early writers, and some marks in the work itself, such as the explanations given of matters exclusively Jewish, prove that the Gospel was designed for the benefit of Gentile converts.

The contents of this Gospel are not arranged, like those of St. Matthew and St. Mark, in chronological order, but rather according to the subjects. Schleiermacher has proposed the following classification:—

1. The interval preceding the public life of Jesus, chaps. i. and ii.
2. Narratives of actions and discourses of Jesus, chiefly at Capernaum and its neighbourhood. Chaps. iii. to ix. 39.
3. Similar narratives, relating mostly to a journey of Christ to Jerusalem. The exact end of this division is doubtful.
4. The last days of Christ, his sufferings and death, and his resurrection and ascension.

The qualifications of St. Luke for the task he undertook were very high. He was evidently a well-educated man; perhaps he was an eye-witness of many of the events he relates; and assuredly he had excellent opportunities of gaining information from eye-witnesses. He assures us that he had 'accurately examined all matters from the very first' (*παρηκολουθηκότι ἄνωθεν πᾶσιν ἀκριβῶς*, i. 3); and his assertion is borne out by many marks of care and accuracy which appear in his narrative. In both his works he is scrupulously minute with respect to dates and numbers (see for example *Luke*, iii. 1); and he has taken the trouble to insert copies of important documents and accurate reports of speeches. The examples of the latter are very numerous; of the former we have a striking instance in the letter of Lysias to Felix. (*Acts*, xxiii. 26.) It will not indeed appear improbable to an attentive reader of this evangelist, especially in the account of Paul's voyage from Cæsarea to Rome, that he was in the habit of keeping a journal of events, which he used in composing his histories.

The controversy concerning the sources of this Gospel and those of St. Matthew and St. Mark has been alluded to under GOSPEL. A full account of the theories framed on this subject will be found in the Appendix to the fourth volume of Horne's 'Introduction.'

(Lardner's *Credibility*, and *Lives of the Apostles and Evangelists*; Cave's *Lives of the Apostles and Evangelists*; Kuinoel, *Comment. in Lib. Hist. N. T. Proleg. in Luc.*; Calmet's *Dictionary to the Bible*, by Charles Taylor; the *Introductions* of Michaelis (by Bishop Marsh), Hug, Horne, and Eichhorn; and Schleiermacher's *Critical Essay on the Gospel of Luke*, with Introduction by the Translator.)

LULEA-ELF. [BOTHNIA.]

LULLY, RAYMUND, surnamed the Enlightened Doctor, an enthusiastic and remarkable character of the thirteenth century, was born at Palma, in the island of Majorca, in 1234. In early life he followed his paternal profession of arms in the service of the king of Aragon, and abandoned himself to all the licence of a soldier's life. Passing from extreme to extreme, Lully subsequently retired to a desert, where he pursued a life of solitude and rigorous asceticism. Here he pretended to have had visions, and, among others, a manifestation of Christ on the cross, who called him to his service and the conversion of the Mohammedans. Hereupon he divided all his property among the poor; and in his thirtieth year he began to prepare himself, by diligent study, for the labours and duties of a missionary. Learning Arabic from a slave, he read in that language several philosophical works, the perusal of which, in all probability, suggested those new views of grammar and dialectic by means of which he hoped to reform science, and thereby the world itself. Full of this idea he had a second vision of the Saviour in the semblance of a fiery seraph, by whom he was expressly enjoined to commit to writing and to publish the treatise, to which he himself gave the name of 'Ars Lullia,' but which his followers and admirers dignified by the title of the 'Great Art' (Ars Magna). Having besought James of Aragon to establish a monastery in Majorca for the education of thirteen monks in the Arabic language and the duties of missionaries, he went to Rome to seek the countenance of Pope Honorius IV. for similar institutions and his own mission. Receiving however little encouragement, he visited Paris and Genoa with the same design, and with similar success. From Genoa he crossed to Africa, where he was in danger of losing his life in consequence of his dispute with a Mohammedan whom he sought to convert, but was saved by the intercession of an Arabian mufti, on the condition of quitting Africa for ever. This promise however he subsequently considered not to be binding upon him; for after revisiting Italy, and in vain seeking to excite sympathy and co-operation in his designs, he reassumed, unassisted, his enthusiastic enterprise. Proceeding first to Cyprus and thence to Africa, he was nearly stoned to death; and being cast into prison, owed his liberty to the generosity of some Genoese merchants. Upon his return to Europe Lully visited its principal cities, preaching the necessity of a crusade for the recovery of the Holy Land, a plan of which he laid before Pope Clement V., by whom it was received with little or no favour. Unchecked however by so many disappointments, and with the ardour of his enthusiasm still unabated, Lully returned a third time to Africa, where his zeal for conversion entailed upon him dreadful torments, from which he was a second time rescued by the generosity of the Genoese. The sufferings however to which he had been exposed were so great, that Lully died on his passage home when he was just within sight of his native country, in the year 1315.

The 'Ars Magna Lulli, or the Lullian Art,' which found a few admirers, who styled themselves Lullists, after its inventor, and was subsequently revived and improved by the celebrated Giordano Bruno, is an attempt to give a formal arrangement of all ideas, with a view as well to facilitate instruction as to systematise knowledge. The means which this logical machine employs are:—1, letters (alphabetum artes), which stand for certain general terms common to all sciences, but especially to logic, metaphysics, ethics, and theology; 2, figures, viz.—triangles, squares, and circles, which indicate the relations of those general terms; and 3, sections (cameræ), in which the combinations of these ideas or terms are formed by the adjustment of the figures. In the angular spaces of the triangles and squares certain predicates are inscribed, and certain subjects on the circles. On the circle of subjects, the triangles of the predicates being so fixed as to move freely, every possible combination of ideas is supposed to be produced by their revolution, according as the angular points successively pass before the letter inscribed on the margin of the circle. Hence arise definitions, axioms, and propositions, which vary infinitely according to the different application of general or particular predicates to particular or general subjects. As however the ideas which are selected for the fundamental notions of this mechanical logic are purely arbitrary, the knowledge to which it professes to lead must be narrow and limited, and at best it does but furnish a few laws of universal notions for analysis and combination. Nevertheless as the invention, weak as it is, was founded on a feeling of the inadequacy of the dialectic of the schools, and as it furnished a weapon for its opponents, the name of Raymund Lully has been gratefully placed on the list of the reformers of philosophy. In his personal character he seems to claim more justly our admiration for the iron resolution with which, late in life, and for the most part unassisted, he applied himself to the study of science and philosophy, and for the steady resolution with which he persevered in his scheme of converting the heathen in despite of all discouragements and disappointment.

The works of Lully have been edited by Salzinger, 'Raymondi Lullii opera omnia,' in 10 vols. fol., Mayence, 1721-42.

LULLY (or **LULLI**), **JEAN-BAPTISTE**, the father of French dramatic music, was the son of a miller, and born at Florence in 1633. Showing in his infant years a strong propensity for music, a kind-hearted monk taught him the use of the guitar, an instrument then as common in Italy as it is now in Spain. Having attracted the notice of the Chevalier Guise, he was by that nobleman recommended to Mademoiselle de Montpensier, niece of Louis XIV., as a page, and sent to Paris in his fourteenth year. But his ready wit and talent found no favour in the eyes of the princess, for they were not set off by either a good figure or a pleasing countenance. Instead therefore of becoming the bearer of the lady's fan, or perhaps of her confidential communications, he was placed in the kitchen, and commenced his life of activity in the humble capacity of *marmiton*, or scullion. This degradation however did not much discourage him. He had previously acquired some knowledge of the violin, and now dedicated every spare moment to it. His devotion and industry were crowned with success. The report of his skill quickly ascended to the apartments of the princess, who placed him under an able master, and he soon was numbered among the king's twenty-four violins. He now aspired to the rank of composer, and having produced some airs which 'with ravished ears the monarch heard,' he was individually summoned into the royal presence, commanded to perform himself the compositions which had excited so much pleasure, and from that moment the road to promotion and honour was opened to him. He was immediately placed at the head of a new band, denominated *Les Petits Violons*, which soon eclipsed the famous *bande des vingt-quatre*.

Lully now was engaged to write music for the *Ballets*, entertainments of a mixed kind much admired at court. But Louis, ambitious of rivalling the grand opera not long before established at Venice, and encouraged in his design by the Cardinal Mazarin, founded, in 1669, the *Académie Royale de Musique*, an institution which has ever since continued to flourish. At the head of this, Lully, who had been appointed *Surintendant de la Musique de la Chambre du Roi*, was soon placed, and being associated with Quinault, the admirable lyric poet, carried into effect the king's wishes to their utmost extent. His abilities and exertions were not, as is too usual, suffered to remain unrewarded: besides the glory of complete success, he acquired a handsome fortune, and was raised to the honourable rank of *Secrétaire du Roi*. The proud *Secrétaires* hesitated at admitting a *marmiton* into their number. Lully complained to the king. 'I have honoured them, not you,' said the monarch, 'by putting a man of genius among them.'

On the recovery of Louis from a severe operation, Lully composed a *Te Deum*, and during a rehearsal of it, while beating the time to the band with his cane, he struck his foot a violent blow, which was followed by serious consequences, and having put himself into the hands of a quack, his life paid the forfeit of his credulity. He died in Paris, in 1687, where, in the church *des Petits Pères*, his family erected a splendid monument to his memory. In his last illness he was attended by a priest, who refused him the consolations of the church, unless he consented to destroy the opera on which he was engaged. He complied: the manuscript was committed to the flames. A friend, entering shortly after, reproached him for having listened to a dreaming Jansenist. 'Hush! hush!' whispered the composer, 'I have another fair copy of the work in my drawer.'

Lully was a shrewd man, possessing a considerable fund of humour, and many pleasant anecdotes are related of him. His companionable qualities led him too much into company, which he did not enjoy in a temperate manner, and the serious turn which the accident just mentioned took was imputed to the bad state of body produced by his habitual indulgences. As a composer, he is to be ranked among the first in his art. To him music is indebted for some of its greatest improvements, and his works display genius of a high order tempered by the soundest judgment. Even Handel acknowledged that he modelled his overtures after those of Lully; and our illustrious Purcell did not hesitate to profit by many hints afforded by the nineteen operas composed by the favourite of *Louis le Grand*.

LUMBA'GO. [RHEUMATISM.]

LUMBRI'CUS. The genus *Lumbricus* of Linnæus consisted not only of the *Earth-worms*, properly so called, but of an Intestinal worm or *Entozoon* (var. Intestinalis γ), the *Ascaris lumbricoides*, which so often infests children, and the *Lumbricus marinus* or *Lug* of our shores, so much in request by fishermen as a bait for sea-fish. The genus, as he left it, comprised only the two species *terrestris* and *marinus*, and is arranged under his *Vermes* (Intestina), between *Ascaris* and *Lumbricus*.

Lamarck and Cuvier both place the genus *Lumbricus* among the Annelids.

The former makes the *Echiurées* or *Lombricinés* the second family of his *Apod Annelids*. He observes that they have in truth projecting bristles (soies) externally; but these bristles, rarely fasciculated, are not retractile, have no sheath, nor are they furnished with pediform mamillæ, serving as a case for bundles of retractile bristles, as in all the Annelids of Lamarck's two following orders, the *Antennate Annelids* and the *Sedentary Annelids*.

Lamarck states that he formed this family at the expense of the genus *Lumbricus* of Linnæus, or rather of a part of that genus; but he adds that, in the then imperfect state of the knowledge of their internal organization, he considers his labours as imperfect and provisional only. He assigns to this family as a habitat moist earth and the mud or sand (vase) of the sea, and states that their branchiæ are not known. The three genera placed by him under this family are *Lumbricus*, *Thalassema*, and *Cirratulus*. To these the editor of the last edition adds *Sternapsis*, and expresses his opinion that Savigny's genus *Ophelia* ought to be arranged near *Cirratulus*.

Cuvier makes the *Abranchiata* (Les Abranches) the third order of the Annelids, and the *Setigerous Abranchiata* (Abranches Sétigerès, ou Pourvues de soies) the first order of that family. The order consists of the genera *Lumbricus* and *Nais*. It is to the first of these genera that we are to call the attention of the reader, and it is characterized by a long cylindrical body divided by wrinkles into a great number of rings, and by a mouth without teeth. Cuvier remarks that the *Lumbrici* ought to be subdivided; and Savigny has, in effect, subdivided the Earth-worms into the genera *Entérion*, *Hypogæon*, and *Clitellio*. MM. Audouin and Milne Edwards distinguish also the genus *Trophonia*.

Of these *Enterion* has upon each ring four pairs of small bristle-like processes, eight in all.

Clitellio is stated to have two bristle-like processes only on each ring.

Hypogæon has, besides the other bristle-like processes, one on the back of each ring. (This form is noticed as being American only.)

Trophonia has on each ring four bundles of short bristle-like processes, and at the anterior extremity a great number of long and brilliant bristle-like processes which surround the mouth.

Savigny described upwards of twenty species, which he considers to be distinct, and to have been confounded previously under the name of *Lumbricus terrestris*. M. Morren, in his 'Treatise on the Natural History and Anatomy of the *Lumbricus terrestris*' (Brussels, 1829), appears to be doubtful with regard to the number of species described by Savigny and others, and inclines to the opinion that they are merely varieties. M. Milne Edwards (edit. of Lamarck's *Animaux sans Vertèbres*, 1838) considers the characters on which Savigny relied as distinctions for dividing the group into the three genera as of little importance.

We take as an example the *common Earth-worm* (*Lumbricus terrestris* of Linnæus).

Organization.

Eternally the Earth-worm presents a body composed of numerous narrow rings closely approximated to each other; at about one-third of their length may be seen, particularly at the season of reproduction, the *clitellum*, which becomes at that time a highly important agent. The colour of the body is reddish or bluish, and of a shining aspect, and the animal has the power of secreting a viscous substance, which forms a sort of protecting sheath to its body, and greatly facilitates its progress through the earth. The animal is eyeless, and unprovided with either tentacles, branchiæ, or cirrhi.

Respiratory System.—The generally received opinion is that the blood of the Earth-worms is aërated by means of lateral series of small pyriform vesicles, analogous to the breathing sacs of the Leech [Leech, vol. xiii., p. 382], and opening externally by very minute pores.

Digestive System.—The mouth consists of two lips without tentacles or armature of any description; but the upper lip is elongated and proboscidiform. The œsophagus, which is a wide membranous canal, is continued straight down for half an inch, and ends in a dilated bag or reservoir, to which succeeds a muscular stomach or gizzard, disposed in the form of a ring. The intestine is constricted at each segment of the animal by a series of ligaments or partitions, connecting it to the parietes of the body, and swells out the intermediate spaces, when distended by the particles of earth. (See the *Catalogue of the Physiological Series of Comparative Anatomy in the Museum of the Royal College of Surgeons in London*, vol. i., and the preparation in the Gallery, No. 470.)

Nervous System.—The nervous system of the Earth-worm consists of a series of small ganglions close to each other. In the Museum of the College of Surgeons is a preparation, No. 1296 (*Gallery, Phys. Series*), illustrative of this system. It is an Earth-worm (*Lumbricus terrestris*, Linn.) with the ventral parietes of the abdomen removed to show the nervous chords, their ganglions, and lateral branches. The divergence of the two main lateral chords, in order to pass to the dorsal aspect of the œsophagus, is clearly shown (*Cat.*, vol. iii., part 1).

Generative System.—Allotriandrous, or with male organs so disposed as to fecundate the ova of a different individual. (Owen.) Cuvier was of opinion that they were hermaphrodites, but that it was possible that their junction only served to excite each other to fecundate themselves. It has been doubted whether these animals are oviparous, ovoviviparous, or viviparous. M. Montègre and Sir Everard Home supposed them to be viviparous. M. Leon Dufour (1825 and 1828) asserts that they are oviparous, in which opinion he is joined by M. Dugès (1828), who believes that the living vermicular animals which M. Montègre took for young *Lumbrici* were intestinal worms only. M. Morren, in the work above alluded to (1829), states that the mode of reproduction is both oviparous and ovoviviparous: that is, we apprehend, the animal under certain unfavourable circumstances will, like the viper, deposit the eggs, instead of hatching them internally. The statement of M. Montègre is that the eggs descend between the intestine and the external envelope to the circumference of the rectum (jusq' autour du rectum), where they are hatched, according to Cuvier, the young making their exits from the anus. M. Dufour, on the contrary, says that they produce eggs analogous to those of the leeches. In the Museum of the College of Surgeons (*Gallery, Phys. Series*, No. 2294), the anterior moiety of an Earth-worm (*Lumbricus terrestris*, Linn.) is shown with the parietes of the body slit open along the back, and the two halves divaricated, so as to expose the alimentary canal, testes, and ovaries. Four portions of black bristle indicate the four testes, which are the small white globular bodies immediately exterior to the bristles, two on each side. The ovaria are the larger oval bodies, of a less pure white than the testes, in the interspace between the bristles. They are four on each side, and increase in size as they are situated more posteriorly. Each of these essential organs of reproduction has a separate external aperture, which is very minute; and impregnation takes place by the apposition of the genital outlets of one individual to those of another, without intromission, as in the leech. In this state two Earth-worms are preserved in a succeeding series (Owen., *Cat.*, vol. iv.); Nos. 2295 and 2296 are also preparations illustrative of the organs of generation in these animals.

Organs of Progression.—Earth-worms creep at a good pace by means of muscular contraction and dilatation acting on the rings, which carry on their under-side the bristle-like processes above mentioned: these last operate as feet. The power of elongation is considerable, and the anterior part of the animal acts as a sort of awl in penetrating the earth.

Habits, &c.—The Earth-worm, as far as relates to its appearance above the surface of the ground, may be considered almost a nocturnal animal. In the night-season and at early morning hundreds may be seen, though not one, unless they are disturbed either by moving the ground or pouring liquids into their holes, is to be found moving about in the day. The power of reproducing parts after mutilation is, as most must have noticed, very great in this animal.

Utility to Man.—The worm-casts, which so much annoy the gardener by deforming his smooth-shaven lawns, are of no small importance to the agriculturist; and this despised creature is not only of great service in loosening the earth and rendering it permeable by air and water, but is also a most active and powerful agent in adding to the depth of the soil, and in covering comparatively barren tracts with a superficial layer of wholesome mould. In a paper 'On the Formation of Mould,' read before the Geological Society of London, by Charles Darwin, Esq., F.G.S., the author commenced by remarking on two of the most striking characters by which the superficial layer of earth, or, as it is commonly called, vegetable mould, is distinguished. These are, its nearly homogeneous nature, although overlying different kinds of subsoil, and the uniform fineness of its particles. The latter fact may be well observed in any gravelly country, where, although in a ploughed field, a large proportion of the soil consists of small stones, yet in old pasture-land not a single pebble will be found within some inches of the surface. The author's attention was called to this subject by Mr. Wedgwood, of Maer Hall, in Staffordshire, who showed him several fields, some of which, a few years before, had been covered with lime, and others with burnt marl and cinders. These substances, in every case, are now buried to the depth of some inches beneath the turf. Three fields were examined with care: the first consisted of good pasture-land, which had been limed, without having been ploughed, about twelve years and a half before; the turf was about half an inch thick; and two inches and a half beneath it was a layer or row of small aggregated lumps of the lime, forming, at an equal depth, a well-marked white line. The soil beneath this was of a gravelly nature, and differed very considerably from the mould nearer the surface. About three years since cinders were likewise spread on this field: these are now buried at the depth of one inch, forming a line of black spots parallel to and above the white layer of lime. Some other cinders, which had been scattered in another part of the same field, were either still lying on the surface or entangled in the roots of the grass. The second field examined was remarkable only from the cinders being now buried in a layer, nearly an inch thick, three inches beneath the surface. This layer was in parts so continuous, that the superficial mould was only attached to the subsoil of red clay by the longer roots of the grass.

The history of the third field is more complete. Previously to fifteen years since it was waste land; but at that time it was drained, harrowed, ploughed, and well covered with burnt marl and cinders. It has not since been disturbed, and now supports a tolerably good pasture. The section here was turf half an inch, mould two inches and a half, a layer one and a half inch thick, composed of fragments of burnt marl (conspicuous from their bright red colour, and some of considerable size, namely, one inch by half an inch broad, and a quarter thick), of cinders, and a few quartz pebbles mingled with earth; lastly, about four inches and a half beneath the surface was the original black peaty soil. Thus beneath a layer (nearly four inches thick) of fine particles of earth, mixed with some vegetable matter, those substances now occurred, which, fifteen years before, had been spread on the surface. Mr. Darwin stated that the appearance in all cases was as if the fragments had, as the farmers believe, worked themselves down. It does not however appear at all possible that either the powdered lime or the fragments of burnt marl and the pebbles could sink through compact earth to some inches beneath the surface, and still remain in a continuous layer; nor is it probable that the decay of the grass, although adding to the surface some of the constituent parts of the mould, should separate in so short a time the fine from the coarse earth, and accumulate the former on those objects which so lately were strewed on the surface. Mr. Darwin also remarked that near towns, in fields which did not appear to have been ploughed, he had often been surprised by finding pieces of pottery and bones some inches below the turf. On the mountains of Chile he had been perplexed by noticing elevated marine shells, covered by earth, in situations where rain could not have washed it on them.

The explanation of these circumstances, which occurred to Mr. Wedgwood, although it may at first appear trivial, the author does not doubt is the correct one, namely, that the whole is due to the digestive process by which the common Earth-worm is supported. On carefully examining between the blades of grass in the fields above described, the author found that there was scarcely a space of two inches square without a little heap of the cylindrical castings of worms. It is well known that worms swallow earthy matter, and that, having separated the serviceable portion, they eject at the mouth of their burrows the remainder in little intestine-shaped heaps. The worm is unable to swallow coarse particles; and as it would naturally avoid pure lime, the fine earth lying beneath either the cinders and burnt marl, or the powdered lime, would, by a slow process, be removed and thrown up to the surface. This supposition is not imaginary, for in the field in which cinders had been spread out only half a year before, Mr. Darwin actually saw the castings of the worms heaped on the smaller fragments. Nor is the agency so trivial as it at first might be thought, the great number of Earth-worms (as every one must be aware who has ever dug in a grass-field) making up for the insignificant quantity of work which each performs.

On the above hypothesis, the great advantage of old pasture-land, which farmers are always particularly averse from breaking up, is explained; for the worms must require a considerable length of time to prepare a thick stratum of mould, by thoroughly mingling the original constituent parts of the soil, as well as the manures added by man. In the peaty field, in fifteen years, about three inches and a half had been well digested. It is probable however that the process is continued, though at a slow rate, to a much greater depth; for as often as a worm is compelled by dry weather or any other cause to descend deep, it must bring to the surface, when it empties the contents of its body, a few particles of earth. The author concluded by remarking, that it is probable that every particle of earth in old pasture-land has passed through the intestines of worms, and hence that in some senses the term 'animal mould' would be more appropriate than 'vegetable mould.' The agriculturist, in ploughing the ground, follows a method strictly natural; and he only imitates in a rude manner, without being able either to bury the pebbles or to sift the fine from the coarse soil, the work which nature is daily performing by the agency of the Earth-worm.

Since this paper was read Mr. Darwin has received from Staffordshire the two following statements:—1. In the spring of 1835 a boggy field was so thickly covered with sand that the surface appeared of a red colour, but the sand is now overlaid by three-quarters of an inch of soil. 2. About eighty years ago a field was manured with marl, and it has been since ploughed, but it is not known at what exact period. An imperfect layer of the marl now exists at a depth, very carefully measured from the surface, of twelve inches in some places and fourteen in others, the difference corresponding to the top and hollows of the ridges or butts. It is certain that the marl was buried before the field was ploughed, because the fragments are not scattered through the soil, but constitute a layer which is horizontal, and therefore not parallel to the undulations of the ploughed surface. No plough, moreover, could reach the marl in its present position, as the furrows in this neighbourhood are never more than eight inches in depth. In the above paper it is shown that three inches and a half of mould had been accumulated in fifteen years; and in this case, within eighty years (that is, on the supposition, rendered probable from the agricultural state of this part of the country, that the field had never before been marled) the Earth-worms have covered the marl with a bed of earth averaging thirteen inches in thickness. (*Proceedings of the Geological Society of London*, vol. ii., 1837-38.)

LUMME, a name for the bird called the *Speckled Diver*, or *Speckled Loon* (*Colymbus Arcticus*, Linn.).

LUNACY. Unsoundness of mind is perhaps the most accurate definition of the present legal meaning of this term that can be given. Formerly a distinction was made between lunatics and idiots: a lunatic being described as one who has had understanding, but from some cause has lost the use of his reason; and an idiot, as one who has had no understanding from his nativity. The distinction between these two classes of persons of unsound mind also produced some important differences in the management of their property. These have now fallen into disuse, and therefore it will be sufficient for the purposes of this article to consider the consequences to the individual of unsoundness of mind generally. Strictly speaking, perhaps a lunatic is one who has lucid intervals, but this distinction may also at the present day be disregarded.

Persons of unsound mind may inherit or succeed to land or personal property either by representation, devise, or bequest, but they cannot be executors or administrators, or make a will, or bind themselves by contract. It is stated by Blackstone that the conveyances and purchases of persons of unsound mind are voidable, but not actually void; this however perhaps needs some qualification, for a bargain and sale, or surrender, &c., and also personal contracts made or entered into by such persons, are actually void as against their heirs or other representatives, though it is true a feoffment with livery of seisin was voidable only. [CONVEYANCES.] A person of unsound mind, though he afterwards be restored to reason, is not permitted to allege his own insanity in order to avoid his own act; for no man is allowed to stultify himself, or plead his own disability (13 Vesey, 590), unless he has been imposed upon in consequence of his mental incapacity (2 Carr. & P. 178; 3 Carr. & P. 1, 30); and an action will lie against a lunatic upon his contract for necessaries suitable to his station. The reader is referred for information upon this subject to 1 Blackst. *Comm.*, 291; 1 Fonbl. *Eq.*, b. 1, c. 2; 2 Sugd. *Pow.*, 295-6; 5 Barn. & C. 170; Moody & M. 105, 6. Acts done during a lucid interval are valid, but the burthen of proving that at the time when the act was done the party was sane and conscious of his proceedings, lies upon the person asserting this fact. The marriage of a person of unsound mind, except it be solemnized during a lucid interval, is void.

The degree of responsibility under which persons of unsound mind are placed with respect to crimes committed by them, as well as the degree of unsoundness of mind which should be considered as depriving the party of that amount of self-control which constitutes him a responsible agent, are in a painful state of uncertainty. As a general rule it may however be laid down that where unsoundness of mind, of such a nature as to render the party incompetent to exercise any self-control, is established, criminal punishment will not be inflicted; but that he will be kept in safe custody during the pleasure of the crown (39 & 40 Geo. III., c. 94, and 1 & 2 Vict., c. 14). On the subject of criminal responsibility, and what constitutes unsoundness of mind in a legal point of view, the reader is referred to the various treatises on medical jurisprudence, particularly to that by Dr. Ray, lately published at Boston in the United States: and also generally to Dr. Haslam's 'Observations on Madness and Melancholy,' 'Medical Jurisprudence as it relates to Insanity,' 'Illustrations of Madness,' and his other works. The following remarks may however be useful.

In lunacy the question to be decided is not whether the individual be actually of sound mind, though a jury on an inquisition held under a commission of lunacy must express their opinion or finding in the form that the alleged lunatic is of 'unsound mind' (*In re Holmes*, 1 Russell, 182); but though such must be the finding in order to make a man legally a Lunatic, the real question is whether or not the departure from the state of sanity be of such a nature as to justify the confinement of the individual, or the imposition of restraint upon him as regards the disposal of his property. No general rule can be laid down by which to ensure a right decision: but in all such inquiries it should be kept in mind that insanity varies infinitely in its forms and degrees. It should be particularly remembered that persons may be of weak mind, and eccentric, and even be the subjects of delusions on certain subjects, and yet both inoffensive and capable of directing pecuniary matters. The individual's natural character should be taken into consideration as accounting for eccentricities of manner and temper, and his education in estimating his ignorance and apparent want of intellect; and lastly due allowance must be made for the irritation and excitement produced in a mind, perhaps naturally weak, by the inquiry itself, and the attempt to deprive him of his liberty and property. Confidence should not be placed in depositions or evidence founded on short and inattentive examinations.

Sometimes the madman conceals his disease, and with such remarkable cunning and dissimulation that the detection of it is very difficult: this is more particularly the case when the insanity consists in some hallucination; and here, unless the nature of the delusion be known, it will often be in vain to attempt to elucidate by questions any proof of unsoundness of mind. Those who are insane on particular subjects will reason correctly on ordinary and trivial points, provided these do not become associated with the prevailing notions which constitute their disease.

When insanity is urged as the ground of non-responsibility for a criminal act, it has been erroneously held that the main point to be ascertained is, whether the individual has or had 'a sense of good and evil,' 'of right and wrong.' But this, though the doctrine of the English law, is found incapable of practical application; and the records of trials of this kind show that the guide to the decision has generally been the proof, or absence of proof, that insanity of some kind existed at the time of the act, although before and after it the power of reasoning and the knowledge of right and wrong might be retained. Thus, on the trial of Hatfield for shooting at George III., Erskine argued that the existence of a delusion in the mind absolves from criminal responsibility, if it be shown that the delusion and criminal act were connected; and on this principle Hatfield was acquitted, but confined for life. Bellingham however, who shot Mr. Percival under an equally powerful delusion, in consequence of the greater excitement in the public mind occasioned by the result of the insane act, was convicted and executed. In many instances homicide has been prompted, not by any insane hallucination or delusion, but by a morbid impulse to kill. Here there is generally evidence of the feelings and propensities of the individual having been previously disordered, of his being in fact the subject of moral insanity [Insanity], and judgment in such cases is aided by the absence of motive to the act. Where the general conduct of the prisoner has been such as to indicate unsoundness of mind, even though considerable contrivance has accompanied the act, or where there is evidence of his having been the subject of an irresistible impulse to kill, it is becoming now the practice to find a verdict of acquittal, in opposition to the older authorities, who confined the exemption from responsibility on the ground of insanity within very narrow limits.

A lunatic is, according to law, responsible for acts committed during 'lucid intervals,' a term by which is understood however, not mere remissions of the violence of the disease, but periods during which the mind resumes its perfectly sane condition. In forming an opinion concerning such lucid intervals, it is to be remembered that the absence of the signs of insanity must have considerable duration before it can be thence concluded that the mind is perfectly sane; and that lunatics, when apparently convalescent, are subject to sudden and violent paroxysms.

One of the most difficult points to be determined is with regard to the mental capacity of old persons, in whom the mind is confessedly impaired. The decay of intellect in old age is first manifested in the loss of memory of persons, things, and dates, and particularly with respect to recent impressions. But it is not the mere liability to forget names, &c., which will render the will of an old person invalid; it should be shown that in conversation about his affairs, and his friends and relations, he did not evince sufficient knowledge of both to dispose of the former with sound and untrammelled judgment. Many old men appear stupid and forgetful, but when their attention is fairly fixed on their property, business, and family affairs, understand them perfectly, and display sagacity in their remarks.

The care and custody of idiots and lunatics form a branch of the royal prerogative, and were formerly administered by the king himself. Since the dissolution of the Court of Wards, the lord chancellor has been specially appointed to exercise this power. [Chancellor.] The method of proving a person to be of unsound mind, for the purpose of depriving him of the control of his property, and, where the circumstances require it, providing for the safe custody of his person, is as follows. The lord chancellor upon petition supported by affidavits, and in some cases upon a personal interview also with the alleged lunatic, when such a course seems necessary, grants a commission to inquire into the state of mind of the party, and if the jury should find him to be *lunatic* or of *unsound mind* (one of which modes of finding is absolutely necessary), the care of his person is committed to some relation or other fit person with a suitable allowance for maintenance, who is called the committee of the person; and the care of the estate is committed either to the same or some other person, who is called the committee of the estate. [Guardian.] The commission is a proceeding issuing from the common-law side of the Court of Chancery; but after the appointment of the committee, the chancellor acts by virtue of his general authority, and his orders are enforced by the general process of the court. The committee of the estate is considered as a mere bailiff appointed by the crown for the sole interest of the owner, and without any regard to his successors; but the court will order allowances to be made to near relations of the party who is of unsound mind, and even to his natural child, where the circumstances of the several parties justify and require it, and will direct proper acts to be done in the management of the estate, as repair of buildings, felling of timber which is deteriorating, &c.

On the general subject see Stock *On the Law of Non Compotes Mentis*; and Collinson *On Lunacy*.

LUNAR OBSERVATION generally means an observation of the moon's distance from a star, for the purpose of finding the longitude. [Longitude and Latitude, Methods of Finding.]

LUNAR THEORY. By the theory of a planet is meant the deduction of its motion from the law of gravitation. This subject is discussed in the article Gravitation. For the numerical data see Moon.

LUNATIC. [Lunacy.]

LUNATIC ASYLUMS. Besides the large endowed hospitals (as the Bethlehem) and county asylums, there are numerous private establishments for the reception of the insane. In the cities of London and Westminster, and seven miles around, and in the county of Middlesex, these asylums are under the direct jurisdiction of the Metropolitan Commissioners of Lunacy, who are appointed annually by the lord chancellor for the purpose of licensing and visiting such houses. The commissioners are in number not less than 15 and not more than 20: four or five must be physicians, and two barristers. In other parts of England similar powers of granting licences and appointing visitors are delegated to the justices in general or quarter-sessions; but notices of all such licences are forwarded to the office of the metropolitan commissioners.

No person can be admitted into a house kept for the reception of the insane without a certificate signed by two medical men, not interested in the profits of the establishment, who must have separately visited and examined the patient within seven days before his admission into the asylum; or, upon satisfactory reasons being shown, the certificate may have the signature of one medical man only, but then it must be signed by a second within seven days after the patient's admission.

A variety of statutes have been passed for the management and regulation of houses for the reception of persons of unsound mind, and of county lunatic asylums for the maintenance of pauper and criminal lunatics, the last of which is 3 & 4 Will. IV., c. 64, continued by 1 & 2 Vict., c. 73.

(For the treatment of lunatics see Insanity.)

LUNATION, the time between two new moons. [Moon.]

LUND is a town in Sweden, in the province of Scane and Län of Malmohus, in 55° 40′ N. lat. and 13° 10′ E. long., about seven miles from the Sound. It is situated in the centre of an extensive plain of great fertility, which produces richer crops of wheat than any other district of Sweden: tobacco and madder are also raised in it. The streets are straight and wide, and the houses commonly of two floors, and many of them surrounded by orchards and gardens. In the centre of the town is the cathedral, a large and magnificent building of hewn stone. Lund is the seat of a bishop, and has a celebrated university. Between the cathedral and the university buildings is a space planted with lime-trees, and kept in good order. The university buildings, erected in 1668, consist at present of two extensive edifices, the old and new one. The former, which is the larger, is three stories high, and has a tower. In the ground-floor is the historical museum; there are also two lecture-rooms. In the second floor is the library, which consists of nearly 40,000 volumes, among which are a few valuable manuscripts. In the third floor is the lecture-room for mathematics, and the collection of instruments. The observatory is in the tower. The new university building contains the meeting-rooms of the senate and of the four faculties, and likewise the archives; in the second floor are the collections of natural history. The chemical laboratory is in a separate building. There is a botanical garden belonging to the university. In the building attached to it is the lecture-room for botany, and in the upper floor the lecture-room for anatomy, with numerous preparations. Near the botanical garden is a plantation called Paradislycka, in which foreign forest-trees are grown for sale, and transplanted to other parts of the kingdom. The number of students amounted in 1830 to 632; the population of the town, according to the census of 1825, is nearly 4000, and it is supposed that it now exceeds 4500 souls. An active commerce in the produce of the adjacent country is carried on between Lund and Malmö. (Forsell's *Statistics of Sweden;* Schubert, *Reise durch Schweden, Norwegen,* &c.)

LUNDIN, SIR ALAN, of Lundin, or Lundie, in the shire of Forfar, was son and heir of Thomas de Lundin, who held the office of king's hostiarius, or door-ward, and was one of the magnates Scotiæ who ratified the marriage of king Alexander II. with Joanna of England. Sir Alan early married the bastard daughter of this king Alexander, and before the year 1233 he had succeeded his father in the office of Durward. Before this time also he had imitated his father's munificence to the church, and in the spirit of the age had founded a Dominican convent at Montrose. He was a forward impetuous character, and for twelve years assumed without any authority the title of earl of Athol.

In 1243 he was appointed lord-justiciar of Scotland, and so continued for about six years, when he was removed under circumstances which strongly mark his audacity and ambition. In 1249 he endeavoured to obstruct the coronation of the infant son of king Alexander II.; and the next year he prevailed on Robert, abbot of Dumfermline, then chancellor of the kingdom, to make a motion in council to legitimate his wife, so that on failure of issue of the king's body she and her heirs might succeed to the throne. For this act the king conceived so great a displeasure that he immediately turned the chancellor out of office, and soon after the justiciar likewise. The latter joined King Henry III. in France, and served in his army; and at length, in 1255, by the influence of the English king, he was re-instated in his office of lord-justiciar, and so continued till 1257, when he was again removed for the powerful Comyn. He died in 1275, leaving three daughters, who carried his great possessions with his blood into other families. Fordun calls him 'vir dapsilis et strenuissimus in armis, et regi et regno fidelissimus.'

LUNDY ISLAND. [Devonshire.]

LUNE, LUNULE, the figure formed on a sphere or on a plane by two arcs of circles which enclose a space. [Hypothenuse; Sphere.]

LUNE (River). [Lancashire.]

LÜNEBURG is an antient allodium of the house of Brunswick, which, in the year 1235, was raised, together with Brunswick, to the rank of a duchy, and was subsequently separated, and formed a distinct principality. In recent times it lost the bailliwick of Klötze, which was ceded to Prussia, but was indemnified by the addition of that part of Lauenburg which was retained by Hanover. It is now a landdrostei, or province, of the kingdom of Hanover, situated between 52° 15′ and 53° 30′ N. lat. and 9° 16′ and 11° 40′ E. long. It is bounded on the north by the Elbe, which separates it from Holstein, Hamburg, and Lauenburg; on the north-east by Mecklenburg-Schwerin and the Prussian province of Brandenburg; on the east by the province of Saxony; on the south-east and south by Brunswick and Hildesheim; and on the west by Calenberg. The shape is near a square, and the area 4080 square miles. The population, according to the latest census, is 306,146. The country is on the whole an immense sandy plain, which is broken by some chains of low hills. This tract is chiefly covered with heath, with here and there extensive turf moors, and considerable woods, mostly of fir. Fertile arable land is rare, but on the banks of most of the rivers, especially the Elbe and the Aller, there is very rich marsh-land. It was calculated twenty years ago that at least seven-tenths of the whole province were covered with heath and brake; for of 4,172,642 Calenberg acres which Lüneburg contains, only 560,467 acres were arable land, 174,522 acres pasture, and 492,000 acres forests. On the banks of the smaller rivers the land is in many parts well cultivated; for instance, about Lüchow and Uelzer, where flax of good quality is grown. The principal river is the Elbe, which runs along the frontier; only the bailliwick of Neuhaus lies beyond that river, which receives from the province itself the Ilmenau, with its affluents the Wipperau, Lühe, Seve, and Netze; and the Aland and Ieeze, which come from the Altmark. The Ohre and the Este rise in Lüneburg, the former running into the province of Brandenburg, and the latter towards Bremen. The Aller, in the south of the province, with its tributaries the Oker, Fuse, Oerze, and Böhme, belongs to the valley of the Weser. The country has a very gradual fall towards the Elbe and the Weser, especially towards the former, against the inundation of which the land is secured by dikes. The highest land between the two rivers is the celebrated Lüneburg Heath. This tract, which has been called the desert Arabia of Germany, has some villages and seats of rich landowners on the small streams, who enjoy very extensive rights of common on this heath. The breed of small coarse-woolled sheep, called Heideschnucken, which a French traveller mistakes as the name of a peculiar race of people, *le peuple des Heideschnucks*, is kept on this heath. The villagers derive their chief subsistence from the breeding of bees and gathering bilberries, juniper-berries, and cranberries, of which vast quantities are sent to Hamburg and Bremen. The heath is so favourable to the breeding of bees, that many thousand beehives are sent thither from other parts of the kingdom. The cultivation of the soil has made of late years considerable progress. As it is only in the rich marsh-lands that good crops of corn can be raised, there is scarcely sufficient for the population. Flax is pretty extensively cultivated. The land produces also hops, potatoes, garden vegetables, and turnips in abundance, but only a little fruit. The breeding of cattle is more profitable than tillage; the sheep are very numerous, but their wool is in general indifferent. The breed of horses has been very much improved by the national stud at Colle. The forests afford timber for building as well as fuel, for which there is a good sale. Gypsum abounds in many places; and in the vicinity of the gypsum are the celebrated saline springs. Near Lüchow there is a district called Drawän, or Wendland, the inhabitants of which, in their language and manners, retain traces of their descent from the Wends. The main road for commerce between Hamburg and the interior of Germany passes through this principality. The staple town is Lüneburg, and the inhabitants expect to derive great advantages from the privilege just granted to the city by his present majesty, to hold three annual fairs. The traffic from Hamburg by way of Harburg and Celle, from Bremen by way of Celle, and from Lübeck by way of Lüneburg, is not so considerable. There are no manufactures, properly so called, except at Lüneburg, Harburg, and Celle. Spinning of yarn, linen-weaving, and stocking-knitting are pretty general among the country-people, who likewise make a quantity of wooden wares. In general the inhabitants are in pretty easy circumstances.

LÜNEBURG, the capital, lying in 53° 15′ N. lat. and 10° 17′ E. long., is situated on the Ilmenau, which is here navigable about fifteen miles above its junction with the Elbe, and has 13,000 inhabitants. At the western end is the Kalkberg, the highest mountain in the country (about 350 feet high), on which the convent of St. Michael and some fortifications were erected in the tenth century. At present 20,000 tons of lime are annually procured from the Kalkberg, and exported to Hamburg and Holland. Lüneburg was formerly surrounded with walls, but the fortifications are now dismantled. The principal buildings and public institutions are the royal palace, the gymnasium, St. Michael's church, in the vaults of which are the monuments of the antient princes, the convent of St. Michael, with a Latin school, the town-hall, the arsenal, an hospital, &c. The inhabitants carry on a considerable trade in the products of the country, such as linen, salt, wax, honey, woollens, linen thread, flax, horses, of which 70,000 are annually brought hither to market, &c. There are very productive salt-works in a part of the city which is separated from the rest by a wall, and is called the Sulze. The spring from which the salt is obtained is very strong, being perfectly saturated, and yields 200,000 cwt. annually, and would yield much more. We have already spoken of the transit trade from Hamburg to the interior. There are manufactories of soap, snuff, playing-cards, some breweries and distilleries, a paper-mill, &c. Of the other towns in the principality the most important are Celle (otherwise Zell), a tolerably well-built town, at the junction of the Fuse and the Aller, the seat of the supreme court of appeal; it has a gymnasium, a national stud, with 120 stallions, a large house of correction, six churches, and many other public buildings and institutions. The suburbs are very extensive. On the west side of the town is a palace, with a magnificent chapel, and in the French garden is the monument of Matilda, queen of Denmark, sister of George III. of England. Harburg, on the Elbe, opposite Hamburg, has some manufactories of linen, woollens, and stockings, a powder-mill, tanneries, wax-bleaching, sugar-refinery, and a great trade in timber. Uelzen in the Heath, on the Ilmenau, has 3000 inhabitants, who cultivate the best flax, and have manufactories of woollen cloth, camlets, and starch.

LUNEL. [He′rault.]

LUNETTE, in fortification, is a work similar to a ravelin, or demi-lune, but generally of smaller dimensions. Such works have been placed in the retired angles between the ditches of a bastion and of the collateral ravelin, but they are now usually considered as advanced works, and are placed in front of those just mentioned.

The form of a lunette is the same as that of the redoubt Y in the plan at the end of the article Fortification; and its positions may be understood by conceiving such works to be placed beyond the glacis S S on lines passing through P and Z, X and R, and produced. Each lunette is protected in front by a ditch, beyond which is a covered-way, as usual.

The best disposition for a series of such works is that in which they are alternately more and less advanced beyond the fortress; since then they afford one another a reciprocal defence by the crossing fires which may be kept up from the nearest faces of every salient and retired lunette. And should the besiegers succeed in carrying their approaches up the glacis of the latter, the artillery on the flanks of the two more salient and collateral lunettes would effectually prevent them from forming a battery on its crest to breach the work. The operations against any one retired lunette must consequently be postponed till the two collateral lunettes are taken; whereas had all been equally advanced beyond the fortress, the three might have been breached and assaulted at the same time.

To give the more advanced lunettes, which are generally those placed beyond the ravelins, all the advantages of which they are susceptible, the magistral lines of their faces should coincide with the sides of an equilateral triangle whose base is a line joining the faces of the two collateral bastions at points about twenty or thirty yards from their flanked angles; for thus the earthen parapets at the salient angles of the lunette will not be easily destroyed by rain, and the ditches before the faces of the work can be defended by two or more pieces of artillery conveniently placed on the faces of the bastions. The ditches of the retired lunettes should in like manner be defended by artillery placed on the faces of the collateral ravelins; and the magistral lines of their faces should consequently be directed towards such ravelins.

In a front of fortification of the ordinary extent (360 yards) this rule for placing the advanced lunette will permit the ditch and covered-way of the latter to be defended by a fire of musketry from the retired places of arms L L [Fortification], and from the covered-way before the bastions; and, that such fire may graze the bottom of the ditch of the lunette, this ditch ought to be in an inclined plane nearly coinciding with the slope of the glacis S S. Should the ditch so formed be too shallow to fulfil its end, which is that of being an obstacle to the enemy in his attempt to assault the lunette, it would be necessary to make it deeper; and that it might not thus become a trench in which the enemy would be covered from the fire of the defenders, it should communicate with water, by which it might be filled previously to the expected assault.

The rampart of a lunette differs in no respect from that of other works; it should have the same relief, or height above the natural ground, as is given to the ravelins; since, as in the latter work, the fire of artillery should be capable of being directed against the trenches of the enemy at the foot of the glacis, over the heads of the defenders on the banquette of the covered-way. Its escarp should be revêted with brick or stone, in order that the enemy may be compelled to form a breach in it by artillery, or by a mine, previously to making an assault; or at least that the attack by escalade might be a process of difficulty and danger. The terreplein, or ground in the interior, should be high enough at the gorge to prevent an enemy from entering there without scaling-ladders; this part should be further protected by a loop-holed wall, or a line of palisades; it should be seen and defended from some collateral work, and an open caponnière, or a subterranean gallery, for communication, should lead from the gorge of each lunette to the place of arms in its rear. The advanced covered-way should pass in front of all the lunettes, and it might terminate at the two extremities on inaccessible ground, or in the general covered-way of the place.

Advanced lunettes about a fortress form strong posts for artillery, by which an enemy is compelled to commence his approaches at a greater distance than would otherwise be necessary. The length of their faces may be from sixty to seventy yards, and that of their flanks from fifteen to twenty. It is considered that a well-disposed series of these works would prolong the defence of a place about ten or twelve days. But they are only proper for fortresses of the first magnitude, since they would require a large garrison; and the troops, on being compelled to retire, might not find sufficient room in a small place.

LUNE′VILLE, a town in France, capital of an arrondissement in the department of Meurthe, 186 miles from Paris in a direct line east by south, or 221 miles by the road through Châlons sur Marne, Bar le Duc, and Nanci. This place appears to have been a mere village before the eleventh century. It afterwards became a fortified town and the capital of a county. In the war between Charles le Téméraire, duke of Bourgogne, and René II., duke of Lorraine, it was taken and re-taken. In the year 1638 it was taken by the French, who demolished the fortifications. Leopold, duke of Lorraine, rebuilt the castle at the commencement of the last century, and made it his residence.

A fire destroyed part of this castle, A.D. 1720, but it was promptly restored. A second fire (A.D. 1755) destroyed one of the wings, which has been rebuilt of late years. This castle was the usual residence of Stanislaus, ex-king of Poland and duke of Lorraine; it now serves as a cavalry barrack, and is capable of accommodating 6000 horse. The park and gardens have become public walks, and in the 'Champ de Mars,' or exercise-ground, a cavalry exercise camp is formed every year. There is a covered riding-school for cavalry, 320 feet long by 85 wide, without pillars to support the roof, in which 200 men can exercise at one time. The town was much improved by the dukes Leopold and Stanislaus. The streets are for the most part wide and straight. There are three suburbs, those of Nanci, of Viller, and of Alsace. There are two bridges over the Vezouze, on which the town stands; and near the town are two others over the Meurthe, into which the Vezouze falls just below Lunéville. The parish church is a modern building of elegant architecture; the portal however is overcharged with figures and ornaments; two towers rise above the portal, crowned with statues, the one of St. Peter, the other of Michael the archangel casting down Satan. The Place Neuve (New Square) is ornamented with handsome buildings. The population of Lunéville in 1831 was 12,216 for the town, or 12,341 for the whole commune; in 1836 it was 12,798 for the commune. The inhabitants are engaged in spinning cotton and woollen yarn, weaving woollen-cloth and cotton goods; manufacturing silk, cotton, and worsted hose; in making embroidery, pins, hats, earthenware, iron-stoves, and especially leather and gloves. There are several breweries. The principal trade is in the above articles; also in grain, wine, brandy, flax, hemp, wood, and fruit grown in the gardens round the town. There are six yearly fairs. There are several government offices, a high-school, an agricultural society, two hospitals or asylums (one of them for orphans), a Jews' synogogue, and a theatre. Charles Alexander of Lorraine, an Austrian general of reputation in the middle of the last century, was born here. A treaty of peace between the empire and France was negotiated at Lunéville in 1801.

The arrondissement of Lunéville has an area of 466 square miles, and comprehends five cantons, and 145 communes. The population in 1831 was 82,851; in 1836 it was 84,698.

LUNGS. [Respiration.]

LUNGS, DISEASES OF THE. The highly organized structure of the lungs and the incessant exercise of their important function, frequently under noxious circumstances, render these organs perhaps the most liable to disease of any in the body. Exposure to damp and cold, sudden atmospherical changes and transitions of temperature, want of proper nourishment, inattention to personal cleanliness, and some of the mechanical employments in which the confined and heated atmosphere of workshops is impregnated with minute particles of foreign substances, such as steel, wool, &c., may be considered as amongst the chief exciting causes of this extensively prevailing class of diseases. The subject may be conveniently divided into those affections which are acute and rapid in their progress, and those in which their course is slower and the changes of structure more gradually effected.

In *inflammation of the lungs* (pneumonia, peripneumonia) the air-cells and parenchymatous structure of the organ are the seat of the disease. This affection is generally preceded in a greater or less degree by shivering and such other febrile symptoms as commonly usher in any febrile attack. Soon afterwards pain and a sense of oppression are felt in the chest, with hurried respiration and a short dry cough. The pain is sometimes severe, sometimes it is described as of a dull and obscure kind and deeply seated. If the pleura, or investing membrane of the lungs, participate in the affection it is generally severe. At first there is little expectoration, but this increases in the progress of the disease, and the sputa acquire a reddish or rusty colour from the admixture of small quantities of blood. They also possess an unusual viscidity and tenacity, sometimes to such a degree that the vessel into which they are received may be inverted without their falling out; they also contain numerous minute bubbles of air, which are prevented from escaping by the consistence of the secretion.

If the disease continue unchecked, the difficulty of breathing becomes much greater, and the respirations, which in the natural state are about 20 in a minute, increase in frequency to about 40 or 60. Sometimes there is little cough throughout the disease, but most commonly it increases as the disease advances, and the sputa become more deeply tinged with blood. The features subsequently assume a livid appearance; the breathing gets more oppressed; expectoration is effected with difficulty; the powers of life fail, and the patient dies from the lungs being no longer able to carry on their function.

When a favourable change takes place in the course of the disease, either spontaneously, or from judicious medical treatment, it is generally attended by perspiration, the expectoration loses its rusty colour and unusual tenacity, the urine becomes turbid, and sometimes there is diarrhœa. Andral and other authors are of opinion that improvement is most likely to take place at certain times—critical days. The diagnosis of this disease has received most important assistance from auscultation, and in many instances it has been detected by its aid, where formerly it would have been overlooked. The assistance afforded by the auscultatory signs will perhaps be better understood if we defer them until we have spoken of the changes of structure in the lungs occasioned by inflammation.

In the early stage of pneumonia the inflamed part acquires an unnatural density and heaviness from the unusual accumulation of blood in it, and if a portion of lung so circumstanced be examined after death, pressure with the finger on its surface leaves an indentation which is not filled up, as would immediately be the case in a healthy state of the part. When it is cut into, a bloody frothy fluid exudes freely from it, and the surfaces present a deep blood-red colour, and if a portion be squeezed between the finger and thumb a crackling noise is heard indicating the presence of air. In a more advanced state, the lung is found still more dense, and does not crepitate when squeezed, showing that air is no longer admitted. As in this condition it somewhat resembles liver, it has been termed the stage of hepatization. When the disease has proceeded still further, suppuration may be found to have taken place. Pus is then observed to be effused throughout the structure of the diseased part, by which its dull red is changed to a yellow or straw colour, and the mass is rendered soft and easily broken. Suppuration in the form of abscess very rarely occurs as a consequence of pneumonia. Laennec is of opinion that death most probably takes place before the change can have proceeded to that extent.

Auscultatory Signs.—In that stage of the disease in which there is only an accumulation of blood in the part, and whilst air is still admitted, the respiratory murmur is heard on examining the chest with the ear or stethoscope, but it is attended with a crackling sound which resembles that produced by rubbing a portion of hair between the finger and thumb near the ear, or by throwing salt into the fire; this is commonly called crepitous rattle, or crepitous respiration. A clear sound is also heard on percussing the chest.

If the disease has proceeded to the stage of hepatization, the lung being in that part solid and impervious to air, percussion will afford only a dull sound without resonance, and the murmur attendant on respiration will be altogether wanting. Should a large branchial tube pass near the hepatized portion, the resonance of the voice in the bronchus will be heard more distinctly than usual, on account of the solid being a better conductor of sound than the healthy lung.

When suppuration has taken place, the sound on percussion is also dull, and the natural respiratory murmur is wanting, but in its stead a loud gurgling noise is heard, resembling that produced by air passing through soap-suds. It is perhaps occasioned by pus escaping into the larger air-tubes.

Treatment.—The treatment of inflammation of the lungs must be conducted on the same general principles as inflammation occurring in any other part. The important nature of the organ renders it necessary to resort promptly to bleeding, sometimes to a very large amount, and on repeated occasions. Antimonials and mercury are also highly useful in this affection.

Inflammation is sometimes confined to the bronchial tubes, and is called bronchitis; it may also co-exist with pneumonia. [Bronchitis.]

Mortification or gangrene of the lungs, though sometimes occurring as a result of pneumonia, most frequently takes place as an independent affection. Great fetor of the breath, with an expectoration of dark-brown, greenish, and fetid sputa, excessive debility, and a cadaverous expression of countenance, are the symptoms by which it is indicated. After death portions of lung are found in a partially decomposed state, of a dark brown or dirty greenish appearance, with a putrid smell. Occasionally, under favourable circumstances, the mortified parts have been separated and removed by expectoration, and the patients restored to health; but this is not a result which can commonly be looked for. It has been known to occur sometimes as a consequence of working in cesspools, and of long exposure to the noxious effluvia attendant upon such occupations.

Hæmoptysis; Spitting of Blood.—Expectoration of blood may occur either by exhalation from the mucous membrane of the air-tubes or from the lesion of a blood-vessel. It generally occurs in early life, from the age of fifteen to thirty-five, and in the former instance may be dependent upon local congestion. This determination of blood to the lungs may be occasioned by the sudden suppression of some natural or accidental discharge from other parts, as in suppressed or impaired menstruation, or the arrest of an hæmorrhoidal discharge. Malformation of the chest also, by interfering with the free circulation through the lungs, or an impeded transmission of blood through the abdominal viscera, from the presence of tumours or ascites, may likewise contribute to produce it. Sometimes it appears to be dependent upon an altered condition of the blood itself, as in purpura and some eruptive fevers; but its most frequent cause is tubercular disease of the lungs, in which it may arise in an early stage from the obstruction to the circulation occasioned by the tubercles, or subsequently from the vessels participating in the ulcerative destruction.

A remarkable sympathy has been observed to exist between the uterus and the organs of respiration, and spitting of blood has sometimes been known to precede the appearance of the menses, and to cease entirely on their accession. Sometimes it has been found to supersede the discharge altogether, or to make up for a deficiency in its quantity.

An attack of hæmoptysis is usually preceded by certain premonitory symptoms, such as chilliness, headache, lassitude, and a quick and vibrating pulse. The patient also experiences a sensation of weight and constriction at the chest, with a feeling of heat and itching in it. The expectoration of blood is attended with cough. Sometimes the quantity brought up is very considerable, and is expelled with violence; at other times the sputa are only streaked with it. The expectorated blood is generally of a vermillion colour, and, when in small quantities, it is frothy and mixed with air. When the blood comes from the stomach, it is brought up by vomiting and without cough, without the frothy appearance, and is of a dark grumous character.

Pulmonary Apoplexy.—When it happens that the blood, instead of being exhaled into the air-tubes, is effused into the parenchymatous structure of the lungs, the name of pulmonary apoplexy is given to it. One or two lobules, or a small portion of the lungs only, may be affected in this manner, the structure of the part not being broken down by it. When this is the case, hæmoptysis may not take place. Such effusions are found after death in the form of circumscribed indurated masses of a dark brown colour nearly approaching to black, and surrounded by the lung in a perfectly healthy state. Life not being immediately destroyed in such cases, time is given for the absorption of the most fluid parts of the blood, which will account for the indurated character of these deposits. When the effusion is more extensive, large portions of the substance of the lung may be torn and broken down, and hæmoptysis to a very considerable and generally immediately fatal extent takes place.

One of the most common causes of pulmonary apoplexy is disease of the heart, by which the circulation through the lungs is impeded and oppressed with blood. The causes mentioned as conducing to hæmoptysis are also common to this affection, and the symptoms are very similar. The plan of treatment in these affections is founded on the same general principles as are applicable in any case of internal hæmorrhage. [Hæmorrhage.]

Phthisis Pulmonalis.—This is by far the most frequent and most fatal of all diseases of the chest. It is the consequence of the deposition of small granular bodies of a greyish-white colour, called tubercles, in the structure of the lungs. By coalescing these smaller bodies acquire sometimes the size of a bean, or even of a filbert, assume a light yellow colour, and become something like cheese in consistence. They may exist in a quiet state for a long time without materially affecting the health, but subsequently they become more active, soften, and give rise to abscesses (vomica), which increase and produce death either by suffocation or by wearing out the powers of the constitution. For a more extended account see article Phthisis Pulmonalis.

Malignant Diseases.—The lungs are also subject to diseases of a specifically malignant nature, such as medullary sarcoma and melanosis; but these rarely occur as a primary affection. The medullary and melanoid matter is deposited in these organs as a secondary affection, in conjunction with its existence in other parts, and frequently in all or the majority of the organs of the body.

Black or Carbonaceous Matter in the Lungs.—Of late years medical men have observed a peculiar discoloration in the lungs of persons who have died after working for a long period of time in coal-mines, or in mines where gunpowder is used in large quantities for blasting masses of rock. The lung is found of a coal-black colour throughout, though still perfectly natural in all its other characters. It also exists in connection with disease of the lung, and the expectoration of persons so affected partakes of the same colour. The cause of it seems to be doubtful; but most probably it arises from the inhalation and absorption of the carbonaceous matter existing in the atmosphere of such mines.

Bony and cartilaginous tumours have been found in the lungs, and the membrane surrounding the lungs (the pleura) is sometimes met with converted into bone; sometimes it is studded with tubercles similar to those found in the lungs of Phthisis. For an account of inflammation of the pleura see Pleurisy.

LUNULITES. [Cellariæa, vol. vi., p. 490.]

LUPA. (Crustaceology.) [Portunidæ.]

LUPINITE, a peculiar bitter substance, extracted from the leaves of the *Lupinus albus* by treating the meal with anhydrous alcohol: the solution being evaporated to dryness, the lupinite remains; it has a green colour, is translucent, and may be melted; it is soluble in æther as well as in alcohol; but it is probably mixed with other vegetable products.

LUPI'NUS, a very extensive genus of hardy annual, perennial, and half-shrubby plants, commonly cultivated in gardens for the sake of their gaily-coloured flowers. The species inhabit Europe, the basin of the Mediterranean, and the temperate parts of both North and South America, especially of the former, where they are extremely abundant; but they are unknown in a wild state throughout all the tropics, except on mountains, and in the principal part of Asia, New Holland, and South Africa. Figures of great numbers have appeared in the volumes of the 'Botanical Register and Magazine,' and there is a monograph of the genus published at Lund by the younger Agardh in 1835, under the name of 'Synopsis generis Lupini.'

Lupines have been used as green manure, that is, as a crop to be ploughed into land when green, but they are not esteemed for this purpose. They are also still cultivated, as in the times of the Romans, by the Neapolitans and other southern nations, who eat the seeds after steeping them in water to diminish their bitterness, which always renders them unpleasant to those who are unaccustomed to them. The Greeks, who called them thermos, employed lupines not only as an article of food, but medicinally, esteeming them vermifugal and emmenagogue, &c. (Dioscor., lib. i., c. 132.) What species was cultivated by them is unknown; their wild thermos is supposed by Sibthorp to be the *L. angustifolius*. The two species most common in Greece now are *L. hirsutus* and *pilosus*, but the species cultivated in the south of Europe are *L. albus* and *L. thermis*.

Lupines are said to derive their name from *lupus*, a wolf, because of their devouring the substance of the land on which they are grown.

LUPO'NIA. [Cypræidæ, vol. viii., p. 256.]

LUPULIN, a name given to a substance extracted from hops, and which was at first supposed to be their peculiar principle; but it has been since found that it contains only from about 8 to 12 per cent. of the vegetable matter to which hops owe their power, and to this the name of *lupulite* has been given.

LUPULITE is prepared by a tedious process; it is nearly colourless, but sometimes of orange-colour: in the former case it is opaque, but in the latter transparent; it has no smell till it is heated, and then it has the odour of hops; its taste is bitter: water, even when boiling, dissolves only $\frac{1}{20}$th of its weight; the solution is pale yellow, and is not either acid or alkaline; neither dilute acids, alkalis, nor solutions of metallic salts produce any effect upon it; alcohol dissolves lupulite readily, but in æther it is almost insoluble.

LUPUS (the Wolf), one of the old constellations, named in Aratus and Ptolemy simply θήριον, 'the wild beast.' It was not a separate constellation, but was carried in the right hand of the Centaur towards the Altar. The same description is given by Hyginus. In modern maps it is represented as a wolf transfixed by the spear of the Centaur. It is situated between Centaurus and Ara, directly under Scorpius.

The principal stars are as follows:—

Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.	Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.) Lacaille(C).	Astron. Society.			Flamsteed. (Piazzi.) Lacaille(C).	Astron. Society.	
(*f*)	2*	1731	4½	β	(211)	1689	3½
(χ)	5	1797	5	η	(217)	1821	5
δ	(31)	1734	5	π	(242)	1704	5
ι	(33)	1622	4½	θ	(248)	1835	4
(ϕ^1)	(34)	1738	5	λ	(266)	1713	5
ε	(35)	1739	4½	σ	1216 C	1642	5
(ϕ^2)	(42)	1742	5	ρ	1223 C	1648	5
π^1	(66)	1634	5	α	1231 C	1657	3
π^2	(67)	1635	5	ζ	1265 C	1717	4
γ	(98)	1760	4	κ	1266 C	1718	5
ι	(113)	1766	5	μ	1274 C	1728	5
(*g*)	(134)	1779	5	ν	1281 C	1735	5
ο	(185)	1679	5				

LURE. [Saône, Haute.]

LU'RIDÆ, a name given by Linnæus to one of his natural orders of plants. It is equivalent to Solana of modern botanists.

LUSA'TIA. [Lausitz.]

LUSIGNAN. [Cyprus.]

LUSITA'NIA. [Portugal.]

LUSTRUM was the name applied to a period of five solar years among the Romans; and the termination of this period was generally marked by great religious solemnities. A purifying sacrifice, called *suovetaurilia*, was usually offered at this time by one of the censors in the Campus Martius (Liv., i. 44); and the victims consisted of a cow, a sheep, and a bull, which were led round the people three times, and then slain; but this sacrifice was sometimes omitted on religious grounds (Liv., iii. 22). Varro (*De Ling. Lat.*, v. 2) derives the word from *luere*, because the farmers paid their taxes at that time; but others, with more probability, trace the etymology to the purifying sacrifice which was then offered.

It is well known that the most antient Roman year consisted only of 10 months, or 304 days, and that this year continued to be used for religious purposes. Niebuhr, in his 'History of Rome,' has shown that the *lustrum* was the period, after which the beginnings of the civil and religious years were made to coincide; since 5 solar or civil years of 365 days each, containing 1825 days, coincide with 6 religious years of 304 days each, containing 1824 days, with the difference of one day.

In the time of Domitian the name of *lustrum* was given to the public games which were exhibited every fifth year in honour of the Capitoline Jupiter. (Sueton., *Domitian*, c. 4.) The poets frequently used the word for any space of five years (Hor., *Od.* ii. 4, 24; iv. 1-6), and sometimes confounded it with the Greek olympiad, which was only a space of four years. (Ovid, *Pont.*, iv. 6-5; Martial, iv. 45.)

(Niebuhr's *History of Rome*, vol. i., pp. 270-280, Eng. transl.; Creuzer's *Abriss der Römischen Antiquitäten*, p. 146; and the article Censor in this work.)

LUTE, a musical stringed instrument with frets, one of the numerous varieties of the antient cithara. Till towards the end of the seventeenth century its practice formed an essential part of a good education, but it has since been partially superseded by the guitar: nevertheless the salaried office of *Lutenist* is still continued in the Chapel Royal, though the place is a sinecure. The derivation of the word seems to have perplexed many who have sought its etymology: it is, we have no doubt, to be traced to the Teutonic *Lut*, whence, modified, it has passed into all the European languages, whether cognate or otherwise.

We do not meet with any notice of this instrument, so named, before the time of Dante, who, ludicrously enough, compares the swelled figure of a person suffering under dropsy to the form of the lute. The shape of the body and principal or lower neck may be seen in our wood-engraving of the Arch-Lute. Mersenne, in his *Harmonie Universelle* (1636), describes the lute as consisting of three parts: the table, made of fir; the body or belly, of the same wood or cedar, constructed of nine convex ribs joined; and the neck, on which was fixed the finger-board, of hard wood, having nine frets made of catgut. To these is to be added the head or cross, in which the pegs or screws were placed. Thomas Mace, a celebrated teacher of the lute, in a curious work entitled *Musick's Monument* (1676), agrees in the description given by the learned French monk, adding a great number of other particulars relative to the construction and use of the instrument; to whose very remarkable folio we refer those who are desirous of minute information on the subject. We shall here only state, from the same writer, that the lute had at first six strings, or rather eleven; for the five largest were doubled; but that the number was gradually increased till it reached twenty-four. He tells us that in his time a very choice instrument fetched the sum of 100*l.*, which may be considered as equal to 400*l.* of our present money. [Arch-Lute; Guitar.]

The notation for the lute, theorbo, &c., called the *tablature*, differed entirely from that of other instruments. 'The chords,' says Sir J. Hawkins, 'are represented by a corresponding number of lines, and on these are marked the letters *a*, *b*, *c*, &c., which letters refer to the frets on the neck of the instrument. The time of the notes is signified by marks over the letters of a hooked form, that answer to the minim, crotchet, &c. This is the French tablature; but the Italians, and also the Spaniards, till of late years, made use of figures instead of letters.' There were many kinds of tablature, but being now obsolete and forgotten, it is unnecessary to add anything further concerning them.

LUTES, in chemistry, are substances employed in various operations for closing the joints of apparatus, and especially for connecting retorts and receivers so as to prevent the escape either of the vapour or gases generated during distillation or sublimation. The term lute is also applied to the external coating of clay and sand, or other substances applied to glass retorts, in order that they may support a high temperature without fusing or cracking. For operations on the large scale, as the distillation of aquafortis and muriatic acid, &c., common plastic clay is a sufficiently good lute. Sometimes it has been recommended to use what is termed *fat lute*, but this generally only in small distillations, as of nitric acid: this lute is prepared by mixing dried and powdered pipe-clay into a paste with linseed oil; and the joint is further secured, both where this lute is used and in many other cases, by tying it over with moistened bladder.

In most operations however a mixture of pipe-clay and meal, as linseed meal or almond powder, is quite sufficient, when secured by bladder, for any purposes, either when acids or ammonia are to be distilled. In luting common stills, in which oils or water are merely distilled, linseed meal and water, made into a paste, form an effectual lute.

In luting, or rather coating glass retorts, in order to enable them to sustain high temperatures, Stourbridge clay or Windsor loam mixed with tow have been used; but they require long drying, and are apt to crack. The simplest mode is that of brushing the retort over with a paste of pipe-clay and water, sifting sand upon it, drying it quickly in the ash-pit of the sand-heat; then covering it again with clay and sand, and repeating the alternate applications and drying till the coating is judged sufficiently thick.

LUTHER, LUDER, or LOTHER, MARTIN, born at Eisleben in Saxony, in November, 1483, was the son of Hans Luther, a miner and a worker in metals, who was a native of Eisenach. Young Martin was first sent to the school of Eisenach, where he spent four years, and in 1501 he went to the university of Erfurt. His father intended him to study the law, for which however he felt little inclination, but he applied himself to literature and music,

* Mr. Bailey makes this star to be δ of Bayer, and the next λ.

which latter he continued to cultivate during the rest of his life. While at Erfurt he appears to have exhibited the usual jovial careless disposition of a German student. In 1505 an accident occurred which altered the current of his thoughts. One of his fellow-students was killed at his side by lightning, and Luther from that moment made a vow to become a monk. On the 17th of July in the same year he entered the Augustine convent at Erfurt, carrying with him only a Virgil and a Plautus. His father was at first averse from this resolution; but after two years he consented, and was present at the ordination of his son in 1507. In the retirement of his convent Luther was tormented by temptations and religious scruples and doubts, which he has pathetically described, especially on the subjects of faith and salvation, until he at last adopted the principles of St. Augustin, or at least those ascribed to that Father, on grace and predestination. The provincial of his order, Staupitz, a man well-informed, honest, and kind-hearted, administered to him spiritual consolation, and appreciated his talents; and it was through his influence that, in 1508, Luther was appointed professor of philosophy in the university of Wittenberg. In his lectures, which were well attended, he appears to have discarded the scholastic forms which were prevalent at the time, and to have appealed to reason more than to authority. In 1510 he was sent by his superiors to Italy on business concerning the order, a circumstance which brought about a crisis in Luther's life. He proceeded to that country, which he looked upon as the centre of Christendom, with his heart full of spiritual hopes and devout expectations; but he was sorely disappointed and shocked at what he there saw. He found pomp and pride, gross sensuality, hypocrisy, and treachery, as he tells us, even in the convents which were his halting-places on the road. He told the monks at Milan that they ought to fast on Fridays, and he was nearly killed for his pains. His health became affected by these occurrences; he fell ill at Bologna, and was confined to his bed for some time. Having recovered, he continued his journey to Rome, and on his arrival repaired to the convent of his order near the gate Del Popolo. There he knelt on the ground, 'bathed with the blood of martyrs;' he hurried to the various sanctuaries with which the capital of the Christian world abounds; but on looking to those around him, the inmates of the Holy City, he found, to his surprise and grief, what many a young enthusiast has experienced before and since on entering the world, that names and realities, professions and practice, are quite different things. Luther was in fact single in his faith and his religious fervour. Rome at that time, after having passed through the scandalous pontificate of Borgia, was ruled by the choleric and warlike Julius II., who represented the church militant upon earth, and who was then busy about his schemes of humbling Venice and driving the French out of Italy. His cardinals were able diplomatists, men of the world, and learned Latinists, better acquainted with Cicero than with the Bible. In visiting the churches, Luther was shocked at the indecent hurry with which the priests went through the service of the mass, and at the blasphemous jests which he sometimes heard. Even the ministers of the altars made no secret of their unbelief. Luther remained only a fortnight at Rome: he hurried back to his native Germany with his head bewildered, his feelings distressed, and his religious belief greatly shaken. He used to say however, in after-years, that he would not, for one hundred thousand florins, have missed that journey to Rome, for without it he should have been tormented by the fear of being unjust towards the pope during his subsequent controversy with the papal power.

In 1512 Luther was made doctor of divinity, and Frederic, elector of Saxony, called the Wise, defrayed the expense of his inauguration, which was celebrated with splendour. The reputation of Luther had spread as that of a learned divine and an eloquent preacher. He was well acquainted with scholastic learning, and tolerably so with the Fathers; he knew Greek, but very little Hebrew he had, above all, deeply studied the Scriptures, which was not a common attainment among ecclesiastics in those days. He was zealous and earnest, devotional in his thoughts, and irreproachable in his morals. In his own order he was appointed provincial vicar of Misnia and Thuringia, in which office he evinced much zeal for the maintenance of discipline and piety in the various monastic houses of that province.

In 1517 Pope Leo authorized by a bull the sale of indulgences in Saxony and other parts of Germany, as his predecessor Julius II. had done in France, Poland, and other parts, nominally for defraying the expenses of building the new church of St. Peter's, and also for supporting the league of the Christian powers against the Turks, though little of the money derived from the sale was employed for either purpose. [Leo X.] The practice of selling indulgences had existed for some centuries before Luther. For the original doctrine and practice of the Church on this matter see Indulgence. Leo addressed the papal commission for the sale in Saxony to Albert, elector of Mainz and archbishop of Magdeburg, who appointed Tetzel, a Dominican monk, his quæstor, to preach and sell the indulgences through the country. Tetzel appears to have executed his mission with the grossest quackery, enhancing his wares in the opinion of his uninformed and credulous customers by the most absurd exaggerations, and going far beyond the received doctrine of the Roman canonists even of that age. He pretended that his indulgences released not only from penance, but from sin altogether, and from any sin of whatever enormity. Luther, who was then professor of theology at Wittenberg, was shocked at these impious assertions, and while sitting at his confessional in the church of his convent he had practical proof of their mischievous effects. Some of his penitents, who had purchased the indulgences, refused to submit to the penance or reparation which he enjoined, saying that Tetzel had released them from every penalty. Luther having refused absolution, they went and complained to Tetzel, who threatened with both spiritual and temporal punishments all those who denied the efficacy of his indulgences. Luther, little heeding the threats of the Dominican, and being encouraged in his opposition by his own superior Staupitz, who also felt indignant at Tetzel's impudence, drew up ninety-five theses or propositions concerning indulgences, in which, drawing the distinction between the canonical penalties inflicted by the Church on the penitent sinner, and the penalties required here or hereafter by Divine justice, he maintained that the pope had the power of remitting the former only; that indulgences could not be applicable to the dead; that true contrition of heart and amendment of life would obtain pardon without any papal indulgences; that the true treasures of the Church were contained in the Gospel and in the operation of the Holy Ghost; that at all events, if indulgences be of any avail, they ought to be distributed gratis to the poor, and not to be made an article of trade: and here he exposed in strong colours the avarice, impudence, and licentiousness of the quæstors, and the fearful corruption of principles and conduct among the poor deluded population resulting from the whole system.

Luther enclosed a copy of his propositions in a letter to the archbishop of Magdeburg, dated 31st October, 1517, beseeching that prelate to interpose to prevent the further spreading of error, and to put a stop to Tetzel's scandalous practices. On the same day Luther affixed another copy of his theses on the gates of the Castle church of Wittenberg, signed with his name, and containing his offer to defend them. This was Luther's first challenge to that power which then kept all Europe in awe, and which he was destined to shake to its very foundations. Though in these celebrated theses there was nothing but what has been maintained by many Roman Catholics, still some of them were certainly at variance with the opinions generally entertained for three centuries before Luther's time, and also with the claim of infallibility assumed by the popes. From the pulpit of the same church Luther repeatedly expounded his propositions, and was eagerly listened to by crowded audiences. His theses spread with the greatest rapidity, and the main principle upon which they rested, namely, that indulgences could only remit the canonical or temporal penalty, gained ground universally throughout Germany. Tetzel and his brother Dominicans, after burning Luther's theses, attempted to answer them by counter-propositions mainly grounded upon the supreme authority of the pope and his infallibility. But this production injured Tetzel's cause, and a copy of it was publicly burnt by the Wittenberg students. Leo X., when he heard of the dispute, remarked, that it was but a quarrel between monks, and that brother Luther seemed to be a man of parts. The idle assertion which has been put forth by later writers, that Luther and his superior Staupitz were actuated by jealousy against the Dominicans for having the monopoly of the indulgences, has been triumphantly refuted by Dr. Maclaine in a note to Mosheim's 'Ecclesiastical History,' and the insinuation was never broached during Luther's lifetime by his most inveterate enemies. In fact the traffic in indulgences had fallen into contempt among the clergy, and the Franciscan friars themselves refused to have anything to do with it.

In the year 1518 Eckius, a professor of divinity at Ingolstadt, took up the controversy against Luther, who answered him, and thus increased his popularity and the number of his adherents, whilst at the same time the warmth of debate carried him beyond his original propositions and led him to touch on the abstruse subjects of free-will and the means of justification. Still it appears that Luther had as yet no intention of separating from the Roman Catholic Church. In May, 1518, he addressed a submissive letter to Leo X., in which he says, 'I throw myself prostrate at your feet, most holy father; call or recall me, approve or condemn me as you please; I shall acknowledge your voice as the voice of Christ, who presides and speaks in your person.' Leo summoned Luther to appear at Rome in sixty days, and there to plead his own cause; but the elector of Saxony interposed, and obtained permission for Luther to be examined within the bounds of the empire, and to be judged by its ecclesiastical laws. Cardinal Caietano, of the order of Dominicans, and papal legate at the diet of Augsburg, was ordered to examine him. Luther, accompanied by Staupitz and another friend, repaired to Augsburg, in October, 1518, and was received by the cardinal with courtesy; but instead of arguing the point with him, the cardinal assumed an imperious tone, and commanded him to retract because the pope so willed it, and how could he, Luther, a single monk, expect to be able to cope with the pope? (Luther's *Letter* to Spalatin, chaplain to the elector, and his friend, dated Augsburg, 14th October.) Luther replied that neither the legate nor the pope could pretend to infallibility, and that St. Peter himself had erred. In one of these interviews however the cardinal was insensibly drawn out from his high ground, and entered the field of controversy, but it would appear with little success. He rejected with scorn what he considered the novel doctrine of justification by faith and by faith alone. In the end, Luther, thinking perhaps of the fate of John Huss, suddenly quitted Augsburg, leaving behind an appeal to the pope 'better informed.' In November of the same year Leo issued a bull, declaratory of the doctrine of indulgences, asserting that the pope, as Christ's Vicar on earth, had the power of delivering from all the punishments due to sin those who had repented and were in a state of grace, whether they be alive or dead. On the 28th November Luther appealed from the pope to a general council of the church.

Meantime the cardinal legate was urging the elector of Saxony to expel Luther from his dominions. But the elector, who considered Luther as the pride and ornament of his newly founded university of Wittenberg, would not consent, and the emperor Maximilian I. having died just at this moment, Frederic, as hereditary vicar of the empire during the vacancy, was a person too important for even Rome to dictate to. Leo commissioned a new legate, a Saxon, named Miltitz, a man of sagacity and prudence, to endeavour to bring Luther to a reconciliation. Miltitz had a conference with Luther at Altenburg, in the beginning of 1519, in which he agreed with Luther in condemning the abuse made by Tetzel of the indulgences, threw the whole blame of it on that monk's ignorance and profaneness, and so far conciliated the warm but generous spirit of his antagonist as to induce him to write a submissive letter to Leo, dated 13th March, 1519, in which Luther acknowledged that he had carried his zeal and animosity too far, and promised to observe in future a profound silence upon the matter in debate, provided his adversaries would observe an equal temperance; further protesting that he never meant to deny the power of the pope, which was inferior only to that of Christ, and that he would always exhort the people to honour the Roman see, which he had in his writings endeavoured to clear from the impious exaggeration of the quæstors. 'This letter,' says Beausobre, 'is a sad monument of human weakness,' for Luther had already appealed from the pope to the council. Luther's vacillation however may be easily accounted for by reference to the old established reverence for the papal see, the reminiscence of his own early impressions and education, and of his solemn monastic vows, and also to the cordiality and convivial familiarity of his intercourse with Miltitz. It appears that Leo himself wrote to Luther a very mild and conciliatory epistle, published by Loscher in his *Unschuld Nachricht*, 1742. Miltitz had other conferences with Luther at Leibenwerd and Lichtenberg, which gave great hopes of a full reconciliation, when the polemic intemperance of Luther's personal adversaries widened the rupture and brought the dispute to a crisis. (Seckendorf, *Commentarius Histor. de Lutheranismo.*)

Eckius challenged Carlostadt, one of Luther's disciples, to a public disputation at Leipzig, concerning free-will. Carlostadt maintained that since the fall of our first parents our natural liberty is not strong enough to lead us in the path of good without the intervention of Divine grace. Eckius asserted that our natural liberty co-operates with divine grace, and that it is in the power of man to consent to the divine impulse or resist it. Eckius seemed to have the best of the argument on his side, when Luther, who had repaired to Leipzig, entered the lists against Eckius, by preaching in the chapel of Duke George's castle a sermon calculated to draw the hostility of Eckius against himself. Eckius, in fact, immediately selected from Luther's works thirteen propositions, which he met by as many counter-propositions. One was concerning the supremacy of the Roman see. Eckius maintained that the church was a monarchy with a head of divine appointment. Luther admitted this, but contended that the head was no other than Jesus Christ. The long acknowledged supremacy of the pope, he observed, extended only to the Western church, and he maintained that it was not *jure divino*, but founded on reasons of policy and tacit consent. Then came the subjects of purgatory and of indulgences, in which Luther had decidedly the advantage, and partly drew his antagonist to his side. Next were discussed the questions of absolution, grace, free-will, and good works, in which the Catholic divine appeared to prevail in point of argument. Hoffman, the rector of the university of Leipzig, who had been appointed judge of the disputation, refused to declare to whom the victory belonged, and the decision of the matter was referred to the universities of Paris and of Erfurt. Luther however went on publishing several works, 'On Babylonian Captivity,' 'On Christian Liberty,' &c., in which he openly attacked the doctrines and the authority of the church of Rome. Leo now assembled a congregation of cardinals, before whom the works of Luther were laid, and by whose advice a bull of condemnation was drawn up against Luther, and published on the 15th of June, 1520, in which forty-one propositions, extracted from his writings, were declared heretical, and as such solemnly condemned; his writings were ordered to be publicly burnt; and Luther himself was summoned to confess and retract within the space of sixty days, under pain of excommunication. Luther having again appealed to the general council of the church, publicly separated himself from the communion of Rome, by burning on a pile of wood, without the walls of Wittenberg, in presence of a vast multitude of people, Leo's bull, and also the decretals and canons relating to the pope's supreme jurisdiction. This was done on the 10th of December, 1520, and on the 6th of the following January the pope launched a second bull against him, by which Luther was expelled from the communion of the church for having disowned the supremacy of the Roman Pontiff.

Luther having now irrevocably separated from Rome, gave way to the violence of his temper in several vehement and scurrilous pamphlets, full of coarse vituperation against the pope, whom he openly styled Antichrist.

At the same time Leo urged the new emperor Charles V., in his character of advocate and defender of the church, to make an exemplary punishment of Luther as an obdurate heretic. But Frederic, the elector of Saxony, employed his influence with Charles to have Luther's cause tried by a diet of the empire, which assembled at Worms, in April, 1521.

Having obtained the emperor's safe conduct, he repaired to Worms, and was met by multitudes outside of the town. On entering he began singing the hymn 'Our God is a strong citadel,' which became known as Luther's hymn, and the inspiring song of the Reformation. On the 17th of April he appeared before the emperor, the electors, bishops, dukes, margraves, and other princes and lords assembled, and being asked whether he was the author of the books now produced, in which the propositions condemned by the pope were contained, he answered in the affirmative. Being next asked whether he would retract or maintain them, he begged for time to consider of his answer, and was allowed one day. The following day he appeared again before the assembly, and said that his writings were of various character, that in some he had treated only of Christian faith and piety, and these could contain nothing objectionable; that in some he had exposed the inventions of men and the usurpations of the popes, and these he could not retract; that in others, which were directed against the defenders of the pope, he might have expressed himself in an unbecoming manner, but that he could not retract the substance however censurable the manner of it; that, being a man, he was liable to error, and that he was ready, if convicted by the testimony of the Scriptures, to commit a portion or the whole of his publications to the flames. And he repeated what he had already said on another occasion, that both pope and council were liable to error, and had in fact often erred. He had formerly quoted the council of Constance as an instance of his assertion.

On the following day Charles V. told the diet, that attached as he was to the Roman Catholic church, he should ever defend its doctrines and constitution, that he could hear Luther no more, and that he should dismiss him, and afterwards treat him as a heretic. This decision was also that of the majority. Some were for trying persuasion and entreaty with a man who, like Luther, could not be frightened into submission; but entreaty was likewise of no avail, for Luther refused to retract a single proposition unless proved to be erroneous by the authority of the Scripture. He was then ordered to leave Worms, with a written promise of security for twenty-one days. He left on the 26th of April, but on entering a forest his carriage was stopped by a party of armed horsemen in masks, who placed him on horseback and rode off with him to the solitary castle of Wartburg, situated on a mountain. This was another contrivance of his kind protector the elector of Saxony. The greatest secrecy was observed concerning the place of his retreat, and it was purposely reported about that his enemies had carried him off. A month after his departure an imperial edict appeared, placing Luther under the ban of the empire, ordering him to be seized and retained in prison at the emperor's pleasure, and imprisonment and confiscation were denounced against any one who sided and abetted him. But the edict could not be enforced. The elector of Saxony was Luther's friend; few, if any, of the other electors or princes were his enemies, and the popular voice was for him: for the Germans in general, although few of them understood the subject matter of Luther's polemics, were weary of the abuses and encroachments of the ecclesiastical power.

In his asylum at Wartburg Luther wrote several treatises against auricular confession, against monastic vows, clerical celibacy, and prayers for the dead, against the Sorbonne of Paris, which had condemned his works, and which he exposed to public ridicule. His writings spread and produced a wonderful effect in Saxony. Hundreds of monks quitted their convents, and married. The Austin friars of Wittenberg abolished the mass. Carlostadt, a disciple of Luther, but more intemperate than his master, accompanied by a band of reformers, demolished the images in the church of All Saints at Wittenberg, and next proposed to banish all books from the university except the Bible. He also affected to obey to the letter the sentence pronounced on Adam by going to work in the fields for some hours daily. Even the polished Melancthon followed the example, and went to work in a baker's shop.

Luther, in his retirement, heard of these follies; he perceived that fanaticism was spoiling his cause, and he resolved immediately, without heeding his own danger, to return to Wittenberg (1522). He rebuked Carlostadt, who retorted, calling him an idolater because he believed in the real presence in the sacrament, and a courtier for living on terms of intimacy with princes. At last they parted in anger; Carlostadt was banished from Saxony as a seditious person by the elector, for inculcating the principles of natural equality, and he went to join Zuingli in Switzerland.

Luther was now the acknowledged leader and oracle of the reformers of Germany, and as such he continued to the end of his life. The doctrines which he gradually asserted, and which were expounded and fixed by his disciple Melancthon, in the Confession of Augsburg, are stated in the article PROTESTANTISM. At the close of 1522 he published his German version of the New Testament. In 1523 he preached against the mass. He had already replied in his usually scurrilous style of polemics to the treatise in defence of the sacraments written by Henry VIII. of England. It must be observed however that the coarse vituperations which shock the reader in Luther's controversial works were not peculiar to him, being commonly used by scholars and divines of the middle ages in their disputations. The invectives of Valla, Filelfo, Poggio, and other distinguished scholars against each other are notorious, and this bad taste continued in practice long after Luther down to the seventeenth century, and traces of it are found in writers of the eighteenth, even in some of the works of the polished and courtly Voltaire.

In 1524 Luther threw off his monastic dress, and definitively condemned monastic institutions. Convents, both of men and women, were now rapidly suppressed throughout North Germany, and their property was seized by the secular power: indeed there can be no doubt that the hope of plunder contributed greatly to the encouragement which the princes and electors gave to the new doctrines. The insurrection of the *wiedertaüfer*, or anabaptists, led by a fanatic named Muntzer, which assumed the character of a peasant war against all property and law, gave great concern to Luther, who was taunted by many with being the source from which all those aberrations flowed. He preached against the fanatics, he tried to mediate, he besought the peasants to lay down their arms, and at the same time he told the princes to redress the grievances of the poor; but the insurgents were too far gone in their brutal career of bloodshed and devastation, and nothing but the sword could put a stop to it. Luther was sorely grieved throughout the rest of his life at the renewed disorders of the anabaptists and other fanatics on one side, and on the other at the selfishness, worldliness, and corruption of all classes. He fancied at times that the end of the world must be nigh, for the world had fallen into decrepitude; avidity and self-interest were the ruling passions. (Luther's *Table Talk;* and his *Letters.*)

In 1525 Luther married Catherine de Bora, a young nun who had left her convent the year before. He had long before condemned the obligation of clerical celibacy, as well as that resulting from monastic vows, as being human devices unknown to the original church. 'Marriage in its purity,' he wrote, 'is a state of simplicity and peace.' When Luther married he was poor, for amidst the great change from the old to the new system of church discipline, his salary, which was charged upon the revenues of monastic property, was by no means regularly paid, and Luther was not a man to ask money of his friends. In the same year his steady and considerate patron Frederic of Saxony died; but John, his successor, not only continued to favour Luther, but made open profession of his doctrines, and commissioned him to prepare a new church service for his dominions, in addition to which Luther wrote a larger and a small catechism for the use of schools, in a style admirably suited to youth. Besides the elector of Saxony, the Elector Palatine, the landgrave of Hesse, the duke of Deux Ponts, the margrave of Brandenburg and grand-master of Prussia, and also many cities in other parts of the empire, openly embraced Luther's reformation. In Switzerland however another reformer, Zuingli, who had begun, like Luther, by opposing indulgences, had also effected a reformation, but he inculcated tenets different in some respects from those of Luther, especially on the subject of the real presence in the sacrament, which Luther admitted, and Zuingli entirely denied. Luther was vexed at this division, especially as several towns of Germany, Strasburg, Ulm, Meiningen, Lindau, Constance, and others, adopted Zuingli's tenets.

In March, 1529, a diet was convoked at Speyer, in which the Catholics endeavoured to enforce the edict of Worms, but the opposition of the elector of Saxony, the landgrave of Hesse, the margrave of Brandenburg, and the deputies of the imperial cities, caused its rejection. The Catholics then endeavoured to separate the reformers; they drew up a decree, apparently directed against those who denied the real presence, but so worded as to include the Lutherans also, who refused their sanction to it. It was on this occasion that the reformed princes and deputies delivered a formal 'protestation' against the decree, dated Speyer, 19th of April, 1529, which was signed by John, elector of Saxony, George, margrave of Brandenburg, Philip, landgrave of Hesse, Ernest and Francis, dukes of Lüneburg, Wolfgang, prince of Anhalt, and the deputies of fourteen cities. From this protestation arose the name of 'Protestants,' which in its origin was applied to the Lutherans.

The landgrave of Hesse, wishing if possible to bring about a union among all reformers, succeeded in appointing a conference between Luther and Melancthon on one side and Zuingli and Œcolampadius on the other at Marburg. The conference turned chiefly on the subject of the real presence, but it produced no approximation among the opposite parties. They separated neither in friendliness nor hostility, and both parties retained their favourite tenets.

In 1530 a diet was convoked at Augsburg by Charles V., who attended it in person, and there the Lutherans presented their confession of faith, which was drawn up by Melancthon and approved by Luther. [AUGSBURG, CONFESSION OF.]

In 1534 Luther completed his greatest work, the German version of the Bible, which is much admired for its elegance, force, and precision, and which has rendered the Scriptures really popular in Germany.

The remaining years of Luther's life were passed in comparative quiet, chiefly at Wittenberg, in the duties of his professorship, in writing religious and controversial tracts, and in epistolary correspondence. He was consulted by the Protestant princes and clergy upon all important matters, and listened to with deference. The pacification of Nürnberg in 1532 had left the Lutheran princes, states, and towns in full possession of their religious liberties; and that peace was not openly interrupted till after Luther's death. Luther had the satisfaction of seeing his doctrines spread farther and farther through Germany, thoughout Saxony and Brandenburg, to Moravia and Bohemia, Denmark, and Sweden. He also effected a reconciliation with the so-called Sacramentarians of Strasburg, Ulm, and other towns, by means of Bucer, so that all reformed Germany was united under one banner. The Helvetic reformed churches however continued separate from his.

At the beginning of 1546 Luther repaired from Wittenberg to Eisleben for the purpose of reconciling the counts Mansfeld, whose subject he was born. He attended several conferences for that benevolent purpose, and succeeded in restoring peace to that family. While at Eisleben he preached four times, and also revised a plan of regulations concerning the ecclesiastical discipline of that little state. He had been for some time in a very precarious state of health: on the 17th February he felt very ill and weak, laid himself on a couch, spoke of his approaching death, for which he appeared quite prepared, and recommended his soul to Jesus. He grew worse in the evening. Count Albrecht of Mansfeld and his countess and several medical men attended him during his last hours. His old friend Dr. Jonas having asked him: 'Reverend father, do you die with a firm conviction of the faith you have taught?' Luther in a distinct voice replied 'Yes,' and soon after breathed his last. His body was carried to Wittenberg, where it was buried with great honours. Shortly before his death he wrote several affectionate letters to his wife, who had remained at Wittenberg with her children. He left her by his will a house which he had purchased, as well as a small estate at Zeilsdorf, charging her to pay his debts, which amounted to 450 florins; and he left her also a few valuable trinkets and other moveables, worth about 1000 florins. 'I leave,' he wrote, 'no ready cash or hidden treasure, as I have had no other income but my salary and a few presents, and yet have managed to keep an establishment and purchase property'

Luther's works, which are multifarious and voluminous, partly in Latin and partly in German, have been repeatedly published. The latest edition is that of Erlangen, 26 vols. 12mo., 1826-33. Among his works, those of most interest to the general reader are his 'Table Talk,' *Tischreden*, his familiar letters, and his sermons. Luther ranks high among German writers for the vigour of his style and the development which he imparted to his vernacular language. Schroeck, Melancthon, and others have written biographies of Luther, and Michelet has extracted a kind of autobiography from numerous passages of his works: 'Mémoires de Luther, écrits par lui-même, traduits et mis en ordre,' 2 vols. 8vo., Paris, 1835. From these passages the character of Luther is clearly deduced, for there was no calculation, reserve, or hypocrisy about him. He was frank and vehement, and often intemperate. But he was in earnest in his vehemence; he really felt the importance of the topics he was discussing; and whether he was right or wrong in his peculiar opinions, he was a sincere and zealous believer in the Christian Revelation. Luther considered religion as the most important business of man, and because he considered it as such, he wished to ascend to its very source unalloyed by human authority. He contended for the right of every man to consult the great book of the Christian law; and although he insisted upon his own interpretation of particular passages of the scriptures, the principles of free inquiry which he introduced led to further results, and gradually established that liberty of conscience which now exists in the Protestant states of Europe. But Luther himself, whilst he appealed to the scriptures against human authority, did not for a moment admit of any doubts concerning the truth of revelation. The question between Luther and his antagonists is therefore of material importance chiefly to Christians. To those who do not believe in Christianity it may appear of little consequence what Christians do believe, or how and whence they derive their belief; but even in a social point of view it is of some importance to decide whether large multitudes of men are to exercise their own judgment and be able to give reasons why they believe certain doctrines, or whether they are for ever to repeat, generation after generation, whatever they have been taught in their youth, without exercising their reasoning powers on the matter.

Those who judge of Luther's disposition merely from his controversial style and manner greatly mistake his character. He was a warm-hearted German, kind and generous; he abused and vilified his antagonists the more in proportion as they were powerful, but he could feel for the unhappy, and he even tendered some consolation to his bitterest enemy Tetzel, when, forsaken by his employers, and upbraided as the cause of all the mischief, he was in the agonies of death and despair.

Luther gave that impulse towards spiritual philosophy, that thirst for information, that logical exercise of the mind, which have made the Germans the most generally instructed and the most intellectual people in Europe. Luther was convinced of the necessity of education as auxiliary to religion and morality, and he pleaded unceasingly for the education of the labouring classes, broadly telling princes and rulers how dangerous as well as unjust it was to keep their subjects in ignorance and degradation. He was no courtly flatterer: he spoke in favour of the poor, the humble, and the oppressed, and against the high and mighty, even of his own party, who were guilty of cupidity and oppression. Luther's doctrine was altogether in favour of civil liberty, and in Germany it tended to support constitutional rights against the encroachments of the imperial power.

Luther's moral courage, his undaunted firmness, his strong conviction, and the great revolution which he effected in society, place him in the first rank of historical characters. The form of the monk of Wittenberg emerging from the receding gloom of the middle ages, appears towering above the sovereigns and warriors, statesmen and divines of the sixteenth century, who were his contemporaries, his antagonists, or his disciples.

(J. Alb. Fabricius, *Centifolium Lutheranum*, 2 vols., 1728-30, gives a list of all the authors who had then written concerning Luther and his Reformation.)

LUTON, is a parish in the hundred of Flitt and county of Bedford, comprising the township of Luton and the hamlets of East and West Hyde, Leegrave, and Stopsley. The town, which is situated on the right bank of the Lea, 18 miles south by east from Bedford, and 29 north-west by north from London, is, we believe, neither paved nor lighted, but the inhabitants are well supplied with water from the river. The making of straw-plat and malting constitute the chief manufactures of the place. The living is a vicarage in the patronage of the Marquis of Bute, and valued at 830*l.* per annum. Besides almshouses and a few other benevolent institutions, there is a national-school which is usually attended by a considerable number of children. The population of the entire parish in 1831 was 5693, that of the township alone being 3961. (*Ecclesiastical Revenues Report; Population Returns*, &c.)

LUTRA. [OTTER.]

LUTRA'RIA. (Conchology.) [PYLORIDEA.]

LUTRI'COLA. (Conchology.) [PYLORIDEA.]

LUTTERWORTH. [LEICESTERSHIRE.]

LÜTZEN. [GUSTAVUS ADOLPHUS.]

LUXEMBOURG, or LUXEMBURG, a grand-duchy or province in the Netherlands, the sovereignty of which at this time (February, 1839) forms a subject of dispute between Holland and Belgium. The king of the Netherlands became grand-duke of Luxembourg by the arrangements of the Congress of Vienna, and as such a member of the Germanic Confederation. [Belgium.] Luxembourg is bounded on the east by the Prussian Rhenish provinces, on the north by Liege, on the west by Namur, and on the south by the French departments of the Moselle and Ardennes. Its greatest length from east to west is 75 miles, and its greatest breadth is 50 miles; its area is 690,000 hectares (equal to 1,700,000 English acres), or 2656 square miles, distributed as follows:—

	Hectares.
Woods and plantations . .	211,000
Arable land, pastures and meadows	240,000
Heaths and commons . .	127,000
Uncultivable land, marshes, &c.	88,240
Roads, &c. . .	23,760
	690,000

The principal rivers of Luxembourg are, the Moselle, which for twenty-five miles forms the boundary between this province and Prussia; the Sûre, an affluent of the Moselle, and also a boundary through part of its course between this province and the Prussian territory; the Our and the Elze or Alzette, which fall into the Sûre; the Semois, which rises near Arlon, and, flowing first to the west and then to the north, falls into the Maas; the Ourthe, which rises near Bastogne, and falls into the Maas near Liege; the Lesse, which rises near Neufchâteau, and also falls into the Maas near Dinant. There are also several small streams, which have the appearance of rivers only when swollen by rains.

Luxembourg is crossed from the south-west to the north-east by a range of high ground, part of the Ardennes, which separates the valley of the Maas from that of the Moselle. This range has a mean elevation of 1800 feet above the Maas at Liege, and 1640 feet above the level of the Moselle on the French frontier. The soil of this elevated region is calcareous, which character extends on both sides of the range, and forms a band about 25 miles wide, which is principally occupied as pasturage. The lower lands, which are commonly called the *good country*, are very productive, and yield abundant harvests of wheat and rye, as well as flax, hemp, mangel-wurzel, and all kinds of legumes. Such of the high lands as are applied to arable cultivation rarely yield anything but rye, oats, and potatoes. Luxembourg contains many woods of large growth. The agriculture of this province is said to be inferior to that of any other part of the Netherlands. The vine is cultivated on the banks of the Moselle and the Sûre; and in 1837, the most abundant vintage on record, there were produced 75,563 hectolitres (1,661,066 gallons) of wine. The quality of the wine of the district is inferior. In the same districts are upwards of 2000 distilleries, nearly two-thirds of which have been established since 1832. The quantity of spirit distilled in 1837 was 4,116,420 gallons, from which it is evident that the establishments are generally upon a very small scale.

At the beginning of 1835 there were in the province 32,585 horses, 122,288 horned cattle, and 167,532 sheep; and in the course of that year there were exported 5 horses, 172 horned cattle, and 7536 sheep and lambs, besides 22,217 hogs, of the number of which no account has been taken; they must however be very numerous, as there is scarcely a family in the province by whom swine are not bred and reared. The branches of industry, not agricultural, pursued in Luxembourg, besides distilling, are those of iron-works, slate-quarries, potteries, tanneries, cloth-mills, and paper-mills. The quantity of iron made is about 9000 tons in a year, the ore for which is found in the eastern and western parts of the province. The fuel employed in the smelting-furnaces is wood-charcoal. Luxembourg contains lead and copper. At Stolzembourg, a village about seventeen miles north of the city of Luxembourg, a copper-mine was worked in 1749, 1764, and 1768, and in 1772 was abandoned as being exhausted. There is a lead-mine in work at Longwilly, near Bastogne, but the produce is not great.

Luxembourg is less densely peopled than any province of Belgium. The number of inhabitants, on the 1st of January, 1837, was 323,219, of whom 15,693 only were living in towns, and 307,526 in rural districts. In 1836 there were born in the towns 322 male and 283 female children, and in the country 5678 male and 5469 female children; all together, 11,752. The number of deaths in that year was, in towns 231 males and 194 females, in the country 3588 males and 3408 females; all together, 7421. It appears from an authentic document that the population of Luxembourg in 1541 was only 95,058 souls. In 1784 there were, in the towns of Luxembourg, Arlon, and Echternach, 12,874, and in the rest of the province 211,220 inhabitants; all together, 224,094. In 1817 there were only 213,597 souls, but since that time the increase has been rapid. In 1828, when the population was 302,654, there were 302,251 Catholics, 68 Protestants, and 335 Jews.

The moral condition of the inhabitants is said to be superior to that of any province in Belgium, a fact which is sometimes attributed to the small number of towns and to the minute division of the land, which is such as to make proprietors of the majority of the labouring people. To these causes may be added the absence of wealth and consequently of temptation to commit offences against property, which form the great majority of charges brought before the tribunals in richer and more densely peopled communities. The province does not contain any considerable libraries nor museums of natural history. Some antient abbeys in former times possessed considerable collections of books, but they have long since been dispersed, and even in the city of Luxembourg there is now no collection that would be considered remarkable if possessed by a private person.

The youths of Luxembourg have no college within the province which they can attend, and are accustomed to go for instruction to Louvain, to Liege, and to Paris. There were in 1833, in all Luxembourg, 779 primary schools, attended by 39,114 scholars of both sexes. The number has increased since that time, and every village or hamlet has now its primary school, the teacher of which is chosen by the heads of families.

The city of Luxembourg, the capital of the province, is a fortress of great strength, in 49° 37′ N. lat. and 6° 9′ E. long., on the Elze: 66 miles south-south-east from Liege, 25 miles south-west from Treves, and 100 miles south-east from Brussels. The city is surrounded by strong walls and deep ditches, and has a double line of outworks in the form of a heptagon. It is small but well built, has four churches, a military hospital, and a newly built market-place; its population is 11,500. Luxembourg as a fortress belongs to the Germanic Confederation, and is occupied by their troops. The town of Arlon is 10 miles north-north-west from Luxembourg. [Arlon.] Echternach, on the right bank the Sûre, 13 miles north-east from Luxembourg, has a population of 3417, who are occupied with the manufacture of pottery, woollen cloths, and other less important matters. The town is surrounded by a wall, and has five gates; it contains 527 houses, 1 church, 3 chapels, a town-hall, and an hospital. Other towns of the province are St. Hubert, in the Ardennes, formerly the seat of a rich Benedictine abbey, and a place of pilgrimage, with 1500 inhabitants; Bouillon, the capital of the duchy of the same name [Bouillon]; Neufchâteau, in a wild district of the Ardennes, with 1200 inhabitants; Bastogne, in a plain in the Ardennes, with 2400 inhabitants; Diekirck on the Sûre, with 2500 inhabitants; and Grevenmachern, in a pleasant country on the Moselle, where a considerable quantity of wine is made. [Ardennes.]

LUXOR. [Egypt; Thebes.]

LUZE'RN (*Lucerne* in French), a canton of Switzerland, bounded on the north by Aargau, on the east by Schwytz and Zug, on the south by Unterwalden, and on the west by Bern. Its greatest length, from north to south, is 33 miles, and its greatest breadth 27. Its area is reckoned at 657 miles. The declivity of the valleys is towards the north-east and north-west. The southern part of the canton belongs to the basin of the Reuss, which issues out of the Waldstätten lake at the town of Luzern, and flows in a north-east direction into Aargau. Below Luzern the Reuss is joined by the Wald Emme, which rises at the south-west extremity of the canton, runs northward through the fine district called the Entlibuch, and then flows north-east until it meets the Reuss. A succession of high grounds, running across the middle of the canton, divides the basin of the Reuss from that of the Aar, to which latter river the northern part of Luzern belongs. The Suhren flows out of the Sempacher lake, which is in the centre of the canton, and runs northward towards the

Aar. The Wigger rises in the centre of the canton, south-west of the lake of Sempach, and runs northward into the Aar. North-east of the Sempacher lake is another and smaller lake, called the Baldegger lake, from which a stream runs into the Halwyler lake, which is in Aargau, but touches the borders of Luzern, and from which a river runs into the Aar. The only mountains in the canton are at its southern extremity, on the borders of Unterwalden and the Bernese Oberland. None of them attain the limits of perpetual snow. The highest is Mount Pilatus, south-west of the town of Luzern, and a conspicuous feature in its landscape. It is a mountain-group nearly thirty miles in length, extending along the borders of Luzern and Unterwalden, and having seven peaks or summits, called Esel, Oberhaupt, Band, Tomlishorn, Gemsmätli, Widderfeld, and Knappstein. The Tomlishorn, 6858 feet, and the Esel, 6678 feet, are the highest summits. The name of Pilatus is said to be derived from the Latin word 'pileatus,' because the mountain-top is often covered with clouds as with a hat. The local legend of the peasantry derives it from Pilate, the governor of Judæa, who is said to have wandered into Helvetia, and to have drowned himself in a lake on this mountain. It is also called Fracmont, 'Mons fractus,' because its sides, especially towards Luzern, look broken, craggy, and inaccessible. The southern side towards Alpnach in Unterwalden is less abrupt, and it is covered with forests which belong to that canton. The most practicable path for ascending the Pilatus is on that side. The view from its summits is very extensive. The soil of Luzern is fertile; it is one of the very few cantons of Switzerland which produces more corn than it consumes, and the excess is purchased by the neighbouring Waldstätten, or pastoral cantons. Fruit-trees are also abundant; the vine is cultivated only in some favourable situations. The rearing of cattle is the principal branch of industry in a great part of the canton, especially in the Entlibuch. In some districts of the canton are manufactories of linen and cotton goods. The trade between Switzerland and Italy by the St. Gothard employs a number of people, and all the goods pass through Luzern and the lake of the Waldstätten.

The population of the canton in 1836 was 123,407 inhabitants, of whom only 3585 were natives of other countries. They are exclusively Catholic. German is the language. Under the former system Luzern was a municipal aristocracy, the majority in the legislative council being monopolized by the citizens of the head town. In 1831, the country-people having strongly remonstrated against this arrangement, a new constitution was framed, by which all the citizens of the canton, of the Catholic faith, being above 20 years of age, and having a property of 600 francs and paying taxes thereupon, have a vote in the elections. The great council consists of 100 members, of whom 18 are returned by the town of Luzern, and 62 by the rest of the canton: these 80 deputies appoint the remaining 20, of whom 7 must be from the town of Luzern. The qualifications for a deputy are, 25 years of age and a taxed property of 3000 francs. Every two years one-third of the council is renewed. The great council appoints 15 of its members to form the little council, or executive, at the head of which is a schultheiss or avoyer, who is renewed annually. The supreme court of justice consists of fifteen members chosen by the great council, one-third of whom are renewed every two years. The canton is divided into twenty-five electoral circles, and into five administrative districts, namely, Luzern, Sursee, Entlibuch, Willisau, and Hochdorf. The public revenue of the canton is 367,642 Swiss livres (the Swiss livre is one franc and a half of France, or about 15 pence sterling), and the expenditure 347,380 livres. The monopoly of salt, which is in the hands of the government, as in most Swiss cantons, brings in 102,000 livres to the revenue; the ohmgeld, or tax on the vineyards, 118,000 livres; the postages 24,000; the tolls 17,000; stamps 10,000; the contributions at which monastic and other ecclesiastical foundations are assessed amount to 19,425 livres. The abbey of Münster, or Beromünster, founded in 850, and the convent of St. Urban, are among the wealthiest in Switzerland. Luzern is in the diocese of the bishop of Basel, who resides at Soleure.

There are in the canton 165 primary or elementary schools, and 16 secondary or grammar schools, a seminary for teachers, a gymnasium, a lyceum, and a polytechnic institute.

LUZE'RN, the town of, is situated at the western extremity of the lake of the Waldstätten, and is divided into two unequal parts by the Reuss, which issues out of the lake. The larger part, which is on the right bank, is built on the slope of a hill: the whole is surrounded by old walls flanked by towers, and has a fine appearance from the lake, being in the midst of a delightful and well-wooded country interspersed with neat country-houses, with Mount Pilatus rising on one side, and Mount Rigi on the opposite side of the lake. The interior of the town is not so pleasant, the streets being narrow, uneven, and ill paved. The remarkable buildings are: 1, the town-house, with some fine rooms adorned with paintings; 2, the college of the Jesuits, with a fine painting by Torriani; 3, the arsenal, which contains some relics of the battles of Sempach and Morat; and 4, the three covered wooden bridges, which are the chief curiosities of Luzern. They are built on the lake, and serve as a promenade: the Hofbrück is 1380 feet long, and is painted with subjects taken from the Bible; the Kapellbrück is 1000 feet long, and its paintings relate to the history of Switzerland; the Spreuerbrück, which is short, has some paintings of the 'Dance of Death.' The parochial church and cemetery are outside of the town, and are well worth visiting. The topographic map, in relief, of the country round the Waldstätten See, by the late General Pfyffer, who spent more than 10 years of his life in constructing it, is one of the most remarkable things at Luzern. It is 22 feet long and 13 feet wide, and contains the cantons of Uri, Schwytz, Unterwalden, Zug, and part of Luzern. The materials are pasteboard, wax, and resin.

In a secluded spot in the neighbourhood of Luzern is the monument erected in 1821 to the memory of the Swiss guards who died in the defence of the Tuileries against the mob of Paris, on the 10th August, 1792. It consists of a wounded and dying lion, of colossal size, in alto rilievo, sculptured on the side of a rock, in a kind of niche. The model for it was sent by Thorwaldsen from Rome. The names of the officers, 26 in number, who, with 760 soldiers, fell on that memorable occasion, as well as those officers, 16 in number, who, with about 350 soldiers, survived it, are engraved underneath. The lion is represented grasping a shield with a fleur-de-lys on it, and a bundle of broken arms with the Swiss cross are lying on one side.

Luzern contains 8150 inhabitants. It has two hospitals, a savings' bank, a friendly society, and other benevolent institutions. It has also a musical society, a collection of minerals, and very good elementary and secondary schools, each divided into three classes. Luzern is the principal of the Catholic cantons, and the Pope's nuncio resides here. (Leresche, *Dictionnaire Géographique Statistique de la Suisse*; also an anonymous work entitled *Slight Reminiscences of the Rhine and Switzerland*, 2 vols., London 1834, which contains some curious particulars of Luzern life, manners, and scenes.)

LUZON. [PHILIPPINE ISLANDS.]

LYCA'ON. [HYÆNA-DOG.]

LYCAO'NIA (*Λυκαονία*, and the inhabitants *Λυκάονες*), a district of Asia Minor, is first mentioned by Xenophon, who describes it as extending eastward from Iconium in Phrygia to the beginning of Cappadocia, a distance of 30 parasangs, about 110 English miles. (*Anab.*, i. 2, s. 19.) It was united during the Persian monarchy to the satrapy of Cappadocia. (Xen., *Anab.*, vii. 8, s. 25.) But in the time of Strabo the name of Lycaonia was applied to the south-eastern part of Phrygia; and it was bounded on the south by Mount Taurus, on the east by Cappadocia, and on the west by Pisidia.

Lycaonia is described by Strabo as high table-land, deficient in water, which the inhabitants could only procure by digging deep wells, but well adapted for sheep, of which Amyntas had upwards of 300 flocks (xii. c. vi., vol. iii., p. 58, 59, *Tauchnitz*). Iconium, the principal town of Lycaonia, called by Abulfeda *Kunijah*, and at present *Konieh* (Strabo, *ut supra*; Cic., *Fam.*, xv. 4; Plin., *Nat. Hist.*, v. 25), was situated in a fertile plain at the foot of Mount Taurus. Konieh contains at present a population of about 30,000 inhabitants. (Hassel, *Erdbeschr. Asiens*, ii. 197.) Isauria is mentioned by Strabo as part of Lycaonia; it contained the cities of Larauda, Lystra, and Derbe; the two last of which were visited by Saint Paul, and appear, from the narrative in the *Acts*, to have been places of considerable importance. (*Acts*, xiv. 6.)

The northern part of Lycaonia was united, but at what time is uncertain, to Galatia; but the southern part was governed in the time of Cicero (*Fam.* xiii. 73) by an independent prince of the name of Antipater, who resided at Derbe. Antipater however being afterwards conquered by Amyntas, king of Galatia, the whole of Lycaonia fell under the power of the Galatians. At the death of Amyntas, B.C. 25, Lycaonia, together with Galatia, became a Roman province. (Dion. Cass., liv., p. 589, *Stephan.*) In the time of Pliny Lycaonia formed a separate tetrarchy, which contained 14 towns. (*Nat. Hist.*, v. 25.)

The language of Lycaonia mentioned in the *Acts*, xiv. 11, has occasioned much dispute among the learned; of which an account is given in Jablonsky's 'Opuscula,' ed. Te Water, iii. 3.

LYCESTA, Savigny's name for a genus of crustaceans, which M. Desmarest views as coming very near to the genus *Mæra* of Leach.

LY'CIA (Λυκία), a province of Asia Minor, was bounded on the north by Phrygia, on the east by Pamphylia, on the west by Caria, and on the south by the Mediterranean Sea. The interior of this country was entirely unknown till the recent visit of Mr. Fellows (1838), who travelled a considerable distance into the interior, and made many interesting discoveries, which will be shortly communicated to the world by the publication of his journal. We are informed by him that the country is erroneously represented in all the maps, and that there are no mountains of any importance in the interior. The coast is surrounded by lofty mountains, which rise in many places to a great height. Mount Solyma, called at present Takhatlu, to the north of Phaselis on the borders of Pamphylia, rises to the height of 7800 feet. [ANATOLIA, i., p. 493.] According to Strabo (xiv., c. iii., vol. iii., p. 213, *Tauchnitz*) there is a great number of good harbours, notwithstanding the rocky nature of the coast. The length of the coast, from Telmissus on the west to Phaselis on the east, is said by Strabo to be 1720 stadia. The northern part of Lycia is occupied by the mountains which support the high table-land of Phrygia on the south, and which appear to have been known to the antients under the name of Massicytus. Mount Massicytus is erroneously placed in most maps in the centre of the country, where there are no mountains, according to Mr. Fellows. The Xanthus, which is also represented as an inconsiderable stream, is in reality a river of considerable length, flowing from the mountains in the north of Lycia; and the whole of the interior, instead of being occupied by mountains, as was commonly thought, is, on the contrary, a fertile plain, surrounded by mountains on every side, and drained through its whole extent by the river Xanthus.

According to Herodotus the Lycians were originally called Milyans, and afterwards Solymi; but again changed their name to that of Termilæ, after Sarpedon settled in the country, having been compelled to leave Crete in consequence of dissensions with his brother Minos. They were, according to the same authority, eventually called Lycians from Lycus, the son of Pandion, who came to Lycia after he had been expelled from Athens by his brother Ægeus. (Herodot., i. 173. Compare Strabo, vol. iii., p. 217, 218.) In the Homeric poems the country is always called Lycia, and the Solymi are mentioned as a warlike people against whom Bellerophon is sent to fight by the king of Lycia (*Il.*, vi. 184). In later times the southern part of Phrygia, on the north of Lycia, was always called Milyas; but the people are never called Solymi, though the name still remained in Mount Solyma on the north-eastern coast. That Lycia was early colonized by the Greek nation is evident, not only from the account of Herodotus, but also from many other Lycian traditions, as well as from the worship of Apollo, which was spread over the whole country. Xanthus was a Cretan settlement (Steph. Byz.), and 60 stadia below the town was a grove sacred to Latona, near an antient temple of the Lycian Apollo (Strabo, vol. iii., p. 215; Diod., v. 56). But the chief temple was at Patara, the winter habitation of the god, where he gave oracles through the mouth of a priestess. (Müller's *Dorians*, i., p. 245, Engl. transl.)

The Lycians appear to have obtained considerable power in early times. They were almost the only people west of the Halys who were not subdued by Crœsus (Herodot., i. 28); and they made an obstinate resistance to Harpagus, the general of Cyrus, but were eventually conquered. (Herodot., i. 176.) They supplied Xerxes with fifty ships in his expedition against Greece. (Herodot., vii. 92.) After the downfall of the Persian empire they continued subject to the Seleucidæ, till the conquest of Antiochus by the Romans, when their country, as well as Caria, was granted by the conquerors to the Rhodians (Polyb., p. 848, *Casaubon*); but their freedom was afterwards again secured to them by the Romans (Polyb., p. 925), who allowed them to preserve their own laws and their political constitution, which is greatly praised by Strabo. According to this account (vol. iii., p. 214) the government was a kind of federation consisting of 23 cities, which sent deputies to an assembly, in which a governor was chosen for the whole of Lycia, as well as judges and inferior magistrates. All matters relating to the government of the country were discussed in this assembly. The six principal cities, Xanthus, Patara, Pinara, Olympus, Myra, and Tlos, had three votes each; other cities two votes each; and the remainder only one each. In consequence of dissensions between the different cities, this constitution was abolished by the emperor Claudius (Suet., *Claud.*, c. 25; compare *Vespas.*, c. 8); and the country united to the province of Pamphylia. (Dion. Cass., lx., p. 777, *C. Steph.*)

Lycia contained many cities of considerable importance. Pliny (*Nat. Hist.*, v. 28) mentions 36, but says that there were formerly as many as 70. Telmissus, on the borders of Caria, a seaport with a good harbour, must have been a place of some importance in the time of Crœsus (Herodot., i. 78), but afterwards declined in power; it is mentioned by Strabo as a small place. South of Telmissus, on the coast, were the towns of Pynda, Cragus, and Patara; the last of which is described by Strabo as a large city with many temples in it, and is said by Livy (xxxvii. 15) to have been the capital of Lycia. According to Pliny, the antient name of this town was Sataros (*Hist. Nat.*, v. 28); but the name was afterwards changed by Ptolemy Philadelphus into Arsinoe. (Strabo, vol. ii., p. 215, 216.) To the north of Patara, on the river Xanthus, were the towns of Xanthus (which was burnt by its inhabitants, when they could no longer resist Brutus) and Tlos; and to the east, along the coast, those of Myra (mentioned in the *Acts*, xxvii. 5, as a seaport, but placed in most maps in the interior), Limyra, and Olympus. The position of Pinara is doubtful: it is put down in the maps on the river Xanthus, above the town of the same name; but the numerous inscriptions which Mr. Fellows found at this spot, called at present *Doover*, prove that this was the position of Tlos. Between Myra and Olympus was the sacred promontory, stretching out a considerable distance into the sea, off which were the Chelidonian islands. On the borders of Pamphylia was the important town of Phaselis, founded by the Dorians. (Herodot., ii. 178.) It had three harbours (Strabo, vol. iii., p. 217), and was one of the most flourishing commercial cities on the southern coast of Asia Minor. It was one of the principal resorts of the Cilician pirates in the later times of the Roman republic, and was destroyed for this reason by Paulus Servilius. (Cic., *Verr.*, vi. 10.) It was afterwards rebuilt, and is mentioned by Lucan (viii. 251); but it never recovered its former importance.

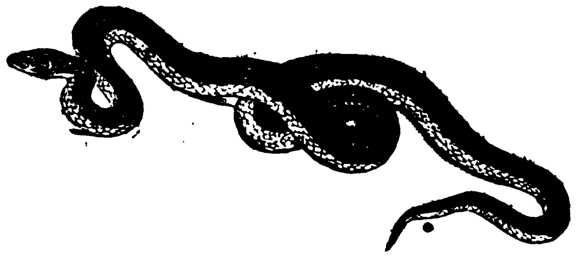
LY'CIUM. Many antient authors, and among others Dioscorides, describe under the above name a substance as used in medicine, which is stated to be of two kinds; one obtained from Lycia and Cappadocia, and the other from India. The former is said to be the produce of a thorny shrub called Pyxacantha. The latter is stated to be more valuable and efficacious as a medicine, and to be produced also by a thorny shrub which is called Lonchitis.

Most modern authors have stated these plants and the substance they produce to be totally unknown; others consider species of Rhamnus, or the common box, to be alluded to. Prosper Alpinus thought Berberis Cretica to be one of the plants; while Garcias ab Orto thought Catechu to be the substance, and Acacia Catechu the plant yielding it. It is possible that some species of Rhamnus, as R. infectorius, of which both the root, wood, and berries possess medicinal properties, and which are in the present day used for dyeing yellow, may have formed one of the kinds of Lycium, as it is common in the countries where the first kind is said to have been produced, and some species of Rhamnus were by the older botanists called Lycium. Though there is uncertainty about the Lycium of Asia Minor, that of India seemed to have been quite unknown until the publication of a paper 'On the Lycium of Dioscorides,' by Dr. Royle, in the Linnean Society's Transactions for 1833, where it is stated that there is no proof that Catechu was the λύκιον ἰνδικόν (*Lycium indicum*) of the antients; in fact is incompatible with the evidence adduced on the subject from Oriental writers. The Greek authors on medicine having been translated into Arabic, and from this language into Persian, and these, with additions, forming the works now in use in India, we may expect to find in them some trace of Lycium; and in fact in that called *Makhzun-al-Udwieh; loofyon* is mentioned as the plant which yields *huziz*, and in Persian it is called *feel-zukreh*. *Loofyon* is evidently written for *lookyon*, through an error of the transcriber in a diacritical point, in the same way that Filafoos (Philip of Macedon) has been changed in some of these works into *Filakoos*. This is further evident indeed from referring to the Latin translations of Serapion and Avicenna, where *hadad* and *feel-zuhuruj* are translated Lycium and Lycium indicum. In the Persian work, hoozuz or hooziz (the same word as hadad) is described as being of two kinds: one from India, of which the Hindee name is *rusot;* and the other from Arabia. The Persian name *feel-zuhreh* is translated in our best dictionaries 'box-thorn,' that is, Pyxacantha. The best kind of rusot is said, in the *Makhzun-al-Udwieh*, to be brought from Nuggur-kote in the neighbourhood of Lahore, and that it is an extract made from a decoction of the fresh wood of *dar-huld*. On inquiring in the shops of the druggists in the bazars of India, Dr. R. learned that both the wood *dar-huld* and the extract *rusot* were imported into the plains of India from the Himalayas. On travelling in these mountains, and on wishing to be shown the plant which produced the wood called *dar-huld* as well as that from which the *rusot* was procured, species of Berberry were immediately pointed out, and it was stated that both the wood and the extract were procured indifferently from *Berberis asiatica*, *B. aristata*, *B. Lycium*, and *B. pinnata*. On cutting into the wood of each, and having some converted into extract, he found both to correspond in every respect with what he had bought in the plains under the name of *dar-huld* and *rusot*. The extract *rusot* is procurable in the bazars of India, being much employed by the native practitioners of medicine in India, as an external application rubbed over the swollen eye-lid either simply or in combination with opium and alum and a little water or oil, both in incipient and chronic inflammation of the eye. The wood of Berberry being employed both in Europe and India as a yellow dye, it has been suggested by Mr. E. Solly, in a paper read before the Royal Asiatic Society, that the root, wood, or extract might be imported from India for the use of the manufacturers of Europe. This notice may appear disproportioned to the importance of the subject, but it is interesting as showing the knowledge which the Greeks had of the products of India, at the same time that it proves the great extent to which the influence of their own works has spread.

LY'CODON, a genus of serpents.

Example, *Lycodon Capensis*, Smith (*Lycodon Horstokii*, Schlegel).

Description.—Shining greenish-brown above, head without variations, and the scales along the middle of the back less distinctly marked with white specks than those of the sides.



Lycodon Capensis (Smith), var.

Dr. Smith, who recorded this species in 1831, in the 'South African Quarterly Journal,' figures and describes, in the 4th number of the 'Illustrations of the Zoology of South Africa' (1838), now in the course of publication,* a variety of a shining blackish-green colour above, tinged with purple, the head reticulated with white lines, and the scales white at the tips; greenish-yellow below; eyes livid-green. Length from nose to tail 12 inches; of the tail two inches.

Locality of the variety above described,—among decayed wood, near a small stream, immediately beyond Kurrichane; lat. about 25° south.

Habits, &c.—'When,' continues Dr. Smith, 'by the removal of some of the rotten masses, the reptile was exposed, it moved slowly among the remaining ones in search of a place of concealment; and when it was interrupted in its advance, it simply coiled itself up without manifesting any disposition to resist the opposition offered; a similar course I had previously observed others of the same species pursue when attempts were made to secure them; and neither did the one here described nor the others ever move with any considerable rapidity, nor appear much in fear of their assailants. All the specimens which I have seen of this species were obtained in damp situations, and never remote from localities where they could rapidly and without much exertion conceal themselves if necessary; and in the latter respect they resemble most of the innocuous snakes of South Africa, which are not endowed with the powers of effecting rapid movements.

LY'COPUS EUROPÆUS, a wild plant inhabiting wet ditches and sides of ponds, belonging to the natural order Labiatæ, and known popularly under the name of gipsy-wort, because gipsies are said to stain their skins with its juice.

LYCOPERDON, a genus of fungi, emitting when burst, either by violence or natural dehiscence, a quantity of dust-like seeds or spores, whence the species are commonly called puff-balls. The old botanists collected under this name a variety of plants, very different from each other in many respects, although agreeing in the circumstance just mentioned: recent writers have distinguished them as so many distinct genera. The only two which it is necessary to mention here are the common puff-balls, which burst irregularly, and the starry puff-balls, which split in a definite stellate manner. They are each inhabitants of meadows, pastures, woods, lawns, &c., and some of the species are exceedingly common. When the common puff-ball, Lycoperdon gemmatum, first appears, it forms a whitish ball, looking like a common eatable mushroom, but by degrees it changes colour, becomes brown, and tearing irregularly at the apex, discharges a cloud of brownish dust, consisting entirely of its spores. The Geasters, or starry puff-balls, are much less common; instead of bursting irregularly at the apex when ripe, their outer rind separates into a definite number of lobes, which spread open, curve backwards, and at last elevate upon their centre a bag containing the spores. No use has ever been made of any of the Lycoperdons, except in the case of L. giganteum, a very large indehiscent species, often many feet in circumference, and filled with a loathsome pulpy mass, which has been employed as a styptic, and for tinder.

LY'COPHRIS. [Foraminifera, vol. x., p. 348.]

LY'COPHRON, a native of Chalcis in Eubœa, the son of Socles, and adopted by the historian Lycus of Rhegium, was a distinguished poet and grammarian at the court of Ptolemy Philadelphus, from B.C. 280 to B.C. 250, where he formed one of the seven poets known by the name of Pleias. He is said by Ovid to have been killed by an arrow. (*Ibis*, 531.)

Lycophron wrote a great number of tragedies, the titles of many of which are preserved by Suidas; but only one has come down to us, entitled 'Cassandra, or Alexandra.' This poem however cannot have any claims to be called a drama; Cassandra is the only person introduced as speaking; and she narrates to Priam the destruction of Troy, and the subsequent adventures and misfortunes of the Grecian chiefs. But in the course of her narration she gives an account of almost all the leading events in Greek history, from the Argonautic expedition to the time of Alexander the Great. The work is written in iambic verse, and has no pretensions to any poetical merit; the style is very obscure, and the meaning of most passages very doubtful, which led Statius to describe it as the 'Latebras Lycophronis atri.' (*Silv.*, v. 3, 157.) But from the quantity of mythological and historical information which it contained, and perhaps from its very obscurity, it formed a favourite study with the Greek grammarians, who wrote many commentaries upon it; of which the most celebrated by Tzetzes,

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[*] Published under the authority of the Lords Commissioners of Her Majesty's Treasury, and containing beautiful and accurate figures, with excellent descriptions, of the animals of South Africa, collected during an expedition into the interior in the years 1834, 1835, and 1836; fitted out by the 'Cape of Good Hope Association for exploring Central Africa.'

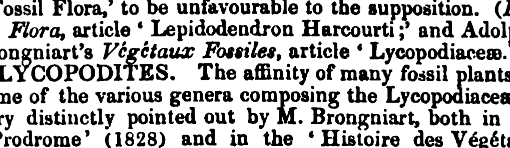
who lived in the 12th century of the Christian æra, is still extant, and affords no small assistance in making out the meaning of this difficult poem.

The 'Cassandra' was printed for the first time at the Aldine press, Venice, 1513. The best editions are by Potter, Oxf. 1697, 1702; by Reichard, Leip. 1788; by Sebastian, Rome, 1804; and by Bachmann, Leip. 1833. The commentary of Tzetzes has been published with most of the editions of the 'Cassandra;' and has also appeared in a separate form under the superintendence of C. G. Müller, Leip. 1812 The 'Cassandra' has been translated into English by Lord Royston.

LYCOPODIA'CEÆ, a natural order of vascular Acrogens, chiefly consisting of moss-like plants, inhabiting moors, boggy heaths, and woods in many parts of the world. They never exceed the height or length of two or three feet, and usually grow prostrate, having their stems covered with numerous imbricated scale-like leaves, which, at the ends of the branches bear in their axils bivalve cases containing an inflammable powder, sometimes extremely fine, and used for artificial fireworks, which is supposed to be their spores. No distinct trace of two kinds of sexes has been found in these plants, which seem to have no very close allies among existing races. Their resemblance to ferns, near which systematists always place them, chiefly consists in their being asexual, and having spiral vessels in their stems. Some of them, especially Lycopodium rubrum, are violent purgatives, and it has been proposed to use others as dyes, but in general they are of little importance to any except the botanical systematist. Their name has however of late been brought frequently before the public in popular works, in consequence of an opinion that certain large fossils common in the coal-measures, and called Lepidodendra, are the relics of an extinct gigantic race of these now pigmy species. This opinion has been formed upon the supposition that the dichotomous mode of branching, common in Lycopodiaceæ, is a circumstance of paramount importance in determining natural affinities, and that the Lepidodendra were asexual. The latter is however not proved, nor indeed very probable, and the internal anatomy of Lepidodendron Harcourti has been shown, in the 'Fossil Flora,' to be unfavourable to the supposition. (*Fossil Flora*, article 'Lepidodendron Harcourti;' and Adolphe Brongniart's *Végétaux Fossiles*, article 'Lycopodiaceæ.')

LYCOPODITES. The affinity of many fossil plants to some of the various genera composing the Lycopodiaceæ is very distinctly pointed out by M. Brongniart, both in the 'Prodrome' (1828) and in the 'Histoire des Végétaux Fossiles.' Such of these as agree in the following characters are ranked under the title of Lycopodites.

Branches pinnate; leaves inserted all round the stem, or in two opposite rows, not leaving distinct and circumscribed cicatrices. Several species are described from the coal deposits and oolitic formations. We give below a drawing of part of Lycopodites falcatus (Phillips's *Geol. of Yorkshire*) from the oolitic shales of Gristhorpe, near Scarborough.



a, leaf magnified to show the direction of the nervures.

LYCO'RIS, Savigny's name for a genus of *Dorsibranchiate Annelids* (*Nereids*, properly so called) of Cuvier. See Savigny (*Eg. Annel.*), and Cuvier (*Règne Animal*).

LYCURGUS. [Sparta.]

LYCURGUS, the Athenian orator, the son of Lycophron, and the grandson of Lycurgus, who is ridiculed by Aristophanes (*Birds*, l. 1296), was one of the warmest supporters of the democratical party in the contest with Philip of Macedon. The time of his birth is uncertain, but he was older than Demosthenes (Liban., *Arg. Aristogiton*); and if his father was put to death by the Thirty Tyrants (*Vitæ Decem Orat.*, p. 841, B.), he must have been born previous to B.C. 404; but the words of the biographer are, as Mr. Clinton has justly remarked (*Fast. Hell.*, vol. ii., p. 151), ambiguous, and may imply that it was his grandfather who was put to death by the Thirty.

Lycurgus is said to have received instruction from Plato and Isocrates. He took an active part in the management of public affairs, and was one of the Athenian ambassadors who succeeded (B.C. 343) in counteracting the designs of Philip against Ambracia and Peloponnesus. (Demosth., *Philip*, iii., p. 129, ed. Reiske.) He filled the office of treasurer of the public revenue for three periods of five years, that is, according to the antient idiom, twelve years (Diod. Sic., xvi. 88); and was noted for the integrity and ability with which he discharged the duties of his office. Böckh (*Public Economy of Athens*, vol. ii., p. 183, Engl. transl.) considers that Lycurgus was the only statesman of antiquity who had a real knowledge of the management of finance. He raised the revenue to twelve hundred talents, and also erected during his administration many public buildings, and completed the docks, the armoury, the theatre of Bacchus, and the Panathenaic course. So great confidence was placed in the honesty of Lycurgus, that many citizens confided to his custody large sums of money; and shortly before his death he had the accounts of his public administration engraved on stone and set up in part of the wrestling-school. An inscription, preserved to the present day, containing some accounts of a manager of the public revenue, is supposed by Böckh (*Public Economy of Athens*, vol. i., p. 264) to be a part of the accounts of Lycurgus. (See the inscription in Böckh's *Corpus Inscriptionum Græcarum*, vol. i., p. 250, No. 157.)

After the battle of Chæronea (B.C. 388) Lycurgus conducted the accusation against the Athenian general Lysicles. He was one of the orators demanded by Alexander after the destruction of Thebes, B.C. 335. He died about the year B.C. 323, and was buried in the Academia. (Pausan. i. 29, § 15.) Fifteen years after his death, upon the ascendency of the democratical party, a decree was passed by the Athenian people that public honours should be paid to Lycurgus; a brazen statue of him was erected in the Ceramicus, which was seen by Pausanias (i. 8, § 3), and the representative of his family was allowed the privilege of dining in the Prytaneum. This decree, which was proposed by Stratocles, has come down to us at the end of the 'Lives of the Ten Orators.'

Lycurgus is said to have published fifteen orations (*Vitæ Dec. Orat.*, p. 843, C.; Photius, *Cod.*, 268); of which only one has come down to us. This oration, which was delivered B.C. 330, is an accusation of Leocrates (κατὰ Λεωκράτους), an Athenian citizen, for abandoning Athens after the battle of Chæronea, and settling in another Grecian state. The eloquence of Lycurgus is greatly praised by Diodorus Siculus (xvi. 88), but is justly characterized by Dionysius of Halicarnassus as deficient in ease and elegance (vol. v., p. 433, ed. Reiske).

The best editions of Lycurgus are by Taylor, who published it with the 'Oration of Demosthenes against Midias,' Camb., 1743; Becker, 1821; Pinzger, 1824, Blume, 1827; and Baiter and Saupp, 1834. It is also included in the edition of the 'Oratores Græci,' by Reiske and Bekker, and has been translated into French by Auger, Paris, 1783.

(Dionysius of Halicarnassus; *Life of Isocrates*, attributed to Plutarch; Preface to Taylor's edition of Lycurgus; Nissen's dissertation, *De Lycurgi Oratoris Vita et Rebus gestis*, 1833. Compare Böckh's *Public Economy of Athens*, vol. i., pp. 264-269; vol. ii., pp. 183-188, Engl. transl.)

LYCUS, River. [Anatolia.]

LYDFORD, a village in the west of Devonshire, seven miles north of Tavistock, now almost deserted, and visited only for the sake of a waterfall or cataract in the Lyde, near a bridge where the stream is pent in between high rocks. When the river is full, this waterfall is a very pleasing object, though Risdon ('Survey of Devon') says, 'It maketh such an hideous noise, that being only heard and not seen, it causeth a kind of fear to the passengers, seeming to them who look down to it, a deep abyss, and may be numbered among the wonders of the kingdom.' This now insignificant village was formerly a frontier town of considerable strength and importance, having 140 burgesses within the walls, and many without, and protected by a castle, erected probably by the Saxons, when they had driven the West Britons across the Tamar. Lydford was burnt by the Danes in 997. It is recorded in Domesday as a manor and borough in antient demesne, having formed part of the possessions of the crown in the time of Edward the Confessor, and as not being liable to any impost, except at the same time, and for the same causes, as London. Lydford appears however to have been tallaged with Exeter, Axminster, Witeford, and ten other towns, in 20 Henry II.

(1174); and in the fifth year of John (1203), that king, for the small sum of 5 marks (3*l.* 13*s.* 4*d.*), entered into an engagement with H. de la Pomeraie, that he would not grant to the burgesses of Lydford better liberties than those enjoyed by the citizens of Exeter. (Madox, *Exch.*, 282, note (t.) 485.) When in the possession of his son Richard, king of the Romans, it had a market, which had been renewed in 1130 ('Magn. Rot. Scacc.') and a fair. (*Cal. Rot. Chart.*, 97, 102.)

The parish of Lydford is one of the most extensive in the kingdom, including the high morass called the Chace or Forest of Dartmoor, formerly Dertemore, which occupies the centre of the county of Devon.

Lydford, with Dartmoor, was commonly annexed in royal grants to the earldom of Cornwall, and in 6 Edward II., after the forfeiture of Gaveston, we find Thomas Le Ercedekne committee of the earldom (1 *Abbr. Rot.*, Origin. in Scacc. 186, 195, 196), and also constable of Lydford Castle, and keeper of the forest of Dartmoor. (*Ibid.* 196 b.) Lydford and Dartmoor were inalienably incorporated with the dukedom of Cornwall upon its creation in 1339, in favour of the Black Prince.

Lydford Castle, sometimes called the castle of Dartmoor, (*Cal. Rot. Pat.*, 249) is an extensive building, though now very dilapidated. It is the Stannary Castle, and contains the rooms where the warden of the stannaries of Devon, an office sometimes granted to the abbot of Tavistock (2 *Parl. Rolls*, 10 b.), or the vice-warden, held his stannary courts; it had dungeons for the reception of delinquent tinners. By the charter of Edward I., the tinners of that county were not to be imprisoned elsewhere. In the last year of this king's reign, the warden of the stannaries claimed the body of tinner who had been imprisoned upon a charge of killing his brother's son; but upon an inspection of the charter it was found to contain a reservation of cases of life and member. The privilege of imprisoning at Lydford became the subject of a complaint in parliament at the close of the reign of Edward III., 1377, when it was asserted by the commons, that the warden of the stannaries took prisoners arrested for arrearages of account out of other gaols and kept them at Lydford, where there was sometimes no gaol delivery for ten years, and where these supposed tinners were so favourably treated, that they thought of anything but paying their debts. (2 *Parl. Rolls*, 344.) This complaint does not seem to accord with the popular notion that 'by Lydford law' men are hanged first and tried afterwards.

The parliaments, or convocations, of tinners for Devon, were held on a high rock in Dartmoor, called Crockern Torr, where stood a table and seats, the whole being hewn out of the granite surface, without any neighbouring building or protection from the weather. The stannators of the stannaries of Devon (called sometimes the stannaries of Dartmoor, *Cal. Rot. Pat.*, 23 b.), who composed these parliaments, were elected by the mayors, or other chief magistrates, of the four coinage towns, Chagford, Ashburton, Plympton, and Tavistock, though in the beginning of the reign of Edward III. there appears to have been a contention between the latter place and the three former, as to the privilege of coinage. (*Cal. Inq. post Mort.*, 10.) The table, round which these legislators assembled, and the seats which they occupied, have ceased to exist. These interesting remains were some years since broken to pieces and removed by the workmen of the late judge Sir Francis Buller, who, unfortunately for those who respect the relics of by-gone usages, had purchased an estate in this parish, and the fragments of these venerable monuments were employed in the construction of a modern mansion.

Like other border districts Lydford presents some peculiarities in respect of tenures. It is said (5 *Co. Rep.*, 84) the custom of Lydford Castle is, that freeholders of inheritance cannot pass their freeholds except by surrender into the hands of the lord. This particular form of restriction upon alienation appears to have been by no means unusual. ('Year Book,' 14 Henry IV., fo. 1.) Risdon mentions other peculiarities annexed to the tenures of the freeholders in Lydford, called the Fenfield men, formerly the Fengfield men. The term may have been originally 'fangfield,' the Anglo-Saxon (and German) verb 'fangen,' to receive (preterite 'fing'), being still current throughout Devonshire, where however the preterite is become regular, 'fanged.'

Though Dartmoor is a bleak unsheltered morass, we find that in the time of Henry III. 'David de Seyredun held a yard-land (virgata terræ, sometimes 20, sometimes 48 acres) in Seyredun and Sappesby, by the service of the serjeanty of finding two arrows when the king came to hunt in the forest of Dartmoor, and so held his ancestors since the Conquest' (Testa de Nevile, 195), and that Richard de Droscombe held a yard-land of the (yearly) value of half a mark (6*s.* 8*d.*), in the hundred of Exminster by the serjeanty of carrying the king's bow when he hunted in Dartmoor (*Ibid.*, 196). It also appears that the service of Odo *le Archer* in Droscomb was to present a bow and three arrows when the king hunted in Dartmoor (*Ibid.* 197).

LYDGATE, JOHN, an antient English poet, one of the successors of Chaucer, was a monk of the Benedictine abbey of Bury St. Edmund in Suffolk. The dates of only a few of the events of his life have been ascertained. He was ordained a subdeacon in 1389, a deacon in 1393, and a priest in 1397; whence it has been conjectured that he was born about 1375. Warton says he seems to have arrived at his greatest eminence about the year 1430. After a short education at Oxford, he travelled into France and Italy, and returned a complete master of the language and literature of both countries. He chiefly studied Dante, Boccaccio, and Alain Chartier, and became so distinguished a proficient in polite learning, that he opened a school in his monastery for teaching the sons of the nobility versification and composition. Although philology was his subject, he was not unacquainted with the philosophy of the day: he was not only a poet and a rhetorician, but a geometrician, an astronomer, a theologist, and a disputant. Warton was of opinion that Lydgate 'made considerable additions to those amplifications of our language, in which Chaucer, Gower, and Occleve led the way;' and that he was the first of our writers whose style was clothed with that perspicuity in which the English phraseology appears at this day to an English reader.

To enumerate Lydgate's pieces would be to write the catalogue of a little library; Ritson, in his 'Bibliographia Poetica,' has given a list of no fewer than two hundred and fifty-one. No poet seems to have possessed greater versatility. His most esteemed works are his 'Story of Thebes,' his 'Fall of Princes,' and his 'History, Siege, and Destruction of Troy.' The first is printed by Spight in his edition of Chaucer; the second, the 'Fall of Princes,' or 'Boke of Johan Bochas' (first printed by Pynson in 1494, and several times since), is a translation from Boccaccio, or rather from a French paraphrase of his work, 'De Casibus Virorum et Feminarum Illustrium.' 'The History of Troy' was first printed by Pynson in 1513, but more correctly by Marshe in 1555, and was once the most popular of his works.

A pension of 7*l.* 13*s.* 4*d.* for life was granted to Lydgate by King Henry VI. in 1440, probably upon the presentation to that monarch, when he visited St. Edmunds Bury, of a MS. Life of St. Edmund, the patron saint of the monastery. This manuscript is still preserved in the Harleian collection in the British Museum, No. 2278, and is one of the most splendidly illuminated MSS. in that great repository, which also contains in the old Royal, Cottonian, Harleian, and Lansdowne Collections, other splendid manuscripts of Lydgate's various poems.

A note in Wanley's part of the Harleian Catalogue of Manuscripts seems to insinuate that Lydgate did not die till 1482, which is improbable. He was certainly alive in 1446; and the best authorities place his death about 1461.

(Warton's *Hist. Eng. Poet.*, 4th edit., vol. ii., p. 51-100; Ritson, *Bibliographia Poetica*, p. 66-90; Ellis's *Specimens*; Chalmers's *Biogr. Dict.*, vol. xxi., pp. 5, 6.)

LY'DIA (Λυδία), a country of Asia Minor. It is difficult to determine its exact boundaries, as they differed at various times; but under the Roman empire it was bounded on the south by Caria, from which it was separated by the river Mæander; on the north by a range of mountains known under the name of Sardene, which divided it from Mysia; on the east by Phrygia; and on the west by the Ægean, though the tract of country along the coast was more commonly known by the name of Ionia. Lydia was intersected by mountain-ranges, running from east to west; of which the principal, called Messogis by Strabo, is a branch of Taurus, and forms the northern boundary of the valley of the Mæander. Another chain of mountains, known to the antients under the name of Tmolus, which appears to detach itself from the Méssogis near the borders of Phrygia, runs parallel to the Méssogis through the centre of Lydia and terminates on the western coast opposite the island of Chios. A branch of Tmolus, called Sipylus, stretches more to the north-west towards the towns of Cuma and Phocæa. The chain of mountains which separates Mysia from Lydia appears to be a continuation of the northern range known in Bithynia by the name of Olympus, and in Mysia by that of Ida and Temnon. Lydia is thus divided into two principal valleys; the southern, between Méssogis and Tmolus, through which the Caystrus flows, is of moderate extent; but the northern, between Tmolus and Sardene, watered by the Hermus, and its tributaries the Hyllus, Pactolus, and Coganus, forms a considerable plain. The fertility of Lydia and the salubrity of the climate are frequently mentioned by antient writers; and this account is confirmed by the reports of modern travellers. (Chandler's *Travels in Asia Minor*, p. 260; compare Arundell's *Visit to the Seven Churches of Asia*.) Chishull speaks of the country between Tmolus and Méssogis as a 'region inexpressibly delicious.'

The origin of the Lydian people is uncertain. Some writers, and among others Josephus (*Antiquit.*, i. 6, 4), have imagined that they are mentioned in the book of *Genesis* (x. 22) under the name of Lud (לוד); in which passage they are described as descendants of Shem. Homer does not appear to have known the name of Lydia, but always calls the people Mæones. According to most antient writers, the people were originally called Mæones, and obtained the name of Lydians from Lydus, the son of Atys, who is mentioned by tradition as the first king of the country. (Herodot., i. 7; Diod. Sic., iv., p. 237, Rhodoman; Pliny, *N. H.*, v. 30.) Later writers make a distinction between Mæonians and Lydians, and represent the former as dwelling on the north-east of Tmolus, near the river Hyllus, and the Lydians as inhabiting the southern part of the country. According to Herodotus, the Lydians were of a common origin with the Carians and Mysians (i. 171).

The early history of Lydia is related by Herodotus, who informs us that three dynasties ruled in Lydia: the *Atyadæ* from the earliest times to B.C. 1221; the *Heraclidæ* from B.C. 1221 to 716; and the *Mermnadæ* from B.C. 716 to 556. The proper history of Lydia can only be said to begin with the last of these dynasties; since the two first are almost entirely fabulous. The following is a list of the Mermnadæ princes: 1. Gyges, who obtained the throne by the murder of Candaules, the last of the Heraclidæ monarchs, reigned from B.C. 716 to 678. 2. Ardys, from B.C. 678 to 629. 3. Sadyattes, from B.C. 629 to 617. 4. Alyattes, from B.C. 617 to 560. [ALYATTES.] 5. Crœsus, from B.C. 560 to 556, though he was probably associated in the sovereignty during the lifetime of his father. [CRŒSUS.] These monarchs were engaged in almost uninterrupted wars with the Greek cities on the coast; but the empire steadily increased in wealth and power. It obtained its greatest prosperity during the reign of Crœsus, who subdued all the people of Asia Minor west of the river Halys (*Kisil-ermak*), with the exception of the Cilicians and Lycians. (Herodot., i. 28.) But this empire, the most powerful at that time in Western Asia, was overthrown by Cyrus (B.C. 556); and the country became a Persian province. Herodotus informs us that no nation in Asia was more warlike than the Lydians (i. 79); till, through the advice of Crœsus, they were deprived of their arms by Cyrus, and obliged to learn music and dancing (i. 154). After Alexander's conquests, Lydia, with the rest of Western Asia, formed part of the empire of the Seleucidæ; and on the conquest of Antiochus by the Romans, B.C. 189, it was given to Eumenes, king of Pergamus, as a reward for the assistance he had afforded them in their war against the Syrian monarch. (Liv., xxxvii. 56; Appian, *Syr.*, 38; 1 *Macc.*, viii. 8.) On the death of Attalus III., B.C. 133, it came, with the other dominions of the kings of Pergamus, into the power of the Romans.

The antient Lydians appear to have enjoyed great commercial prosperity and to have possessed abundance of the precious metals; as is evident from other circumstances, and particularly from the rich presents which Crœsus sent to the different oracles in Greece. (Herodot., i. 50.) The Lydians are said to have obtained a large quantity of gold which was washed down from the mountains by the river Pactolus; but there is no proof that they ever carried on the operation of mining. (Herodot., i. 93; v. 101; compare Heeren's *Researches*, &c., 'Asiatic Nations,' vol. i. p. 106, 107; Eng. transl.) But in the time of Strabo no gold was found in this river (xiii. 928); and if Herodotus had been misinformed, which is improbable since he visited Sardis, the tale might easily have arisen from the appearance of Mount Tmolus, which, according to a modern traveller, 'is adorned with bright and shining particles, resembling gold-dust.' (Chishull, quoted by Chandler, *Travels in Asia Minor*, p. 260.) The Lydians are said by the Greeks to have been the first people who put a stamp upon gold and silver; and they claimed to be the inventors of the games which were prevalent in Greece in the time of Herodotus (i. 94).

The most extraordinary work of art in antient Lydia was the enormous sepulchral mound of Alyattes, the father of Crœsus, erected a little to the north of the river Hermus. Herodotus classes it next to the great works of the Egyptians and Babylonians, and describes it as 6 stadia (about three-quarters of a mile) and 2 plethra (200 feet) in circumference; and 13 plethra (1300* Greek feet) in width. The basement was built of great stones, and the upper part of earth. (Herodot., i. 93.) Chandler visited the spot in which this mound is supposed to have been raised; he describes the ground as covered with earthen barrows or mounds of various sizes, and mentions one in particular, near the middle, larger than the rest, which he supposes to have been the sepulchral mound of Alyattes, and conjectures that the basement of stone is now concealed by the mould, which has been washed down from the top. (*Travels*, p. 263; compare Arundell's *Visit*, &c., p. 186.) In the neighbourhood of this mound is the lake known to the antients by the name of Gygæa. (Homer, *Il.*, ii. 864; Herodot., i. 93.) It is described by Chandler as large and abounding in fish; its colour and taste like common pond-water, with beds of sedge growing in it. (*Travels*, p. 262.)

The Grecian towns on the coast of Lydia are described under IONIA. The most important of those towns which properly belonged to Lydia were Sardis, Philadelphia, and Thyatira.

Sardis (Σάρδεις, Σάρδις, Σάρδιες), called at present *Sart*, is situated on the river Pactolus, a tributary of the Hermus, in the middle of an extensive plain. The citadel was remarkable for its strength, being situated on a lofty hill, which was a perpendicular precipice on the back part, which looked towards Mount Tmolus. It is not mentioned by Homer, but some have conjectured that he speaks of it under the name of Hyde (ὕδη, *Il.*, xx. 385). Sardis was taken by the Cimmerians during their invasion of Lydia, in the reign of Ardys. (Herodot., i. 15.) It was the capital of the Lydian monarchy, and the residence of the Persian satraps of the country. It was burnt by the Athenians, B.C. 503 (Herodot., v. 100, 101); at which time the houses were principally made of reeds or straw, and those built of brick had thatched roofs. Under the Romans, Sardis formed the seat of a separate provincial government. ('Sardiana Jurisdictio,' Pliny, *N. H.*, v. 30.) It was nearly destroyed by an earthquake in the time of Tiberius (Tac., *Ann.*, ii. 47); but it was again rebuilt, and is frequently mentioned in the wars between the Greeks and Turks. Sart is at present a 'miserable village' (Chandler's *Travels*, p. 255); but there are large ruins of the antient Sardis in the neighbourhood.

Philadelphia (Φιλαδέλφεια) called at present *Allah Shehr* (that is, *City of God*), 28 miles south-east of Sardis (Anton., *Itin.*, p. 336), stands on a part of Mount Tmolus, by the river Coganus. This town was built by Attalus Philadelphus, king of Pergamus; and is still a place of some importance. Chandler speaks of it as 'a mean but considerable town, of large extent, spreading on the slopes of three or four hills.' (*Travels*, p. 249.) To the east of Philadelphia Strabo places the district of Katakekaumene, or *Entirely-burnt*, 500 stadia in length and 400 stadia in breadth (xiii. 628, *Casaub.*). Strabo was in doubt whether it ought to be reckoned as part of Mysia or Mæonia. He describes the surface of the plain as covered with ashes, and the mountain rocks as of a black colour, as if they had been subject to the action of fire. (Compare *London Geog. Journal*, vol. viii., p. 142.) The vine was cultivated in this district with great success.

Thyateira (Θυάτειρα), called at present *Akhissar*, was built by Seleucus Nicator; though there appears to have been a small town on the same spot before his time, called Pelopia. (Steph. Byz.; Pliny, *N. H.*, v. 29.) Strabo mentions it as a colony of the Macedonians (xiii. p. 929). It was situate on the borders of Lydia and Mysia near the river Hyllus, on the road between Pergamus and Sardis. It was famous for the art of dyeing purple. (*Acts*, xvi. 14; and Kuinoel's note on the passage.) Thyatira, Philadelphia, and Sardis are three of the Seven Churches which are addressed in the Book of Revelations.

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* In the article ALYATTES the width is erroneously stated at 2600 feet.

LYDIAN MODE. [MODE.]

LYDUS, JOANNES LAURENTIUS, was born at Philadelphia in Lydia (whence he derived his surname), about A.D. 490. At the age of twenty-one he repaired to Constantinople, and was employed for forty years at the court of the emperor in various official duties. He died about the latter end of Justinian's reign. Lydus appears to have been well acquainted with Greek and Roman antiquities; and his works, which are said to have been written after he had retired from the Imperial court, contain much curious information on the mythology and history of several of the nations of antiquity.

Three works of Lydus have come down to us: one 'On the Magistrates of the Roman Republic,' edited by Hase, Paris, 1812; a second, 'On the Months,' which was originally published by Schow, Leipzig, 1794, and has since been edited by Roether, Leipzig, 1827; and a third, 'On Omens and Prodigies,' which has also been published by Hase, with a facsimile of the MS. from which the edition has been printed. The best edition of Lydus is by Bekker, Bonn, 1837, which forms a part of the 'Corpus Scriptorum Historiæ Byzantinæ.'

LYE, EDWARD, born 1704, died 1767, an English clergyman, distinguished by the attention which he paid to the Saxon and Gothic languages and literature, was a native of Totness, educated in the university of Oxford, and beneficed in Northamptonshire. The living which he held was that of Houghton Parva, which he exchanged for that of Yardley Hastings. This appears to have been all the preferment he enjoyed.

The publications of Lye are all in that rare department of literature to which he especially devoted himself. The first was an edition of the manuscript left by Francis Junius [JUNIUS], entitled 'Etymologicum Anglicanum.' This manuscript had long lain in the Bodleian Library, no one having the courage or the knowledge and leisure sufficient to undertake the publication of it, to the great regret of all scholars both at home and abroad. This Lye accomplished, and the work appeared, with some additions and suitable prolegomena, in a folio volume, 1743. He also published, at the desire of Berzelius, bishop of Upsal, an edition of that singular remain of the Gothic language, the parent of many dialects, the translation of the Evangelists, commonly called Ulphilas's version. During the whole course of his studies he had kept in view the preparation of a large dictionary of the Anglo-Saxon and Gothic languages. This great undertaking he had just completed, having actually delivered the manuscript to the printer, when death took him away. His labour however was not lost, the work being published in 1772, in two folio volumes.

There is a fuller account of this eminent person in Nichols's 'Literary Anecdotes of the Eighteenth Century,' vol. ix., p. 751-753, a work abounding in exact and original information concerning nearly all the distinguished literary labourers of the century to which it relates.

LYME REGIS is a small and irregularly built seaport town in the parish of Lyme and county of Dorset, 20 miles west from Dorchester and 120 west-south-west from London. The streets are badly paved and not at all lighted, and the principal thoroughfare is so narrow, that the safety of foot-passengers is said to be endangered. The fish-market, held in the best part of the town, is regarded as a nuisance, and the butchers' shambles are erected in the main street. Indeed the corporation appear for many years to have altogether disregarded the improvement of the town. The charters of incorporation granted to the town date from the 12th Edward I. to the 26th Charles II., which last was acted upon until 1688, when it was recalled by a proclamation of James II. The revenue of the corporation in 1833 was 288*l.*, which was sufficient to cover its expenditure. This however is independent of the 'Cobb' or harbour dues, which amounted, in the year ending Sept. 30, 1833, to 417*l.*, the disbursements on account of the same during that period being 446*l.* That the trade of the port is rapidly declining appears from the circumstance, that in 1831 the number of vessels which entered and cleared with cargoes inwards, outwards, and coastwise, was 629, the aggregate tonnage of which amounted to 44,930; while in 1833 the number of vessels was only 201, and the corresponding tonnage 11,877. Indeed the harbour appears chiefly valuable as a place of refuge for small vessels during bad weather, as it is the only safe shelter between Lyme Regis and the Start Point of Portland. The church, dedicated to St. Michael, is an antient edifice. The living, a vicarage in the diocese of Bristol and patronage of the prebendaries of the cathedral of Sarum, is valued at 275*l.* per annum. In 1831 the population of the parliamentary borough, comprehending the parishes of Lyme and Charmouth, was 3345, that of the town alone being 2407. Until the passing of the Reform Act Lyme Regis had returned two members to parliament continuously from the reign of Edward I. It now returns but one member. (*Report of the Commissioners on the Corporation of Lyme Regis*, from which this notice is chiefly drawn.)

LYMFIORD. [JUTLAND.]

LYMINGTON is a corporate town and parliamentary borough of Hampshire. The town is agreeably situated on the right bank of the river Lymington, at a short distance from its mouth, and is 7 miles south-west by south from Southampton, and about 90 miles south-west from London. It is well supplied with water, and the paving and lighting are defrayed by a rate of 13½*d.* in the pound on houses, and 4½*d.* in the pound on land. 'Lymington is subordinate to the port of Southampton, from the necessity of the importers having to pay the full duties on the entrance of their cargoes into the port' (*Corp. Reports*), which circumstance is regarded by the inhabitants as a grievance, inasmuch as they consider the situation of their own port peculiarly favorable to foreign trade. The foreign trade is unimportant, and the coasting-trade is evidently on the decline, for it appears that the aggregate tonnage inwards and outwards, which in 1812 amounted to 44,934, had gradually decreased down to the year 1832, when the tonnage inwards was 10,757, and outwards 7242. The town has of late years received considerable improvements, with a view to invite visitors during the bathing season: 3000*l.* had been subscribed in 1835 for the erection of baths, and a like sum for the establishment of gas-works. The chief manufacture of the neighbourhood is salt, which some years ago was carried on to a considerable extent, but has since declined. The salt-works are situated on the bank of the Solent Channel, to the south-west of the town. The fairs for cheese are held May 12 and October 2, and are usually well attended. Lymington is a borough by prescription, there being no charter extant or upon record. The town-council consist of four aldermen and twelve common-councillors (5 and 6 William IV., c. 76), and the income of the corporation, arising from landed property, tolls, quay and river dues, amounted, in the year ending October, 1832, to 68*l.* 19*s.* 5*d.*, the expenditure during the same period being 79*l.* 12*s.* 4*d.* The parish church, dedicated to St. Thomas à Becket, is in the diocese of Winchester, and in its interior are many handsome monuments. The living is a curacy, dependent in some respects upon the church of Boldre, and the income is included in that of the vicarage of Boldre. The population of the town and parish in 1831 was 3361. Lymington has returned two members to parliament since the reign of Elizabeth. (*Boundary Reports*; *Corporation Reports*, &c.)

LYMNE'A. [LIMNEANS.]

LYMNO'REA (Zoology), Peron's name for a genus of *Medusæ*. This name comes too near to *Limnoria*. See that article.

LYMNO'REA, a genus of fossil zoophyta, proposed by Lamouroux (*Expos.*, p. 79). Also the name of a genus of recent Medusidæ. (De Blainville, *Actinologie*, p. 290.)

LYMPH, LYMPHATICS. The Lymphatics are the system of vessels which, from the part that they take in the process of absorption, are not unfrequently called absorbents. They consist of minute branched tubes of extremely delicate membrane, whose extremities are arranged in a more or less dense net-work in every part of the body. From this net-work they gradually converge into a succession of branches of increasing size, and terminate in two main trunks, called the right and left great lymphatic veins, through which the lymph is poured with the chyle from the thoracic duct [LACTEALS] into the right and left subclavian veins. The lymphatics also communicate with the veins at some other parts of their course, chiefly near their minute extremities, and more rarely by larger branches. They have in their interior numerous delicate valves formed of crescentic folds of the lining membrane, exactly like those of the veins [CIRCULATION, *fig.* 11], and, like them, preventing the retrograde course of the contained fluid. The valves of the lymphatics however are much more closely set than those of the veins, so that when full of fluid, the spaces between them being most distended, they give those vessels a knotted or beaded appearance, by which they are easily distinguished from veins of the same size. In the course of the larger lymphatics there are numerous firm roundish or oval bodies, called lymphatic or absorbent glands. [GLAND.] To each of these there pass two or more lymphatic vessels, which on entering them become extremely tortuous, and after varied convolutions and anastomoses, terminate in nearly the same number of branches, which again pass from the gland and pursue their course towards the main trunk.

The *Lymph* is a thin opaline whitish fluid of a somewhat saline taste, which a short time after it is removed from the body separates into a clear fluid and a soft white or pinkish coagulum. It is extremely difficult to obtain, in consequence of the small size of the lymphatic vessels; but in the rare cases in which a sufficient quantity has been procured for analysis, it has presented the same constituents as the blood deprived of its colouring globules. The coagulum consists of nearly pure fibrine, and the fluid portion is a solution of albumen with alkaline salts.

The physiology of the Lymphatics is explained in the article ABSORPTION.

The name of Lymph is rather vaguely applied to many different morbid secretions which have a thin watery appearance. Coagulating or coagulable Lymph is the fibrinous matter effused in the adhesive inflammation. [INFLAMMATION.]

LYNCEUS. [BRANCHIOPODA, vol. v., p. 342.]

LYNCHBURG. [VIRGINIA.]

LYNN, distinguished as LYNN REGIS, or KING'S LYNN, a parliamentary borough, port, and market-town in the hundred of Freebridge Lynn, in the county of Norfolk, is on the right or east bank of the river Ouse, a little above its outfal, in 52° 45′ N. lat. and 0° 25′ E. long., about 88 miles in a straight line north by east of St. Paul's, London, or 96 miles from Shoreditch Church by the road through Cambridge, Ely, and Downham Market.

The present town is supposed to have existed before the Conquest. It has been supposed that there was in the Roman time a town on the spot where the village of West or Old Lynn now stands, on the western side of the river. Before the time of Henry III. the Ouse is supposed to have had its outfal at or near Wisbeach (Wis-beach, or Ouse-beach), the Little Ouse, with the Nare, and one or two other streams, having their outlet at Lynn; but the old channel of the Ouse having become obstructed, a new channel was opened into the bed of the Little Ouse, and the waters of the Greater Ouse were thus brought by Lynn. The harbour of Lynn was considerably enlarged by this alteration, the western bank of the river being to a considerable extent swept away, with one of the churches of Old Lynn, and perhaps the site of the original or Roman town. (Richards's *Hist. of Lynn.*) Lynn had been, previously to this, a place of considerable trade, and was especially favoured by King John, who granted it a charter of incorporation. It was subsequently patronised by Henry VIII., who emancipated the corporation from the feudal superiority of the bishops of Norwich, and changed the name of the town from Lynn Episcopi, Bishop's Lynn, to Lynn Regis, or King's Lynn. In the civil wars of Charles I. the town stood out for the king, but capitulated A.D. 1643, after a siege of three weeks, to the earl of Manchester, the parliamentary commander for the eastern associated counties. A conspiracy was formed soon afterwards to surprise the parliamentary garrison, but it was detected, and the projector (the well-known Sir Roger L'Estrange) was kept for some years in prison.

The town at present extends in length about a mile on the east bank of the river, and about half a mile in breadth. It is traversed or bounded by several narrow streams or 'fleets,' over which are many bridges. There is no bridge in the town over the Ouse, which is about as wide as the Thames at London Bridge; but there are bridges about a mile above the town over the Eau Brink, which is a modern cut, and the old channel of the Ouse; by which bridges there is communication with West Lynn as well as with Wisbeach and the Lincolnshire Fens. The town was formerly defended on the land side by walls, in which were nine bastions and three gates. One of the gates on the south side of the town remains, and there are a few fragments of the walls: the fosse, which was outside the walls, still encircles the town. On the north side of the town is St. Ann's Fort, a battery of heavy guns, intended to guard the passage of the river. The town is well paved and lighted, but not well supplied with water. The three principal streets are parallel to the river; smaller streets connect them or branch from them. The houses are chiefly old and inconvenient, except in the more modern parts of the town. The Tuesday market-place, in the northern part of the town, comprises an area of three acres, and is surrounded by some good houses. There is in it a market-cross, an octagonal building, erected A.D. 1710, now in bad repair, having an Ionic peristyle rising to the first story, surmounted by an open gallery. The Saturday market is held in a convenient area near St. Margaret's Churchyard. There are also a cattle and a fish-market. The guildhall is an antient building of stone and flint, with court-rooms, assembly-rooms, &c. There is a borough gaol, but it is not sufficient for the proper classification of the prisoners. There are an exchange and a custom-house in one building, an excise-office, and a theatre, a modern building, well arranged and fitted up. The borough comprises the united parishes of St. Margaret and St. Nicholas, and the parish of All Saints in South Lynn. The church of St. Margaret is a cross church of spacious dimensions, which was once much larger. It contains portions of the early, decorated, and perpendicular styles of English architecture. The chancel or choir, which is early English, has a fine east window, and two octagonal turrets crowning the buttresses at the angles. There are two western towers, one of which formerly had a lofty spire, and there was formerly a lantern or tower at the intersection of the transept. The charnel-house, in the churchyard, was some years back used as a grammar-school, but a new school-house has been since built. The chapel of St. Nicholas is very large, being 194 feet long and 74 wide, inner dimensions. It consists of a lofty nave with side aisles, but without any transept or distinct choir: it is chiefly of decorated or perpendicular English architecture, with large east and west windows. It has a very rich south porch, and a fine wooden roof. It had a spire 170 feet high, which was blown down a century ago. All Saints' Church is also a cross church, but of smaller dimensions than St. Margaret: the tower, which fell down in 1763 and demolished part of the church, has not been rebuilt. Beside the churches there are the remains of some other ecclesiastical edifices. There is an hexagonal tower 90 feet high, a remain of the Grey (or Franciscan) Friars' monastery, which serves as a landmark to vessels entering the harbour. The chapel of our Lady on the Mount, or Red Mount Chapel, is on the east side of the town, and is remarkable for the beauty of its architecture: it is a small cross chapel of stone, and is erected on the walls of a more antient building of coarse red bricks, an irregular octagon, about 26 feet in diameter, with buttresses at the angles. St. James's Chapel was lately used as a workhouse. There are several dissenting meeting-houses in Lynn.

The population of the borough in 1831 was 13,370, of which a very small proportion was employed in agriculture or in manufacture properly so called. Rope and sailcloth are the only manufactures, and of the latter but little is made. The trade of the place is however great. It is the port of that large portion of the midland counties which is watered by the Ouse. The harbour is shallow, and the channel by which it is approached from Lynn Deeps is rather intricate. Some parts of this channel are not more than one foot deep at low-water in spring tides; and in following the channel from Lynn seawards, it is necessary to go at least five miles before reaching a depth of six feet. The banks on each side of the channel are then dry in some places to the height of ten or twelve feet. 'Lynn deeps' are the deeper parts of the channel out to sea, but they are ten or twelve miles below Lynn, following the course of the channel. (Commander Hewett's *Survey of Lynn and Boston Deeps.*) The exports are chiefly corn and agricultural produce, sent coastwise, and a fine white sand, found near the town, and used in making glass. A vast quantity of shrimps, caught on the shores of the Wash, are sent to London. The imports are corn and coal; timber from America; timber, deals, hemp, and tallow from the Baltic; wine from France, Spain, and Portugal, &c. Formerly many ships were fitted out for the Greenland whale-fishery, but this branch of industry has been in a great degree given up. Ship-building is not carried on to the extent it formerly was. There is a corn-market on Tuesday, and a market for general commodities on Saturday. There are two yearly fairs.

The corporation under the Municipal Reform Act consists of six aldermen and eighteen councillors, one of whom is chosen mayor: by the same act the borough was divided into three wards. Lynn has sent two members to parliament ever since 23rd Edward I. The parliamentary constituency in 1833 consisted of 257 freemen and 608 ten-pound householders; together 865. The parliamentary and municipal boundaries coincide, and include an area of 2620 acres.

The living of St. Margaret is a perpetual curacy united with the perpetual curacy of St. Nicholas; their joint yearly value is 138*l*. All Saints is a vicarage, of the clear yearly value of 134*l*., with a glebe-house. Both are in the archdeaconry of Norfolk and diocese of Norwich.

There are at Lynn an endowed grammar-school, national and Lancasterian schools, and several private schools; a mechanics' institute, a parochial library in St. Margaret's Church, and a public subscription library. There are four hospitals or almshouses, and many other charitable institutions.

LYNX. The name of *Lynxes* is applied by zoologists to a subdivision of the great genus *Felis*, or Cats, well marked externally, and elevated by Mr. Gray to the rank of a genus, under the appellation of *Lyncus*.

There does not appear to be any considerable difference between the organization of the Lynxes and that of the other Cats; but it is extremely probable that there is some modification about the bones of the tongue, and the organ of the voice generally, to produce the peculiarly powerful noise analogous to what is called 'spitting' and 'swearing' in the domestic cat.

Linnæus, in his last edition of the *Systema Naturæ*, records but one species, *Felis Lynx*, to which he assigns the woods and deserts of Europe and Canada as localities. This was probably the *European Lynx*, and the descriptions may have been founded on Lynxes from Canada as well as Europe.

Gmelin, in his edition, adds three other species, *Feles Chaus, Caracal*, and *rufa;* and gives two varieties of *Felis Lynx*, with Europe, America, Northern Asia, and even Japan, as the habitations.

Pennant notices seven species of Lynxes,—the *Mountain Lynx*, Cat-a-mountain of Ray (North America), the *Serval*, the *Lynx*, the *Bay Lynx*, the *Caspian Lynx*, the *Persian Lynx*, and the *Libyan Lynx*. He states that the third inhabits the vast forests of the north of Europe, Asia, and America; 'not India, though poets have harnessed them to the chariot of Bacchus, in his conquest of that country.' The fourth, he says, is an inhabitant of the inner parts of the province (now the State) of New York. To the fifth he assigns the 'reeds and woods in the marshy parts that border on the western sides of the Caspian Sea, particularly about the Castle Kislar, on the river Terek,' and the Persian provinces of Ghilan and Mazanderan; adding that it is frequent about the mouth of the Kur, the antient Cyrus. Persia, India, and Barbary are the countries which he states to be the localites of the sixth; and Libya and Barbary are mentioned by him as the countries of the seventh. It is doubtful what animals Pennant meant to designate under some of these names. The *Serval* is not considered to be a *Lynx*.

Cuvier observes that there are known in commerce, under the name of *Loups Cerviers* (Lupus cervarius), four or five sorts of Lynxes, which had long been confounded by naturalists, and whose specific limits were not perhaps well fixed when he wrote. We shall proceed to notice the arrangement of M. Temminck, and then return to observe what part of it is adopted by the Baron.

M. Temminck gives the following as species:—

Felis cervaria; described as nearly equalling a wolf in size, and possibly the *Kattlo* of Linnæus and the Swedes; but it has been remarked that no skins of it are contained in the cargoes that arrive from the Baltic. In commerce the skins of *F. cervaria* are said to be only obtained from the markets of Moscow, to which they are brought from the provinces of Asia. It is considered as probable that this species may have been confounded, under the name of the *Canadian Lynx*, with

2. *F. Borealis*, which is intermediate in size between the fox and the wolf. This comprehends the *Canadian* but not the *Mississippi Lynx* of Cuvier, and is said to inhabit the north of both the old and the new continents: its fur, less valuable than that of *F. cervaria*, is stated to be received equally from Sweden and from Hudson's Bay.

3. *F. Lynx* (true Lynx), different from, but nearly allied to, *F. cervaria, F. Borealis, F. rufa*, and

4. *F. pardina*. Size of a badger, but the legs longer, resembling *F. rufa* in form and size; tail short, but longer in proportion than that of *F. Lynx*. *F. pardina* is the *Loup Cervier* of Perrault, and is found only in the south of Europe, the centre being the locality of the true *Lynx*.[*]

5. *F. Caracal*; *Nubian Caracal;* and *Cat of the Desert* of Bruce; *Persian Cat* (*Lynx*) of Pennant.

6. *F. aurata*. Rather less than the Caracal. Country unknown. Skin purchased from a London dealer.

7. *F. Chaus* (Güldenstedt), figured by Schreber. The other animals described under this name are considered to be referrible to

8. *F. Caligata; Booted Lynx* of Bruce; *F. Libycus* (Olivier); *Libyan Caracal* of Buffon.

Of these Baron Cuvier notices *Felis cervaria* as the finest and largest; *Felis Borealis; Felis Lynx*, which has almost entirely disappeared from populous countries, but is still to be found in the Pyrenees, the mountains of the kingdom of Naples, and even, it is said, in Africa; *Felis pardina*, Oken, from the south of Europe; *Felis rufa*, Gülden.; and *Felis Chaus*, or *Lynx of the Marshes* of Caucasus, Persia and Egypt. Cuvier further observes that it is believed at present that the *Booted Lynx, Felis caligata*, Temm., may be distinguished from *Felis Chaus;* but he remarks that *F. caligata* is at least very nearly approximated to it, and that it has the same habits.

Felis Caracal (Persia, Turkey, &c.), which he considers to be the true Lynx of the antients, closes Cuvier's list of species; but he alludes in a note to *Lynx fasciatus, L. Floridanus*, and *L. montanus* of Rafinesque; and to *Felis aurata* of Temminck, as belonging to this tribe.

Mr. Gray places his genus *Lyncus* (subfamily *Felina*) between the genera *Felis*, Linn., and *Prionodon*, Horsf.

M. Lesson gives the following species:—1. *F. Lynx*, the '*Loup cervier* of the furriers, *Goupe* of the Norwegians, and *Wargelue* of the Swedes, who recognise three very different varieties of it.' He states that the whole of Europe is its habitat, where it has become very rare, and he says that they point out (' on indique') a pale variety, '*Felis rufa*, Pennant?' and that ' le capitaine Brooks en indique trois,' which may be, in his (the captain's) opinion, regarded as species. 2. *F. pardina*, Oken, Temm.; *Loup cervier* of the French Academicians; to this Portugal, Sardinia, Sicily and Turkey are assigned as localities. Next follows *Felis Serval*, which cannot be considered a Lynx. 3. *F. cervaria*, Temm. 4. *Felis Borealis* (Chat du Canada, Geoff.), to which the northern countries of America and Asia are given as its distribution. 5. *Felis Caracal*, the *Lynx* of the antients (Africa, Persia, and Arabia). M. Lesson describes the differences of the Caracals of Algiers, of Nubia, and of Bengal. 4. *F. Chrysothrix* and *F. aurata*, Temm.; country unknown. 5. *F. Chaus*, Gülden. (Egypt, Nubia, and Caucasus). 6. *Booted Lynx* (*F. caligata*, Bruce, Temm.; *F. Libycus*, Oliv.). To this a range is given from Egypt to the Cape of Good Hope in Africa, and the south of Asia. M. Lesson also notices as specifically different the *Felis Manul* of Pallas and Desmarest, a species not admitted by Temminck, but which has, according to Pallas, the appearance of the *Lynx*. (Mongolian Tartary.)

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[*] With respect to *Felis Pardina*, Col. Sykes makes the following statement 'Although Temminck, in his "Monographie de Mammalogie," p. 116, in a note, says the skin of this European *Felis* is well known amongst the furriers as the Lynx of Portugal, I have nowhere been able to meet with a specimen in London; and as amongst my friends scarcely any one appeared to be aware of the existence of a Spanish Lynx, I thought it might be acceptable to the members to exhibit specimens in a state of maturity and nonage. In Andalusia, whence the specimens come, it is called *Gato clavo* (*clavo* meaning the pupil of the eye), illustrative of the spotted character of the skin. Some peasants in Andalusia make short jackets of the skins. The animal inhabits the Sierra Morena. I bought both skins at Seville for thirty reales, about 6*s*. 3*d*. Neither the British Museum nor the Zoological Society has specimens.

'Temminck describes the *Pardina* as "Toutes les parties du corps *lustre*, a peu près de la même teinte que dans le caracal." This is certainly not the description of my animal, the colour of the adult being reddish-gray, and that of the non-adult light fawn; nevertheless there are so many other points common to both, that it would be unadvisable to consider them distinct.' (*Zool. Proc.*, 1838.

Sir William Jardine ('Naturalist's Library,' Mammalia, vol. ii., 1834), who adopts the genus *Lyncus* or *Lynchus* of Mr. Gray, as the fifth genus of the *Felinæ*, enumerates the following species: *Lynchus Caracal*; *L. aurata*; *L. Chelidogaster*, inhabits Chili (Temm., Mus. Leyd.); *L. caligata*, Bruce; *L. nigripes*, Burchell, inhabits South Africa; *L. Chaus* (Gülden., Rüpp.); *L. Canadensis*; *L. rufa*, Bay Lynx, inhabits banks of Colombia river, United States, not Canada (Temm.); *L. fasciata*, Banded Lynx (Richardson), inhabits N. America, woody countries in the neighbourhood of the Pacific (Lewis and Clark); and *L. Lynx*.*

Sir William Jardine remarks that there is yet considerable confusion among the Lynxes of America, and that, except the Canada Lynx, the species are perhaps not well determined. He observes that Mr. Vigors and Dr. Horsfield describe one under the title of *F. maculata* from Mexico.

Sir William further states that another Asiatic Lynx may be perhaps added in the *Felis affinis* of Mr. Gray, figured in his 'Illustr. of Indian Zoology.'

It may be necessary also to call the reader's attention to two species of *Felis*, one in the volume of the 'Naturalist's Library,' *F. Servalina*, figured as *F. ornata*, which Sir W. Jardine at first considered as identical with Mr. Gray's species with the last-mentioned name, but which Mr. Gray considered to be distinct. The figures of both *F. ornata*, Gray ('Illustr. Ind. Zool.'), and *F. servalina*, Jardine, have small tufts on the tips of their ears, and are otherwise inclined to be lynx-like; as if they formed the passage between some of the smaller Spotted Cats and the Lynxes.

Mr. Swainson ('Natural Hist. and Classification of Quadrupeds,' 1835) having compared the two typical forms of the *Feræ* and *Raptores*, observes that it remains to be ascertained which group among the *Feræ* may be likened to the *Owls*, and he fixes upon the *Lynxes*, because *Lynxes* and *Owls* are both nocturnal animals, both have short tails and comparatively large heads; and because the *Owls* 'are particularly remarkable for certain appendages or tufts which rise above their ears,' whilst in the *Lynxes* the 'ears are long, and from the tip of each arises a tuft of lengthened hairs, perfectly analogous to the tufts of lengthened feathers on the horned *Owls*, the most typical birds of the family of *Strigidæ*.' His only notice of *Lynx* in the 'Classification' at the end of the volume is '*Lynx* Antiq., ears tufted with hairs, tail short;' and it appears as the fifth and last subgenus of *Felis*, Linn., the other four being,—1. 'Leo Antiquorum, *Lions*, head and neck furnished with a mane of long hair, tail tufted. 2. *Felis*, *L. Cats*, no main, tail long, not tufted. 3. Cynailurus, Wag., *Hunting Leopards*, claws semi-retractile; and, 4. Prionodon, Horsf., affinities uncertain.'

The *Lynxes* may be divided into two groups: the first consisting of those species whose bodies are comparatively slender, and whose tails and tufted ears are comparatively long; the second of those whose bodies are thicker and stout, and whose ears and tail are comparatively short. The *Caracal* is an example of the first subdivision; and the *European* and the *Canada* Lynxes of the second. Sir Wm. Jardine considers the tufts of hair at the tips of the ears as somewhat inconstant, and only present in spring, or at the commencement of the breeding season, like those adorning the ears of many squirrels.

It is evident that much doubt still hangs about many of the species, and we shall endeavour to lay before the reader some of those forms which are most free from uncertainty.

LYNXES OF THE OLD CONTINENT.

As examples of the Lynxes of the Old World we select the following species:—

The Caracal. M. Temminck describes this species (*Felis Caracal*), which is the *Siyah Ghush* or *Black-ear* of Charleton and others, as having a pale reddish-brown fur with a vinous tinge, the red becoming paler as it reaches the lower parts. Two spots of pure white above the eyes, the uppermost on the inner side of the eye, the lower at its external angle. Termination and edges of the upper lip, chin, breast, belly, and insides of the legs pure white; parts whence the whiskers spring, black; back of the ears at the base, deep black, more grey towards the tips, which are tufted with long black hairs. Length, 2 feet 10 inches, of which the tail measures 10: average height about 14 inches.

Mr. Bennett (*Tower Menagerie*) describes the Caracal as larger than the Fox, and the whole of the upper surface of the body as of a deep and uniform brown, the hairs being for the most part slightly tipped with grey; the under and inner parts nearly white; and the chin, lower lip, and two spots, one on the inner side of and above the eye, and the other beneath its outer angle, completely white; neck and throat of a lighter and brighter brown than the rest of the fur; the ears long and upright, tapering gradually to a fine tip, surmounted by a pencil of long black hairs, and black externally and whitish within; whiskers short, taking their origin from a series of black lines which occupy the sides of the muzzle; at some distance behind them, in front of the neck on each side, a short and thick tuft of lighter coloured hairs; tail eight or nine inches long, of the same uniform colour with the body from base to tip.

The description of Mr. Bennett is very good, and so is that of M. Temminck. Slight variations of colour as to the hue depend most probably on sex, age, and locality. There are three or four specimens now living in the Garden of the Zoological Society of London (Regent's Park). The finest of these, now in very fine condition, was brought over with the Giraffes.

Geographical Distribution.—Persia, India, Barbary (Pennant); Persia, Turkey, &c. (Cuvier); the whole of Africa from Egypt and Barbary to the extremity of Caffraria, and the southern half of Asia, at least as far eastward as the Ganges (Bennett). N.B., the specimen from which Mr. Bennett took his description is noticed by him as a native of Bengal, and he observes that there is no difference of any importance between it and the African variety. Cuvier, to whom M. Duvaucel sent drawings of the animal from Calcutta, was convinced that this is the case. He refers to the *Caracal à longue queue* of Buffon's Supplement, iii., pl. 45, and observes there is no difference between that and the others, and that the first Caracal of Buffon had a mutilated tail. Africa, Arabia, Persia (Fischer); Africa, Persia, Arabia (Lesson); Southern India and Africa (Jardine).

Habits, Food, &c.—This species is said to follow the lion and other large beasts of prey, most probably for the purpose of feeding upon what they leave. But in addition to this it feeds on small quadrupeds and birds, the latter of which it is said to pursue actively on trees. It has obtained the name of lion's provider, most probably from its dogging the footsteps of the lion and having been found preying upon the carcasses which the former has left. According to M. Temminck, the Caracals hunt in packs like the wild dogs, and so run down their prey. Pennant, quoting Thévénot, notices their feeding on the remains of the prey which the lion leaves, and seems to confirm the account given by M. Temminck, for he states that they are often brought up tame, and used in the chace of lesser quadrupeds and the larger sorts of birds, such as cranes, pelicans, peacocks, &c.: when they seize their prey, they hold it fast with their mouth and lie motionless on it. Pennant, quoting Hyde, also states that the Arabian writers, who call it *Anak el Ard*, say that it hunts like the panther, jumps up at cranes as they fly, and covers its steps when hunting. In captivity the Caracal is generally very ill-natured and irritable, and does not seem to hold out much promise for domestication; but we are aware that it is not safe to come to conclusions of this sort upon the evidence of an unhappy irritable animal shut up in a cage, when nature intended it for unlimited roamings. Since the above was written, we have seen a young Caracal in the Garden of the Zoological Society at the Regent's Park that might be rendered very tame with a little attention: it is already familiar, anxious to be noticed, pleased with being caressed, and playful as a kitten. Dr. Charleton however gives evidence of the fierceness and strength of this species, for he relates that he saw one fall on a hound, which it killed and tore to pieces in a moment, though the dog defended itself to the utmost.

This animal derives its name of *Caracal* from the Turkish words *kara*, black, and *kulach*, ear; and the Persian name *Siyah Gush* or *Sia-gusch* (*sia*, black, and *gusch*, ear) is derived from the same characteristic markings.

Authors seem to concur in holding that this is the λύγξ

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* In the article LION, vol. xiv., p. 36, in the enumeration of the species of Puma adopted by Sir William Jardine, the word 'Pajeros' has been interpolated between 'P.' and 'chalybeata,' and 'P. Yaguarundi' is omitted. The correct list, as given by Sir William, is, 'P. concolor, P. nigra, P. Yaguarundi, P. Eyra, P. Pajeros, P.? chalybeata.' Figures of Felis Yagouarondi and Felis Pajeros are given in 'The Zoology of the Voyage of H.M.S. Beagle,' edited by Mr. Darwin and published with the approval of the Lords Commissioners of the Treasury, now in course of publication.

Lynx, of the antients, and though we lean strongly to this opinion, the reader should bear in mind that the latter evidently used the term to denote various animals, as Gesner well remarked. The 'lynces Bacchi variæ' of Virgil (*Georg.*, iii. 264) and the skin 'maculosæ lyncis,'* alluded to by the same author (*Æneid.*, i. 323), can hardly be held to apply to the *Caracal*, though Ovid's line (*Met.*, xv. 413)

> 'Victa racemifero lyncas dedit India Baccho'

may. The truth seems to be that the antients themselves had no very precise ideas of the animal which was accorded to Bacchus as one of his attributes. The terms Lynx, Panther, and Tiger seem to be all employed to designate this animal or these animals; and if we refer to gems or coins or other antient monuments, the *Lynces*, to play somewhat unpardonably perhaps on Virgil's expression, will be found to be sufficiently *variæ*. The animals represented on the antient sculptures have generally the round ear of the Lion, Tiger, and Panther or Leopard; and their general contour is that of the Lion, Lioness, or Panther, and Leopard. See, for instance, No. 30, No. 37, in Room 1; Fragments of Terracottas in Room x.; No. 8 (Bacchus and Ampelus), Room iv.; No. 40 (Libera, or Female Bacchus), Room vi.; No. 12, Room iii.; and No. 7, Room ii., of the Townley Gallery in the British Museum; and the publication by the Society for the Diffusion of Useful Knowledge, 'British Museum: Townley Gallery,' vol. i. and ii. The Lion's skin, with which, as well as that of the Panther and Roe, he was represented, appears on the colossal statue of Bacchus in the Elgin collection in the British Museum.† In the edition of the *Gemmæ et Sculpturæ Antiquæ*, by Gronovius, we find in the 'Carro di Baccho,' alluded to in the article **Leopards**, a child in a chariot driving two round-eared spotted great cats: and, in the next gem figured, 'Tigre di Bacho,' also a cornelian, we have a round-eared spotless female great cat with a tuft at the end of the tail, which no Panther, Leopard, or Lynx possesses.

In the coin of Septimius Severus, noticed in Captain Smyth's 'Catalogue,' between the figures‡ is a Lynx or Panther, illustrating the verse of Propertius:—

> 'Lyncibus ad cœlum vecta Ariadne tuis.'

Nor does there occur to us any antient statue, gem, or coin whereon the 'Lynx' of Bacchus is represented with pointed ears tufted at the summit, the characteristic mark of that subdivision of the cats denominated *Lynxes* by modern zoologists; though we by no means feel sufficient reliance upon our limited experience to consider this negative evidence as conclusive. The animal in the Palestrine Mosaic, with the word 'Lynx' below it, is represented with a tail of considerable length, and cannot be mistaken for one of the animals now called Lynxes; indeed, if we do not err, the Abbé Barthélemi observes that this animal bears a strong resemblance to a horse.

That the Λύγξ of Aristotle, Ælian, and Oppian was not one of the doubtful animals above alluded to, but one of the Lynxes of modern zoologists, there can be, in our opinion, no doubt.

Ælian (xiv. 6) gives such a description of his Lynxes, with the tips of their ears tufted, their leaping on their prey, and their tenacity in holding it, as cannot be mistaken; and he quotes two lines of Euripides, to show that the animal which he is describing is the Lynx of that poet. Oppian (*Cyneget.*, iii., v. 84) also gives such an account of his Lynxes as can be referrible to no other animals than those on which we are treating. He speaks of two kinds, notices their preying on hares, and leaping upon stags and oryxes.

Pennant conceived that the European Lynx was the Λύγξ of Ælian and Oppian, and the *Chaus* of Pliny; with regard to the former, we think, without due consideration. The *Caracal* comes much more within Oppian's description than the European Lynx. Oppian expressly notices the ruddy and the yellow colours of his two kinds, but mentions no spots. The localities of the *Caracal*, combined with the other evidence, make it much more probable that it should be the animal designated as a Λύγξ by Aristotle and Ælian, and one, at least, of the two kinds mentioned by Oppian, if his differences were not, as they well might be, those of climate, sex, or age. Mr. Bennett ('Tower Menagerie') thinks that the *Caracal* is unquestionably identical with the 'Lynx' of the antients, though the name has been usurped in modern times for an animal of northern origin, utterly unknown to the Greeks, and known to the Romans by a totally different appellation.

The Caracal.

The Booted Lynx, *Felis caligata*, Bruce, Temm.; *F. Libycus*, Olivier; *F. Chaus*, Thunb., Geoff. (part); *Lynx des Marais* (part), Cuv. (Fischer).

Description.—Small, total length about three feet, of which the slender tail measures rather more than one-third, or thirteen inches and a half; ears large, red within, tipped with a pencil of brown short hairs; sole and posterior part of the foot (leg, in common parlance) deep black; upper parts of the body bluish grey, in some specimens fulvous, clouded with grey and sprinkled with black hairs; lower parts, including the under parts of the neck and breast, reddish; thighs marked with indistinct bands of rather bright brown; two rather bright ruddy bands on the cheeks; tail at its base colour of the back, black at the tip, and with three or four incomplete rings above it, which rings are separated by intervals of a more or less pure white.

The *Female* has, generally, the tints more yellow.

The *Young* have well-defined dark bands upon their sides.

Geographical Distribution.—Africa, from Egypt and Barbary to the Cape of Good Hope; the south of India.

The Booted Lynx.

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[*] 'Succinctam pharetrâ et maculosæ tegmine lyncis.'

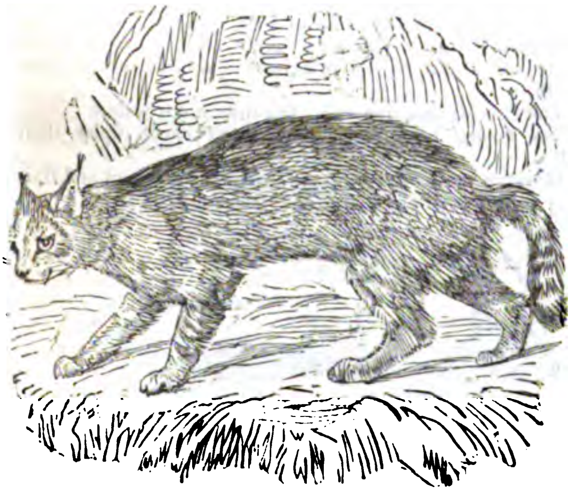
[†] See 'Library of Entertaining Knowledge:—British Museum—Elgin and Phigaleian Marbles,' vol. ii.

Hercules and Bacchus.

Food, Habits, &c.—The *Booted Lynx* preys upon birds and small quadrupeds; of the former the Guinea-fowl is much sought after by the African varieties. Like others of the subdivision, it will make a good meal on carrion, and feast on the remains of larger quadrupeds which have fallen before the great beasts of prey.

The Chaus, Felis Chaus, Güldenst.; *Lynx des Marais* (part), Cuv.; *Mota Rahn Munjur*, or *Larger Wild Cat*, of the Mahrattas (Col. Sykes).

Dr. Rüppel's figure and description have dissipated the confusion that formerly reigned with regard to this and the preceding species. He states that the *Chaus* is well covered with hair all over, and of this covering that which forms the ground-work is woolly, very soft, and plentifully developed; the hairs are not thickly set. The colour of the woolly hair is of a dirty palish ochre-yellow, darker on the back and lighter on the under parts; the hairs or bristles are of the same colour at bottom, have a dark-brown ring in the middle, and at the tip are of a greyish yellow, whitish, or saffron-colour; so that the appearance produced is a mixed colouring of greyish yellow and dirty white. Many of the hairs have a black point, and on the sides, where many lie together, they form pale black perpendicular or oblique spiral lines, and here and there single black points. The hairs of the back are of a light ochre-yellow, with points almost of a saffron colour, and form from the shoulders to the tail a yellow stripe, which is darkest on the cross. The nose is black; above the eye is a large white spot, and below it a smaller one of the same colour. A black streak runs from the inner corner of the eye to the nose. The edges of the lips are bordered with black, and a fine white ring encircles them. The eyebrows, cheeks, and bristles of the whiskers are white, and among the latter are a few hairs of a shining black. The inner surface of the ear, towards its outside, is bordered by tufts of hair which are white and yellow; the back of the ear is grey brown, and the tips are brown with terminating black tufts, half an inch in length; the cheeks, lower jaw, throat, neck, and chest are ochreous yellow, and the belly inclines to whitish yellow with darker spots. Externally the anterior and posterior extremities are of the general colour down to the ankles (which are dirty ochreous yellow and black behind), and barred with four or more black transverse bands. The inside of the limbs is yellowish, and there is a large round black spot on the fore-legs. The tail is about one-fourth as long as the body, of a greyish colour, blunt and black at the point, towards which are two black rings between two greyish white ones; but neither of these is very distinct. (Rüppel.)



The Chaus (Rüppel.)

Geographical Distribution.—North of Africa; how far up the Nile is not ascertained. In the morasses and bushy lowlands that border the Caspian Sea, and on the banks of its tributary rivers. Said to be more numerous in Persia. Noticed in Deccan by Col. Sykes. The female that served for Dr. Rüppel's description and figure was killed at the Lake of Menzale, in the Delta of Egypt.

Habits, Food, &c.—This species haunts marshes and boggy regions, and goes hunting during the night after birds, small rodents, and fishes; it seldom climbs trees, and is not easily tamed. (Rüppel.

The *Chaus* of Pliny (*Nat. Hist.*, viii. 19), which the Gauls called Raphius, with the figure of a wolf and the spots of a pard, first shown at Pompey's games, can hardly, we think, have been this animal.

European Lynxes.

The European Lynx. Felis Lynx, Linn.; *Le Lynx*, Buff.—Fur long, of a dull reddish grey above, with oblong spots of reddish grey upon the sides, the spots on the limbs rounder and smaller; whitish below, mottled with black. Length about three feet.

This species varies much. In winter the fur is much longer than it is in the summer, and has a hoary appearance in the former season, owing to the long hair being then tipped with greyish white. The tail, which is black at the end, is short, not more than six or seven inches long.

Geographical Distribution.—Some authors confine the locality of this species to Europe; others are of opinion that it increases in numbers as it approaches the borders of Asia, which it also inhabits, and abundantly. France is considered its most northern range. It does not seem to be quite clear that *Felis cervaria* of Temminck is not a variety of this species. But *F. cervaria* inhabits the north of Asia, and skins are sent from Moscow. This is supposed to be the *Kattlo* of the Swedes by some, while others consider *F. Lynx* to be the *Goupe* of the Norwegians and the *Wargelue* of the Swedes. If these differences should prove to be well founded, it may be that there are two European species, or at least varieties, one inhabiting southern Europe not higher than France and the warm parts of Asia, and the other inhabiting the north of Europe and Asia.

Habits, Food, &c.—The European Lynx feeds upon small quadrupeds and birds, in search of which it often climbs trees.

This species is supposed by many to be the *Lupus cervarius* of Pliny (*Nat. Hist.*, viii. 22) and the *Chaus* (viii. 19) above alluded to. Both are spoken of as shown in the arena by Pompey, and as coming from Gaul. Dr. Fischer, who is of this opinion, supposes it also to be the *Lynx* mentioned by Pliny in his chapter 'De Ungulis' (viii. 46).

European Lynx.

The European and northern Asiatic Lynxes and the Canadian Lynx produce the great supply of furs known by the furriers under the name of lynx. The colder the climate the fuller and the more valuable is the fur.

American Lynxes.

We select as our example the

Canada Lynx, Felis Canadensis (Geoff.). Dr. Richardson ('Fauna Boreali Americana') states that the early French writers on Canada, who ascribed to this species the habit of dropping from trees on the backs of deer, and destroying them by tearing their throats and drinking their blood, gave it the name of *Loup Cervier.* The French Canadians, he adds, now term it indifferently *Le Chat*, or *Le Peeshoo.* He remarks that the mistake of Charlevoix in applying to it the appellation of Carcajou, which is proper to the wolverene, has produced some confusion of synonymes amongst subsequent writers. Other writers however consider that Charlevoix intended to designate the Puma by the name of Carcajou, though he used the term improperly. If the following be the passage alluded to, it can hardly be applied to the Canadian Lynx—'The elk has other enemies besides the Indians, and who carry on full as cruel a war against him. The most terrible of all these is the Carcajou, or Quincajou, a kind of cat with a tail so long that he twists it several times round its body, and with a skin of a brownish red. As soon as this hunter comes up with the elk he leaps upon him, and fastens upon his neck, about which he twists his long tail, and then cuts his jugular,' &c. &c. (*Letter* vii.) Now though there may be a little exaggeration about the length of the tail, and the use which the animal makes of it, the description is generally applicable to the Puma, and not to the Lynx, which has a mere stump of a tail, whilst the Puma has a remarkably long one. [GULO; LIONS, vol. xiv., p. 36.]

Description.—As there is some question about this species—for Pennant notices it as identical with the European Lynx, and M. Temminck describes the species as the same in both hemispheres, under the name of Felis Borealis, whilst M. Geoffroy has named it as a distinct species—we shall give the description of Dr. Richardson, who adopts M. Geoffroy's name, at length.

'The *head* is round, the nose obtuse, and the face has much of the form of that of the domestic cat, but the facial line is more convex between the eyes. The *ears* are erect, triangular, and tipped by an upright slender tuft of coarse black hairs; they are placed about their own breadth apart, and on their posterior surface they have a dark mark beneath the tip, which is continued near both margins downwards towards their bases. On the *body* and *extremities* the fur is hoary, most of the hairs being tipped with white; on the crown of the head and for a broad space down the middle of the back there is a considerable mixture of blackish brown, and on the sides and legs of pale wood-brown. In some specimens these colours produce an indistinct mottling, but in general there are no defined markings. A rufous tinge is also occasionally present about the nape of the neck, and on the posterior parts of the thigh. The *tail* is coloured like the back, except the tip, which is black. The *fur* is close and fine on the back, longer and paler on the belly. When blown aside it shows on the middle of the back a dark liver-brown colour from the roots to near the tip, but on the sides it is for the greatest part of its length of a pale yellowish-brown, being merely a little darker near the roots. The *legs* are thick, the toes very thick and furry, and are armed with very sharp awl-shaped white claws, shorter than the fur. There are four toes on each foot, those on the hind foot being rather the largest, but both feet have much spread. Length three feet one inch,' &c.

Dr. Richardson gives the following synonymes, &c.:—*Loup cervier* (Anarisqua) Sagard. Theodat.; *Loup-cervier*, or *Lynx*, Dobbs; *Cat-Lynx*, Penn.; 'Arct. Zool.;' *Cat*, or *Pishu*, Hutchins; *Lynx*, or *Wild Cat*, Hearne, Mackenzie; *Felis Canadensis*, Geoff., 'Ann. du Mus.,' Sabine, Franklin's 'Journ.'; 'Zoological Museum,' No. 72; *Peeshao*, Cree Indians and Canadian Voyagers.

Geographical Range.—The only species of the genus existing north of the Great Lakes, and eastward of the Rocky Mountains. Rare on the sea-coast; does not frequent the Barren Grounds, but is not uncommon in the woody districts of the interior. Found on the Mackenzie River as far north as 66°. (Richardson.)

Habits, Food, &c.—Timid, incapable of attacking any of the larger quadrupeds, but well armed for the capture of the American hare, its principal prey. 'Its large paws, slender loins, and long but thick hind legs, with large buttocks, scarcely relieved by a short thick tail, give it an awkward clumsy appearance. It makes a poor fight when it is surprised by a hunter in a tree; for though it spits like a cat and sets its hair up, it is easily destroyed by a blow on the back with a slender stick, and it never attacks a man. Its gait is by bounds, straight forward, with the back a little arched, and lighting on all the feet at once. It swims well, and will cross the arm of a lake two miles wide;[*] but it is not swift on land. It breeds once a year, and has two young at a time.' (Richardson.)

Utility to Man.—The skin of the Canada Lynx forms a considerable article in the fur trade; the annual importation by the Hudson's Bay Company is stated at from seven to nine thousand. Dr. Richardson says that the natives eat its flesh, which is white and tender, but rather flavourless, much resembling that of the American hare.

The Canada Lynx.

Those who would wish to read of the fabulous qualities gravely attributed to the quick-sighted lynxes, and the use of some of their parts in the antient 'Pharmacopœia,' may consult Pliny, *Nat. Hist.*, viii. 38; xxviii. 8; and Ovid, *Met.*, xv. 413. See also the article BELEMNITE.

LYNX, a constellation of Hevelius, situated directly in front of Ursa Major, the head of the animal being half way between *a* Ursæ Majoris and Capella. Its principal stars are as follows:—

Character.	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.)	Astron. Society.	
a	1	770	5½
b	2	776	4
e	15	847	5
k	27	987	5
m	31	1014	5
p	38	1125	4
r	40	1131	4
	(245)	1103	5

LYON, or LION, a city in France, formerly the capital of the district of Lyonais, now of the department of Rhône, situated at the confluence of the Rhône and the Saône, in 45° 46′ N. lat., and 4° 50′ E. long.; 240 miles in a direct line south-east of Paris; 286 miles by the road through Sens, Auxerre, Autun, and Châlons sur Saône; 288 through Fontainebleau, Nevers, Moulins, and Roanne; and 303 by Troyes, Dijon, and Châlons sur Saône.

The common opinion is that Lyon was founded by L. Munatius Plancus, commander of the legions in Gaul at the time of Julius Cæsar's death, who settled here the people of Vienna (Vienne), who had been driven from their own home by a revolt of the Allobroges, about 42 B.C. It seems improbable however that a situation so advantageous should have been entirely neglected by the Gauls; and the Celtic name given to the place, Lugudunum or Lugdunum (a name common to two other towns, Lugdunum Batavorum, now Leyden, and Lugdunum Convenarum, now St.

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[*] In reference to the allegation that Charlevoix refers to this animal when he uses the term Carcajou, we may remark that in the continuation of his account he describes the Elk as fleeing to the water the moment he is seized; for 'the Carcajou, who cannot endure the water, quits his hold immediately, but if the water happen to be at too great a distance, he will destroy the elk before he reaches it.'

Bertrand de Comminges), prevents our ascribing its origin wholly to Plancus.

Cæsar does not mention Lugdunum, which has furnished one of the reasons for denying to the town any higher antiquity than the time of Plancus; but the reason seems altogether insufficient.

Almost thirty years after the settlement of the Viennese, Plancus established at Lugdunum a Roman colony, or rather a municipium; such at least is the opinion of Father Menestrier, the Jesuit, in his erudite history of Lyon: others make the settlement of the Viennese and of the Roman colony to have been simultaneous.

Augustus was in Gaul about the time when Plancus is supposed to have established his colony, and appears to have made Lugdunum his place of residence for some time, an indication of the rising importance of the place. Strabo, writing a few years after, describes it as the most populous city of Gaul, except Narbonne (iv. 192, *Casaub.*). It was the great mart of the Romans, who had, even at that early time, a mint for coining gold and silver money, and it gave name to one of the four great divisions of Gaul. An altar was erected here by sixty of the nations of Gaul, by common consent, in honour of Augustus.

Coin of Lyon.

British Museum. Actual size. Silver.

Both Tiberius and Caligula appear to have favoured the town. The latter visited it, and instituted games professedly in honour of Augustus, about A.D. 40. The emperor Claudius, himself a native of Lyon, raised it from the rank of a municipium to that of a colony, in the strictest sense of the term, and regulated its local government. But its greatness received soon after a terrible blow; it was utterly destroyed in a single night by fire, originating, it has been conjectured, from lightning, about A.D. 59, according to some, but according to other calculations, about A.D. 64 or 65. The rebuilding of the city was promoted by a grant from the emperor Nero, to whom the citizens manifested their affection and fidelity in his downfal. Upon Vitellius assuming the imperial purple, they embraced his cause; and he stayed some time at Lugdunum on his way from the Rhenish provinces to Rome. Domitian, afterwards emperor, came to this city on the overthrow of Vitellius, to establish the authority of his father Vespasian in Gaul.

In the contest of Clodius Albinus with Septimius Severus Lugdunum became the scene of contest. In an engagement near this town Albinus was totally defeated and slain (A.D. 197). Lugdunum, which had afforded a retreat to the vanquished, was pillaged by the victor, who put most of the inhabitants to the sword, and burned the town, which Herodian describes as being then large and wealthy. In the reign of Probus, Proculus was elected emperor by the people of Lugdunum, who had been ill-treated by Aurelian, and were fearful of the severity of Probus. The latter however defeated Proculus, and caused him to be put to death (A.D. 280).

The usurper Magnentius, having been defeated by Constantius, sole survivor of the sons of Constantine, took refuge in Lugdunum, but was seized by the townsmen, who thus made their peace with Constantius (A.D. 353). Magnentius slew himself to avoid being delivered up. While Julian held the government of Gaul under Constantius, the environs of Lugdunum were ravaged, and the town nearly captured by the Allemanni. The emperor Gratian, pursued by the usurper Maximus, was overtaken and slain at Lugdunum (A.D. 383). In the beginning of the fifth century, in the reigns of Honorius and his successors, the Burgundians seem to have possessed themselves of this town and of the south-eastern part of Gaul, under the sanction of the emperors, who employed them to oppose other barbarians of a fiercer character. [BURGUNDIANS.] On the overthrow of the Burgundian kingdom, Lugdunum came into the power of the Franks.

Lugdunum, during the Roman period, occupies a considerable place in ecclesiastical as well as in civil history. The Gospel had been early introduced into this part of Gaul, and here a severe persecution raged in the reign of Marcus Aurelius Antoninus (A.D. 172 or 177). The churches at Vienna (Vienne) and Lugdunum sent a relation of their sufferings to those of Asia and Phrygia. This account, ascribed by some to Irenæus, 'is written with simplicity and beauty, and is one of the most affecting passages in the antient history of Christianity.' (*Hist. of the Church*, in *Library of Useful Knowledge*.) Pothinus, bishop of Lyon, and perhaps the person who introduced the Gospel into these regions, was one of the martyrs in this persecution. His successor was Irenæus, one of the most eminent of the early Fathers.

In the division of the Frankish kingdom under the Merovingian princes, Lyon, as we may now call it, was included in the kingdom of Bourgogne or Burgundy (A.D. 561-613); but the city was depopulated by a fearful pestilence, and the troubles of the period and the rise of Châlons, which became a royal residence, were unfavourable to it. In the division of the Frankish empire among the grandchildren of Charlemagne (A.D. 843), Lyon, with the district of Lyonais, fell to the lot of the emperor Lothaire, and in the subsequent division of his states (A.D. 855) it fell to Charles, king of Provence, who made it his usual residence. On his death (A.D. 863) it was seized by Charles le Chauve, king of France. On the re-establishment of the kingdom of Bourgogne by Boson (A.D. 879) Lyon was included in his dominions. In the troubled period of the later Carlovingian kings of France, Lyon was subject alternately to that kingdom and to the kingdom of Bourgogne Transjurane. It was in these troubled times that the counts or governors of Lyon succeeded in establishing an hereditary sway, not over the city of Lyon so much as over the districts of Lyonais, Forez, and Beaujolais.

From about A.D. 955, Lyon was under the kings of Bourgogne Transjurane, and, upon the union of that kingdom with the Germanic empire, A.D. 1032, it became part of the domains of the emperors. Under the kings of Bourgogne the counts of Lyonais exercised the functions of government. The city was not however considered as a part of their hereditary fief; and in the reign of Rodolph III., surnamed *Le Fainéant*, Bruchard his brother, archbishop of Lyon, obtained the lordship of the city, which appears to have remained annexed to the see. The emperor Frederick Barbarossa (A.D. 1157) confirmed the temporal jurisdiction of the archbishops, extended it over all that part of their diocese which was in the kingdom of Bourgogne (*i.e.* on the east of the Rhône and Saône), and made them princes of the empire. The archbishops received the title of exarch: they were allowed free and independent jurisdiction, except so far as they were subject to the supreme authority of the emperor and the general laws of the empire. This grant excited the jealousy of the then count of Forez, and stirred up a war between him and the archbishop. Soon after this time Pierre Waldus, or Waldensis, one of the reformers of the church in the dark ages, lived and preached at Lyon.

At Lyon was held, A.D. 1245, the thirteenth general council, in which the pope Innocent IV. pronounced sentence of excommunication and deposition against the emperor Frederick II., on the ground of sacrilege and heresy. A new crusade for the recovery of the Holy Land was agreed upon, and it was determined to render aid to the emperor Baudouin, or Baldwin II. of Constantinople.

The citizens of Lyon appear at this time to have formed a powerful body. There was considerable trade carried on, and many Italian and Swiss families settled here. They were by no means satisfied with the government of their ecclesiastical rulers. Learning that Philippe II., Auguste, had established or extended the power of the municipality of Paris, they determined (in the early part of the thirteenth century) to elect a municipal body, which accordingly they did. The differences between them and the archbishop and chapter led at last to open hostilities; and the king of France (St. Louis) being one of the arbitrators appealed to in order to heal these disorders, his successors managed to bring the city under the dominion of the French crown. Philippe IV., Le Bel, received the citizens of Lyon under his especial safeguard and protection. The archbishops struggled stoutly for their rights; but in the reign of Philippe V., Le Long, the regal authority was firmly established.

In the year 1274 another general council was held at Lyon: at which the Greek church was professedly united to the Latin church, and several other important affairs brought under notice.

The remoteness of Lyon from the centre of the German empire, and the other more pressing occupations of the emperors, prevented them from interfering in the contest between the citizens of Lyon and their ecclesiastical governors, and the withdrawal of the city from the imperial government and its annexation to France took place with scarcely any opposition from the emperors. The political authority and a portion of the judicial authority were in the hands of the kings of France, and were exercised for them by officers appointed with the title of gardiateurs; by the baillis of Mâcon, who were seneschals of Lyon; and subsequently by the governors of the province of Lyonais. A portion of the judicial administration remained in the hands of the archbishops, and another portion in the hands of the municipality (or consulate, as it was termed), which constituted, down to the last century, a tribunal distinguished by its upright and enlightened decisions. Lyon continued to increase in population, wealth, and commerce. Its institutions were free; the citizens elected their own magistrates, controlled the receipts and expenditure of the municipality, and were exempt from the jurisdiction of any courts except those established in the city.

In the year 1362 Jacques of Bourbon, count of Maine, and his son Pierre, with several other nobles, were defeated and mortally wounded near Lyon by the 'free companies' who were at that time ravaging France. In the contest carried on with these marauders, the aqueducts which had conveyed water to the Roman Lugdunum, and the Roman bridge of Francheville, were ruined.

In the religious dissensions of the sixteenth century, Lyon suffered much at the hands of the Huguenots; but recovered its prosperity in the seventeenth and eighteenth centuries. The execution of Cinq Mars and De Thou, beheaded by order of Richelieu, A.D. 1642, took place in this city.

In the year 1793, during the government of the convention, the people of Lyon rose against the tyranny of the revolutionary club which had been established in the city; and seizing the Hôtel de Ville (or town-hall), condemned Challier, president of the club, whom they had captured, and put him to death. The population of Lyon in 1788 has been estimated at 180,000: other accounts make it to have been only 121,000 in 1791. It is likely that the troubles of the Revolution had diminished the prosperity, and with it the population of the city, but the great difference in the two statements makes it likely that one comprehended a larger portion of the environs than the other. Against this great city, the Convention sent an army of 60,000 men with a hundred pieces of cannon. The townsmen determined on resistance: 10,000 men engaged in the defence under the count of Précy, women and children caught the spirit of resistance, and the wealthy merchants and landowners devoted their fortunes to the providing of necessaries. The town was bombarded, and, though several successful sallies were made, was obliged, after a siege of sixty-six days, to yield to famine and force. The chief defenders quitted the place and retired towards Savoy, but were overtaken, and cut to pieces or dispersed by the hostile cavalry: about fifty, with the count de Précy, succeeded in reaching Savoy. The victorious army took possession of the now defenceless city, and a fearful train of cruelties followed for five months, under the direction of Couthon, Collot d'Herbois, and Maignet. The guillotine was rendered permanent; and its operation being too slow, the wretched prisoners were mowed down by grape-shot. Nearly six thousand victims perished, including those who fell in the defence; the principal buildings were demolished; and the Convention, as if in mockery, gave a new name to the city, that of Commune Affranchie.

This dreadful blow, together with the long war which followed the French revolution, caused the commerce and manufactures of Lyon to languish. In 1806 the population was estimated at less than 90,000, only half its population at the time of the fatal siege. On the return of Napoleon from Elba in 1815, the count of Artois (afterwards Charles X.), brother of Louis XVIII., the duke of Orléans (the present king of the French), and Maréchal Macdonald, hastened to Lyon: but on the approach of Napoleon, the populace and the army raised the cry of 'Vive l'Empereur,' and the princes retired. Napoleon took possession of the city, and issued a decree annulling the chief political changes made during his absence.

In 1834 Lyon was the scene of great disturbances. Unions for the protection of their interests had been formed by the artisans, who took the name of Mutuellistes; and a reduction of wages by the masters occasioned a general turn-out. Political feelings mingled with the irritation caused by these circumstances, acts of disorder called for the interference of the civil and military authorities, and several arrests were made. The determination to bring the parties arrested to trial led to an insurrection. The rioters fortified themselves with barricades, took possession of the suburbs, and the place was contested for two days, with a loss of nearly 200 men to the military and more than that number to the insurgents, who, finding it hopeless to continue the contest, laid down their arms.

Lyon is situated at the confluence of the Saône with the Rhône. The general direction of the Rhône previous to the junction is from east to west, but in the city and vicinity its course is from north-north-east to south-south-west. The general direction of the Saône is from north to south, but it makes a bend, convex to the east, round the base of the hill Fourvière just before its junction with the Rhône. The two rivers enclose between them a long tongue of land extending to the south or south-south-west, on which part of the city is built. The junction of the streams formerly took place just south of the then existing ramparts of the town, and below the junction was an island called Mognat, or Mogniat, and several shoals; but about sixty years since (A.D. 1776) a new and straight channel was cut for the Rhône, carrying the point of junction above a mile farther down the stream, converting a considerable part of the former bed of the river into dry land, and uniting the island of Mognat and the shoals with the main. The prolongation of the bed of the Saône between the former and present points of junction was formed on the western side of what had previously been the bed of the united streams. By this great alteration a large extent of ground was gained, over which new streets and buildings are continually extending. Another considerable part of the city is on the hill Fourvière and at the base of it, along the right bank of the Saône; it is surrounded on the west by the antient town-wall. There are the remains of fortifications on the north side of that part of the city which is between the two rivers. These fortifications run along the hill of La Croix Rousse, which rises on this side, and which occupies the whole of the interval between the Rhône to the Saône. On the south-west of the city, adjacent to the part on the right of the Saône, are the three faubourgs, or suburbs, of St. Irenée, St. Just, and St. Georges, or La Quarantaine. On the north-west, extending along the right bank of the Saône, is the faubourg of Vaize, which forms a distinct commune, or municipality. On the north is the new commune, or municipal district of La Croix Rousse, on the hill of that name, comprehending the suburbs of Le Serin on the left bank of the Saône and St. Clair on the right bank of the Rhône. On the left bank of the Rhône is the faubourg of La Guillotière, which forms with the quarter Les Botteaux another distinct commune, or municipal district. South of the city is the new quarter, on the land gained by altering the bed of the Rhône, called, from the architect who planned it, the Presqu'ile (or Peninsula) Perrache.

The Rhône has a medium breadth of about 650 feet. Its current is very rapid, and it is liable to sudden and great inundations; to prevent the disastrous effects of which, an embankment has been formed to protect the suburb of La Guillotière. There are three bridges over it: the Pont Morand, a wooden-bridge; the Pont Charles X., which has the foundation of the piers of stone and the other parts of wood; and the Pont La Guillotière, a stone bridge, leading to the suburb of the same name. On the right bank of the river is a range of quays, not much used for commercial purposes, and partly planted with trees; south of the city, on the same bank, an avenue extends along the Presqu'ile Perrache, forming the commencement of the road to St. Etienne; another avenue, extending northward from the quays, forms the commencement of the road to Bourg-en-Bresse and Geneva. These quays and avenues form a tolerably direct line of more than three miles in length. There are on the left bank of the Rhône a promenade, the 'Cours Bourbon;' and several public gardens and houses of entertainment much frequented on holidays.

The Saône has a slower current and a more winding course than the Rhône. It skirts the hill of Fourvière, a projecting crag of which stretches down to the river. A passage was made by the Romans along the bank by cutting away part of this crag, which derived from that circumstance the name of Petra Excisa, now Pierre-Scise. On the summit of the crag stood a Gothic castle, long the residence of the archbishops when lords of the city. After the war of the League, in the sixteenth century, it was made a state prison; and demolished after the siege of 1793. The crag, which consists of granitic rock, is perpetually diminishing, being quarried for building. Both banks of the Saône are lined with quays, and have several basins or docks for boats. It is crossed by seven bridges in the city. The Pont de l'Archevêché (formerly Pont de Tilsit) and the Pont du Change are of stone, and are remarkable, the first for its elegant architecture, and the second for its antiquity. The Pont de Serin and the Pont d'Ainay have the foundation of the piers in stone, the rest of wood. The Pont St. Vincent and the Pont Volant are wholly of wood. There is one suspension iron-bridge and it was designed to throw another over from the suburb of Vaize to that of Serin. We know not if this design has been executed.

Besides these seven bridges, there is one below the city, partly of stone and partly of wood, just at the junction of the Saône with the Rhône. Over this bridge the railroad from Lyon to St. Etienne passes. The traffic by boats on the Saône is very great.

Between the Rhône and the Saône, in the Presqu'île Perrache is a cut with a basin for boats; another large basin is in the suburb of Vaize on the Saône.

The interior and more antient part of the town has narrow, wet, and dirty streets, paved with inconvenient round or projecting stones, and lined on each side by a row of curbstones, designed not for footpaths, but to preserve the shops from accident by carts or other carriages. The houses are old and gloomy, six or seven stories high, with narrow courtyards into which the rays of the sun rarely penetrate. They are chiefly built of stone, and are of solid construction. In the newer parts of the town are some handsome streets. The quays are lined with good houses; those on the bank of the Saône are older than those on the bank of the Rhône. The whole number of the streets was variously estimated ten years since at from two hundred and fifty to three hundred. The squares and other open spaces amounted to near sixty. The principal is the Place Bellecour, otherwise Place de Louis le Grand. It is above 300 yards in length and has a varying breadth of from about 200 to 240 yards; it is planted with lime-trees, and has in the centre a fine equestrian statue of Louis XIV., in the place of one destroyed at the Revolution. This statue, two fountains which adorned the Place, and the fine houses which surrounded it, were destroyed after the siege of 1793, and the Place remained long in ruins. In the north of the city is the Place des Terreaux; and at the southern extremity the Place Louis XVIII. lately built. The quarter of Bellecour is the residence of the most wealthy people; there are many good houses in the quarters of St. Clair, Les Terreaux, and Perrache; the quarter of St. Jean, on the right bank of the Saône, is occupied principally by the members of the bar. Lyon is remarkable for the contrast frequently presented by the mean hovels which may be seen in immediate juxtaposition with the most splendid mansions.

Of the public buildings the cathedral is one of the most remarkable. The western front, which is praised by some for its magnificence, is on the whole heavy, but it has three richly ornamented doorways, and over the central doorway a fine circular window. The interior of the building is of simple but striking architecture. In this cathedral there is a curious clock, which shows the year, the month, the day, the hour, the minute, and the second; the sun's place, the phases of the moon, and the saints' days of the calendar. It is now out of repair. The church of the Chartreux, on the slope of the hill of La Croix Rousse in the northern part of the city, has a good dome and a handsome high altar, that of St. Irenée (Irenæus), rendered a mere shell by the siege of 1793, has a handsome front; that of Enay is remarkable for four granite columns which support its cupola, and which were taken from a Roman temple, dedicated to Augustus, that occupied the same site; that of St. Nizier is of Gothic architecture with a Grecian portico, the work of Philibert Delorme; that of the Collège has a fine nave, and that of St. Just is a modern building in good taste and of elegant proportion. The churches of Lyon generally are but little worthy of notice. The Protestants occupy as a church a building originally designed for an exchange.

The archbishop's palace, though it has some fine rooms, has little exterior beauty. The Hôtel de Ville, or town-hall, is perhaps the finest public building in Lyon. It has a fine front with a clock-tower rising from the centre. It was built A.D. 1646-55, by Simon Maupin, and is considered the finest building of the kind in Europe, except that of Amsterdam. It forms one side of the Place des Terreaux; another side is formed by the former Benedictine abbey of St. Pierre, now called 'Le Palais du Commerce et des Arts.' It is used as an exchange, a repository for several museums or collections of objects of science and art, a place of meeting for several learned societies, a school of instruction in drawing, anatomy, &c., and for other purposes. The prefect's office, formerly a Dominican convent, is remarkable rather for its extent than its beauty. It has a tolerably extensive garden. The Hôtel Dieu, or hospital, and the Hôpital de la Charité, destined for foundlings and for the aged and infirm poor, front the banks of the Rhône; the former is a building of noble extent and appearance, with a fine dome in the centre. There are several theatres; the Grand Théâtre built by Soufflot has been lately replaced by a new building.

The population of Lyon in 1826 was 145,675: this number probably includes the inhabitants of Vaize, La Croix Rousse, and La Guillotière. In 1831 the population of Lyon was 133,715; that of the commune of Vaize was 4237 (of whom 3586 were in the town); that of the commune of La Croix Rousse was 9213 (of whom 9080 were in the town); and that of the commune of La Guillotière, 18,294 (of whom about 12,000 were in the town): together, 165,459. In 1836 the population of Lyon was 150,81: and if we estimate the increase of population in Vaize, La Croix Rousse, and La Guillotière to have been in proportion to that of Lyon, the aggregate population of the place will be little short of 185,000. *Lyon* is the greatest manufacturing town in France. *Its staple manufacture* is that of silk, which is highly esteemed *for* the durability of the colours and the good taste of the patterns. Mixed fabrics of silk and cotton and of silk and wool are manufactured; also shawls, crapes, silk stockings, gold and silver stuffs, ribands, and embroidery. The greater part of the silk produced in France is worked up in the looms of Lyon; and a large supply is drawn from Italy. The silk from the worms reared in the immediate vicinity of the city is naturally of a pure white. In 1828 the number of factories or smaller establishments for the silk manufacture in all its branches was 7140 within the walls of Lyon; the looms were 18,829; to which may be added, for the suburbs and the communes within about fifteen miles of Lyon on every side, about 5000 or 6000 looms: making in all 24,000 to 25,000 looms for the district of which this town is the centre. The hat manufacture, though it has declined from its former flourishing condition, is still considerable. Good earthenware is made, and gold-wire drawing is managed with great skill. Among the buildings devoted to the purposes of trade are the 'Condition des Soies,' where the merchants are obliged to deposit the silk brought to the city, that it may be effectually deprived of the moisture contracted in the throwing-mills or on the road; the depôt for colonial produce and foreign goods; and the depôt for salt. Among the subordinate branches of industry are printing and bookselling, and the manufacture of printed cottons, paper hangings, artificial flowers, iron goods, plate, jewellery, glass, and hardwares. There are breweries and curriers' shops. Trade is carried on in groceries, spices, and wines. Chesnuts form also a considerable article of trade: they are brought chiefly from the departments of Ardèche, Loire, Isère, and Var, and are sent from Lyon to various parts. The town is the emporium of the fine woollens of Elbœuf, Sedan, and Louviers, with which it supplies the other towns of the south; and of the oils and soaps of Provence, and the wines and brandies of Languedoc, which it despatches to the north of France. The mercantile men of Lyon have the reputation of close attention to business, exactness in calculation, prudence in their undertakings, and strictness in the fulfilment of their engagements. Wealth is more equally diffused than in other great commercial towns, and capitalists are less subject to great vicissitudes. Luxury has made less progress here than in similar places. Fondness for the country is a characteristic of the inhabitants. The beautiful environs of the town are studded with country-houses; and on holidays the vast population pours out of the town in swarms to enjoy a purer air. Science and art are more cultivated than in most other trading towns; they are however valued chiefly for their bearing on commerce and manufactures. The town is the seat of an Académie Universitaire, the circuit of which comprehends the departments of Ain, Loire, and Rhône. There is a public library of 92,000 volumes and about 800 (some authorities say 1500) manuscripts. There are schools of theology and medicine; a seminary for the priesthood; a royal academy of sciences, belles-lettres, and arts; and various other institutions for the promotion of knowledge. There are three hospitals, a subscription dispensary, a maternity society, a deaf and dumb institution, and many other charitable institutions. The archbishopric of Lyon (now united to that of Vienne) is very antient. The diocese comprehends the departments of Rhône and of Loire: the suffragans of the archbishop are the bishops of Autun, Langres, Dijon, St. Claude, and Grenoble. There are a Protestant consistory and a Jews' synagogue. The Cour Royale of Lyon has under its jurisdiction the departments of Ain, Loire, and Rhône: there are two prisons in the town, and several subordinate judicial courts and fiscal offices. There are a mint, a royal powder refining-house, and a royal snuff manufactory. Lyon is the capital of the nineteenth military division, which includes the departments of Rhône, Loire, Cantal, Puy de Dôme, and Haute Loire.

Among the eminent natives of Lyon were the Roman emperors Claudius and Caracalla, the poet Sidonius Apollinaris, the architect Philibert Delorme, who built the Tuileries; the botanist Jussieu, and Maréchal Suchet.

The arrondissement of Lyon comprehends an area of 501 square miles; it had, in 1831, a population of 292,370; in 1836, of 330,044. It contains 126 communes, and is divided into 16 cantons, or districts under a justice of the peace.

LYONAIS, or LYONNAIS, a province of France previous to the Revolution, deriving its name from the city of Lyon, which was the capital of it. It was bounded on the north by Bourgogne; on the east by the principality of Dombes, the district of Bresse, and the province of Dauphiné, from all which it was separated by the Saône and the Rhône; on the south by the districts of Le Vivarais and Le Vélay, in Languedoc; on the west by Auvergne and Le Bourbonais or Bourbonnois. It was subdivided into three parts, Le Forez on the west and south, Le Beaujolais or Beaujolois on the north, and Le Lyonais proper on the east [BEAUJOLAIS; FOREZ]; and comprehended several towns beside Lyon, as Beajeu, Villefanche, Feurs, Montbrison, Roanne, St. Etienne, L'Arbresle (formerly La Bresle), Tarare, St. Chamond, and others. It is now divided into the departments of Rhône and Loire. The province of Lyonais became, in the anarchy which preceded the extinction of the Carlovingian dynasty, an hereditary county; but this county does not appear to have included the city of Lyon. The partition of the county among the different branches of the family led to the separation of the lordship of Beaujolais and the county of Forez. It is not clear whether the district of Lyonais Proper passed with the city of Lyon under the government of the archbishops of that see, and subsequently of the French crown, or whether it was subject to the county of Forez. The former is most likely.

Lyonais was the country of the Segusiani. It was included in the Roman province of Lugdunensis Prima. It was subsequently in the power of the Burgundians and of the Franks. It does not appear that any part, except the city and environs of Lyon, was incorporated with the German empire. The counts of Lyonais and Forez were vassals of the French crown.

LYO'NSIA, a genus of Conchifers belonging to the Myaceous group. Mr. G. B. Sowerby has described two species: one, *L. picta*, found by Mr. Cuming at the island of Muerte, attached to particles of sand in eleven fathoms water, and which becomes rather irregular in form as it increases in size; and the other, *L. brevifrons*, found at Saint Helena, in sandy mud, at depths ranging from six to eight fathoms, attached to particles of sand.

LYPORNIX, Wagler's name for a genus of birds with a moderate bill defended by very long bristles, and both mandibles nearly equal, the wings very short and rounded, and the tail narrow. Example, *Lypornix striata* (Brazil). Mr. Swainson arranges the form as a subgenus of *Tamatia* (Puff Birds) [BARBETS, vol. iii., p. 434], under the family *Halcyonidæ*. [KINGFISHERS, vol. xiii., p. 227.]

LYRA (the Harp), one of the old constellations, representing the lyre of Mercury (Aratus), of Mercury or of Orpheus (Hyginus). It is surrounded by Cygnus, Aquila, Hercules, and the head of Draco. Its brightest star, α Lyræ, also called Vega, is a conspicuous object. If a line be drawn through the middle of Cassiopea, the pole-star, and the middle of Ursa Major, this star may be seen nearly in the perpendicular to that line drawn through the pole-star. When Aquila is known, a line drawn through its four neighbouring stars, θ, β, α, and γ, will pass through α Lyræ. Its principal stars are as follows·—

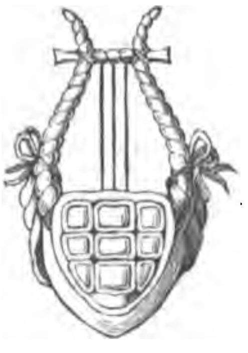
Character.	No. in Catalogue of		Magnitude.
	Flamsteed.	Astron. Society.	
κ	1	2113	5
α	3	2156	1
ε	4	2169	5
	5	2170	6
ζ	6	2171	5
β	10	2177	3
δ^2	12	2191	4
γ	14	2200	3
η	20	2232	6
θ	21	2242	6

LYRA. (Ornithology.) [MÆNURA.]

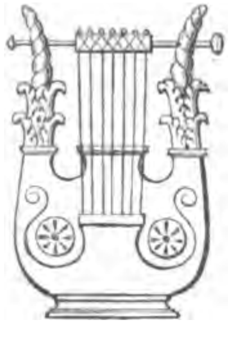
LYRE (Λύρα), a musical instrument of the stringed kind, known, under various names, from the earliest historical period. The Greeks ascribe its invention, some to Mercury, some to Apollo; but it is possible that they may have had it from the Egyptians, and the Egyptians from Asia. Indeed Holy Writ leads us to conclude that it was of antediluvian origin. Jubal, the seventh only in descent from Adam, was 'father of all such as handle the harp and organ;' and as by the word *harp* we are to understand either the *lyre* itself, or some instrument analogous to it, we must, on such authority, grant to the son of Lamech the merit of being its inventor. In our version of the Scripture, *kinnor* (כנור) is rendered by the word *harp*, while the Septuagint and Vulgate give the Hebrew term a Greek form—κιθάρα, *cithara*, a word generally, though we believe erroneously, supposed to be synonymous with λύρα, or lyre. Erroneously, we say, because it is our opinion that Lyre and Cithara (or guitar) were generic terms; the first being the parent of all instruments of the harp kind, having no neck, or finger-board; the last, of all those furnished with a neck, and which finger-board probably was divided by frets. [GUITAR, HARP.]

It is true that in all the remains of Grecian art, no instrument with a neck is to be found. Artists perhaps preferred the more compact and elegant form of what is now called the Grecian lyre. The same taste descended to the moderns; witness the statue of Handel in Vauxhall Gardens, as Dr. Burney well remarks. Montfaucon tells us that he had examined the sculptured representations of six hundred antient lyres and citharas, and found not one with a neck. But had the learned father—who was a most excellent and indefatigable antiquary—lived in the present day, he would have met with abundant evidence in Egypt to prove that instruments with necks—instruments of the guitar kind, such as were subsequently called *lutes*—existed at least three thousand years ago. The three-stringed guitar, says Mr. Wilkinson (*Manners and Customs of the Antient Egyptians*), was in use at the earliest period of the Egyptian history; 'those at the pyramids are apparently of a date long previous to Osrtasen, or the arrival of Joseph.' And in Rosellini's splendid work 'I Monumenti dell' Egitto e della Nubia' are many engravings, some coloured, exhibiting instruments of great antiquity, resembling in essential points the modern guitar, or lute, with a neck, but this much elongated.

The most antient Grecian lyre—said to have been formed by Mercury from the shell of a tortoise, and of which the subjoined is a representation, as given by Mersenne—



had but three strings. That of Terpander (from Blanchinus) had seven, and took the annexed form—



Timotheus increased the number to eleven; and others were gradually added, till they reached sixteen, fifteen of which rendered the principal sounds in the Greek scale, and the sixteenth was the *Proslambanomenos*, *i.e* the added or supernumerary sound.

LYRIC POETRY is commonly understood to be that kind of poetry which is composed in order to musical recitation, but the epithet has been transferred to all kinds of verse partaking in any degree of the same nature as that to which it was at first applied. Thus we hear of lyrical ballads, the greater part of which might with as great propriety be called epical, and of lyric measures in Horace, where there is no ground to suppose that they were sung, and no fitness for the purpose of musical rehearsal. In a former article [Epic Poetry] we have endeavoured to point out a distinction between epic and lyric poetry more satisfactory than common language allows; but there is surely no impropriety in giving a decided meaning to words which have usually been understood in a confused sense, particularly when, as in the present case, the same senses have been applied to each, so as not only to confuse but to confound them. Pursuing then the course which we have pointed out, lyric poetry must be defined as that class of poetry which has reference to and is engaged in delineating the composer's own thoughts and feelings, in distinction from epic poetry, which details external circumstances and events.

A very slight glance at the growth of society will be enough to show us that lyric poetry is posterior in point of time to epic. Men think of war and hunting, of anything and everything which surrounds them, before they look at themselves; and as consciousness in the child comes much later than the exercise of all the senses, so that it learns the names of many objects before it begins to call itself 'I'; so in the development of national life the epic period comes before the lyric. Homer and Hesiod were favourites for centuries before the invention of an epigram or a chorus; the narrative novel or romance precedes the novel of manners, and our own epical cycles existed long before anything in the form of lyric poetry.

The history of lyrical poetry is perhaps subject to greater difficulties than any other species of composition. In that nation where it attained to its most perfect growth, it is precisely that class of its literature which is to us, except in regard to one author, a total blank. Pindar is nearly all that remains to us of the whole lyric poetry of Greece, and great as his reputation has deservedly been, we have no reason to consider him as paramount to his class, and very good reason for denying to him what has commonly been considered his right, that of presenting us with the purest type and example of a lyric poet. With almost as much reason might he be called an epic writer, for many long passages occur in which he does not deviate at all from the path of narration, while in others again he is all but a dramatist. Thirlwall has observed too, that 'even if it was certain that his genius was unequalled, still it could not replace the freshness which we might expect to find in the earlier gushes of the lyric vein, nor that peculiar character which distinguished each of the other poets, nor that which belonged to the several schools formed by the great tribes or branches of the nation.' We have thus to deplore in Tyrtæus the loss of writings which kept up the patriotism of a whole nation; in Hipponax and Archilochus, all the circle of Greek satire; in Anacreon, the first poems on the fruitful subjects of love and feasting; and in Mimnermus, the Greek elegy, that offspring of the sadness which reflection on the fleeting nature of human enjoyments produces. But most of all have we to regret that scarcely any trace remains of that link between epic and lyric poetry which was the origin of Greek tragedy. This was perhaps the most national form of lyric poetry among the Greeks, the others having been for the most part rather the productions of individual imaginations, which gained popularity in proportion as they found sympathy, much in the way in which modern poetry makes its way into notice.

Ulrici, in his very elaborate work on the history of Greek poetry, gives two as the principal sources from which lyric poetry was derived—religious worship, and the individual feelings of the people; the first of which elements is traceable in one of the two kinds of epic poetry, which we named *hieratic*, while the second is that in which consists the difference between epic and lyric poetry. He proceeds to divide Greek lyric into the Doric, Æolic, and Ionic kinds: which correspond nearly, the first to what is to be found in choruses; the second to love-songs, such as *Sappho's*, and drinking-songs, or scolia; and the third to the elegy, epigram, and satire of Callinus, Archilochus, Tyrtæus, Hipponax, and others. We have no space to do more than notice his division of the subject, but the whole work will repay a far closer attention.

It has been remarked that both in epic and in lyric poetry the Romans possessed nothing like a school of poets, while in Greece there was a regular progression from epic to lyric schools, each of which supplied many individuals grouped round a principal figure in each class. Virgil and Lucan are the types of Roman epic poetry, and Horace stands almost alone as a lyric poet. But to attempt to give a history of Roman lyric would be little else than to enumerate every man who wrote verses from Ennius downwards, for almost every one of them attempted that as well as all other kinds of poetry. The whole of Latin poetry was in fact on a Greek model, even the most original of the Latin poets having borrowed his metres, though he might make everything else his own.

It might perhaps startle any one to be told that satire is a branch of lyric poetry, and that the most important branch of Roman lyric is satire. But a careful review of the definition with which we started cannot fail to explain this. Satire is essentially lyrical or subjective in its nature, and the Roman satire more so than the Greek, inasmuch as it partakes far less of the nature of lampoon or ludicrous description, and deals more with general than with individual traits of character. In their satire it is that we must look for information on Roman modes of thought and feeling. It was, or at least appears to us to have been, the only outlet which the Imperial tyranny gave to the free and noble spirit of Rome in her best days, and it is quite astonishing how far this liberty was employed. What it was in earlier days we cannot tell, except as far as Horace's description of Lucilius avails. The words may mean almost anything, but we should be inclined to suppose that it partook much more of the nature of lampoon than in later times. To the satire we may add its powerful auxiliary the epigram, the same in name but very different in nature from its Greek fellow, which ought rather to be called epigraph, or even epitaph

The Horatian lyrics merged in the later ages of the empire into a species of poetry much though undeservedly neglected, we mean the rhyming verses of the monks, which contain much Hebrew sublimity expressed in most sonorous verses. They are curious as affording the best specimen of the transition from scansion to accent, that is, from the antique to the modern rule of versification.

English lyrical poetry is late in its full development, for to call our ballads lyrical is a misnomer, seeing that the prose and poetical romances often give exactly the same story in another shape. We need go no further than the ballad 'Mort d'Arthur,' so well known to readers of Percy's 'Reliques.' At the same time, though the form of these ballads is mostly narrative or epical, there is often a strong admixture of lyrical feeling, as in 'The Jew's Daughter,' 'Sir Cauline,' and others. Scarcely any poems occur before the time of Milton deserving the title of lyrical, except perhaps some of Giles and Phineas Fletcher's works and Shakspere's sonnets. In 'Lycidas,' 'Il Penseroso,' and 'L'Allegro,' we see almost the first, and perhaps the most beautiful examples our language can boast. The prevalence of French taste until the revival of poetry at the close of the last century gave so artificial a character to the works of Dryden, Pope, and their successors, that we can hardly give the title of lyrical to any of them excepting the satires and a few fine odes. In our own day Wordsworth and Coleridge are too well known to require that we should point out how exclusively lyrical is the tendency of their works. Shelley has combined more of what is called sensuous beauty with the rest of the qualities requisite to make up a lyrical poet; and, among living poets, Tennyson may perhaps be mentioned as giving the greatest promise of lyrical excellence, although he has yet written so little, and that little has so many of the redundancies of a young writer, that it is hard to predict with certainty his future course.

It is natural to anticipate what may be the course of poetry in our own time, and perhaps the balance of probability is on the side of its taking a lyrical or subjective character. Novels have shut out the drama, and epic poetry is utterly at variance with the feelings of the age; so that if our children are to have any poetry at all, it must apparently partake largely of a lyrical character, and that probably not unmixed with satire, of which, since the 'English Bards and Scotch Reviewers,' we have had scarcely a specimen.

(Ulrici's *Geschichte der Hellenischen Dichtkunst;* Dunlop's *Hist. of Roman Literature; Quarterly Review,* articles on Pindar and Horace.)

LYRICS are those verses which are commonly used in lyrical poetry. Such are those of Pindar, of Horace's odes, and of the tragic and comic choruses. They are generally short, in order, as is said, to agree better with the time of any music which might have been intended to accompany them. The old grammarians divided all verses into those in which the metre was repeated in each line (*κατὰ στίχον*), such as hexameters, iambics, and trochaics, and those which require more lines than one to make up a system (*κατὰ σύστημα*), as in the case of Sapphic or Alcaic verses, or a choric strophe. The latter division contains almost all the lyric metres known, including nearly all Horace's odes, all Pindar's, and all the choruses and even anapæstic systems. Of these strophes a further division has been made, into *longer*, such as Pindar, Stesichorus, Simonides, and the Greek dramatists employed; and *shorter*, such as those of the earlier Ionian and Æolian poets, of their imitators, and of Seneca, besides rare examples in the Greek dramatists.

Hermann further distinguishes the longer strophes into Dorian, Æolian, and Lydian, of which he gives examples from Pindar to prove that the first was used where impressive majesty was requisite, the second to give a notion of rapidity and vehemence, and the third as possessing part of the qualities of each.

A question has arisen, and it is at all events a curious point, why lyrical poems are generally divided into lines so much shorter than heroic. That such was the case in Greek and Roman poetry is certain, and it is not explained by saying that they were sung to an accompaniment, for surely there is just as much reason to suppose that Homer's long hexameters were chanted as Anacreon's short iambics, and music might be as well adapted to one as to the other.* Perhaps it is better accounted for by considering that a lyrical poem does not consist of descriptions, where the same sense may be expressed in many ways, but in thoughts, which, to be striking, must be terse. Take for example the famous verses—

'Υγιαινειν μεν ἄριστον ἀνδρὶ θνατῷ·
δεύτερον δὲ, καλὸν φυὰν γένεσθαι·
τὸ τρίτον δὲ, πλουτεῖν ἀδόλως·
καὶ τὸ τέταρτον, ἡβᾷν μετὰ τῶν φίλων.

Hesiod would probably have spun them out into five or six hexameters,* inserting epithets and expanding at pleasure, but converting each from the expression of a moral sentiment in which the hearer is supposed to agree, into the inculcation of a precept of prudence which he is to follow. (Hermann, *Elementa Doctrinæ Metricæ.*)

LYRIOCE'PHALUS. [Iguanidæ.]

LYRU'RUS. [Black-Cock; Tetraonidæ.]

LYS. [Belgium; Schelde.]

LYSANDER, a Spartan, who rose to eminence towards the end of the Peloponnesian war, and was placed in command of the Lacedæmonian troops on the coast of Asia Minor, B.C. 407. Having about him little of the old Spartan severity, and being ready to sacrifice that personal and national pride and inflexibility, which were the peculiar characteristic of the Spartan institutions, to personal or national interests, he gained in an unusual degree the regard and confidence of his Persian allies. This he used to the best advantage, by seizing a favourable moment to obtain from the younger Cyrus, the Persian viceroy in Asia Minor, in place of any personal advantage, the addition of an obolus daily (rather more than a penny) to every seaman in the Peloponnesian fleet. During his year's command he defeated the Athenian fleet, commanded by Antiochus, as lieutenant of Alcibiades, at Notium. In September, 406, he was superseded by Callicratidas; who was defeated and slain in the memorable battle of Arginusæ. The allies then petitioned that Lysander might be re-appointed. It was contrary to Spartan law to entrust the fleet twice to the same person; but this difficulty was evaded by nominating another person commander-in-chief, and sending Lysander as lieutenant with the command in Asia. He soon justified the preference, by gaining the decisive victory of Ægospotami, in the Hellespont, where 170 Athenian ships were taken. This in effect finished the war. Receiving as he went the submission of her allies, Lysander proceeded leisurely to Athens, and blockaded the ports, while the Spartan kings marched into Attica and invested the city, which, unassaulted, was reduced by the sure process of famine. The capitulation being settled, B.C. 404, Lysander had the proud satisfaction of entering as a victor the Peiræus, unviolated by the presence of an enemy since the Persian invasion.

His services and reputation gained for him a corresponding weight in Sparta; and on occasion of the contested succession his influence was powerful in raising Agesilaus to the throne. He accompanied that eminent statesman and soldier during his first campaign in Asia, where his popularity and renown threw his superior into the shade; and an estrangement resulted, in which Lysander behaved with temper and wisdom. About B.C. 396 he returned to Sparta. In the following year, on occasion of a quarrel with Thebes, he was sent into Phocis, to collect contingents from the northern allies, a task for which his name and popularity rendered him peculiarly fit. Having done this, and being on his way to join the Lacedæmonian army, he was taken by surprise, and slain by the Thebans, at Haliartus in Bœotia. The force which he had collected dispersed; and the war came at once to an end, with no credit to the Lacedæmonians, B.C. 395.

It is said that, urged by ambitious hopes, he meditated a scheme for abolishing the hereditary right of the descendants of Hercules, and rendering the Spartan throne elective, and that he had tampered largely with different oracles to promote this scheme. The contemporary Xenophon however makes no mention of this rumour. This subject has been discussed by Mr. Thirlwall in an appendix to his fourth volume of the 'History of Greece.' [Alcibiades; Athens; Agesilaus.]

(Plutarch's *Life of Lysander;* Xenophon's *Hellenica.*)

LY'SIAS, one of the ten Athenian orators, was born at Athens, B.C. 458. His father Cephalus was a native of

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* The Huntsmen's chorus in 'Der Freischütz' is perfectly adapted to hexameters.

* In the following way:—

'Ω Περσῆ τόδ' ἄριστον ἐπιχθονίοις ἀνθρώποις,
Λοιμοὺς ἐκ μελάθρου καὶ ἀπεχθέα νοῦσον ἐλαύνειν·
Τῆς δὲ φυῆς καλῆς μετέχειν, τόδε δεύτερον αἰνῶ·
Καὶ τὸ τρίτον, πλουτεῖν ἀδόλως· τέτρατόν τε, φίλοισι
Ξὺμ πιστοῖσιν ἐμὸν διάγειν βίον ἠδ' ἀποθνήσκειν.

Syracuse, who settled at Athens during the time of Pericles; he was a person of considerable wealth, and lived on intimate terms with Pericles and Socrates. His house is the supposed scene of the celebrated dialogues of Plato's 'Republic.'

Lysias, at the age of fifteen, went to Thurium in Italy, with his brother Polemarchus, at the first foundation of the colony. Here he remained for thirty-two years; but in consequence of his supporting the Athenian interests, he was obliged to leave Italy after the failure of the Athenian expedition in Sicily. He returned to Athens B.C. 411, and carried on, in partnership with his brother Polemarchus, an extensive manufactory of shields, in which they employed as many as 120 slaves. Their wealth excited the cupidity of the Thirty Tyrants; their house was attacked one evening by an armed force, while Lysias was entertaining a few friends at supper; their property was seized, and Polemarchus was taken to prison, where he was shortly after executed (B.C. 404). Lysias, by bribing some of the soldiers, escaped to the Piræus, and sailed from thence to Megara. He has given us a graphic account of his escape in his oration against Eratosthenes, who had been one of the Thirty Tyrants.

Lysias actively assisted Thrasybulus in his enterprise against the Thirty; he supplied him with a large sum of money from his own resources and those of his friends, and hired a considerable body of soldiers at his own expense. In return for these services Thrasybulus proposed a decree, by which the right of citizenship should be conferred upon Lysias; but in consequence of some informality this decree was never carried into effect. He was however allowed the peculiar privileges which were sometimes granted to resident aliens (namely, *ἰσοτέλεια*). Lysias appears to have died about B.C. 378.

The author of the life of Lysias, attributed to Plutarch, mentions four hundred and twenty-five orations of Lysias; two hundred and thirty of which were allowed to be genuine. At present there are thirty-four extant, attributed to this orator. But some of these may not be genuine; and at least the 'Epitaphius' bears strong internal evidence of being by another hand.

Dionysius of Halicarnassus has written a laboured essay on the style and merits of Lysias. He allows him almost every excellence except those of sublimity and the power of strongly moving the passions. 'His style,' he observes, 'is not so well adapted to show the power of art as to represent the truth of nature.' In narrating events or circumstances, Dionysius considers him as superior to all the orators, and as the rule and model in this department of the art. The 'Apology for the death of Eratosthenes' is a pattern of simple and perspicuous narration.

According to Suidas and other antient biographers, Lysias also wrote some treatises on the art of oratory (which he is said by Cicero (*Brut.*, c. 12) to have taught), and discourses on love. There is still extant a treatise on love, which bears the name of Lysias, and which has been edited by Haenish, Leip., 1827, but this work evidently belongs to a much later period in Greek literature.

The best edition of the text of Lysias is by Bekker. Useful editions have also been published by Taylor, 1738; by Foertsch, 1829; and by Franz, 1831. Lysias has been translated into French by Auger, Paris, 1783, and into English by Gillies, together with the orations of Isocrates, London, 1778.

(Dionysius of Halicarnassus; *Life of Lysias*, attributed to Plutarch; Photius, C., 261; *Life of Lysias*, prefixed to Taylor's edition.)

LYSI'DICE, Savigny's name for a genus of *Dorsibranchiate Annelids* [DORSIBRANCHIATA], which, with jaws like those of *Eunice* (Cuv.), or even more numerous than in that form, and often unequal in number, have only three tentacles, and cirrhi for *branchiæ*. See Savigny (*Eg. Annel.*), and Cuvier (*Regne Animal*).

LYSI'MACHUS, one of the officers of Alexander the Great, was born of an illustrious Macedonian family. (*Justin*, xv. 3.) In the general distribution of the provinces, or satrapies, to the chief Macedonian officers after the death of Alexander, Lysimachus received Thrace and the neighbouring countries. It was not however without difficulty that he obtained possession of the province which had been assigned to him; he was vigorously opposed by Seuthes, king of Thrace, and other native princes, and it was some time before his power was firmly established in the country. In B.C. 314 he joined Cassander, Ptolemy, and Seleucus in their endeavour to check the power of Antigonus [ANTIGONUS, p. 102]; but he does not appear to have been able to take an active part against Antigonus, in consequence of the revolt of many Thracian tribes who had been excited by Antigonus to make war against him. The peace, which was made between the contending parties B.C. 311, lasted only for a short time; and the war was continued with various success till the conquests of Demetrius, the son of Antigonus, in Greece, roused the confederates to make more vigorous exertions; and Lysimachus was accordingly sent into Asia Minor, B.C. 302, where he took several places, and acquired immense plunder. Antigonus hastened to meet him, but could not force him to a battle. In the following year Lysimachus, having formed a junction with the forces of Seleucus, met Antigonus at Ipsus in Phrygia, where a bloody battle was fought, in which Antigonus was killed and his army entirely defeated.

The dominions of Antigonus were divided among the conquerors, and Lysimachus obtained the north-western part of Asia Minor. He shortly afterwards married Arsinoe, the sister of Ptolemy, king of Egypt, although his eldest son Agathocles had already married Lysandra, the half-sister of Arsinoe. In B.C. 286 he obtained possession of the throne of Macedon, and obliged Pyrrhus, king of Epirus, who had laid claims to the kingdom, to retire to his native dominions. Hitherto the career of Lysimachus appears to have been fortunate, but the latter part of his life was embittered by family dissensions and intestine commotions. Arsinoe, fearful lest her children should be exposed after the death of her husband to the violence of Agathocles, persuaded Lysimachus to put him to death. Agathocles had been an able and successful general; he was a great favourite with the people, who deeply resented his death; and Lysimachus found himself involved in almost open war with his subjects. Lysandra, the widow of Agathocles, fled to Babylon, and entreated Seleucus to make war against Lysimachus. The Syrian king was willing enough to take advantage of the troubled state of his rival's kingdom; but Lysimachus, anticipating his intentions, marched into Asia, and fell in a battle with the forces of Seleucus, in the seventieth year of his age, according to Appian (*Syr.*, c. 64), and in his seventy-fourth, according to Justin (xvii. 1).

The town of Lysimachia was founded by this monarch on the narrow neck which connects the Thracian Chersonese with the mainland; its position was about midway between Pactya and Cardia, from which latter town most of the population were removed to the new city of Lysimachus.

(Diodorus Siculus; Justin; Plutarch's *Life of Demetrius*; Pausanias, i., cc. 9, 10; Droysen, *Geschichte der Nachfolger Alexanders*.)

Coin of Lysimachus.
British Museum. Silver Actual Size.

LYSIPPUS, one of the most celebrated statuaries of antiquity, was born at Sicyon. He was particularly distinguished by his statues in bronze, which are said to have been superior to all other works of a similar kind. He introduced great improvements in his art, by making the head smaller, and giving to the body a more easy and natural position than was usual in the works of his predecessors. Pliny informs us that his statues were admired among other things for the beautiful manner in which the hair was always executed. (Plin., xxxiv. 8.)

Lysippus is placed by Pliny in the 114th Olympiad (B.C. 324), contemporary with his brother Lysistratus, Sthenis, Euphronides, Sostratus, Ion, and Silanion. He is said to have been self-taught, and to have attained his excellence by studying nature alone. His talents were appreciated by his contemporaries; the different cities of Greece were anxious to obtain his works; and Alexander is reported to have said, that no one should paint him but Apelles, and no one represent him in bronze except Lysippus. (Plin., vii. 37; Cic., *Ad Div.*, v. 12.) His reputation survived his death; many of his most celebrated works were brought to Rome, in which they were held in so much esteem, that Tiberius is said to have almost excited an insurrection by removing a statue of Lysippus, called Apoxyomenos, from the warm baths, where it had been placed by Agrippa, to his own palace.

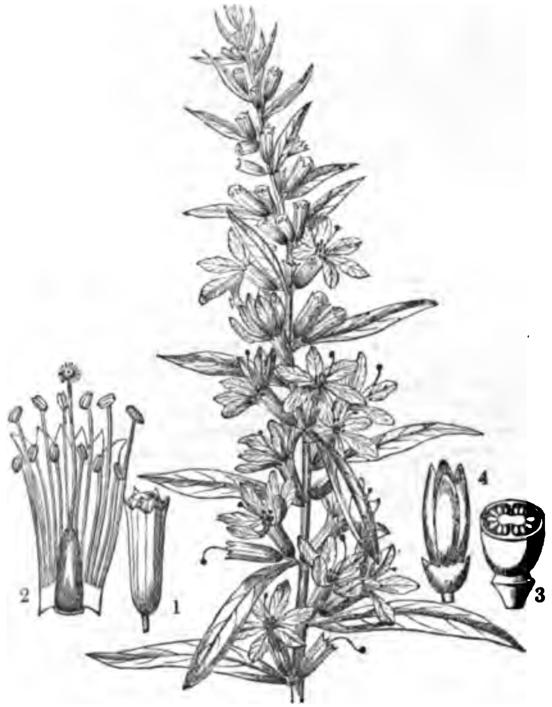
Lysippus is said to have executed 610 statues, all of the greatest merit (Pliny, xxxiv. 7); many of which were colossal figures. Pliny, Pausanias, Strabo, and Vitruvius have preserved long lists of his works; of which the most celebrated appear to have been, various statues of Alexander executed at different periods of his life; a group of equestrian statues of those Greeks who fell at the battle of the Granicus; the Sun drawn in a chariot by four horses at Rhodes; a colossal statue at Tarentum; a statue of Hercules, at Alyzia in Acarnania, which was afterwards removed to Rome; and a statue of Opportunity (*καιρος*), represented as a youth with wings on his ankles on the point of flying from the earth.

Among the numerous pupils of Lysippus, the most celebrated was Chares, who executed the colossal figure at Rhodes.

(Pliny's *Historia Naturalis;* Pausanias; Junius, *De Pictura Veterum*, p. 109-116.)

LY'SMATA, Risso's name for a genus of *Macrurous Decapod Crustaceans*, allied to the *Shrimps*.

LYTHRA'CEÆ, a natural order of polypetalous Exogens, the essential character of which is to have a tubular calyx with conspicuous complete ribs, petals inserted into the orifice of the calyx, stamens springing from its base or middle, and a superior polyspermous ovary. They are most near Melastomaceæ and Onagraceæ. The order contains few plants of any interest. Some of the genus Lagerströmia are handsome Indian large-flowered bushes, represented in South America by Diplusodon; a few Ammannias have acrid leaves, which act as vesicants when applied to the skin: and the Henné dye used by Oriental women for their nails is the juice of the fruit of Lawsonia. Lythrum Salicaria, the subject of the preceding cut, is an English type of the order.



Lythrum Salicaria.

1, A flower-bud; 2, a calyx cut open and showing the insertion of the stamens; 3, a transverse section of an ovary; 4, a ripe capsule, with its four valves.

LYTTELTON, GEORGE LORD, born in January, 1708-9, the eldest son of Sir Thomas Lyttelton, Bart., of Hagley, in Worcestershire, was educated at Eton, and Christchurch, Oxford, at both of which his scholastic acquirements and promising talents gained him much credit. After travelling on the Continent for some time, he entered parliament in 1730, connected himself with the leaders of the opposition to Sir Robert Walpole, and acquired eminence and weight as a parliamentary speaker. He was a favourite of Frederic, Prince of Wales, at whose court he filled the office of secretary. After Walpole's retirement, Lyttelton was made a lord of the treasury, in 1744 He was raised in 1756 to be chancellor of the exchequer, a place for which his qualifications were but limited, if the story be true that he never could comprehend the simplest rule of arithmetic. He resigned that office to Mr. Legge in less than a year, and went out of office altogether on the dissolution of the ministry in 1759; at which time (his father being dead) he was raised to the peerage by the title of Baron Lyttelton of Frankley. The rest of his life was chiefly devoted to literature. He died in 1773.

Lord Lyttelton's literary talents in early life won the affection of Pope. His poetry, though elegant and tasteful, does not rise above mediocrity; it has however gained for him a place in Johnson's 'Lives.' Of his prose works the chief are: 'Observations on the Conversion and Apostleship of St. Paul,' 1747, the result of those studies by which, in middle life, he was converted from scepticism into a sincere and zealous believer in Christianity. This work has enjoyed a high reputation. 'Dialogues of the Dead,' 1760, a popular and amusing work. 'History of Henry II.,' to which is prefixed an account of the Revolutions of England, from the death of Edward the Confessor to the birth of Henry II., 1764-7. This is a learned, laborious, and valuable work, the fruit of twenty years' research. Miscellaneous Works, 1774. Poetical Works, 1785. Lord Lyttelton took a leading part, by his 'Account of a Journey in Wales,' in opening the eyes of the English to the beauties of their own country; and by the tasteful and expensive improvements in his celebrated park at Hagley, in introducing the modern practice of landscape gardening.

Lord Lyttelton's private character was exemplary; his acquirements extensive; his judgment as a politician and man of the world penetrating. But his indolence prevented him from doing justice to his own powers, exposed him to imposition, and led him into some embarrassments. His son Thomas lord Lyttelton, who died early in 1779, also possessed great abilities, but wasted and debased them in a profligate and unhappy life

INDEX TO THE LETTER L.

VOLUME XIII.

L, page 259
La, in music, 259
Laaland, 259
Labarraque's Disinfecting Liquids, 259
Lábeo, 259
Lábeo, C. Antistius [Justinian's Legislation]
Lábia [Forficulidæ]
Labiátæ [Lamiaceæ]
Labidoura [Forficulidæ]
Lábidus [Mutillidæ]
Labiénus [Cæsar]
Lablab, 259
Laboratory, 260
Laborde, J. B., 260
Labour [Wages; Wealth]
Labour, Pays de [Basques, Pays des; Guyenne and Gascogne]
Labrador [Hudson's Bay]
Labradorite, 260
Labrax, 260
Lábridæ, 260
Labroides [Labridæ]
Labrus [Labridæ]
Labruyère [Bruyère, La]
Laburnum, 262
Labyrinth [Crete; Faioum]
La Caille, 262
La Châtre [Châtre, La]
La Condamine, 263
Lac, 263
Laccadive Islands, 264
Lace, 264
Lacedæmon, Lacedæmonians [Sparta]
Lacépède, 265
Lacerta (constellation), 265
Lacértiadæ, 265
Láchesis [Viperidæ]
Lachrymal Organs, Diseases of the, 266
Lachrymatory, 266
Lachsa, or Lahsa [Arabia]
Lacistemáceæ, 266
Lacónica, 266
Lacquering [Japanning]
Lactántius, 267
Lacteals, 267
Lactic Acid, 268
Lactucáricum, 268
Lactucic Acid, 268
Lacúna [Trochidæ]
Ladakh, 268
Ládanum, 269
Ladoga, Lake [Russia]
Ladrone Islands, 269
Laeken [Brussels]
Læmodípoda, 270
Laennec, 270
Laer, P. van [Bamboccio]
La Fayette [Fayette, La]
La Fontaine [Fontaine, La]
Lagána, 271
Lagerstrœ'mia, 271
Lagny, T. F. de, 271
Lágo Maggióre, 271
Lágomys [Leporidæ]
Lagoon, 271
Lágopus [Tetraonidæ]
Lagos, 272
Lagóstomys, 272
Lágothrix, 273
Lágotis [Chinchillidæ, vol. vii., p. 83]
Lagrange, 272
Lagriidæ, 274
La Harpe [Harpe, La]
Lahire, P. de, 275
Lahn, river [Rhine]
Lahore, province, 275
Lahore, city, 275
Laibach, or Laybach [Illyria]
L'Aigle [Orne]
Lainez [Jesuits]
Lairesse, Gerard, 276
Laity, 276
Lake, Gerard, 276
Lakes, 276
Lakes (pigments), 278
Laland [Laaland]
Lalande, 278
Lama [Llama]
Lama, Lamaism, 280
Lamantin [Whales]
Lamarck, 280
Lamb [Sheep]
Lamb, Charles, 281
Lamballe [Côtes du Nord]
Lambarde, W., 281
Lambert, John, 282
Lambeth, 282
Lambrus, 282
Lamégo, 282
Lamellária [Pleurobranchus]
Lamellibranchiáta, 283
Lamellicornes, 283
Lamellirostres, 283
Lamentations of Jeremiah [Jeremiah]
Lamiáceæ, or Labiátæ, 283
Lamian War, 283
Laminarites, 283
Lammas Day, 283
Lamouroux, J. V. F., 284
Lamp Black, 284
Lamp, Safety, 284
Lampornis [Trochilidæ]
Lamprey [Petromyzon]
Lamprídius, Ælius [Augusta Historia]
Lámprotes [Tanagers]
Lamprótila [Kingfishers, p. 232]
Lamprotornis [Sturnidæ]
Lampy'ridæ, 285
Lanarkshire, 286
Lancashire, 288
Lancaster [Lancashire]
Lancaster, Sir James, 300
Lancelot Claude [Port Royal]
Lancéola, 300
Lanceróta, or Lanzarote [Canaries]
Lanciáno [Abruzzo]
Land, 300
Land-tax, 300
Landau, 301
Landen, James, 301
Lander [Quorra]
Landernau [Finistère]
Landes, Les, 301
Landes, department, 301
Landing Waiter, 302
Landgrave, 303
Landguard Fort [Harwich]
Landrécy, or Landrecie [Nord]
Landscape Gardening [Garden]
Landscróna, 303
Landshut, 303
Lanfranc, 303
Lángaha [Viperidæ]
Langhorne, John, 303
Langeland [Denmark; Funen]
Langres, 304
Langtoft, Peter, 304
Langton, Stephen, 304
Language, 304
Langue d'Oc [France (Literature)]
Languedoc, 320
Languedoc, Canal de [France]
Lániadæ [Shrikes]
Laniógerus [Nudibranchiata]
Lanner [Falconidæ, vol. x., p. 181]
Lannion, 322
Lánsium, 322
Lantána, 322
Lantier, 322
Lanzi, 323
Laócoon, 323
Laomedéa, 324
Laon, 324
Laos, 324
Lapis Lázuli [Lazulite]
Lápithæ [Centaurs]
Laplace, 325
Lapland, 328
La Plata [Plata, La]
Laply'sia [Tectibranchiata]
Lapse [Legacy]
Lapwing [Plovers]
Lar, Laristan [Persia]
Larash [Marocco]
Larceny, 329
Larch Tree [Abies]
Larchér, P. H., 332
Lard [Fat]
Lardner, N., 332
Larghetto, 332
Largo, 332
Largs, 332
Láridæ, 332
Larissa [Thessaly]
Larks, 337
Larnica [Cyprus]
Lárridæ, 338
Larunda [Læmodipoda]
Larva, 338
Larvária, 339
Laryngítis [Croup]
Larynx, 339
Láscaris, C., 342
Láscaris, A. J., 342
Laser, 342
Lasiopy'ga [Pygathrix]
Lasso, Orlando di, 343
Latakía [Syria]
Latakoo, or Lætakoo, 343
Latánia, 343
Lateran, 343
Lathe [Kent]
Lathe [Turning]
Láthria [Muscicapidæ]
Latimer, Hugh, 344
Latíni, 345
Latinum Jus, 348
Latitude [Longitude and Latitude]
Latitude, Methods of Finding [Longitude and Latitude, Methods of Finding]
Látium, 349
Latreille, 350
Latrobite, 351
Latus Rectum [Ellipse; Hyperbola; Parabola]
Laud, William, 351
Laudanum [Opium]
Lauenburg, or Saxe-Lauenburg, 352
Laugharne [Caermarthenshire]
Laughter, 353
Laumonite, 353
Launceston, 353
Lauráceæ, 354
Laureate, Poet, 354
Laurine, 354
Laurus, 354
Lausanne, 355
Lausitz, or Lusatia, 355
Lava, 356
Laval, 357
Lavándula Spica, 357
Laváter, 357
Lavaur [Tarn]
Lavender, 358
Laver, 358
Lavoisier, 358
Lavóro, Terra di, 359
Law, 360
Law, John, 363
Law, William, 364
Law, Edmund, 365
Law Merchant [Lex Mercatoria]
Lawes, Henry, 365
Lawes, William, 365
Lawn, 366
Lawrence, St., river [Canada]
Lawrence, Sir Thomas, 366
Lawsónia, 367
Lay Brothers, 367
Laybach [Illyria]
Layering, 367
Lázulite, 368
Lazzaróni [Naples]
Lazzeretto, 368
Lea River [Essex; Hertfordshire]
Leach, William Elford, 368
Lead, 368
Lead, Medical Properties of, 373
Lead, Black [Plumbago]
Leaf, 374
Leaf Bud, 375
League, 375
League [Guise, Dukes of]
Leake, Admiral Sir John, 376
Leamington [Warwickshire]
Leap Year, 377
Lease, 377
Lease and Release, 378
Least Squares, Method of, 379
Leather, 379
Leaven [Bread]
Lebadæa, Livadia [Bœotia]
Lébanon [Syria]
Le Blanc [Blanc, Le]
Lebrun, Charles, 380
Lecce, 380
Lectoure [Gers]
Lecythidáceæ, 380
Ledbury [Herefordshire]
Ledoux, C. N., 381
Ledyard, John, 381
Lee, Nathaniel, 382
Leeches, 382
Leeches, Medical Use of, 383
Leeds, 384
Leek [Staffordshire]
Leer, 388
Leet, 388
Leeuwarden, 391
Legacy, 391
Legate, 392
Legend, 392
Legendre, 392
Leger Lines and Spaces, 393
Leghorn [Livorno]
Legion, 393
Legislation, 394
Legnágo [Verona]
Legrand, J. G., 396
Legúmin, 396
Leguminósæ, 396
Leibnitz, 397
Leicester [Leicestershire]
Leicester, Earl of, 400
Leicestershire, 400
Leighlin, 409
Leighton, Robert, 409
Leighton Buzzard, 409
Leiningen, 409
Leinster, 409
Leiocéphalus [Iguanidæ]
Leiolæmus [Iguanidæ]
Leiólepis [Agama, vol. i., p. 192; Iguanidæ]

VOL. XIII.
Leiosaurus [Iguanidæ]
Leíothrix, 410
Leiotrichánæ, 410
Leipzig, circle, 410
Leipzig, city, 410
Leith, 412
Leitmeritz, circle, 412
Leitmeritz, town, 412
Leitrim, county, 412
Leland, or Laylonde, John, 416
Leland, John, 416
Leland, Thomas, 416
Léleges, 416
Lely, Sir Peter, 417
Leman, Lake, 417
Lemberg, circle, 417
Lemberg, town, 417
Lemgo [Lippe Detmold]
Lemma, 418
Lemming [Muridæ]
Lemnian Earth, 418
Lemniscáta, 418
Lemnos, 418
Lemon [Citrus]
Lemons, Acid of [Citric Acid]
Lemons, Salt of [Oxalic Acid]
Lemúridæ, 418
Lena, river [Siberia]
L'Enclos, Ninon de, 420
Lennep, 420
Lens, 421
Lens, Crystalline [Eye]
Lens [Pas de Calais]
Lent, 423
Lentibuláceæ, 423
Lenticulína [Foraminifera, vol. x., p. 348]
Lento, 423
Lenzinite, 423
Leo I.—VI., emperors, 423
Leo I.—XII., popes, 425
Leo, John, 428
Leo, Leonardo, 428
Leo Allátius [Allatius]
Leo, constellation, 428
Leo Minor, constellation, 429
Leódice, 429
Leominster [Herefordshire]
León, Reyno de, 429
León, province of, 429
Leonard, St. [Vienne, Haute]
Leonardo of Pisa, 429
Leónidas, 429
Leonine Verses, 430
Leóntodon Taráxacum, 430
Leopards, 430
Leopold I., II., 435
Leósthenes, 437
Lepadites, 437
Lepanto, Gulf of, 437
Lepas [Cirripeda]
Lepedolite, 438
Lépidi, 438

VOL. XIII.
Lepidodendron, 438
Lepidophyllum, 439
Lepidóptera, 439
Lepidóstrobus, 440
Lepóridæ, 440
Lepra, 442
Leprosy [Lepra]
Léptides, 442
Leptochonchus, 443
Leptophína, 443
Léptophis [Leptophina]
Leptopodíidæ [Macropodians]
Leptosómus, 444
Leptostomínæ [Indicatorinæ, vol. xii., p. 459]
Lepus [Leporidæ]
Lepus, constellation, 444
Lérida, 444
Lerista, 445
Lernæa, 445
Leroi, J. D., 445
Leros [Archipelago, Grecian]
Lesbónax, 445
Lesbos, 445
Lesghis [Georgia]
Leslie, Charles, 446
Leslie, Sir John, 446
Lessinnes, or Lessines [Hainault]
Lessing, 447
L'Estrange, 448
Lestris [Laridæ]
Le Sueur, 448
Lethargy, 448
Letter or Power of Attorney, 448
Letters-Patent, 449
Lettuce, 449
Leucádia [Santa Maura]
Leuchtenberg, 450
Leucin, 450
Leucippus, 450
Leucíscus, 450
Leucite, 451
Leucóma, 452
Leucon [Bosporus]
Leucosians [Oxystomes]
Leuctra [Epaminondas]
Leunclávius, 452
Leusden, 452
Leuwenhoek, or Leeuwenhoek, 452
Leuze [Hainault]
Levánt, 453
Levantína, Val [Ticino]
Levelling, 453
Leven, Loch [Kinross-shire]
Lever, 454
Leveridge, Richard, 455
Levite [Jews]
Levyne, 455
Lewes, 455
Lewis, Kings of France [Louis]
Lewis [Ross-shire]
Lewisham [Kent]

VOL. XIII.
Lex [Law]
Lex Mercatória, 456
Lexicon [Dictionary]
Lexington [Massachusetts]
Leybourn, William, 456
Leycestéria, 456
Leyden, 456
Leyden Phial [Electricity]
Leyden, Lucas van, 457
Leyden, John, 457
Leyt [Philippine Islands]
Leyton [Essex]
L'Hassa [Tibet]
L'Hôpital [Hôpital]
Líalis, 457
Liamone [Corsica]
Lias, 457
Libánius, 457
Líbanus [Syria]
Libation, 458
Libau [Courland]
Libel, 458
Líber, 458
Liber Regis, 459
Libérius, 459
Libertínus, 459
Libertus [Libertinus]
Liberty, 459
Libínia, 460
Libourne, 460
Libra, 460
Library, 461
Libration, 461
Líbya [Africa]
Licentiate in Medicine, 461
Lichanótus, 461
Lichas, 462
Lichenic Acid [Malic Acid]
Lichenin, 462
Lichenópora, 462
Líchens, 462
Lichfield, 463
Lichtenberg, 463
Lichtenberg, Geo. C., 464
Lichtwer, M. G., 464
Licínius Stolo, 464
Licínius, Flávius Valérius [Constantinus; Diocletianus; Galerius; Maximinus]
Lícinus, 465
Licks, 466
Lictor, 466
Licuála, 466
Liechtenstein, 466
Liege, province, 466
Liege, town, 467
Liegnitz, government, 467
Liegnitz, town, 467
Lien, 467
Lieou-Kieou Islands, 468
Lier, 469
Lieutenant, 469
Lieutenant-General [General]

VOL. XIII.
Lieutenant, Lord and Deputy [Lord-Lieutenant]
Life, 469
Life, Mean Duration of, 470
Life Insurance, 470
Life-boat, 470
Liffy, river [Ireland; Dublin]
Lifting, 471
Ligament [Articulation]
Ligan [Flotsam]
Ligature [Hæmorrhage]
Ligature, in music, 471
Light, 472
Light, Barometrical, 477
Light-Equation, 477
Light, Chemical Agency of, 477
Lightfoot, John, 478
Lighthouses, 478
Lightning, 478
Lights, Northern, 480
Lígia [Isopoda, vol. xiii., p. 55]
Lignin, 480
Lignite, 480
Ligulate Flowers, 480
Ligúria, 481
Ligurite, 481
Líguus, 481
Lilac [Syringa]
Liliáceæ, 481
Liliwati [Viga Ganita]
Lille, 481
Lillo, George, 482
Lilly, William, 482
Lily, William, 483
Lilybæum [Sicily]
Lima, 483
Lima (zoology) [Pectinidæ]
Limacella [Limacinea; Limax]
Limacína [Hyalæidæ]
Limacínea, 484
Limax, 484
Limb (astronomy), 488
Limbilite, 488
Limborch, 488
Limburg, 488
Lime [Calcium]
Lime, Medical Properties of, 488
Lime [Manure]
Lime Tree [Tilia]
Limerick, county, 489
Limerick, city, 493
Limerick, see, 496
Lime tone, 496
Limit; Limits, Theory of, 496
Limitations, Statute of [Statute of Limitations]
Limma, 497
Limnácea [Limneans]
Limnéans, 497
Limnória, 502
Limoges, 502
Limósa [Scolopacidæ]

VOLUME XIV.

Limónia, page 1
Limousin, 1
Limoux, 1
Límulus, 1
Lináceæ, 1
Linacre, 1
Lincoln [Lincolnshire]
Lincoln College, 2
Lincolnshire, 2
Lindesnaes, Cape [Trondheim]
Line, 18
Linear, 18
Linear Dimensions [Solid, Superficial, and Linear Dimensions]
Linen, 18
Lines, in music, 19
Lines of Intrenchment, 19
Linguella [Inferobranchiata, vol. xii.]
Língula, 21
Lingulína [Foraminifera, vol. x., p. 347]
Linkia, 21
Linkoping [Sweden]
Linley, Thomas, 21
Linley, William, 21
Linlithgow, county, 21
Linlithgow, town, 22
Linnæus, 22
Linnet, 25
Linseed, 27
Linseed Oil, 27
Línthuris [Foraminifera, vol. x., p. 348]
Linúchia, 27
Linum, 27
Linum Usitatíssimum, 27
Linz, 28
Lion, 28
Lip [Hare Lip]
Lípari Islands, 36
Lippe, river [Rhine]
Lippe, 36
Lípsius, 38
Lipúra, 38
Lipúrus, 38
Liquation, 38
Liquidambar, 38
Liquorice [Glycyrhiza]
Liriodendron [Tulip Tree]
Liris [Campania]
Lisbon, 38
Lisburn, 40
Liscov, C. L., 40
Lisieux, 41
Liskeard, 41
Lisle, or L'Isle [Vaucluse]
Lisle, William de, 41
Lismore, 42
Lissa, in Posen, 43
Lissa, in Prussian Silesia, 43
Lissa [Maiidæ]
List, Civil [Civil List]
Listing [Enlistment]
Litany, 43
Li-tchi, 43
Litharge [Lead]
Lithic Acid [Uric Acid]
Líthium, 43
Lithodendron 44
Lithódomus [Mytilidæ]
Lithography, 44
Lithólelaps [Cirripeda, vol. vii. p. 208]
Lithontriptics, 46
Lithophágidæ, 46
Lithostrotion, 51
Lithótrya [Cirripeda, vol. vii., p. 208]
Lithótomy, 51
Lithotrity, 53
Lithuánia, 53
Litíopa, 55
Litmus, 55
Litre, 56
Littleton, Thomas, 56
Littorína [Turbinidæ]
Lituites, 57
Liturgy, 57
Lítuus, 58
Lituus (augural), 58
Liutprandus, 58
Livadia [Bœotia]

VOL. XIV.
Live Stock, 58
Liver, 59
Liver, Diseases of, 60
Liverpool, 61
Lívia [Augustus]
Lívius Andronícus, 64
Lívius, Titus, 64
Livónia, 66
Livóneca [Isopoda, vol. xiii., p. 52]
Livorno, 67
Livre, 68
Lixívium, 68
Lizard [Lacertiadæ; Saurians]
Lizard-Point [Cornwall]
Ljungan-Elf [Angermanland]
Ljusnan-Elf [Sweden]
Llama, 68
Llandaff [Glamorganshire]
Llandilo-Vawr [Caermarthenshire]
Llandovery [Caermarthenshire]
Llanelly [Caermarthenshire]
Llangollen [Denbighshire]
Llanos [Plains]
Llanrwst [Denbighshire]
Lo, St., 75
Loach [Cobitis]
Loadstone [Iron (Ores)]
Loam, 75
Loango, 76
Loasáceæ, 76
Lobária [Bulladæ, vol. vi., p. 11]
Lobéira, Vasco [Amadis de Gaula]
L'Obel, Matthew, 77
Lobélia Infláta, 77
Lobeliáceæ, 77
Lóbipes, 77
Lobo, Jerome, 77
Lobophy'llia, 77
Lobster [Astacus; Crustacea; Homarus]
Lobulária, 78
Locarno [Ticino]
Lochaber, 78
Loches [Indre et Loire]
Loci [Locus]
Lock, Matthew, 78
Locke, John, 78
Locked-Jaw [Tetanus]
Lockeren, 82
Locris, 82
Locus, 82
Locust, 82
Locust Tree, 83
Locusta (Crustaceology) [Palinurus]
Loddon [Berkshire]
Lodève, 83
Lodi, province, 83
Lodi, town, 83
Lofoden Islands [Trondheim]
Log and Logline, 84
Logboard and Logbook, 84
Logarithms, 84
Logarithmic Curve and Logarithmic Spiral, 87
Logic [Organon]
Logistic [Proportional]
Lógos, 87
Logwood, 88
Loheia [Arabia]
Loir et Cher, 88
Loire, river, 90
Loire, department, 91
Loire, Haute, 92
Loire, Inférieure, 94
Loiret, 96
Lokmân, 98
Lolígo [Sepiadæ; Teuthidæ]
Loligopsis [Sepiadæ; Teuthidæ]
Lólium, 98
Lollards. 99
Lomatóceras, 99
Lombard, 99
Lombardic Architecture, 99

VOL. XIV.
Lombardo-Venetian Kingdom, 100
Lombardy and Lombard Cities, 104
Lombez [Gers]
Lombhouk, 108
Lomond, Loch, 108
Lomonosov, M. V., 109
Lonchéres, 109
Lonchópteris, 109
Lonchúra, 109
London, 109
London Clay, 129
London, New [Connecticut]
Londonderry, county, 129
Londonderry, city, 133
Long, Roger, 135
Long Island [New York]
Long, in music, 135
Longford, 136
Longínus, 138
Longipennes, 139
Longirostres, 139
Longitude and Latitude, 139
Longitude and Latitude, Methods of Finding, 140
Longland, 145
Longobards, 145
Longomontánus, 147
Longus, 148
Longwy [Moselle]
Lons-le-Saunier [Jura]
Loo-Choo Islands [Lieou-Kieou Islands]
Looe, East and West [Cornwall]
Loon (ornithology), 148
Lop, Lake [Turkistan]
Lope de Vega [Vega]
Lóphiadæ, 148
Lóphiodon, 148
Lophorína [Bird of Paradise, vol. iv., p. 421]
Lophóphorus [Phasianidæ]
Lóphotes, 149
Lophotus, 149
Lophúra, 149
Lophy'ropa [Branchiopoda, vol. v., p. 339]
Lóphyrus, 149
Loranthácæ, 149
Lorca, 149
Lord-Advocate of Scotland, 149
Lord-Keeper, 150
Lord-Lieutenant, 150
Lord of Misrule, 151
Lords, House of, 151
Lordship [Leet]
Loréto, 152
Lorenzo de' Medici, 152
Loricária, 152
Loricáta, 152
Lórient, 152
Lóripes [Veneridæ]
Loris [Lemuridæ; Nycticebus; Stenops]
Lorn, 152
Lorraine, 152
Lorraine, Cardinal de [Guise]
Lory [Psittacidæ]
Löss, 154
Lostwithiel [Cornwall]
Lot, river, 154
Lot, department, 154
Lot et Garonne, 156
Lothaire [Germany]
Lotharingia [Lorraine]
Lothians, 158
Lotions, 160
Lotteries, 160
Lotus, 161
Loudéac, 162
Loudun [Vienne]
Lough Diver, 162
Loughborough [Leicestershire]
Loughrea [Galway]
Louis I.—XVIII., 162—170
Louis d'Or, 171
Louis, St. [Missouri]

VOL. XIV.
Louisbourg [Cape Breton]
Louisiade Islands, 171
Louisiana, 171
Louisville [Kentucky]
Loulé, 174
Lourdes [Pyrenées Supérieures]
Louse [Pediculus]
Louth, 175
Louth [Lincolnshire]
Loutherbourg, 178
Louvain, 178
Louviers, 179
Louvre [Paris]
Love-Apple, 179
Low Countries, 179
Lower Greensand [Cretaceous Group]
Lowth, William, 179
Lowth, Robert, 179
Loxa, 180
Loxíadæ, 180
Loxodromic Spiral, 183
Loyola [Jesuits]
Lozère, 183
Lübeck, 185
Lübeck (principality) [Oldenburg]
Lubienietski, 186
Lublin, province, 186
Lublin, town, 186
Luc, De [De Luc]
Lucánus, 187
Lucas, Paul, 187
Lucca, Duchy of, 187
Lucca, town, 188
Lucern [Luzern]
Lucern (agriculture), 188
Lucernária, 189
Lucia, St., 189
Lucian, 189
Lucian, St., 190
Lúcida, 190
Lúcifer, 190
Lucílius, 190
Lucína (conchology) [Veneridæ]
Lúcius I., II., III., 191
Lucknow, 191
Lucon [Vendée]
Luçon [Philippine Islands]
Lucretia [Brutus, M. J.]
Lucrétius, 191
Lucrine Lake [Averno]
Lucúlia, 192
Lucullus, 192
Ludlow, 192
Ludlow Rocks, 192
Ludlow, Edmund, 193
Ludolphus, 193
Lugáno [Ticino]
Lugo [Galicia]
Luke, St., 193
Luke, St., Gospel of, 194
Lulea-Elf [Bothnia]
Lully, Raymund, 194
Lully, Jean Baptiste, 195
Lumbágo [Rheumatism]
Lumbrícus, 195
Lumme, 197
Lunacy, 197
Lunar Observation, 198
Lunar Theory, 198
Lunatic [Lunacy]
Lunatic Asylums, 198
Lunation [Moon]
Lund, 199
Lundin, Sir Alan, 199
Lundy Island [Devonshire]
Lune, Lunule, 129
Lune, river [Lancashire]
Lüneburg, duchy, 199
Lüneburg, town, 200
Lunel [Hérault]
Lunette, 200
Luneville, 200
Lungs [Respiration]
Lungs, Diseases of the, 201
Lunulites [Cellariæa, vol. vi., p. 400]

VOL. XIV.
Lupa (crustaceology) [Portunidæ]
Lupinite, 202
Lupínus, 202
Lupónia [Cypræidæ, vol. viii., p. 256]
Lupulin, 202
Lupulite, 202
Lupus, 203
Lure [Saône, Haute]
Lúridæ, 203
Lusátia [Lausitz]
Lusignan [Cyprus]
Lusitánia [Portugal]
Lustrum, 203
Lute, 203
Lutes, in chemistry, 203
Luther, 203
Luton, 207
Lutra [Otter]
Lutrária (conchology) [Pyleridea]
Lutrícola (conchology) [Pyloridea]
Lutterworth [Leicestershire]
Lützen [Gustavus Adolphus]
Luxembourg, 207
Luxor [Egypt; Thebes]
Luzérn, canton, 208
Luzérn, town, 209
Luzon [Philippine Islands]
Lycáon [Hyæna-Dog]
Lycaónia, 209
Lycesta, 210
Ly'cia, 210
Lycium, 210
Ly'codon, 211
Ly'copus Europæus, 211
Lycoperdon, 211
Ly'cophris [*Foraminifera*, vol. x., p. 348]
Ly'cophron, 211
Lycopodiáceæ, 212
Lycopodites, 212
Lycóris, 212
Lycurgus [Sparta]
Lycurgus, orator, 212
Lycus, river [Anatolia]
Lydford, 212
Lydgate, 213
Ly'dia, 213
Lydian Mode [Mode]
Lydus, J. L., 215
Lye, Edward, 215
Lyme Regis, 215
Lymfiord [Jutland]
Lymington, 215
Lymnea [Lymneans]
Lymnórea (zoology), 215
Lymnórea, 215
Lymph, Lymphatics, 215
Lynceus [Branchiopoda, vol. v., p. 342]
Lynchburg [Virginia]
Lynn, 216
Lynx, 217
Lynx (constellation), 221
Lyon, 221
Lyon King at Arms [Herald]
Lyonais, 225
Lyónsia, 225
Lypornix, 225
Lyra (constellation), 225
Lyra (ornithology) [Mænura]
Lyre, 225
Lyric Poetry, 226
Lyrics, 227
Lyriocéphalus [Iguanidæ]
Lyrúrus [Black-Cock; Tetraonidæ]
Lys [Belgium; Schelde]
Lysander, 227
Ly'sias, 227
Lysídice, 228
Lysímachus, 228
Lysippus, 228
Ly'smata, 229
Lythráceæ, 229
Lyttelton, George, Lord, 229

M.

M is the labial letter of the liquid series. For the various forms of the characters by which it has been denoted in the chief European languages, see ALPHABET.

The changes to which it is liable are chiefly as follows:—

1. *M* is interchanged with *n*. Thus *m*, at the end of Latin cases and tenses, is generally represented by an *n* in Greek. Similarly the German dative *ihm* and accusative *ihn* have been confounded in the English *him*, which is at once dative and accusative. So again the German *boden*, *busen*, *besen*, *faden*, are in English, *bottom*, *bosom*, *besom* or *broom*, *fathom*. And even in the Greek language, notwithstanding its aversion to a final *n*, inscriptions exhibit such forms as τομ βασιλεα, αιθηρ μεμ φσυχας, &c., where the nasal is modified so as to accord with the initial letter of the following word.

2. *M* with *b*. Thus in Latin, *hiems* co-exists with *hibernus*, *tumeo* with *tuber*, *glomus* with *globus*, *fama* with *fabula*. This interchange explains the form of *summus*, the superlative of *sub*, of *sumo* for *subimo*, and perhaps that of *melior*, as the comparative of *benus* or *belus*, the old form of *bonus*; whence *bene*, *bellus*, βελτερος, βελτιστος, βεντιστος, &c. Again, βροτος is equivalent to μροτος, and so related to the Latin *mor-i* and the Sanskrit *mri*. In our own language *husband* is a corruption of *houseman*, *dominus*, the correlative of *housewife*.

3. *M* with *p*. Hence the Greek forms ομμα, τετυμμαι, &c., for οπμα, τετυπμαι, &c. So the Greek preposition μετα has a form πεδα, and the Greek μολυβδος is in Latin *plumbum*.

4. *M* with *v*. This is particularly the case in the Welsh language. Hence the name *Roman* was transferred into that tongue with a *v* (or rather an *f*, which is pronounced as *v*) in place of the *m*; and the Latin *amnis* is believed to be identical with the Welsh *Afon*, pronounced *Avon*. The Latin language too has *promulgare*, apparently for *provulgare*.

5. *M* with *w* probably. This interchange follows easily from the last, and is a natural step towards the next. The German *mit* seems to be identical with our own *with*. In Greek too μια, 'one,' and the particle μεν (which also appears to denote 'one,' and so to correspond to δε, 'two,' probably a corruption of δυο), seem to have passed through a form Fια, Fεν, before they became ια and ἐν. Compare the old Latin *oeno* and the English *one* as it is pronounced.

6. *M* disappearing. This appears to have been the case even at the beginning of words. See what is said above; and compare the Greek μεχρις with αχρις, μοχλιζω with οχλιζω, the Latin *manus* with the Teutonic *hand*, the Latin *mere-re* with the English *earn*. At the end of words at least, the loss of an *m* is very common, particularly after *o*. Thus the Greek and Latin verb often has the first person ending in ō, where analogy would lead to *om*; *scribo*, τυπτω. Compare in Latin the words *sum*, *inquam*, besides the other tenses *scribebam*, *scribam*, &c.; and in Greek the middle form τυπτομ-αι, τυπτεσ-αι, τυπτετ-αι, which would seem to have been formed from an old active, τυπτομ, τυπτες, τυπτετ, with the addition of a fixed suffix denoting *self*. In Latin all the adverbs ending in *o*, signifying *motion to*, appear to have lost an *m*, viz. *quo*, *eo*, &c. Hence *adeo*, *quoad*, occur in conjunction with a preposition which elsewhere requires an accusative. Again, an *m* has been lost in *posteā*, *anteā*, *postillā*, &c.; compare *postquam*, *antequam*, &c. Lastly, the use of *refert meā*, *refert Ciceronis*, *interest meā*, &c., are probably to be explained by the full forms, *rem fert meam*, *rem fert Ciceronis*, *inter rem est meam*. Such a use of *res* accords well with the phrases, *in rem meam est*, *e re tua est*.

7. *M*, like the other liquids, but not so frequently, is liable to change its position with regard to the vowel of a root. Thus in Greek the root τεμ, *cut*, may take the form τμη; and δαμα-ω has derivatives where the μ is next to the δ.

The letter M, or rather a symbol somewhat like it, for which modern printers have found it convenient to substitute that letter, was used by the Romans to denote a thousand. It is commonly said that this character was thus used because it is the initial of *mille*; but see NUMERALS.

MAAR, the German term for certain extinct volcanic craters, especially in the Eifel, which are filled with lakes. Others not different in origin are called See. Each term alludes to the watery expanse. Thus the Laacher See, the Maars of Daun, Ulmen, &c., are all volcanic craters, situated on eminences, but sunk so much below the level of the country as to have received the surface drainage, and to have formed a series of lakes. Those which have no apparent outlet for the waters are considered by Dr. Daubeny specially to have claims to the title of 'Maars.'

MAAS. [RHINE.]

MAASLUYS (or Maaslandsluys) is a pretty considerable town of the kingdom of the Netherlands, in the province of South Holland, about 10 miles west of Rotterdam, in 51° 55′ N. lat. and 4° 14′ E. long. It is situated on an arm of the Maas called t'Scheuer or Sluys-diep, which here empties itself into the North Sea. It has a tolerable harbour. The inhabitants, 7000 in number, are chiefly engaged in the cod and herring fisheries, the produce of which is exported in considerable quantities.

MAASTRICHT (Mastricht, or Maestricht, *Trajectum ad Mosam*), the capital of the Dutch part of the province of Limburg, is in 50° 48′ N. lat. and 5° 43′ E. long., on the banks of the Maas (or Maese), at the junction of that river with the small stream of the Jaar. It is divided by the Maas into two parts, which are connected by a handsome stone bridge 500 feet in length. The part on the right bank is properly a suburb, called Wyck. Maastricht is a pretty, regular, and well built town. It contains some large squares, such as the extensive market-place, and the parade, which is surrounded with avenues of trees. Among the public buildings the most remarkable are the very handsome townhall, with a public library, in the great market-place, and the church of St. Gervais. There are six Roman Catholic, one Lutheran, and three Calvinist churches, twenty-one churches belonging to dissolved monasteries, two hospitals, two orphan asylums, and a Lyceum. The population is 22,000 inhabitants, who have considerable manufactories of woollen cloth, flannel, leather, fire-arms, soap, and extensive breweries and distilleries. In the adjacent country they likewise cultivate madder, tobacco, and succory.

Maastricht is one of the strongest fortresses in the Netherlands, and the key to the kingdom on that side. On the west side of the Maas is St. Peter's mountain (Petersberg), upon which a citadel was erected in the year 1703. The level tract between the town and St. Peter's mountain can be laid under water by means of sluices. This mountain is very remarkable on account of its fine stone quarries, to which there is an entrance on the side next the Maas, through which waggons are driven and loaded with the blocks of stone, which they convey to the banks of the river. This quarry, extending over a tract twelve leagues in circumference, is traversed by a great number of horizontal passages, which are supported by square pillars. In various places there are openings for the admission of air and light, and small water cisterns. At one place, called the Fountain, there is a pretty large basin of water, into which a small stream flows, that issues from the foot of a fossil tree. In time of war, the inhabitants of the surrounding country, with their cattle, found a secure refuge in this quarry, which is said to be capable of receiving 40,000 persons. The passages, said to be 20,000 in number, intersect and cross each other in all directions, forming such an intricate labyrinth, that it is dangerous to venture into it without an experienced guide.

(*Beschryving van het Kon. der Nederlanden*, &c., van N. G. van Kampen; Hassel's *Handbuch*; Stein, *Geog. Lexicon*; Cannabich, *Lehrbuch*.)

MAASTRICHT ROCKS. The rock of St. Peter's mountain is generally of a granular texture, and to geological observers presents a sort of middle character between chalk and particular parts of the 'calcaire grossier' of the Paris basin. The geological relation thus suggested is confirmed by the organic remains, which, with many points of specific resemblance to the ordinary fossils of the chalk, exhibit likewise some generic relations to the Tertiary series. Accordingly, the place in the scale of strata now assigned by common consent to the Maastricht rocks is in immediate superposition above the chalk of England, and at some small interval below the calcaire grossier of Paris. It may be considered as an upper part of the chalk formation, and is paralleled by observed cases in the south-west of France. It is principally to Dr. Fitton ('Proceedings of Geol. Soc. of London,' 1829) that English geologists owe the establishment of this important classification.

St. Peter's mountain is rich in fossils, some of which lie in flint nodules, and others in the stone. A few years ago the bones of some ruminant quadrupeds were offered for sale at Maastricht, and were described as from this hill, but they did not really belong to the antient rock. The genuine remains are however very remarkable; in particular the great aquatic reptile, imagined to be a crocodile by Faujas St. Fond, but determined to have other analogies to the Lacertiadæ by Cuvier, who named it Mosasaurus: vertebræ of this animal have been found in the chalk of England and Sweden. A very large species of marine turtle (Chelonia) has also been completely examined by Cuvier from this locality. Beautiful teeth of fishes, shells of Nautili, Baculites, Belemnites, Hippurites, Inocerami, Ostreæ, Echinida, Terebratulæ, and Polypiaria may be seen in some of the interesting collections at Maastricht, and go far to prove the truth of the prevalent opinion, that the strata of St. Peter's mountain are more allied to the chalk than to the calcaire grossier—the newest of the Secondary, rather than the oldest of the Tertiary rocks.

(Dr. Fitton in *Geol. Proceedings and Transactions;* Meyer, *Palæologica;* Von Dechen, *Handbuch*, &c.)

MABILLO'N, JEAN, born in 1632, studied at the college of Rheims. He took vows in the congregation of St. Maur, belonging to the order of Benedictines, in 1654. He afterwards assisted Father D'Achery in his collection entitled 'Spicilegium,' and also edited the works of St. Bernard. In 1668 he published the first volume of his 'Acta Sanctorum Ordinis S. Benedicti,' being the Fasti of his order, preceded by a learned introduction, 'Præfationes in Acta Sanctorum.' Mabillon was afterwards sent to Italy by Louis XIV. to make a collection of books and MSS. for the royal library. On his return he published his 'Museum Italicum,' 1689, a kind of literary and antiquarian itinerary of Italy, in which he briefly describes the towns that he visited, and more at length the churches and convents, especially those of his order, such as Monte-Casino, Vallombrosa, &c., the libraries and colleges, the rare MSS., inscriptions, and other curiosities. This work is followed by learned dissertations upon subjects of ecclesiastical history and palæography. The second volume of the 'Museum Italicum' is occupied by a 'Commentarius in Ordinem Romanum,' or Commentary on the ritual of the various services, or liturgy, and ceremonies of the Roman Church, which are there exhibited at full length. He had previously published 'De Liturgia Gallicana libri tres,' 1685, in which he compares the Gallican with the Mozarabic liturgy

Mabillon wrote also the 'Iter Germanicum,' being a similar tour through part of Germany, namely, Suabia, Helvetia, and Bavaria, which he likewise undertook by order of Louis XIV. In this journey he visited the abbeys and libraries of St. Gall, Augsburg, &c., and among others the secluded Benedictine convent of Tegern See, where he and his companion met with a very scurvy reception from the librarian, a rough Bavarian, who hated them as being Frenchmen, and the more so as they caused him to be called out of the refectory to attend upon them. He also wrote an 'Iter Burgundicum,' which is among his posthumous works: 'Ouvrages Posthumes de D. Jean Mabillon et D. Thierri Ruinart, Bénédictins de la Congregation de St Maur,' 3 vols. 4to., Paris, 1724. This interesting collection contains, among other valuable matter, Mabillon's correspondence, and his 'Reflexions sur les Prisons des Ordres Religieux,' in which he censures the cruelties practised in several monastic houses against those monks who transgressed the rules of their order, and speaks among others of the famous *Vade in Pace*, or subterraneous dungeons in which some were confined till they died. This strange authority exercised by communities over the liberty and life of individuals, uncontrolled by and unknown to the state, is one of the most repulsive features of the monastic system.

In the above collection of Ouvrages posthumes are: 'Discours sur les Anciennes Sepultures de nos Rois,' 'Remarques sur les Antiquités de l'Abbaye de St. Denis,' 'Histoire de la Contestation sur l'Auteur de l'Imitation de Jesus Christ' [KEMPIS, THOMAS A], 'Lettres et Ecrits sur les Etudes Monastiques.' These last concern a curious controversy between the Abbé de Rancé, the founder of the order of the Trappists, and the Benedictines. De Rancé, in his ascetic enthusiasm, had forbidden his monks all scientific studies, and indeed all reading except the Breviary and a few monastic tracts. The rest of the clergy, both secular and regular, took the alarm, and Mabillon was requested to defend monastic studies and learning as perfectly compatible with piety and religious discipline, as the Benedictine order had fully proved. Mabillon accordingly wrote his 'Traité des Etudes Monastiques,' in 1691, which was received with great applause, and was translated into Latin and other languages. This led to a controversy with Rancé, who had the worst of it: 'Réflexions sur la Réponse de l'Abbé de la Trappe,' 1692. Another controversy which Mabillon had with Rome concerning the worship of relics of unknown persons whose bones were found in the catacombs, fills part of the posthumous works: 'Lettres et Ecrits sur le Culte des Saints inconnus.' They contain also a 'Votum D. Io. Mabillonis de quibusdam Isaacii Vossii Opusculis.' While Mabillon was at Rome, he was asked his opinion by the Congregation of the Index concerning some writings of Isaac Vossius, in which that scholar gave the preference to the chronology of the Septuagint over that of the Hebrew text, and in another place maintained that the deluge had not been universal. Mabillon said that although he believed that the opinions of Vossius, especially the latter, were not correct, yet he did not think that they constituted heterodoxy, and accordingly the Congregation did not place Vossius in the Index.

Mabillon wrote also 'De Re Diplomaticâ libri sex: accedit Commentarius de antiquis Regum Francorum Palatiis;' 'Veterum Scripturarum varia Specimina,' &c., a work much esteemed. In 1701 he was chosen member of the Academy of Inscriptions, and in 1703 he published the first volume of his 'Annales Ordinis S. Benedicti,' which he brought down to the year 1157, 6 vols. folio. He died at Paris, in 1707. Mabillon was one of the most learned men of his age, and his liberal and candid disposition is clearly exhibited in his 'Correspondence,' and in his other posthumous writings.

MABLY, ABBE' DE, born at Grenoble in 1709, studied at Lyon in the Jesuit College, and afterwards went to Paris, where he was introduced to the Cardinal de Tencin, who was then minister. He wrote in 1740 his 'Parallèle des Romains et des Français,' which acquired him a kind of popularity. He was employed by the cardinal as his secretary, and while in that office he compiled his 'Droit public de l'Europe, fondé sur les Traités,' a useful work derived from good sources. Mably was employed in several secret negotiations between 1743-6, after which he appears to have quarrelled with the cardinal, in consequence of which he gave up his official prospects for a studious retirement. His historical works are:—1. 'De la manière d'écrire l'Histoire;' 2. 'De l'étude de l'Histoire;' 3. 'Observations sur l'Histoire de la Grèce;' 4. 'Observations sur les Romains;' 5. 'Observations sur l'Histoire de France,' 2 vols. 12mo., 1765, with a posthumous continuation in two more volumes, published in 1790 (this is the best of his historical works); 6. 'Entretiens de Phocion sur le Rapport de la Morale avec la Politique.' Many of the author's views, especially in this last work, are visionary; such as a community of goods: he would also banish commerce and the fine arts from a republic. Mably was a great admirer of the institutions of Sparta. He died at Paris in 1785.

MABOU'IA, Fitzinger's name for a genus of Saurians allied to the Skinks (*Scincus*).

MABUSE, or MAUBEUGE, JOHN. This eminent painter, whose proper name was John Gossaert, was born at Maubeuge in Hainault, in 1499. Nothing is known of his parents, or of the name of the master under whom he studied. It is evident however that in early life he must have very assiduously devoted himself to the study of nature, and have acquired habits of industry. Considering that he was in after-life of a most restless ardent temperament, indulging in dissolute and licentious habits, and especially addicted to immoderate drinking, we cannot but admire the patience, fidelity, and labour which appear in his works. Most writers have affirmed that he went early to Italy, but even this is not clearly ascertained; but whatever advantage he may have derived from the study of the great masters and of the antique, he never attained the elegance of the Roman school.

After his return from Italy he lived for some time at Utrecht, in the service of the bishop, Philip of Burgundy. From Utrecht he went to Middelburg, where he painted the celebrated altarpiece, representing the Descent from the Cross, for the great church. This picture, which was of extraordinary dimensions, was highly admired by Albert Durer. The church, with this picture and all the treasures of art that it contained, was destroyed by lightning. He seems to have lived in a very extravagant manner at Middelburg, and was at last thrown into prison; but whether for debts or for some excesses is not known. It seems to have been after the recovery of his liberty that he came to London, where he was employed in the service of Henry VIII. He painted the king's children, and many portraits of the nobility, which gained him great reputation. Several of his pictures painted in England are still in existence, and others were destroyed in the fire at Whitehall Palace. One of his finest works is at Castle Howard, the seat of the earl of Carlisle. It represents the Wise Men's Offering, and is a rich composition, in which there are thirty principal figures. Dr. Waagen, in his 'Arts and Artists in England,' speaks in the highest terms of this picture, which is in as good a state of preservation as if it had been finished only yesterday. Most of the great galleries on the Continent have specimens of his works. Among these are three in the celebrated collection formed by Messrs. Boisserée, which contained above 300 pictures by the antient German masters, which they saved from neglect or destruction during the wars of the French revolution, and which are now in the possession of the king of Bavaria. These pictures are a very large and splendid composition, representing the Crucifixion, the archangel Michael overcoming Satan, and a small highly-finished picture representing the Virgin Mary as Queen of Heaven. This is conjectured to be the picture which was most highly extolled during his lifetime, and which he painted while in the service of the marquis of Verens, a wealthy Flemish nobleman, and in which he took the marchioness and her son as models for the Virgin and Child. This nobleman having to entertain the emperor Charles V., put all the persons in his service into new and splendid liveries, and among the rest ordered suits of rich white brocade for his painter and two others of his household. Mabuse, under some pretence, got possession of the brocade, which he sold, and spent the produce at a tavern. When the great day came, and the retainers and servants were to pass in procession before the emperor, the dress of Mabuse appeared to be of such superior whiteness and beauty, that the emperor desired to examine it, and, to his astonishment, discovered it to be paper: thus the secret came out, and greatly amused the company. It is said that Mabuse died in 1562, but neither the place nor manner of his death is known.

Such are the particulars which we have been able to collect of the life of this artist. Three different accounts of him now before us agree in giving the dates of 1499 and 1562 as those of his birth and death. There is however one circumstance which is absolutely irreconcileable with these dates. In the catalogue of the pictures belonging to King Charles I. is 'The children of Henry VII.: Prince Arthur, Prince Henry (afterwards Henry VIII.), and Princess Margaret.' Dr. Waagen, who saw this picture at Hampton Court, says, 'As Prince Henry, who was born in 1492, appears to be about seven years old, the picture was painted about 1499, which fixes the time when Mabuse was in England;' but 1499 was the year in which all the accounts fix the birth of the artist himself.

MACA'CO. [LEMURIDÆ, vol. xiii., p. 419.]

MACA'CUS, a barbarous word founded on the term *Macaco* (written by the French *Macaque*), which, according to Cuvier and the author of 'Natural History of Monkeys, Lemurs, and Opossums,' appears for the first time in Marcgrave's 'Nat. Hist. of Brazil,' as the native appellation of a kind of monkey found in Congo and along the coasts of the Gulf of Guinea. The author of 'The Natural History of Monkeys,' &c. observes that its application to an Asiatic species, of a genus totally distinct from that to which the animal properly bearing it really belongs, is one of the many similar errors of nomenclature committed by Buffon, at that time indeed unavoidable from the very limited knowledge which naturalists possessed on the subject of specific distinctions, and especially from the confusion which reigned in the geographical part of zoology.

Lacépède seems to have been the first who Latinized this term, and he was followed by other French zoologists as well as by those of other countries. The *Ouanderow* or *Wanderow* appears to be considered the type of the genus, at least it stands at the head of the heterogeneous species comprehended under the title.

Thus Cuvier arranges under the *Macaques* the following *Simiadæ*: *Silenus*, *Sinica*, *radiata*, *cynomolgus* and *cynocephalus*, *rhesus*, *nemestrina*, &c.

Mr. Gray arranges the genus as the last of his subfamily *Cercopithecina* (family *Hominidæ*).

M. Lesson, who makes the characters of the genus consist in a facial angle of from 40 to 45 degrees; in a very strong development of the supraciliary and occipital crests; the presence of pouches and callosities, and a tail more or less long, gives as its dental formula that which is common to so many of the *Simiadæ*, viz.:

$$\text{Incisors } \frac{4}{4};\ \text{Canines } \frac{1-1}{1-1};\ \text{Molars } \frac{5-5}{5-5}=32:$$

and he arranges under it the following species: *Silenus*, *Sinicus*, *carbonarius*, *radiatus*, *cynomolgus*, *rhesus*, *nemestrinus*, and *speciosus*.

Sir William Jardine adopts the genus with the following species: *Macaci*, *Silenus*, *Sinicus*, *radiatus*, *cynomolgus*, *rhesus*, *nemestrinus*, and *niger*.

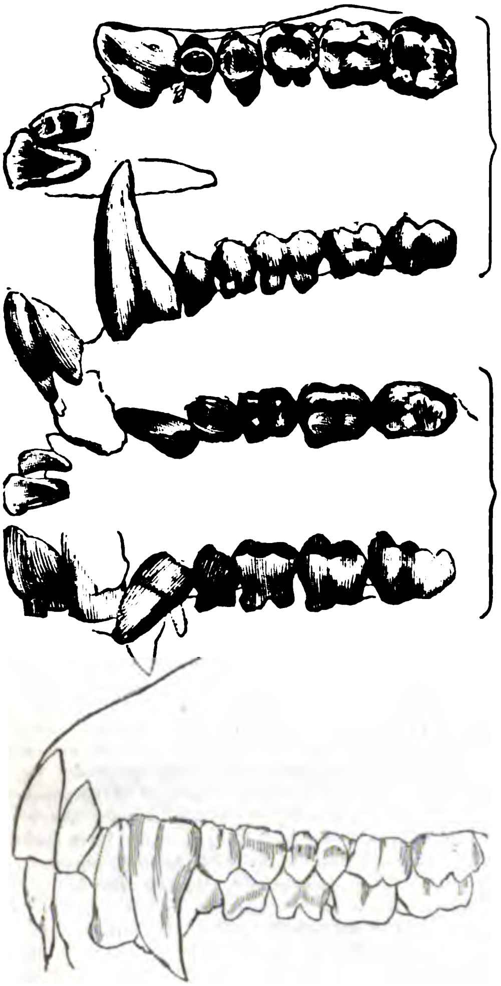
Mr. Swainson, who also adopts the genus, gives the species the English appellation of *Ape-Baboons*, and he considers that they are distinguished by an elongated muzzle, as in *Macacus carbonarius*, much more prominent than in the *Cercocebi*, and by a tail more or less lengthened: he is also of opinion that they differ from the *Cyanocephali* (Cynocephali) of Cuvier, or True Baboons, because their nostrils 'open obliquely on the upper part of the muzzle.' Mr. Swainson thinks that the form of these animals, nevertheless, shows a strong resemblance to the *Cercocebi*, which is further increased by their possessing a tail; although this member is generally so short that it seldom equals a third of the length of the body. The muzzle, he observes, is so much elongated, that the facial angle does not exceed 45°, and the canine teeth are strong and large. He further remarks that it deserves attention, that some of the species (as *M. Silenus*, *Sinicus*, and *radiatus*) are remarkable for having crests, which either assume the form of a mane or of a radiated tuft. The Chinese Bonnet Monkey has the hairs disposed in this manner, while its elongated muzzle, in Mr. Swainson's opinion, is very characteristic of the genus, and he states that the form of these animals separates them widely from the monkeys: it is, he says, strong and compact, while their disposition is cunning and mistrustful. He concludes by remarking, that the crested species inhabit India, and that the others are African. (*Nat. Hist. and Classification of Quadrupeds.*)

The author of the 'Natural History of Monkeys, Lemurs, and Opossums' rejects, for substantial reasons given in that work, the genus *Macacus*, and applies the term *Baboons*, as usually understood and applied in the English language, to a group of *Simiæ* co-ordinate with the *apes* and *monkeys*, as described by him, distinguished from the apes by the equality of their members, their cheek-pouches and ischial callosities, and from the monkeys by the short robust make of their bodies and extremities, their tubercular tails, too short to execute the functions usually assigned to that organ, and the mountain rather than sylvan habitat which this conformation necessarily induces.

'The most prominent of these traits of structure,' continues the author, 'the abbreviated or tubercular nature of the tail, is the idea usually attached to the word *baboon*, and it is certainly the most prominent and characteristic attribute of the group; since, as we have frequently had occasion to observe, the comparative development of this organ, if not the immediate cause, is at all events the most certain index of the habits and economy of these animals:' and he makes the baboons thus defined comprise two distinct genera, *Papio* and *Cynocephalus*, respectively confined, with one or two exceptions, to the continents of Asia and Africa.

The author then introduces to the reader's notice the genus *Papio* as the last and lowest of the groups which inhabit the Asiatic continent and the great islands of the Indian Archipelago, and which appear to occupy in these regions the situation which the *Cynocephali* fill in Africa. Of the forms placed by the author under this genus the *Wanderoo* and *Gelada* (*Papio Silenus* and *Papio Gelada*) are the only species in which the tail acquires any length: it never reaches, he remarks, beyond the houghs, nor is it ever employed to assist the progressive motions of the animals as among the *Cercopitheci*. These species, therefore, he thinks cannot be separated with any kind of propriety from the *Papios* with tuberculous tails, merely on account of their comparative length; because that organ, though rather more developed in the Wanderoo and Rhesus than in the Magot and Papio niger, is still greatly abbreviated as compared with the tails of the *Cercopitheci*, and entirely devoid of influence as an element in the habits and economy of animal life.

The following is given by M. F. Cuvier as the dental development of the *Macaques* and *Cynocephales*, and is taken from the Chinese Bonnet Monkey (*Macaque Bonnet Chinois*)



Teeth of Macacus, &c.

Reverting to the arrangement of the author of the *Natural History of Monkeys*, &c., we find the Papios divided into two small groups, distinguished by the greater or less length of the tail on the one hand, and its tuberculous form or total absence on the other; of the latter the well-known *Magot*, or Barbary Ape, is an example, and the Wanderoo* (*Macacus Silenus* of authors, *Papio Silenus* of the author of the *Nat. Hist. of Monkeys*), is an illustration of the former.

Description of the Wanderoo.—Hair deep black throughout, with the exception of the long beard or mane, which descends on each side of the face in the form of a ruff, extending downwards over the chest, and varying from an ash-gray to a pure white. The upper part of the face between the eyes naked and flesh-coloured; the muzzle perfectly black. Cheek-pouches large, callosities of considerable size, and flesh-coloured. Tail about half as long as the body, and when perfect, which in captivity is not often the case, terminating in a brush of tufted hairs (Bennett.)

Geographical Distribution.—Peninsula of India, Ceylon? (Knox). M. Duvaucel saw the animal in the menagerie at Barracpore, and states, according to M. F. Cuvier, that the Indians give it the name of *Nil bandar*, or perhaps, as the author of *Nat. Hist. of Monkeys* observes, more properly *nyl* or *neel bhunder*, signifying the dark blue or black bhunder; but this, continues the last-mentioned author, evidently refers merely to the colour of the hair, and can scarcely be the real appellation of the animal, which, not being a native of Bengal, is not likely to have a Bengalee name.

Habits, &c.—Father Vincent Maria gives the following quaint account of this species. 'There are found,' says the Padre, 'four sorts of monkeys on the coast of Malabar; the first is quite black with glossy hair and a white beard round the chin, measuring rather more than a palm in length. The other monkeys pay to this so profound a respect that they are humble in his presence, as though they appreciated his superiority. The princes and mighty lords hold him in much estimation for his endowments of gravity, capacity, and the appearance of wisdom above every other monkey. He is readily trained to enact a variety of ceremonies and affected courtesies, which he goes through with so grave a face, and so perfectly, that it is a most wonderful thing to see them so exactly performed by an irrational creature.'

The general posture of the species is on all fours or seated; in which positions it usually takes its food, either by the hands or by bringing the mouth to it. Its first operation in feeding is generally to fill the cheek-pouches.* It sleeps either on its side or sitting, bent forward, and with the head on the breast. Those which we have seen in captivity have exhibited varied temperaments. One in particular was all life, spirit, and mischief, while another was melancholy and staid in its deportment; and yet the health of both these animals appeared to be equally *good, nor* was there much difference in their ages.

Wanderoo.

MACAO, a town in China, situated at the southern extremity of the æstuary of the Choo Kiang, or Canton river, 22° 13′ N. lat. and about 113° E. long., about 80 miles from Canton by sea. It is built on a low sandy promontory, stretching southward from the island of Macao, which is separated by a narrow channel from the larger island of Kiang-shan-hien. The town extends across the central part of the peninsula from the roadstead of Macao on the east to the interior harbour on the west, and is somewhat more than half a mile wide in this direction, whilst from north-east to south-west it occupies about two miles. The streets are regular, but mostly narrow. A considerable number of houses have been built by the Portuguese and other European inhabitants in the European style, but the greater part are Chinese buildings. There are some churches and convents in the town, and also three small fortresses in the neighbourhood. A wall built by the Chinese across the isthmus is carefully guarded by them, and the Europeans are not permitted to pass it. The roadstead of Macao is much exposed to the prevalent gales during the monsoons. The interior harbour is spacious, well sheltered, and has excellent anchoring-ground; but being situated out of the route to Canton, and open only to the south-west, it cannot well be used during the south-western monsoons. For that reason it is rarely entered by vessels, which commonly lie in the harbour, called Typa Cabrado, which is formed by four small rocky islands, lying south of the southern extremity of the peninsula on which Macao is built. This harbour is not large, but as these islands are high and enclose it almost completely on all sides, it is perfectly safe, even during the heaviest gales. The entrance for vessels is from the east, but boats may pass through the northern channel direct to the town, which is only about two miles distant. About 30 miles north-east of Macao, farther up the æstuary, is the rocky island of Lintin, on the western side of which is excellent anchor-ground, where the larger vessels lie-to before they proceed to Canton, and where an extensive smuggling trade is carried on.

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* Lion-tailed Baboon of Pennaut.

* 'First mouthed, last swallowed.'—Hamlet.

It is commonly supposed that the Portuguese possess the sovereignty of Macao; but that is so far from being the case, that they pay a ground-rent amounting to 500 taëls per annum, and Chinese mandarins inspect periodically the Portuguese forts, as well as levy a duty on the Macao shipping. A civil mandarin, called Tso-tang, resides within the town, as governor in the name of the emperor of China; he keeps a watchful eye on the inhabitants, and communicates information to his superiors. The only privilege which the Portuguese possess is to govern themselves; while the Chinese population of the town are entirely under the control of the mandarins. The former, including slaves, does not exceed 5000, while the Chinese are calculated to be above 30,000. Besides the Portuguese, individuals of other European nations reside in the town, especially Englishmen, who pass the summer months there, and go to Canton in autumn, when the vessels arrive.

The trade of Macao was formerly considerable, but it has been continually decreasing. The Portuguese are permitted to employ twenty-five vessels in this trade, but they actually do not possess much more than half that number. The most lucrative branch was the smuggling trade in opium, which has almost entirely passed to the island of Lintin. (Horsburgh; *The Chinese*, by Davis.)

MACARTNEY, GEORGE MACARTNEY, EARL OF, was the only surviving son of George Macartney, Esq., a gentleman of Scottish descent, but whose family had been for some generations settled on their estate of Lissanoure, near Belfast in Ireland, where the subject of the present notice was born on the 14th of May, 1737. At the age of thirteen he was admitted a fellow-commoner of Trinity College, Dublin, and in 1759, after having obtained his degree of M.A., he came to London, where he entered himself of the Inner Temple, but without any intention of prosecuting the profession of the law. He then made the tour of Europe, and on his return home in 1764 it was arranged, through the interest of Lord Holland, with one of the members of whose family he had formed an intimacy on the Continent, that he should be returned to the British parliament for Midhurst, under the patronage of the earl of Sandwich, then one of the secretaries of state; but this destination was changed by his appointment, 22nd August of the same year, as envoy extraordinary to the empress of Russia, for the purpose of concluding a commercial treaty with that country. He was knighted before proceeding on this business, which, after a long and arduous negotiation, in the course of which he was not only opposed by rival interests at the court to which he was sent, but thwarted by very annoying conduct on the part of the British cabinet, he at last brought to a satisfactory conclusion. He returned to England in June, 1767, and soon after received the appointment of ambassador extraordinary and plenipotentiary to Russia, which however circumstances induced him to resign.

In February, 1768, he married Lady Jane Stuart, second daughter of the earl of Bute; and in April was returned to parliament for Cockermouth. In July following he exchanged this seat for one in the parliament of his native country, having been elected for Armagh in contemplation of his appointment to the office of chief secretary for Ireland, which took place on the 1st of January, 1769, on the nomination of Lord Townshend as lord-lieutenant, and the adoption of a new scheme of government, under which the lord-lieutenant should be, not, as heretofore, an occasional visitor only, but a permanent resident in the country.

Macartney, who was now sworn of the Irish privy-council, greatly distinguished himself by his exertions in the debates of the House of Commons against Flood, Dr. Lucas, and the other leaders of the opposition. He held his office till June, 1772, when he was made a Knight of the Bath, and in 1774 was appointed to the sinecure of governor of Toome Castle, which produced an income of above 1000*l.* In October, 1774, he was returned to the British parliament as member for the Ayr burghs; but in December, 1775, he was sent abroad as governor of the island of Granada. He was raised to the Irish peerage by the title of Baron Macartney, 10th of June, 1776. He remained in Granada till July, 1779, when after a most gallant defence he was compelled to surrender the island at discretion to the French admiral Count d'Estaing, and was himself sent prisoner to France. He was however very soon exchanged, and after having been employed by Lord North in a confidential mission to Ireland, was in September, 1780, again returned to the British parliament for Beeralstone.

On the 14th of December of the same year he was appointed by the East India Company governor of Madras. Having returned to England in January, 1786, he found that before his arrival he had been appointed governor-general; but the state of his health and other considerations induced him to decline that post, and it was eventually given to Lord Cornwallis. Very soon after his return home Macartney was severely wounded in a duel with Major-General Stuart, an officer whom he had when in India found it expedient to remove from the service. In 1788 he took his seat for the first time in the Irish House of Peers, and he resided chiefly in his native country till 1792, when he was appointed to his most memorable public employment as ambassador extraordinary to Pekin. Having on the 28th of June been made an Irish viscount, he sailed on the 26th of September, taking with him as his secretary his old friend Sir George Staunton, by whom the account of the embassy was afterwards given to the public. The amount of the benefit gained by this first diplomatic communication on the part of England with the court of Pekin has been matter of dispute; but it is generally agreed that no other person could have accomplished more than was done by Lord Macartney, whose conduct at least was well calculated to impress the subjects of the Celestial empire with a respect for the country which he represented. He left China on the 17th of March, 1794, and landed at Portsmouth on the 5th of September of the same year, having on the 1st of March previous been made Earl Macartney in the Irish peerage.

In June, 1795, he was sent on a confidential mission to Italy, from which he returned in May, 1796; and having on the 8th of June been made a British peer by the title of baron Macartney, he was in the end of the same year appointed governor of the newly captured territory of the Cape of Good Hope. Here he remained till November, 1798, when his impaired health compelled him to return to England. The same cause induced him to refuse the office of president of the Board of Control, with a seat in the cabinet, which was offered him on the formation of the Addington ministry in 1801; and he lived in retirement, suffering severely from gout, till his death, at Chiswick, 31st March, 1806. The manner in which Lord Macartney discharged his duty in the various public services in which he was employed procured him from all parties the reputation of very considerable ability and the highest honour. An account of his public life, with a selection from his unpublished writings, has appeared by Mr. (now Sir) John Barrow, in 2 vols. 4to., London, 1807, with his portrait prefixed. His writings here printed, which occupy the second volume, consist of extracts from an 'Account of the Russian Empire,' 'A Sketch of the Political History of Ireland,' and 'A Journal of his Embassy to China.' The manuscript of the 'Account of Russia' is in the king's library at the British Museum, and also a printed but not published copy of the same tract, in 8vo., dated London, 1768. The Life occupies the first four hundred and twelve pages of the first volume of Sir John Barrow's work.

M'CARTHY, SIR C. [Ashantees.]

MACASSAR. [Celebes, vol. vi., p. 400.]

MACAUCO. [Lemuridæ, vol. xiii., p. 419.]

MACAULAY, CATHARINE, was the daughter of John Sawbridge, Esq., of Ollantigh, in Kent, where she was born in 1733. She took the name by which she is best known from her first husband Dr. George Macaulay, a London physician, to whom she was married in 1760. It was soon after this date that she commenced authoress, by the publication of her 'History of England from the accession of James I. to the elevation of the House of Hanover,' the first volume of which, in 4to., appeared in 1763, and the fifth and last, which however only brought the narrative down to the Restoration, in 1771. The work also went through more than one edition in 8vo. On its first publication it attracted considerable attention, principally from the double piquancy of the sex and the avowed republicanism of the writer; but, notwithstanding some occasional liveliness of remark, and its notice of a good many facts omitted by most of our other historians, it has not been found to have merit enough to compensate for its inflamed and narrow partisanship, the loose shambling gallop of the style, and its general character of common-place and superficiality, so that it has long passed into the oblivion of waste paper. The five volumes of the History were followed, in 1778, by another, entitled 'The History of England from the Revolution to the present time, in a series of Letters to the Reverend Dr. Wilson, rector of St. Stephen's, Walbrook, and prebendary of Westminster,' 4to., Bath. The six letters of which this volume consists come down to the termination of the administration of Sir Robert Walpole, in 1742.

In 1778, or according to another account, in 1785, Mrs. Macaulay, having lost her first husband, married a Mr. Graham, of whom all that is told is that he was so many years her junior as to expose the lady to much irreverent remark. She also wrote several pamphlets, both during the progress of her great work, and after its completion. Of these the catalogue-makers have preserved the following titles:—'Remarks on Hobbes's Rudiments of Government and Society,' 1767, enlarged and republished in 1769, with the more striking title of 'Loose Remarks on some of Mr. Hobbes's Positions;' 'Observations on a Pamphlet (Burke's) entitled Thoughts on the Causes of the present Discontents,' 1770; 'An Address to the People of England, Scotland, and Ireland, on the present Important Crisis of Affairs,' 1775; 'A Treatise on the Immutability of Moral Truth,' called in a second much enlarged edition, 'Letters on Education,' 1790; and 'Observations on the Reflections of the Right Hon. E. Burke on the Revolution in France, in a Letter to the Right Hon. the Earl of Stanhope,' 1791. In 1785 she made a voyage to America to visit Washington. On her return, she retired with her husband to a small house in Leicestershire, where she died on the 22nd of June, 1791. In 1790 was printed a little volume entitled 'A Catalogue of Tracts,' which a manuscript annotation on the copy in the royal library in the British Museum states to be 'Mrs. Macaulay's,' meaning apparently the tracts in her library. The titles are between 5000 and 6000 in number, besides about 1300 sermons. Chalmers (*Biog. Dict.*) refers for further information respecting Mrs. Macaulay to the *Gentleman's Magazine*, vols. xl. and lxi.; *British Critic*, vol. iv.; Baldwin's *Literary Journal*, vol. i.; Boswell's *Life of Johnson*; and Wilkes's *Life and Letters*. There is a medallion profile of Mrs. Macaulay prefixed to the 3rd vol. of the original edition of her History, published in 1767; and the frontispiece to the volume of letters to her friend Dr. Wilson presents a monumental full-length figure of her, apparently copied from a monument which the zeal of Wilson had induced him to erect to her in his church, but which was removed by the opposite zeal of his successor in the living.

MACAW. [Psittacidæ.]

MACCABEES (*οἱ Μακκαβαῖοι*), a Jewish family celebrated for their heroic resistance to the oppression of the Greek kings of Syria in the second century before the Christian æra. Their genealogy has been given under Asmonæans. Though the name Maccabees is applied to the whole family of Mattathias, and is often used even with a wider signification, it belonged properly only to Judas, the third son of Mattathias, who was surnamed Maccabæus (מַקָּבִי, *the hammerer*) on account of his prowess in war. (1 *Macc.*, ii. 4.) Others derive the name from the initial letters of the phrase מִי כָמֹכָה בָּאֵלִם יְהוָֹה. 'Who among the gods is like thee, O Jehovah?' (*Ex.*, xv. 11), which they suppose to have been inscribed on the banner of the Maccabees. If this were the case the Greek form would be Μαχαβαῖοι, not Μακκαβαῖοι.

Antiochus Epiphanes, on his return from his second campaign in Egypt, took Jerusalem by storm, polluted the Temple, carried away from it the sacred utensils and treasures, and made Philip the Phrygian governor of Judæa (B.C. 169). Two years later, after his last Egyptian expedition, he commenced a furious persecution of the Jews. Apollonius, his chief collector of tribute, was sent to Jerusalem, which he attacked and plundered, massacring many men, and making the women and children captives. He fortified Mount Sion, and placed in it a Syrian garrison. At the same time Antiochus issued an edict that all his subjects should adopt the same usages; and not content with this blow at the religion of the Jews, he sent orders forbidding them the exercise of their religious rites, and commanding them to sacrifice to idols, to profane the Sabbath, and to discontinue circumcision. Resistance to these commands was made a capital offence, and many of the Jews were put to death; while some saved themselves by fleeing into the wilderness, and others conformed to the idolatrous rites imposed upon them. The books of *the law* were sought for and destroyed, and whoever *kept them was put* to death. Jerusalem was deserted, and the Temple was polluted a second time. An old man, named Athenæus, who was sent by Antiochus to instruct the Jews in the Greek religion, placed on the great altar a smaller altar to Jupiter Olympius, which the author of the first book of Maccabees calls 'the abomination of desolation' (1 *Macc.*, i. 54), alluding, it is generally supposed, to the prophecy of Daniel (viii. 13; xi. 31; xii. 11). In consequence of this the daily sacrifice ceased on the 15th of the month Chasleu, which answered to parts of December and January, B.C. 168-7. (Clinton's *Fasti*, vol. iii., p. 321.) The officers of Antiochus were sent through the cities of Judæa to enforce the king's edict. Some of them came to Modin, where Mattathias dwelt and lamented with his five sons over the state of Israel. Upon the attempt being made to compel the people of the city to sacrifice to idols, Mattathias made an open resistance, killed a Jew who came to sacrifice, slew the king's officer, and pulled down the altar. He then fled to the mountains with his sons and their adherents. About the same time some Jews who had taken refuge in the wilderness were attacked on the Sabbath by Philip, the governor of Judæa, and massacred without resistance to the number of a thousand. In consequence of this Mattathias and his party resolved not to abstain from fighting on the Sabbath. Being now joined by the Assidæans, a sect of very strict religionists, and others, Mattathias went through the Jewish cities destroying the altars of idols, punishing the apostate Jews, and enforcing the law of Moses. In the midst of this successful course Mattathias died, having appointed his third son, Judas Maccabæus, his successor in the military command, and his second son, Simon Matthes, to be his brother's counsellor (B.C. 166. Judas pursued his father's career of victory. He defeated and slew Apollonius, the governor of Samaria; and with a small force put to flight a large army under Seron, the lieutenant of Ptolemy Macro, governor of Cœle-Syria. Antiochus now gathered an immense army, with part of which he marched against the Armenians and Persians, leaving the remainder under Lysias to act against the Jews. Judæa was presently invaded by 40,000 infantry and 7000 horse, under Ptolemy Macro, Nicanor, and Gorgias. Judas had only 6000 men; but by a skilful manœuvre he surprised the Syrians in their camp, and completely routed them. Next year he defeated an army of 60,000 foot and

5000 horse, commanded by Lysias himself, and by this victory became master of Judæa. His first care was to purify the Temple, which he did on the 15th of the month Chasleu, B.C. 165-4, exactly three years after its pollution. An annual feast of eight days was established in commemoration of this event. In the mean time Judas attacked the Syrian garrison on Mount Sion, which however he was unable to reduce, and fortified the Temple and the fortress of Bethsura, near Jerusalem. His attention was now occupied by the attacks of the neighbouring idolatrous nations, whom he and his brothers Simon and Jonathan repeatedly defeated. Enraged at these events, Antiochus marched in great haste to invade Judæa, but died on his way in the greatest agony, confessing that he suffered for his cruelty to the Jews (B.C. 164 or 3). The Jews now enjoyed a short interval of peace with Ptolemy Macro, upon whose death however the war with the neighbouring nations broke out afresh, and Judæa was once more invaded by Lysias, who had possession of the person of Antiochus Eupator, the infant son and successor of Epiphanes. Lysias was defeated, and concluded a peace with Judas. But not long after this, at the instigation of some idolatrous Jews who had escaped from the castle on Mount Sion, Lysias and the king again invaded Judæa with 100,000 foot, 20,000 horse, 32 elephants, and 300 war chariots. Before this force Judas was compelled to retreat, after fighting one great battle, in which his younger brother Eleazar Savaran died in performing an heroic action. (1 *Macc.*, vi. 43-46.) Bethsura was taken, and the Jews were closely besieged in the Temple, when Lysias was compelled, by the state of affairs in Syria, to grant them peace on favourable terms; but before leaving Jerusalem he demolished the fortifications of the Temple. Under Demetrius Soter the war was renewed at the instigation of Alcimus, who aspired to the high-priesthood. The Syrian armies sent under Bacchides and Nicanor to support his claims were defeated by Judas, and Nicanor himself was killed in battle at Capharsalama. During the short interval of peace which followed, Judas made an alliance with the Romans. But in the next year (B.C. 160) another army entered Judæa under Bacchides and Alcimus, and Judas Maccabæus fell in battle.

The Syrians were now for a time masters of the country, and Alcimus was established in the priesthood. About this time John, the eldest son of Mattathias, fell into an ambush of the enemy, and was put to death. In the following year Alcimus died in agony while engaged in violating the sanctity of the Temple; and Bacchides left Judæa, which remained in peace for two years under the government of Jonathan Apphus, the youngest of the Maccabæan family. At the end of this period another invasion of the Syrians was repelled, and Bacchides made peace with Jonathan, whose authority became fully established. The subsequent history of the Maccabees has already been given fully enough under ASMONÆANS. See also ANTIOCHUS; JEWS; JUDAS MACCABÆUS; JONATHAN APPHUS; and SIMON MATTHES.

(The 1st and 2nd books of *Maccabees*; Josephus; Jahn's *Hebrew Commonwealth*; Prideaux's *Connection*; Winer's *Biblisches Realwörterbuch.*)

MACCABEES, THE BOOKS OF THE. Five books have come down to us under this title.

1. The *First Book of the Maccabees* contains the history of the Jews during forty years, from the accession of Antiochus Epiphanes to the death of Simon Matthes, B.C. 135.

The author is unknown. Some suppose the book to have been compiled from the memoirs of the Maccabæan princes, perhaps by John Hyrcanus, about the close of whose reign internal evidence would lead us to fix its date. (1 *Macc.*, xvi. 23.) The general opinion of critics is that it was written in Hebrew. Origen and Jerome assert that they had seen the Hebrew original, and the Greek copy which we possess bears internal evidence of being translated from Hebrew. It forms part of the Septuagint, and there is an antient Latin version made from the Greek, and a Syriac version, which Michaelis supposes to have been translated from the Hebrew. This book is considered the best authority for the history of the period to which it relates.

2. The *Second Book of the Maccabees* begins with two letters which are not connected with each other, nor with the rest of the book. It then mentions some events which preceded the persecution of Antiochus Epiphanes, relates the acts of Judas Maccabæus, and concludes with the defeat of Nicanor, recorded in 1 *Macc.*, vii.

This book is abridged from an earlier work in five books, by one Jason of Cyrene. (2 *Macc.*, ii. 23-32.) The author is unknown, but from the style he is supposed to have been an Hellenistic Jew. It exists in the Greek of the Septuagint, which is considered to be the original, and there are antient versions in Syriac and Latin. Its authority is greatly inferior to that of the first book, from which it often differs.

The first and second books of Maccabees are received as canonical by the Greek and Roman churches, but not by Protestants. Josephus intimates that they were not reckoned by the Jews as inspired (*Cont. Apion.*, i., § 8), and Jerome says,—'The church does indeed read the books of the Maccabees, but does not receive them among the canonical Scriptures.' (Præfat. in *Prov. Salomonis.*)

3. The *Third Book of the Maccabees* is prior in time to the first and second, and in fact has nothing to do with the history of the Maccabees. It contains the history of the Jews at Alexandria during eight or nine years, from the battle of Raphia, in B.C. 217. The author is unknown. The Greek of the Septuagint is supposed to have been the original. There is a Syriac version in the Paris and London Polyglots, but no antient Latin version exists. Its canonical authority has been maintained by some of the fathers and by the Greek church; but the Western churches have never received it. In historical value Dr. Cotton places it above the second book, but others esteem it very lightly.

4. The *Fourth Book of the Maccabees* contains an account of the martyrdom of Eleazar and the Seven Brethren (2 *Macc.*, vi., vii.), and of the attempt of Heliodorus to plunder the temple. (2 *Macc.*, iii.) It is found in Greek in the Alexandrian and Vatican MSS., and in some editions of the Septuagint. It is generally supposed to be the same as the treatise of Josephus, 'De Maccabæis,' or 'De Imperio Rationis.' It is praised as a composition by Jerome and Augustin, but it has never been received into the canon.

5. The *Fifth Book of the Maccabees* only exists in Arabic and Syriac. Calmet supposes it to have been written in Hebrew, and thence translated into Greek. It extends from the attempt of Heliodorus to plunder the Temple to within a few years of the birth of Christ. It must have been written after the taking of Jerusalem by Titus, for it refers to that event (chaps. ix. and xxi.). The author is unknown. Some suppose it to have been compiled from the acts of the successive high-priests.

(The *Five Books of the Maccabees*, by Henry Cotton, D.C.L., Oxf., 1832; Calmet's *Dictionary* and *Dissertations*; the Introductions of De Wette, Eichhorn, Bertholdt, and Jahn.)

MACCLESFIELD, a market-town and borough, in the county palatine of Cheshire, is situated in the hundred of Macclesfield and parish of Prestbury. Under the Municipal Corporation Act it is divided into six wards, with twelve aldermen and thirty-six councillors. By the Reform Act the townships of Sutton and Hurdsfield were annexed to the parliamentary borough, which sends two members to parliament. The population of Macclesfield in 1801 was 8743; in 1811 it amounted to 12,999; in 1821 to 17,746; and in 1831 to 23,129. The number of inhabited houses in 1831 was 4543; of families, 4740, of whom 4366 were employed in trade and manufactures. Sutton contained 5856 inhabitants, and Hurdsfield 3083. The united population of Macclesfield, Sutton, and Hurdsfield was at that time 32,068, and is now computed to be 40,000. Macclesfield is 168 miles north-north-west from London, and 19 from Manchester.

The son of Henry III., as earl of Chester, made Macclesfield, in 1260, a free borough, consisting of 120 burgesses. Various advantages were afterwards granted to the burgesses by Edward III., Richard II., Edward IV., Elizabeth, and Charles II.

The town of Macclesfield is now the chief seat in the island of the silk-throwing trade, which progressively advanced from 1808 to 1825, when it attained its greatest prosperity. From this prosperity it rapidly declined, and in 1832 there were only forty-one mills at work out of seventy-two. In 1824 not fewer than 10,229 throwsters or spinners were employed: but so many were thrown out of work that the number was reduced to 3622 in 1832. This valuable trade of spinning raw silk flourished in consequence of the protection it received against the introduction of thrown silks from France and Italy. Some notion of the growth of the silk-trade in Macclesfield may be formed, when it is considered that every variety of silk article is now produced in this town, from the narrowest ribbon to the different kinds of sarsnets, plain and figured gros de Naples, satin, silk vestings, and velvets. It is likewise the chief place for the manufacture of silk handkerchiefs of every description, although it suffers from the competition of bandana handkerchiefs from India. This last circumstance, combined with the introduction of the broad silks from the Continent, has reduced wages in Macclesfield more than one-half, and occasionally involves the silk-weavers in the greatest distress

Macclesfield is situated on the west side and at the base of a range of high land which is on the borders of Cheshire and Derbyshire, and is a part of the mountain-region of the latter county. The Bollen, an affluent of the Mersey, runs through the town, the lower part of which is called the Waters. A canal which unites the Grand Trunk and Peak Forest canals passes close to Macclesfield, and thus opens a water communication with most parts of England.

Macclesfield contains four principal streets, diverging from the market-place in various directions; and there are four chief entrances from London, Chester, Manchester, and Buxton. The town-hall is a good building, designed by Goodwin, and decorated with great taste, and the public room is well adapted for concerts and meetings. A subscription library, founded in 1770, contains nearly 20,000 volumes, and is also a depository of the public records. The butchers'-market is a very neat, compact, and suitable range of buildings adjoining the general market. The court-house and gaol for the hundred of Macclesfield are also situated in the market-place. The town is supplied with water conducted in pipes from the adjoining hills, and the money paid for it goes to the borough fund. There are two fire-engines, and the town is lighted with gas. The various factories are situated on the Bollen. One of the cotton-factories cost 30,000*l.*, and some of the silk factories 14,000*l.*; but the value of the latter has been much depressed by the deterioration of the silk-trade. The common at the foot of the range of hills on the east side of the town has been enclosed in consequence of an act passed for that purpose in 1791; it is now partly built upon, and the rest highly cultivated. There is an excellent steam-mill for grinding corn in this part of the town. There are two banking establishments, and a branch from the Imperial Bank of Manchester. The corn and butchers' markets take place on Tuesday and Saturday. The fairs for cattle, cloth, toys, &c., are, May 6th, June 22nd, July 11th, October 4th, and November 11.

The dispensary, erected in 1814, has one physician, three honorary surgeons, and one house-surgeon, with a salary of 100*l.* per annum. There is one savings'-bank, eight benefit societies for males, each consisting of 400 or 500 members, and four for females, of about 300 to 400 members each. There are many trusts for charitable purposes. The free grammar-school was endowed with lands in 1502 by Sir John Percyval, sometime lord-mayor of London, who is said to have been born in this city. It afterwards fell into the hands of the crown, and in April 26th, 6th of king Edward VI., a new foundation took place. The annual revenue now amounts to 1300*l.* per annum. By act of parliament (1838) four exhibitions of 50*l.* each for Oxford and Cambridge are established, and a commercial school is to be connected with the grammar-school.

St. Michael's church was founded by Eleanor, queen of Edward I., in 1278. Its architecture is partly Gothic; the chancel end, which has been rebuilt, contains a painted window representing our Saviour, the four Evangelists, and Moses delivering the Ten Commandments. There are two chapels adjoining this church; one belonged to Thomas Savage, archbishop of York, whose heart was buried here in 1508: this chapel now belongs to the marquis of Cholmondeley. The other chapel belongs to the Legh family of Lyme, one of whose ancestors, as appears from a brass plate in it, served king Edward III. and his son the Black Prince, during all their wars in France, and the estate of Lyme was given him for recovering a standard at the battle of Cressy. He afterwards served Richard II., and was beheaded at Chester. Sir Peers, the son of Perkins, served Henry V., and was slain at the battle of Agincourt.

Christ Church was built by Charles Roe, Esq., who acquired a fortune in the silk trade, and was among the first to establish it. The two churches of St. Michael and St. George have sittings for 4500. St. George's church, Sutton, and Trinity church, Hurdsfield, have 1300 seats. There are various meeting-houses belonging to the different classes of Dissenters.

A mechanics' institution was formed a few years ago by one of the principal manufacturers of this town, with the view of encouraging the efforts of some young men who had already been associated for scientific purposes. Various branches of the arts and sciences are now taught to 150 members, and the musical class has made such progress as to treat the town with a concert, which was attended by 1500 persons. When the Factory Commissioners first visited Macclesfield, a census was taken by the manufacturers of the state of education of the children in their employment, and it was found that 96 per cent. could read: the inability of the remaining four parts was accounted for by the circumstance of their belonging to families newly arrived from the country, and their wanting such dress as they thought necessary for appearing at school.

The following was the state of education as ascertained in June, 1838. The whole number of schools was 52, which contained 2109 scholars. Of this number of pupils 1106 also attend Sunday-schools; 1003 frequent only day-schools; 469 are under five years of age, 1586 between five and fifteen, and 54 above fifteen years old. The monitorial system is adopted in only two of the 38 common day-schools, which are attended by 1219 scholars. The number of Sunday-scholars amounts to 7842. Of these 149 are under five years of age, 5716 between five and fifteen, and 1977 are above fifteen. The Established Church has *two Sunday*-schools and 770 scholars; the union of *church and Dis*senters 2129, the Wesleyan Methodists three schools and 1175 scholars, Primitive Methodists 585, New Connexion Methodists 1248, Independents 871, Baptists 490, and Catholics 594. The average attendance of children on each Sunday is 5639.

(Corry's *History of Macclesfield;* Ormerod's *History of Cheshire;* Aikin's *Manchester; Report on the Silk Trade*, 1832; Charity Commissioners' *Report on the Grammar School; Population Returns; Communications from Macclesfield.*)

MACE, originally a club of metal, whence it derived its name of Maçe or Maçue, and whence its diminutive Mazuelle is also derived. In a more ornamental form it is used as an ensign of authority borne before magistrates.

The mace as a military weapon was peculiarly appropriated to the cavalry, and in the Bayeux tapestry several are represented in the hands of the combatants. It is not clear when the fashion of suspending them from the saddle-bow for occasional use was first introduced into Europe, but as it seems to have been borrowed from the Asiatics, we may perhaps assign it to the middle of the thirteenth century. Muratori observes that in a close conflict of cavalry it was exceedingly difficult to overthrow or wound powerful men in armour sitting on horseback, for their persons, being enveloped in hauberks, helmets, and other iron coverings, eluded the power of swords, darts, arrows, and such like weapons. For this reason it was usual to strike men so defended with iron maces, or to turn the attack on the horses, that by making them fall they might seize the rider; or if he had tumbled on the ground, the weight of his armour might render him unable to contend with any effect.

Maces seem to have been much used from the time of Edward II., both in battles and tournaments. Meyrick says all the heavy cavalry were supplied with them in the fifteenth and sixteenth centuries, though they sometimes gave way to the short battle-axe and horseman's hammer. The invention of pistols in the reign of Henry VIII. occasioned their disuse in the time of Elizabeth.

Ellis, in his notes to the 'Fabliaux,' says the mace was a common weapon with ecclesiastics, who, in consequence of their tenures, frequently took the field, but were by a canon of the church forbidden to wield the sword. Maces are still used by the Turkish horsemen. (Muratori, *Antiq. Med.*

Ævi Dissert., 26; Meyrick and Skelton's *Engraved Illustr. of antient Arms and Armour*, 4to., Lond., 1830, vol. ii., pl. 82 and 134; Ellis's *Fabliaux*, edit. 1815, i., 190.)

The word Mace is sometimes used by our old writers in the sense of a *sceptre*.

MACE. [MYRISTICA.]

MACER. A medicinal bark is described in antient authors by this name. Dioscorides states that it is brought from barbarous regions; Galen and Pliny mention it as brought from India; but all agree that it is useful in dysentery. C. d'Acosta describes a tree on the Malabar coast which by the Brachmans is called *Macre*, of which the bark, he says, is used by them as a cure for dysentery, and that Europeans call it the 'arbor sancta,' and St. Thomas's tree. What tree is intended by him, his description does not enable botanists to determine, but it might probably be ascertained by those resident on the coast by comparing his description with that of the trees indigenous or much esteemed by the natives of the Malabar coast. Avicenna gives *talisafur* as the Arabic synonyme of *Macer*. Dr. Royle states, in his 'Illustrations of Himalayan Botany,' p. 259, that he obtained from Caubul, under the name of *taleesfur*, leaves of a highly aromatic and stimulant nature, which, having ascertained to be those of a species of Rhododendron, he named *R. aromaticum*, but the plant had been previously called *R. lepidotum* by Dr. Wallich.

In Persian works *mafur* is given as the Greek name of *taleesfur*. Transcribers no doubt have here, as in the case of Lycium, changed the *k* into *f* by an error of a single point. Though the leaves do not agree with the descriptions of *Macer*, they may long have been substituted for them; they no doubt possess some astringent with their stimulant properties, and are therefore well calculated to be useful as medicinal agents.

MACEDO'NIA (Μακεδονία). The boundaries of this country varied at different times. In the time of Strabo, Macedonia included a considerable part of Illyria and Thrace; but Macedonia Proper may be considered as separated from Thessaly on the south by the Cambunian mountains; from Illyria on the west by the great mountain-chain called Scardus and Bernus, and which under the name of Pindus also separates Thessaly from Epirus; from Mœsia on the north by the mountains called Orbelus and Scomius, which un at right angles to Scardus; and from Thrace on the east by the river Strymon. The Macedonia of Herodotus was however still more limited, as is afterwards mentioned. Macedonia Proper, as defined above, is watered by three ivers of considerable size, the Axius, the Lydias, and the Haliacmon, all which flow into the Thermaic Gulf (the modern Gulf of Saloniki). The most easterly as well as the argest of the three, the Axius (*Vardar*), flows from the ranges between Scardus and Orbelus, in the north-west of Macedonia, and is increased by several tributaries, and particularly the Erigon (*Kuchuk Karasou*), which rises in the mountains which divide Macedonia and Illyria. The next river to the west of the Axius is the Lydias (called at the present day *Kara Azmac* on the coast and *Potova* in the interior), which flowed, according to Strabo (vii., *Extracts*, sec. 9, vol. ii., p. 30, Tauchn.), from the lake on which Pella is situated. It now joins the Axius about a league above the entrance of he Axius into the sea. To the west of the Lydias is the Haliacmon (*Indje Karasou*), which flows from the Camunian mountains; in the time of Herodotus it joined the Lydias (vii., 127), but at present the Haliacmon and Lyias enter the sea by different mouths. The whole of the istrict on the sea-coast, and to a considerable distance in he interior, between the Axius and the Haliacmon, is very ow and marshy. [AXIUS.]

From the mountains which divide Illyria and Macedonia wo mountain-ranges run towards the south-east, separating he valleys of the Haliacmon, the Lydias, and the Axius: he most southerly of these ranges, which is between the Haliacmon and Lydias, was called Bermius; and the most northerly, between the Lydias and the Axius, Dysorum, in ne part of its course at least. The only other rivers of any importance were the Strymon and the Angites, whose valleys were separated from that of the Axius by a range of mountains which runs from Orbelus on the north towards he peninsula of Chalcidice. The Strymon (*Struma*) rises n Mount Scomius and flows into the Strymonic Gulf (*Gulf of Orphano*). Not far from the sea it forms a lake, called Cercinitis (*Kerkine*), into which the Angites flows from the eastward. [AMPHIPOLIS.]

The origin and early history of the Macedonians are involved in much obscurity. Some moderns have attempted, against all probability, to derive the name from the Kittim (כִּתִּים, or כִּיתִּיִּים) mentioned in the Old Testament, (*Gen.*, x. 4; *Numb.*, xxiv. 24; *Jer.*, ii. 10; *Ezek.*, xxvii. 6; *Dan.*, xi. 30). This opinion appears to have arisen in part from the description of the country inhabited by the Kittim, which is supposed to answer to Macedonia; but still more from the fact that in the book of *Maccabees*, Alexander the Great is said to come from the land of Cheittieim (ἐκ τῆς γῆς Χειττιείμ, 1 *Macc.*, i. 1), and Perseus is called king of the Kittians (Κιττιέων, 1 *Macc.*, viii. 5).

In inquiring into the early history of the Macedonians, two questions, which are frequently confused, ought to be kept distinct, namely, the origin of the Macedonian people and the origin of the Macedonian monarchy under the Temenidæ; for while there is abundant reason for believing that the Macedonian princes were descended from an Hellenic race, it appears probable that the Macedonians themselves were an Illyrian people, though the country must also have been inhabited in very early times by many Hellenic tribes. The Greeks themselves always regarded the Macedonians as barbarians, that is, as a people not of Hellenic origin; and the similarity of the manners and customs, as well as the languages, as far as they are known, of the early Macedonians and Illyrians, appear to establish the identity of the two nations. In the time of Herodotus, the name of *Macedonis* comprehended only the country to the south and west of the Lydias, for he observes that Macedonis was separated from Bottiæis by the united mouth of the Lydias and Haliacmon. (Herodot., vii. 127.) How far inland Herodotus conceived that Macedonia extended does not appear from his narrative. According to many antient writers, Macedonia was originally called Emathia (Plin., *H. N.*, iv. 17; Justin, vii. 1; Gell., xiv. 6); but we also find traces of the name of Macedonians from the earliest times, under the antient forms of Macetæ (Μακέται) and Macedni (Μακεδνοί). They appear to have dwelt originally in the south-western part of Macedonia near Mount Pindus. Herodotus says that the Dorians dwelling under Pindus were called Macedonians (i. 56; compare viii. 43); and although it may for many reasons be doubted whether the Macedonians had any particular connection with the Dorians, it may be inferred from the statement of Herodotus that the Macedonians once dwelt at the foot of Pindus, whence they emigrated in a north-easterly direction.

There are various accounts of the origin of the Macedonian monarchy, but all agree in asserting that the royal family was descended from the race of Temenus of Argos. (Herodot., viii. 137-139; Thucyd., ii. 99.) Perdiccas is usually regarded as the founder of this empire; the dominions of which were first confined to the country in the neighbourhood of Edessa between the Lydias and the Haliacmon, but afterwards extended as far as the Axius, and subsequently along the coast as far as the Strymon. Very little however is known of the history of the country till the reign of Amyntas I., who was king of Macedon at the time of the expulsion of the Pisistratidæ from Athens, B.C. 560. This monarch submitted to Megabyzus, who had been left in Europe by Darius after the failure of his Scythian expedition; and Macedonia was considered a province of the Persian empire till the battle of Platæa delivered it from subjection to the king of Persia.

Amyntas was succeeded by his son Alexander I., who was obliged to accompany the Persian army into Greece, but was able on several occasions to render important services to the Grecian cause. Alexander was not allowed to contend at the Olympian games until he had proved his Argive descent. (Herodot., v. 22; compare Justin, vii. 2.) The time of Alexander's death is uncertain, but he lived at least to B.C. 463, when Cimon recovered Thasos. (Plutarch, *Cimon*, c. 14.) He was succeeded by Perdiccas II., a fickle and dishonourable prince, who took an active part in the Peloponnesian war and alternately assisted Athens and Sparta as his interests or policy dictated. His successor Archelaus (B.C. 413) was the wisest monarch that had yet sat upon the throne of Macedon. He effected greater improvements in his kingdom, according to Thucydides, than all the other monarchs together who had preceded him (ii. 100). He greatly improved the condition of his army, he erected forts to repress his barbarous neighbours, constructed roads, and endeavoured to diffuse among his subjects a love of Grecian literature and refinement. He is said to have invited Socrates to settle at his court, and Euripides resided there during the latter period of his life. [ARCHELAUS.]

On the assassination of Archelaus, B.C. 399, the greatest confusion prevailed for many years; and it was not till the accession of Amyntas II. (B.C. 393), that anything like order was restored to the country. But even during the greater part of his reign Macedonia was distracted by intestine commotions and foreign enemies; and on his death, B.C. 369, the same state of confusion prevailed that had followed the death of Archelaus. Amyntas was succeeded by his eldest son, Alexander II., who was assassinated at the end of the first year of his reign by Ptolemy Alorites, who held the supreme power for three years as regent during the minority of Perdiccas; but, in consequence of abusing his trust, he was cut off by Perdiccas, B.C. 364. Perdiccas, after a reign of five years, fell in battle against the Illyrians, B.C. 359, and was succeeded by his younger brother, the celebrated Philip, who succeeded to a kingdom assailed by numerous enemies and weakened by intestine commotions, and left it, to his son Alexander the Great, the most powerful monarchy in Europe. [PHILIP; ALEXANDER.] The immediate consequences of Alexander's death are given under ANTIPATER and CASSANDER; it may be sufficient to state here, that in the commotions consequent upon that event, the royal family was finally destroyed, and Cassander obtained at first the power, and eventually the title of king of Macedon. Cassander was succeeded by his son Philip, B.C. 296, who reigned only two years; and on his death, in B.C. 294, his two younger brothers, Antipater and Alexander, having quarrelled respecting the succession, the throne was seized by Demetrius, the son of Antigonus, who reigned for seven years. He was driven from his kingdom, B.C. 287, by Pyrrhus, king of Epirus, who was however deposed in his turn, after a short reign of seven months, by Lysimachus, king of Thrace. [LYSIMACHUS.]

On the death of Lysimachus, who fell in battle, B.C. 281, the country remained in almost a state of anarchy for many years. The invasion of the Gauls from B.C. 280 to B.C. 278, and the contests between the numerous pretenders to the throne, brought the country to the brink of ruin. Eventually Antigonus (surnamed Gonnatas), the son of Demetrius, was proclaimed king; but was dethroned by Pyrrhus, who again obtained the kingdom on his return from Italy. After the death of Pyrrhus, Antigonus regained possession of the throne, which he retained till his death, B.C. 239. The two following monarchs, Demetrius II. (B.C. 239-229) and Antigonus II. (B.C. 229-220), were principally occupied in the Grecian wars which followed the formation of the Achæan league. [ANTIGONUS.]

Philip V., who succeeded Amyntas, alarmed at the increasing power of the Romans, entered into an alliance with Hannibal; but was never able to afford him any effectual assistance, in consequence of continual wars with the Ætolians and Illyrians, whom the Romans had found means to excite against him. On the conclusion of the war with Carthage, Philip found that he was unable to cope with the Roman power; and after continuing the contest for a few years, was obliged to sue for peace on such terms as the victors chose to grant. Philip was succeeded by Perseus, B.C. 178, who carried on war against the Romans, and was finally conquered, B.C. 168. [ÆMILII.] Macedonia was not immediately converted into a Roman province, but was divided into four districts, which were considered independent, and governed by their own laws, and of which the capitals were respectively—Amphipolis, Thessalonica, Pella, and Pelagonia. Macedonia was reduced to the form of a Roman province, B.C. 142.

It is very difficult to determine the boundaries of the Roman province of Macedonia. According to the 'Epitomizer' of Strabo (vii.), it was bounded by the Adriatic on the west; on the north by the mountains of Scardus, Orbelus, Rhodope, and Hæmus; on the south by the Via Egnatia; and on the east it extended as far as Cypsela and the mouth of the Hebrus. But this statement with respect to the southern boundary of Macedonia cannot be correct, since we know that the province of Macedonia was bounded on the south by that of Achæa; and although it is extremely difficult, if not impossible, to fix the precise boundaries of these provinces, yet it does not appear that Achæa extended farther north than the south of Thessaly.

Macedonia was inhabited from the earliest times by numerous tribes, whose names continued to be given till a late period to various districts of the country. The most important of these divisions were—Mygdonia, Bottiæis or Bottiæa, Pieria, Elimea, Stymphalia, Orestis, Lyncus, Eordia or Eordæa, Emathia, Pæonia, and Chalcidice.

Mygdonia, on the Thermaic Bay, was separated from the district of Bottiæis, or Bottiæa, by the Axius (Herodot., vii. 123); but its boundaries on the east are doubtful. Thucydides makes it extend as far as the Strymon (ii. 99); but this is at variance with the statement of Herodotus, who speaks of the land to the west of the Strymon under the name of Bisaltia. (Herodot., vii. 115.) Mygdonia was originally occupied by the Edones, a Thracian people, who were expelled thence by the Temenidæ. (Thucyd., ii. 99.) The principal town in this district was Therme, afterwards called Thessalonica by Cassander in honour of his wife, who was daughter of Philip. (Strabo, vii., *Excerpta*, sec. 10, vol. ii., p. 131.) It was a large and prosperous town, and exists at the present day under the name of Saloniki. The Apostle Paul addressed two epistles to the Christian converts in this town. The lake Bolbe, called at the present day Betchik, was either in or near Mygdonia (Thucyd., i. 58); it is said by Dr. Clarke to be about twelve miles in length, and six or eight in breadth.

The Bottiæis, or Bottiæa of Herodotus, was bounded on the east by the Axius, on the west by the united mouth of the Haliacmon and Lydias (vii. 127), and on the north by Emathia.* The principal town of Bottiæis was Pella, situate on the lake through which the Lydias flows, which afterwards became the residence of the kings of Macedon. Pella was a small place till the time of Philip, by whom it was greatly enlarged and beautified. (Strabo, vii., sec. 9, vol. ii., pp. 130-131.) The ruins of Pella may still be seen at Alakilisseh. Near the mouth of the Lydias was the town of Ichnæ, celebrated for an antient temple. (Herodot. vii 123; Pliny, *H. N.*, iv. 17; Mela, ii. 3; Hesych., under Ἰχναίην.) Thirty miles to the south of Pella, at the foot of Mount Bermius (Plin., *H. N.*, iv. 17), was the antient city of Berrhœa, or Berœa, which is mentioned in the *Acts of the Apostles* (xvii. 10).

Proceeding along the coast we come to Pieria. The antient district of Macedonis originally intervened between Bottiæa and Pieria. According to Strabo (vii., sec. 8, vol. ii., p. 130), and Livy (xliv. 9), Pieria was bounded on the south by Dium; but in more antient times the name was probably applied to all the country between Macedonis and the Peneus. Ptolemy calls the country between the mouth of the Lydias and that of the Peneus by the name of Pieria. Pieria was celebrated in Grecian mythology as the first seat of the muses. Pydna, the chief place in this district, also called Cydna (Steph. Byz.), and Citron, according to Strabo (vii., sec. 8, vol. ii., p. 130), known at the present day under the name of Kidros, is said to have been a Greek city, and was for some time in possession of the Athenians; but was afterwards taken by Philip and given to Olynthus. The battle between Perseus and Æmilius, which decided the fate of the Macedonian monarchy, was fought near Pydna. South of Pydna was the town of Dium, at the foot of Mount Olympus, of which Livy has given a short description (xliv. 6, 7). It afterwards became a Roman colony. (Pliny, *H. N.*, iv. 17.) Forty stadia to the north of Pydna was Methone (Strabo, vii., sec. 8, vol. ii., p. 130), at the siege of which Philip, the father of Alexander the Great, lost an eye.

In the interior, to the west of Pieria, in the valley of the Haliacmon, was the district of Elimea, the inhabitants of which were called Elimiotæ. In the time of Thucydides, Elimea was subject to the Macedonian monarchs, but was governed by its own princes (ii. 99). There was a road from Elimea to Thessaly over the Cambunian mountains (Liv., xlii. 53), and another to Ætolia (Liv., xliii. 21).

South-west of Elimea was the district of Stymphalia, which was annexed to Macedon on the conquest of Perseus by the Romans (Liv., xlv. 30), together with the country of the Atintani and Paravæi, which extended to the west of Elimea, in Illyria and Epirus.

North-west of Elimea was the district of Orestis (Polyb., xviii. 30; Liv., xxxiii. 34), which probably derived its name, as Müller has remarked, from the mountainous nature of the country (ὄρος, *mountain*), and not from Orestes, the son of Agamemnon. The Orestæ appear to have been independent of the Macedonian kings for a considerable time;

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* The Bottice of Thucydides is a different country, being a tract occupied by the Bottiæi, to the east of Potidæa and the Gulf of Therme, after they were driven out of Bottiæa. ('Journal of Education,' iv., p. 130.)

they were however obliged at length to submit to their authority, but were declared independent again on the conquest of Macedonia by the Romans. (Liv., xxxiii. 34.) The principal town in this district was Celetrum, situate on a peninsula which ran into a lake of the same name (the modern *Kastoria* or *Kesrie*).

Lyncus, the country of the Lyncestæ (Thucyd., iv. 83, 124; Liv., xxvi. 25; xxxi. 33; xxxii. 9), north of Orestis, was surrounded by mountains on all sides. It contained no towns of any importance except Heraclea, which was situate on the great Egnatian road. The Lyncestæ were governed by an independent prince of the name of Arrhibæus during the early part of the Peloponnesian war. (Thucyd., iv. 124.)

To the east of Lyncus, and north of Elimea and the Bermius, was the district of Eordia, or Eordæa, in the valley of the Lydias. The Eordians are said to have been driven out of their country, which however still continued to bear the name of Eordia by the Temenidæ, and to have settled afterwards about Physca, which was probably a town in Mygdonia. (Thucyd., ii. 99.)

Emathia, which was afterwards limited to the country north of Bottiæa, in the valley of the Lydias, was the name, as has been already remarked, by which the country was originally called, according to many antient writers. The chief town in this district, Ægæ, afterwards called Edessa (*Vodina*), was the capital of the Macedonian kingdom in the earliest times; and even when it had ceased to be the royal residence, it still continued the burial-place of the kings. It was a large city in the time of Livy (xlv. 30). It stood on the Via Egnatia, 30 miles west of Pella.

The northern part of Macedonia was inhabited by various tribes of Pæonians: of which the principal were the Pelagonians, who dwelt north of Lyncestis. The chief town of this district was also called Pelagonia. The Agrians, northeast of the Pelagonians, were a powerful Pæonian tribe, living near the sources of the Strymon (Strabo, vii., s. 18, vol. ii., p. 133.)

The peninsula south of Mygdonia, between the Thermaic and Strymonic gulfs, was called Chalcidice from the Chalcidians of Eubœa, who formed settlements in this country in very early times. The peninsula of Chalcidice comprised in the south three smaller peninsulas: Pallene, formerly called Phlegra (Strabo, vii., s. 12, vol. ii., p. 131), between the Thermaic and Toronaic gulfs; Sithonia, between the Toronaic and Singitic gulfs; and Acté, as Thucydides calls it (iv. 109), or Athos, according to Herodotus (vii. 22), between the Singitic and Strymonic gulfs. [Athos.] The peninsula of Chalcidice, together with the three smaller peninsulas, contained several important towns, which are frequently mentioned in Grecian history.

Potidæa, afterwards called Cassandria from Cassander, king of Macedon, founded by the Corinthians (Thucyd., i. 56), stood on the narrow isthmus which connects the peninsula of Pallene with the mainland. It sent 300 men to Platæa (Herodot., ix. 28), and after the Persian war was subject to the Athenians. Potidæa revolted from Athens, B.C. 432; and was not taken till after a siege of two years; when the Potidæans surrendered and were allowed to quit the place. A mutilated inscription in elegiac verse, now in the British Museum, commemorates the courage of those Athenians who fell in a battle before this town, B.C. 432 (*Elgin Marbles*, No. 348.) An Athenian colony was afterwards sent to occupy the town. (Thucyd., ii. 70.) It subsequently fell under the power of Philip of Macedon, and continued from that time subject to the Macedonian kings. The other towns of Pallene were Aphytis, with a celebrated temple of Bacchus; Mende, a colony of Eretria in Eubœa (Thucyd., iv. 123), which revolted from the Athenians, B.C. 423, and was retaken by Nicias and Nicostratus; and Scione, said to have been founded by the Pellenians from Achaia in Peloponnesus, which also revolted from the Athenians, B.C. 423, but was retaken, and the inhabitants treated with great cruelty; the town and lands were afterwards given to the Platæans. (Thucyd., v. 32.)

At the head of the Toronaic Gulf was the important town of Olynthus, founded by the Chalcidians and Eretrians of Eubœa. [Olynthus.] The chief town in Sithonia was Torone, on the south-western coast, which was also probably founded by the Eubœans. Torone was for a long time subject to the Athenians, but afterwards belonged to the Olynthian confederacy, and was eventually united to the Macedonian monarchy by Philip.

The peninsula of Acté, or Athos, was inhabited in the time of Thucydides by a few people of Chalcidic origin, but principally by Pelasgians, Bisaltæ, Crestonians, and Edones, who dwelt in small fortified villages. (Thucyd., iv. 109.) At the extremity of this peninsula was Mount Athos, called at the present day *Monte Santo*. The canal of Xerxes can still be distinctly traced. Herodotus enumerates six towns within this peninsula: Sane, founded by the inhabitants of Andros (Thucyd., iv. 109); Dium, Olophyxus, Acrothoon, Thyssus, and Cleonæ. Acanthus, situate on the low flat isthmus which connects the peninsula of Acté with the mainland, was once an important town. [Athos.] [illegible] chief towns in the interior of the peninsula of Chalcidice were Chalcis and Apollonia, mentioned in the *Acts of the Apostles* (xvii. 1).

The Via Egnatia, which formed one great line of communication between the Ionian Sea and Byzantium, commenced at Apollonia in Illyria, and was joined at Clodiana on the Genusus by the Via Candavia, from Dyrrachium, which however is also called the Via Egnatia (Strabo, vii. § 3). The Via Egnatia entered Macedonia in the district of Lyncus, and passed by the towns of Edessa, Pella, Thessalonica, Apollonia, and Amphipolis, where it entered Thrace. [Thrace.]

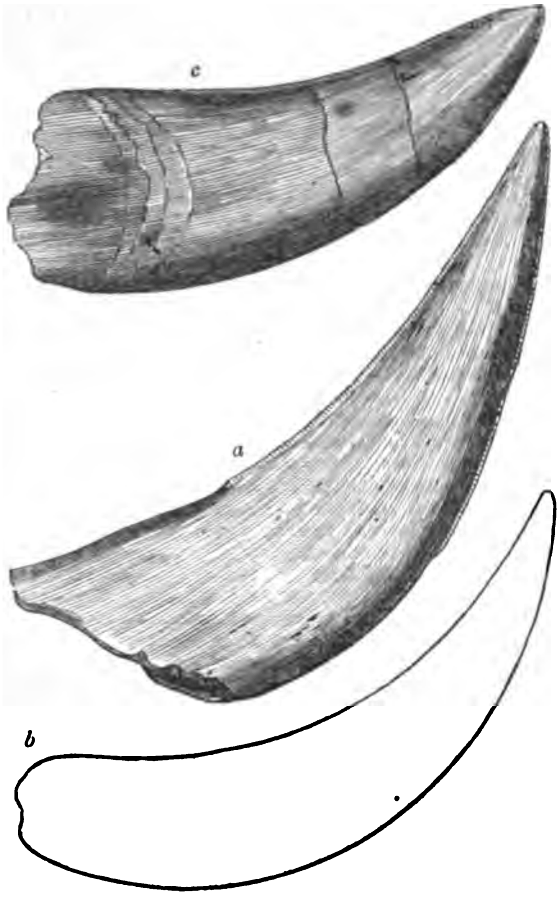
MACERA'TA E CAMERI'NO, DELEGAZIONE DI, a province of the Papal State, forming part of the old division called the Marches, is bounded on the north by the provinces of Ancona and Urbino e Pesaro, on the east by the Adriatic, on the west by the province of Perugia, and on the south by those of Spoleto and Fermo ed Ascoli. Its population amounts to 243,000 inhabitants, distributed among 12 walled towns, 48 terre with communal councils, and 235 villages and hamlets. The general inclination of the surface of the country is to the north-east, as it spreads from the foot of the central Apennine chain to the coast of the Adriatic. The principal rivers are the Potenza, Chienti, and Musone, which rise in the Apennines and flow into the Adriatic.

The principal towns are 1, Macerata, on a hill in a fine country watered by the Chienti, a neat, well-built, cheerful town, with 15,000 inhabitants, several churches and convents with good paintings, a college, and a university, with a library containing 20,000 volumes, a court of appeal for all the provinces of the Marches, a handsome town-house, and several fine private palaces, amongst which the Palace Compagnoni is the most remarkable. Macerata is a bishop's see and the residence of the delegate. It carries on a considerable trade in corn, silk, and cattle. An annual fair for horses is held at Macerata. 2, Loreto. 3, Recanati, near the Adriatic, with 4000 inhabitants, and several churches and convents. 4, Tolentino, farther inland, near the foot of the Apennines, with 3000 inhabitants, and known in modern history for the treaty of peace of February, 1797, between General Bonaparte and Pope Pius VI.; and also for a battle on the 3rd of May, 1815, between the Austrians under General Bianchi and the Neapolitans under Joachim Murat, which by the defeat of the latter decided the fate of Naples. 5, Camerino, the antient Camerinum, an old town among the Apennines, and a bishop's see, with 7000 inhabitants, several churches and convents, and some silk manufactories. It is the birth-place of the painter Carlo Maratti. 6, Fabriano, farther north, a bishop's see, with 7000 inhabitants, manufactories of paper and parchment, and a considerable trade in wool. 7, S Severino, with 3000 inhabitants. 8, Matelica, an old town, with 3000 inhabitants.

The province of Macerata is in part very mountainous and barren, but the valleys and plains towards the sea-coast produce abundance of corn, wine, most kinds of fruit, and very good silk. The coast along the Adriatic has no harbour which deserves the name. Recanati has a kind of port or anchoring-place for small vessels at the mouth of the river Potenza, where some trade is carried on. (Calindri's *Saggio Statistico;* Neigebaur.)

MACERATION is the exposing of any substances, and generally those of vegetable origin, when reduced to coarse powder, to the action of water or any other liquid, without the assistance of heat, in which last circumstance it differs from digestion. The object of maceration is twofold · either merely to soften the parts of the substance operated on, so as to allow of the more ready subsequent action of heat, as when cinnamon or cloves are macerated in water, previously to distillation or it is employed to dissolve the aromatic parts of a substance, when digestion would not merely dissolve but dissipate them.

MACHA'IRODUS, a genus of extinct animals established by Professor Kaup upon those canine teeth with serrated or dentilated edges which have been attributed to bears (*Ursus cultridens*, &c.) by Cuvier and others, and to great cats (*Felis*) by Bravard. Dr. Buckland (*Bridgewater Treatise*), in his catalogue of the animal remains found in strata of sand, referrible to the second period of the tertiary formations (Miocene of Lyell), at Epplesheim near Altzey, about twelve leagues to the south of Mayence, and recorded by Kaup, includes *Machairodus*, which Dr. Buckland places between *Felis* and *Gulo*, and notes as 'allied to bear, *Ursus cultridens*.' Professor Kaup however remarks, that these 'canine teeth' and even the dentilations on their edges have a complete resemblance to those of *Megalosaurus*, and indeed their flatness and thinness do not correspond with the canine teeth of any of the existing *Carnivora*, while the dentilations strongly resemble those of the Saurian above mentioned. We here figure a tooth of *Megalosaurus*, a tooth of *Machairodus* (*Ursus cultridens*) and a cast of another, from specimens in the museum of the Geological Society of London.



a, Tooth, imperfect below, nat. size; *b*, outline of cast of tooth, perfect, ½ nat. size; *c*, tooth of Megalosaurus, nat. size.

Mr. Owen has no doubt that the teeth (*a*, *b*) belonged to a mammiferous animal, and the proof is afforded by the cast (*b*), which shows that the tooth was originally lodged in a socket, and not anchylosed to the substance of the jaw, and that the fang is contracted and solidified by the progressive diminution of a temporary formative pulp, and does not terminate in an open conical cavity like the teeth of all known Saurians, which are lodged in sockets. Careful comparison will show that the canine teeth of Machairodus are very far from those of the bears, and sufficiently removed from those of the tiger, though those of the latter present serrated edges. On looking at the catalogue of the extinct species found at Epplesheim, we do not find any large fossil ruminant noticed, though we find large cats, some as large as a lion, and another carnivorous animal (*Agnotherium*) allied to the dog and also as large as a lion · and we are not without existing ruminants with very long canine teeth in the upper jaw with serrations on their edges, though not so broad in proportion as those of *Machairodus*. [BEAR, vol. iv., p. 95.]

MACHE'TES, Cuvier's name for the Ruff (*Tringa pugnax*, Linn.). [SCOLOPACIDÆ.]

MACHIAVE'LLI, NICCOLO', was born at Florence in 1469, of an old though not wealthy family of that republic. Having received a liberal education, he was employed in the office of Marcello Adriani, chancellor of the community of Florence, and afterwards, when twenty-nine years of age, he was made secretary of the 'Ten,' a board entrusted with the management of foreign affairs and diplomatic negotiations. Machiavelli's abilities and penetration being soon perceived by his superiors, he was successively employed on many and some very important missions. The first was in 1498, to Jacopo Appiani, lord of Piombino, for the purpose of engaging him to join the Florentine troops which were besieging Pisa, whilst their general Vitelli was defending the Florentine territory against the Venetians, who, joined to the emigrant partisans of the Medici, were making incursions from the borders of Romagna. In the following year, 1799, Machiavelli was sent to Catherine Sforza, countess of Forli, in order to make arrangements with her son Ottaviano to engage as a condottiero in the service of the republic. The instructions given by the Ten to Machiavelli for each of his missions, and his letters or reports to them written during the course of his negotiations, have been published, at least in great part, and they occupy volumes iv. and v. of the 4to. edition of his works (Florence, 1782). They are most curious and valuable documents for the history of the times, and they are also most useful for the understanding of Machiavelli's political and historical works which he wrote later in life. Many letters however, and some of great importance, written to or by Machiavelli, remain still inedited. There is a collection of them in the hands of M. Salvi at Paris; three more volumes of autographs were purchased in 1826, at Florence, by Lord Guilford; and another part remains at Florence in the libraries Pitti, Rinuccini, and others. (Valéry, *Voyages en Italie*; Avenel, three articles on the French translation of the works of Machiavelli by Périès, which appeared in vols. 41 and 42 of the *Révue Encylopédique*.)

In the year 1500 Machiavelli was sent as a commissioner to the Florentine camp before Pisa. He was present at the arrival of a body of French and Swiss auxiliary troops under De Beaumont, sent by Louis XII., who had just reconquered Lombardy and had formed an alliance with Florence. Dissensions however arose between the allies concerning the pay of the auxiliaries. The Swiss mutinied, and insulted Luca degli Albizzi, one of the Florentine commissioners; and the French abandoned the attack against Pisa, throwing all the blame upon the Florentines, and took possession of Pietrasanta, of Massa and Carrara, and other districts belonging either to Florence or its allies. This was an anxious period for Florence, which saw itself entirely at the mercy of France, while it was threatened on the other side by Cesare Borgia, then the terror of central Italy, who, supported by his father Pope Alexander VI., and also by the French, was making himself master of Romagna by force or treachery, and threatening Florence, where he wished to re-establish the Medici. [BORGIA, CESARE.] In July, 1500, Machiavelli was despatched to France in order to explain to Louis XII. the untoward occurrences at Pisa, to endeavour to keep the king, or rather his all-powerful minister Cardinal d'Amboise, archbishop of Rouen, in a friendly disposition towards Florence, and thus screen the republic from the ambition of Borgia. This was a very delicate mission. The French king and minister were prejudiced against the Florentines; they had an interest in favouring the Borgias, and they were also instigated against Florence by Trivulzio, Beaumont, and other persons of influence at the French court. Machiavelli's mission to France lasted till January, 1501. He followed the French court to Melun, Blois, Nantes, and other places, and by dint of much skilful management, of fair promises and professions, and of timely suggestions, he left Louis better disposed towards Florence than he had found him, and made him watchful and jealous of the movements of Cesare Borgia. This jealousy of the French king proved the salvation of the republic a few months after, when the ferocious and unprincipled Borgia entered Tuscany with 8000 men, and encamped a few miles from Florence The citizens showed firmness, and in the meantime letters came from the French king forbidding Borgia from molesting the republic. A convention was concluded in May, 1501, between Florence and Borgia, by which the latter, after receiving a sum of money, went his way to Piombino, and left the Florentine territory after committing many depredations. But in the following year Borgia, having returned to Romagna, drove away Guidobaldo, duke of Urbino, and took possession of Camerino, whose lord, Giulio Varano, he caused to be strangled with his three young sons, while his subordinate Vitellozzo Vitelli supported the revolt of Arezzo, Cortona, the Val di Chiana and other districts against Florence, and in favour of the Medici. Here again the French interfered, and Vitelli, who began to be alarmed at the cruelty of Borgia, entered into an agreement with the French and with Florence, by which Arezzo and other towns were restored in August, 1502. On this occasion Machiavelli, being requested by the government, wrote his opinion concerning the manner in which the revolted districts ought to be treated: 'Sul metodo di trattare i popoli di Val di Chiana.' Quoting the opinion of L. Furius Camillus after the subjugation of Latium, and the conduct of the Roman senate towards the Latin cities, he advised moderation in the present instance, except towards Arezzo, which he compared to Velitræ, and advised to be treated accordingly. (Livy, viii.)

In September of the same year, 1502, the Florentines, alarmed at the dangers by which they were encompassed, saw the necessity of giving greater stability to their executive, by appointing a gonfalonière perpetuo, a kind of dictator for life. They chose for this office Piero Soderini, a man upright and disinterested, and without children, and therefore less likely to excite suspicions or jealousy. About the same time Machiavelli was sent on a mission to Duke Valentino, the formidable Borgia, who was then at Imola in Romagna. Borgia had just returned from Lombardy, from an interview with Louis XII., in which he endeavoured to clear himself from the charge of having countenanced the insurrection against Florence, and moreover to obtain assistance from the French king for the purpose of subduing Bologna, which he intended to make the capital of his duchy.

During his absence in Lombardy, his own friends and former colleagues, Vitellozzo Vitelli, Baglioni of Perugia, the Orsini, and Oliverotto da Fermo, alarmed at the increasing ambition and cruelty of Borgia, determined to forsake him, and entered into a secret league with Bentivoglio of Bologna and Petrucci of Siena, who were his declared enemies. At the same time they invited the Florentines to join them. But as Borgia was protected by France, whose displeasure the Florentines were afraid of incurring, they sent Machiavelli to make professions of friendship to Borgia, and at the same time to watch his movements, to discover his real intentions (which was not an easy thing, for Borgia was the closest man of the age), and to obtain something in return for their friendship. The account of this mission is extremely curious: there was deep dissimulation on both sides: Borgia hated Florence as much as the Florentines hated him; but they were both kept in check by the fear of France, and both Borgia and Machiavelli made the fairest and apparently most candid professions towards each other. Borgia even assumed a confidential tone, and began to tell Machiavelli of the treachery of his former friends; he added that he knew how to deal with them, and was only waiting for his own time; he also expatiated on his well-disciplined forces, his artillery, and the assistance he expected from France; and all this in order to persuade the Florentines of the great value of his friendship, and that they should give him a condotta, that is to say, the chief command in their army. Borgia however had to do with a negotiator who, though young, was a match for him. 'I answered,' says Machiavelli, in the 21st letter of that mission, 'that his excellency the duke must not be compared to the generality of other Italian lords, but that he must be considered as a new potentate in Italy, with whom it is more fit and becoming to make a treaty of alliance than a mere condotta or mercenary convention. And I added, that as alliances are maintained by arms, which are the only binding security for either party, your lordships (the magistrates of Florence) could not see what security there would be for them if three-fourths or three-fifths of your forces were to be in the hands of the duke.' Still the negotiations went on about the condotta, whilst Borgia was meditating another stroke of his usual policy. Machiavelli had a foretaste of it at Cesena, where a certain Rimino, a confidential agent of Borgia, and, as such, hateful to the people, was suddenly arrested by order of his master, and the next morning (on the 26th of December) was found in the middle of the square cut into two pieces: 'Such,' says Machiavelli, 'has been the duke's pleasure, for he wishes to show that he can do and undo his own men as he thinks proper.' On the last day of December, Borgia, followed by Machiavelli, marched with his troops to Sinigaglia, where the Orsini, Vitellozzo, and Oliverotto were waiting for him, to have a conference and settle matters. As soon as his troops had entered the town he arrested those chiefs, strangled two of them that very night, and kept the Orsini in prison until he heard that his father, the pope, had secured the person of their relative Cardinal Orsini at Rome, after which they also were put to death. On that very night Borgia sent for Machiavelli, and said that he had done a great service to Florence in ridding the world of those men who were the sowers of discord. He then expressed his wish to attack Siena and revenge himself on Petrucci; but the Florentines, being cautioned by Machiavelli, took measures to thwart his plans, and Petrucci was saved. Machiavelli returned to Florence in January, 1503, after three eventful months passed in the court and camp of Borgia, which was the most complete school of that policy which he afterwards illustrated in his treatise 'Del Principe.' His letters (fifty-two in number) written during that mission have a certain dramatic character which awakens feelings of surprise, terror, and intense curiosity. Machiavelli wrote also a detached report of the Sinigaglia tragedy: 'Descrizione del modo tenuto dal Duca Valentino per ammazzare Vitellozzo Vitelli, Oliverotto da Fermo, il Sigr. Pagolo e il Duca di Gravina Orsini.' He obtained one thing from Borgia by this mission, a free passage through Romagna to all Florentine travellers and merchants, and their goods and other property. This document is headed 'Cæsar Borgia de Francia, Dei gratia Dux Romandiolæ, Valentiæque, Princeps Hadriæ et Venafri, Dominus Plumbini, &c., ac Sanctæ Romanæ Ecclesiæ Confalonerius et Capitaneus Generalis,' and dated 'Imolæ, 19 Octobris, A.D. 1502. Ducatus vero nostri Romandiolæ secundo.'

In August of that same year, 1503, Alexander VI. died, and his successor, Pius III., died a few days after. A new conclave being assembled in October, the Florentines sent Machiavelli to Rome, where he was present at the election of Julius II., and soon after witnessed the fall of Cesare Borgia, who was arrested at Ostia by order of the pope, and all his ill-gotten dominions were taken from him. His troops, in passing through Tuscany, were disarmed and disbanded agreeably to Machiavelli's secret advice.

In January, 1504, Machiavelli was sent to France to rouse Louis XII. to the danger threatening both Florence and the state of Milan from the Spaniards, who were advancing from Naples towards North Italy. The truce between France and Spain put an end to this mission.

After several minor missions to Piombino, to Baglioni of Perugia, Petrucci of Siena, and the duke of Mantua, Machiavelli was sent, in August, 1506, to Pope Julius II., whom he met on his march to dispossess Baglioni of Perugia and Bentivoglio of Bologna, whither the Florentine envoy followed him, and returned in October. (*Opere di Machiavelli: Legazione seconda alla Corte di Roma.*) He then wrote 'Provvisione per istituire Milizie Nazionali nella Republica Fiorentina.' He had always blamed the employment of mercenary troops and condottieri, which was an old custom of the Florentines.

In December, 1507, Machiavelli was sent to the emperor Maximilian in Germany, who had signified his intention of going to Italy to be crowned, and had demanded money of the Florentines. He proceeded by Geneva and Constance, where, finding that the emperor had moved southwards by the Tyrol, he followed him to Bolzano. The Venetians however opposed the passage of Maximilian, and Machiavelli returned to Florence in June, 1508. On his return he wrote several reports on the affairs of Germany, besides the letters which he had sent home during his mission 'Rapporto sulle cose di La Magna;' 'Discorso sopra le cose dell' Alemagna;' 'Ritratti di Lamagna.'

In February, 1509, he was sent to the camp before Pisa, which was again besieged by the Florentines, and he thence addressed a report on the state of affairs: 'Discorso fatto al Magistrato dei Dieci sulle cose di Pisa.' In June of that year Pisa surrendered, through famine

In July, 1510, Machiavelli was sent to France a third time. The Cardinal d'Amboise was lately dead. The object of this mission was to encourage the French court to maintain the alliance with the pope and the emperor against the Venetians (the league of Cambrai), and to induce Louis to prevent the Swiss from enlisting in great numbers in the service of the pope, for fear that Julius, feeling himself independent, should take some new whim into his head. And this in reality happened soon after; for, while Machiavelli was in France, Julius formed a league to drive the French out of Italy. The letters of this mission are very important. The audiences of Louis to Machiavelli, and the conferences of the latter with the cardinal of Paris, the chancellor of France, and others, and his reflections on the pope, on the projects of Louis, on the proposal made by the emperor Maximilian to Louis, of dividing Italy between them, which Louis refused to accede to, are extremely interesting. Machiavelli returned to Florence in September, 1510, having consolidated the alliance of Florence with France.

On his return he wrote his second 'Decennale,' or short chronicle, in terza rima. The first 'Decennale' went as far as 1504, after the fall of the Borgias. It thus alludes satirically to the death of Alexander VI.:—

'Maló Valenza; e per aver riposo
Portato fù frà l'anime beate,
Lo spirto d'Alessandro glorioso.
Del qual seguirno le sante pedate
Tré sue famigliari e care ancelle,
Lussuria, simonia, e crudeltade.'

The second 'Decennale' comes down only to the year 1510, but Machiavelli intended to complete it till 1514. In September, 1511, he was sent again to France, concerning the council which assembled at Pisa, by order of Louis XII., to try and depose Pope Julius, which council however broke up without effecting anything. Machiavelli fell ill, and soon returned home. In 1512 the battle of Ravenna was fought, Gaston de Foix was killed, and the French lost Italy. Julius, who was irritated against Florence for having sided with the French, engaged the Spanish viceroy of Naples to send a body of troops against it, and re-establish the Medici by force. The catastrophe took place soon after.

In September, 1512, when Giuliano and Giovanni de' Medici, the sons of Lorenzo, re-entered Florence by means of the Spanish infantry, and overthrew the popular government, the gonfalonière Soderini made his escape, and the secretary Machiavelli, with others of the popular party, was dismissed from office, and banished for a time from the city. In the following year a conspiracy was discovered against the Medici, in which Machiavelli was accused of having participated; being arrested in February, 1513, he was put to the torture, which was the usual means then employed under all the governments of Florence and of Italy, of examining persons accused of state crimes. He however maintained that he had nothing to confess. From his prison of Le Stinche he wrote a sonnet to Giuliano de' Medici, who was then governor of Florence, his brother Giovanni having gone to the conclave at Rome, where he was elected pope by the name of Leo X. The sonnet, which is half sad, half humorous, describing his sufferings, his own torture, the annoyance of hearing the screams of the other prisoners, and the threats he had of being hanged, is given by Artaud in his biography, entitled 'Machiavel, son Génie et ses Erreurs,' 2 vols. 8vo., Paris, 1833.

He was soon after released, in consequence of a pardon sent from Rome by Leo X. to all those concerned in the conspiracy. Before however the pardon arrived, two of them, Pietro Boscoli and Agostino Capponi, had been executed.

Machiavelli now withdrew for several years from public life, and retired to his country-house at San Casciano, about eight miles from Florence. During this retirement he wrote his discourses upon Livy, his books on the art of war, and his 'Principe.' The last work has been the subject of much controversy, which is now at an end. The book 'Del Principe,' or 'De Principatibus,' for that was the original title, was not intended for publication; it was written by the author for the private perusal first of Giuliano, and then of Lorenzo de' Medici, afterwards duke of Urbino, son of Piero and grandson of Lorenzo the Magnificent, who was appointed by Leo X. governor of Florence, his uncle Giuliano having removed to Rome.

Machiavelli, in a letter discovered only in 1810, and addressed to his friend Vettori, then at Rome, 10th December, 1513, after humorously describing his mode of life in the country, mentions this treatise on which he was then engaged, and tells him that he wishes to show to the Medici 'that he had not spent the 15 years in which he had studied the art of government in sleeping or playing, so that they might think of employing a man who had acquired experience at the expense of others;' and he adds, 'I wish that these signori Medici would employ me, were it only in rolling a stone. They ought not to doubt my fidelity. My poverty is a testimony of it.' These expressions show clearly enough that Machiavelli's object in writing the 'Principe' was to recommend himself to the Medici. All the ingenious surmises of later critics about his wishing to render absolute princes odious to the people, or to induce the Medici, by following his precepts, to render themselves insupportable and thus bring about their own fall and the restoration of the republic, are completely overthrown. Machiavelli saw clearly enough that the Medici were too firmly seated at Florence to be dislodged, and although he was himself partial to a rational system of civil liberty, if consistent with a strong government, he was still more attached to the national honour and independence of his country; and what he dreaded most was, that, through some rash ebullitions of party spirit, foreigners might be enabled to interfere and enslave Florence, as they had enslaved Lombardy and Naples. At the end of his 'Principe' (ch. xxv.) he displays this feeling with great energy. After examining the strong and the weak parts of the armies of other nations, Spanish, French, Swiss, and German, who had by turns invaded Italy, he says that it was still possible to form a native Italian army, on a new system of discipline and tactics, which might unite the advantages of each, and be able to resist them all; 'which would reflect a great credit upon a new prince, who would be looked upon as the liberator of Italy, especially by those provinces which have suffered most from foreign irruptions, and which would hail him with tears of joy and gratitude. What gates would be closed against him? what people of Italy would deny him obedience? Every one is sick of this barbarous domination. (Ad ognuno puzza questo barbaro dominio.) Let your illustrious house undertake this mission with the spirit and hope which ought to accompany just undertakings,' &c. This passage explains sufficiently that Machiavelli wrote his 'Principe' to please the Medici and to encourage them in their views of Italian dominion.

Machiavelli says, at the beginning of his treatise (ch. 2), that he does not intend to treat of republics, of which he had spoken in former works, nor of hereditary principalities, because these are by precedent and custom firm and secure; but he intends to treat of what he styles mixed principalities, that is to say, where a new ruler or prince takes possession of a country, in which he must necessarily have many enemies. He illustrates, by examples from antient and modern history, how a new ruler can secure himself in his recently acquired possessions. In the 7th chapter he gives a sketch of the method pursued by Cesare Borgia, whose political art he extols. The 8th chapter treats of those who usurp the government of their own country, and he instances Oliverotto, the petty tyrant of Fermo, who after one year of usurped power fell by the arts of a greater and more able tyrant, Cesare Borgia. The 9th chapter treats of those new princes who, without any criminal violence, but with the consent of their countrymen, have risen to the supreme power. Chapter 10 treats of the strength of the various principalities. Chapter 11 concerns ecclesiastical states, and especially that of Rome. Chapters 12, 13, 14, treat of the military force, mercenary, auxiliary, and native, showing the danger of relying upon the first two species of troops. Chapter 15 treats of the things which bring to princes praise or blame. Chapter 16, of liberality and parsimony. Chapter 17, of cruelty and clemency, and whether it is better to be loved than feared. He says the sovereign should be feared without being hated, and with this view he ought to abstain from touching the women and the property of his subjects: and he repeats, that even in cases of punishment for treason, he ought not to resort to confiscation, 'because men sooner forget the death of their father than the loss of their patrimony.' The 18th chapter, which has been considered as the most obnoxious, is in answer to the question, 'In what manner ought a prince to keep faith?' Machiavelli begins by observing that everybody knows how laudable it is for a prince to keep his faith, and to live with integrity and not to practice craft: but yet, he adds, we have seen in our own times that those princes who have cared little about faith and have known how to deceive mankind have effected great things. There are two ways of ruling, one by the laws and the other by force; the former is proper for men, the other for beasts; but as the former is not always sufficient, one must resort to the second, and adopt the ways both of the lion and of the fox. If all men were good, this lesson were not good; but as they are bad, and would not keep faith with you, you must not keep faith with them. And then he cites the example of Alexander VI., who did nothing else but deceive men, and never thought of any other means, always confirming his promises with the most solemn oaths, and always succeeding in deceiving others. In chapter 19 Machiavelli among other things praises the institutions of the kingdom of France at that time; and he approves of the parliament as a check upon the nobility. Chapter 20 speaks of fortresses, of factions, of the balance to be kept between various parties in the state. He says the best fortification for a prince is to be liked by his people. Chapter 21 is entitled, 'How is a Prince to conduct himself in order to acquire reputation?' and the author adduces the example of Ferdinand the Catholic. Chapter 22 treats of the secretaries of princes. 28, That flatterers ought to be shunned. 24, Why and how have the Italian princes lost their states? 25, That fortune has a great share in human affairs, and how we can resist its influence. 26, Exhortation to deliver Italy from the barbarians. Had Machiavelli written his book in the form of a commentary upon history, instead of adopting a didactic style, all that he says would be no more than matter of fact, for it was openly practised in his age, and had been practised long before him. Moral considerations are of course totally out of the question in such a work. But even in its didactic form, most of its precepts were not new. Gilles Colonne (Frater Ægidius Romanus), an Austin friar, preceptor to Philippe le Bel, wrote for the instruction of his pupil a treatise, 'De Regimine Principum,' afterwards printed at Venice in 1473, and translated into Spanish under the title of 'Regimiento de los Principes,' for the instruction of the Infante Don Pedro of Castile. This book was probably before the eyes of Machiavelli when he composed his 'Principe.' Several of the obnoxious principles of that treatise are also found in the 'Memoirs' of Comines, and in the 'Politic' of Aristotle.

The 'Principe' was first published, after Machiavelli's death, at Rome in 1532, with the permission of Clement VII. The 'Legazioni,' or letters of the political missions of Machiavelli, which are the key to his 'Principe,' were not made public till the middle of the last century.

In 1516 Machiavelli wrote his 'Discorsi sulla prima Deca di Tito Livio,' or commentary on the first ten books of Livy, which are still much admired. Ater the death of Lorenzo de' Medici, in 1519, Cardinal Giulio having become governor of Florence, both he and Leo X. seem to have remembered Machiavelli, and it was at Leo's request that he wrote a 'Discorso sopra Riformare lo stato di Firenze,' which was a plan of a new constitution for that state.

After 1521 Machiavelli was again employed on various missions. He was sent once to Venice, in 1525, and several times to his friend Guicciardini, who was governor, first of Modena, and then of Parma, for the pope. This was the time when Pope Clement VII. and the French were allied against Charles V., and when the Imperial army under Bourbon was threatening to cross the Apennines, no one knew whether to fall upon Tuscany or upon Rome. Machiavelli was sent to Parma to spy their motions. He returned to Florence in May, 1527, after Bourbon's army had gone to Rome. Being unwell in the stomach, he took some medicine of his own, upon which he grew worse, and died, after receiving the sacrament, on the 22nd June, at the age of fifty-eight. A letter of one of his sons describes the particulars of his death. He left five children by his wife Marietta Corsini, but little or no fortune. He was buried in the family vault in the church of Santa Croce; but it was only in 1787 that a monument was raised to his memory, through the exertions and liberality of Earl Cowper.

The other works of Machiavelli, not mentioned above, are:—'Storie Fiorentine,' which he presented to Clement VII. in 1525, and which come down to the death of Lorenzo the Magnificent, in 1492. They rank among the best works on Italian history. The style of Machiavelli is remarkably nervous, concise, and comprehensive, and very different from that of his contemporary (and, it may be said, continuator) Guicciardini. Machiavelli has left fragments which bring down the history of Florence to 1499. 2. 'La Mandragora,' and 'La Clizia,' two comedies; 3. 'L'Asino d'Oro,' an imitation of the 'Golden Ass' of Apuleius; 4. 'Vita di Castruccio Castracani,' incomplete; 5. 'Sommario delle cose di Lucca,' which is a political and statistical account of that republic; 6. 'Sette libri dell' Arte della Guerra,' which were highly esteemed by Frederick the Great of Prussia and other competent judges; 7. 'Discorso se la Lingua di Dante, Boccaccio, e Petrarca, debba chiamarsi Italiana, Toscana, o Fiorentina;' besides minor productions and a multitude of letters. The best editions of his works collectively are those of Florence, 1783, 6 vols. 4to.; 1796, 8 vols. 8vo.; and 1818, 10 vols. 8vo.

MACHICOLATION. [GOTHIC ARCHITECTURE, p. 321.] This term, which is obviously enough from the two French words *mèches* and *couler*, afterwards compounded into the barbarously Latinized one *maschicolatium* or *macchicolatium*, was significantly bestowed on those openings in the parapet of a fortified building through which ignited combustibles (*mèches*), or melted lead, stones, &c., were poured and hurled down upon the besiegers. The apertures were formed in the soffit or under surface of the projecting parapet, which was supported upon corbel stones, the perforations themselves being in the soffit, between those stones. By this ingenious contrivance the besieged were enabled to harass their assailants in a most formidable manner, while they themselves were protected by the parapet and its battlements. Machicolations were, as frequently as not, confined to particular situations, such as over an entrance gateway and the towers flanking it, or other parts most likely to be assaulted. In antient castellated structures the hanging parapet and machicolations contribute very much both to expression and architectural effect; but in modern buildings affecting the same style, although eminently characteristic of it, they are palpable incongruities in themselves, not so much because unmeaning, as because they carry along with them a false meaning.

MACHIN, JOHN, succeeded Dr. Torriano as professor of astronomy to Gresham College, 16th May, 1713. His death is announced in the 'Gentleman's Magazine,' 7th June, 1751, but the date of his birth is unknown. He is the author of a method for determining the quadrature of the circle, by means of the known development of an arc according to the ascending powers of its tangent, which he so modified as to render rapidly convergent. It was however by means of Dr. Halley's method that he computed the ratio of the circumference of the circle to its diameter. as far as one hundred places of decimals. In the 'Philosophical Transactions' he wrote: 1, A paper 'On the Curve of quickest Descent,' xxx., 1718; 2, 'A Case of distempered Skin,' xxxvii., 1732; 3, 'Solution of Kepler's Problem,' xl., 1738. Besides the above, he published a pamphlet on the 'Laws of the Moon's Motion according to Gravity,' which was printed at the end of Motte's Translation of Newton's 'Principia,' 8vo., 1729.

(Hutton's *Tracts*, vol. i.; *Philosophical Trans.*, &c.)

MACHINE, an object by the intervention of which a motive power is made to act upon any body and overcome the force by which the latter resists the effort to change its state of rest or motion. A machine differs in no respect from a tool, an instrument, or an engine, and any one of these terms might be used indifferently for the same thing the word tool is however generally applied to an object containing in its construction some mechanical power, and which, when in use, is held in the hand of the operator.

The advantage which any machine affords for overcoming resistance, consists in the reaction by which it supports a certain portion of the weight producing that resistance, so that the motive power has only to counteract the remainder. This may be immediately observed in those simple machines called the mechanical powers. For example; in the lever, the wheel and axle, and the pulley, whose properties depend on the theory of parallel forces (when, consequently, of the resistance, the moving power, and the reaction of the machine, some one is equal to the sum of the two others), any convenient portion of the resistance may be made to rest on the point of support, or the point of suspension

Again; in the inclined plane, the wedge, and the screw, whose properties depend on the theory of forces concurring in a point, the motive power, the resistance, and the reaction of the support, are represented by the three sides of a triangle; and the ratio of the first to either of the others may be varied at pleasure by the construction of the machine.

The powers employed to give motion, through machinery, to any object, are produced by the muscular strength of men or animals; the actions of weights, springs, wind, water, steam, or fired gunpowder; and these powers may generally be considered as pressures exerted during certain portions of time. Even that power which is produced by a sudden impulse, as when a rammer descending by its weight falls on the head of a pile, is only a pressure existing during an indefinitely short interval of time. The point in any machine to which the moving power is applied is called the impelled, and that against which the resistance acts is called the working point.

In the employment of any machine a certain portion of the power is expended in overcoming the inertia and friction of the materials, and that which remains is the only efficient force by which the useful effect is to be obtained. Thus, in pushing or drawing a body up an inclined plane, the effective motive power is less than that which is actually expended by as much as is necessary to overcome the inertia of the body and its friction on the plane; and these might be avoided if it were possible or convenient to raise the body vertically to an equal height by the descent of a body of greater weight, when both are connected together by a string passing over a pulley. The loss of power from inertia is doubled when a reciprocating motion exists in the same machine; for a momentary state of rest takes place between every two contrary directions of the movement, and immediately afterwards a new inertia is to be overcome. The retarding forces above mentioned are evidently greater as the quantity of machinery in an engine is augmented; and hence every machine should be as simple as possible consistently with the requisite relation between the moving power and the opposing resistance.

In the construction of machinery it is evident that all abrupt variations of velocity should be prevented, on account of the irregularity which they induce in the action. When, for example, one wheel drives another by means of the teeth on their circumference, the pressure of the teeth takes place wholly on one side of the latter, and the movement may be steady if the teeth are well formed; but on a sudden diminution of the velocity of the driving wheel, that which is driven, continuing for a time to move with its actual velocity, tends further to retard the movement of the other, and the pressure of the teeth against each other takes place on the opposite side. Thus a shaking motion is produced which diminishes the efficacy of the machine. The disadvantage attending such variations in the movement of the machinery renders it advisable to gain the required effect by continued pressure, if possible, rather than by the employment of percussive forces.

It is also a maxim assented to by engineers that the impelled point of a machine should not be allowed to move with a greater velocity than that with which the motive power can act upon it; since in this case the excess of velocity in the machine will be employed in accelerating the motion of the power, and thus the general acceleration of the machine will suffer a corresponding diminution. The velocities of the impelled and working points should therefore be properly adjusted to the pressures, the inertia, and the friction, in order that all possible advantage may be derived from the machine.

A just estimate of the power of a machine ought to include the effects of all the momentary accelerations and retardations of motion to which it is subject, and all the losses arising from inertia and friction; but as the introduction of these circumstances would excessively complicate the investigation, it is usual to make the measure of the power depend on the condition that the impelled and working points shall be in a state of uniform motion. For then, agreeably to the property of the simple lever, the velocities of those extreme points will be inversely proportional to the forces which would be in equilibrio at the same points; and the rule propounded by Euler is, that in every machine, simple or complex, the pressure at the impelled point, multiplied by the velocity of that point, is equal to the product of the resistance at the working point by the velocity of the same point; or the momentum of resistance (commonly called the *performance* of the machine) is equal to the momentum of impulse. Whatever objection may be made to this rule with respect to the measure of the power in action, no doubt can exist that it affords a correct value of the useful effect; and the latter may therefore be measured by the weight which might be raised by the machine to a given height vertically in a given time. The fact is sufficiently evident when a mass of any material is to be conveyed from one place to another, or when a body is let fall on any object from a given height. It follows that, if an algebraical expression be obtained for the momentum of the resistance in terms involving that resistance, the motive power and the distances of their points of application from the axis of motion; on making the differential of that expression equal to zero, the ratio of the resistance to the moving power, when the useful effect of the machine is a maximum, may be found from the resulting equation.

If M represent the mass of any body moved, W its weight, which is equal to Mg, g ($=32\frac{1}{6}$ feet) expressing the force of gravity; also, if H be the height to which the body may be raised in one second of time, and V the velocity which a body would acquire by falling vertically through a height equal to H, we shall have, by the theory of motions, $V^2=2g\,H$; whence W. H (the momentum of resistance, or the useful effect of a machine) $=\frac{1}{2}M\,V^2$. This last expression is designated the living, or active, force of the body moved; and it expresses the force of a body in motion, in contradistinction to the simple pressure exercised by a body at rest.

It is commonly asserted that, in the employment of machinery, as much is lost in time as is gained in power, or that the momentum of resistance is proportional to the power employed; but this rule requires some modification. It can be shown to hold good in a well-constructed machine when the object moved resists by its inertia *only*; but if the inertia is but a small part of the resistance, *the momentum of the latter*, or the work done, *is found to increase* nearly as the square of the power employed.

The various ingenious contrivances which have been adopted in machines for regulating the velocities, and for converting one species of motion into another, are noticed in the article WHEELS.

Descriptions of the several mills, engines, and machines used in manufactures and the arts will be found in Robison's 'Mechanical Philosophy,' in Gregory's 'Mechanics,' and under the word Manufactures in the 'Encyclopædia Metropolitana.'

MACKENZIE, SIR GEORGE, of Rosehaugh, son of Simon Mackenzie (brother of the earl of Seaforth) by a daughter of Dr. Bruce, principal of St. Leonard's College, St. Andrew's, was born at Dundee in 1636, and having finished his grammar education, which he did with much applause, he proceeded to Bourges, 'the Athens of Scottish lawyers,' as he calls it, to study the civil law. On his return he passed advocate, January, 1659, being then about 23 years old. The next year he published his 'Aretina, or the Serious Romance,' where, says Ruddeman, he gives 'a very bright specimen of his gay and exuberant genius.' The year following we find him in the important situation of justice-depute, an office in the nature of an English justice in eyre, or of assize; and in that character appointed to repair with his colleagues 'once a week at least to Musselburgh and Dalkeith, and to try and judge such persons as were there or thereabout accused of witchcraft.' Not many years afterwards, though at what time is not quite certain, he had the honour of knighthood. In the meantime he continued his literary labours. In 1663 his 'Religio Laici, or Short Discourse upon several Divine and Moral Subjects,' appeared; two years afterwards, his 'Moral Essay upon Solitude,' in which he exalts that state above public employment with all its advantages; and in 1667, his 'Moral Gallantry,' a treatise in which he attempts to establish the moral duties on the principles of honour. It was shortly after this time he entered parliament, representing the county of Ross, where the influence of his family was powerful and extensive; and in 1674 he was appointed king's advocate in the room of Sir John Nisbet of Dirleton. He continued in the office till the accession of King James, when it was given to Sir John Dalrymple; but in a short time he was reinstated and continued in office till the Revolution. Previous to this last event he had published several of his legal works, and had been instrumental in founding the *Advocates' Library*. It was in 1682 that this library was founded; and at its foundation he delivered an inaugurate oration setting forth its advantages. In 1678 he published his 'Discourse on the Laws and Customs of Scotland in Matters Criminal.' In 1684 he published his 'Institutions of the Laws of Scotland,' a concise and, generally speaking, excellent compendium of the law; and in 1686 he published his 'Observations on the Scotch Acts.' He seems also to have attempted the establishment of a chair of law in the University of Edinburgh, but was unsuccessful in obtaining that object.

After the Revolution Sir George retired to Oxford, where he was admitted a student on the 2nd of June, 1690; but he did not live long afterwards to enjoy the retirement which he had early praised and had now begun to experience. He died on the 2nd of May, 1691; and after lying several days in state in the abbey of Holyrood House, Edinburgh, his body was conveyed to Greyfriars church-yard, attended by a procession consisting of the council, the nobility, the college of justice, the college of physicians, the university, the clergy, and many others.

Sir George was the correspondent of Dryden and other writers of England; and he was among the first Scotchmen who wrote the English language in a style approaching to purity. But it was as a lawyer, and still more as an officer of state, that he was principally distinguished; and in this last character he received the appellation, which will live with his name, of 'The blood-thirsty Advocate.'

MACKENZIE, SIR ALEXANDER, is said to have been a native of Inverness in Scotland, from which he emigrated to Canada when a young man, and there obtained a situation in the counting-house of Mr. Gregory, one of the partners of the North-West Fur Company. He had resided for about eight years in the service of Mr Gregory at Fort Chipewyan, at the head of the Athabasca lake, in the savage country to the west of Hudson's Bay, when the knowledge he had acquired of the country and the people, and his intelligence and enterprising character, determined his employers to send him out on an exploring expedition through the regions lying to the north-west of that station, and conjectured to be bounded by the Arctic Ocean, a part of which Hearne was supposed to have seen, and, as is now well ascertained, actually had seen on his visit to the Coppermine River in 1771. Mackenzie, attended by a German, four Canadians, and three Indians, together with two Canadian and two Indian women, left Fort Chipewyan, 3rd June, 1789. Embarking in their four canoes on the Slave River, the party reached the Slave Lake, with which it communicates by a course of 170 miles, on the 9th of the same month. Resting there six days, during which the ice somewhat gave way, they launched their canoes again on the 15th, and skirting the margin of the lake, reached the entrance of the river which flows from its western extremity, and is now called the Mackenzie river, on the 29th. Mackenzie pursued the north-westward course of this river, with a perseverance and intrepidity which no dangers or difficulties could subdue, till on the 15th of July it brought him to the object of his hopes, the great Northern Ocean, in lat. 69°. Returning by the same route, the party regained Fort Chipewyan on the 12th of September. On the 10th of October, 1792, Mackenzie set out from the same point on another adventurous journey, the object of which was to reach the Pacific; an attempt, the first made in North America, in which he was also successful. Proceeding partly by the Ungigah or Peace river, and partly by land, after encountering still greater difficulties than on his former expedition, he reached the sea on the 23rd of July, 1793, and returned in safety by nearly the same route. Of both his journeys Mackenzie has himself given a full account in his 'Voyages from Montreal, on the river St. Lawrence, through the Continent of North America, to the Frozen and Pacific Oceans, in the years 1789 and 1793,' 4to. Lond., 1801. The account is preceded by a general history of the fur trade (130 pages), and the volume is embellished with a portrait of the author, who soon after received the honour of knighthood. We have not beenable to ascertain the date of Sir Alexander Mackenzie's death, but his name is inserted in 'A Biographical Dictionary of the Living Authors of Great Britain and Ireland,' 8vo., Lond. 1816.

MACKENZIE RIVER. [HUDSON'S BAY.]

MACKEREL. [SCOMBER.]

MACKEREL FISHERY. [FISHERIES.]

MACKINTOSH, SIR JAMES, was born at Aldourie, on the banks of Loch Ness, within seven miles of Inverness, on the 24th of October, 1765. He was the son of Captain John Mackintosh, the representative of a family which for above two centuries had possessed a small estate called Kellachie, which Sir James inherited from him. Sir James Mackintosh received his education at the universities of Aberdeen and Edinburgh, at the latter of which places he took the degree of M.D., intending to practise medicine, with which view he repaired to London. He afterwards however changed his destination, and was called to the bar in 1795, by the Society of Lincoln's Inn. In 1804 he went to India as recorder of Bombay. He returned to England in 1812; in 1818 he was appointed to the professorship of law and general politics in the college instituted for the education of the civil servants of the East India Company at Haileybury. In 1830, when the Whigs came into office, Sir James was appointed a commissioner for the affairs of India. He died on the 30th of May, 1832.

Sir James's principal works are his 'Vindiciæ Gallicæ,' his 'History of England' (which he left unfinished at his death), and his 'Dissertation' prefixed to the 'Encyclopædia Britannica,' a new edition of which has lately appeared, with notes, &c., by Professor Whewell.

The 'Vindiciæ Gallicæ' is written in an easy flowing style, and displays a considerable surface of reading, the effect of which was the greater from its lying out of the track of English study at that time. This gave him some advantage over his opponent Burke, whose ignorance of the writings of the French *Economistes* was happily exposed. The 'Vindiciæ Gallicæ' obtained for its author great and sudden reputation.

The 'History of England' (published in Dr. Lardner's 'Cyclopædia,' in which work the 'Life of Sir Thomas More' is also from his pen) he left unfinished by his somewhat premature and unexpected death; and this may in part account for its being unequally executed. Particular passages of the story are rather carefully investigated; the survey of others is very slight and unsatisfactory. The remarks on some constitutional points are interesting. The general spirit is that of a very courteous and tolerant whiggism. Besides the history above mentioned, Sir James published a History of the Revolution in England in 1688, a fragment 'completed by the editor.'

In respect to his 'Dissertation' prefixed to the 'Encyclopædia Britannica,' and purporting to be 'A General View of the Progress of Ethical Philosophy, chiefly during the Seventeenth and Eighteenth Centuries,' it will be necessary to say a few words.

To write a good outline of the progress of ethical philosophy, from Socrates to Brown, tracing the course of error to its exposure, and of truth to its establishment, would require extensive reading, patient thinking, and rigid impartiality, and remains to be done; to compose a smooth, readable, drawing-room essay, is easier, and Sir James Mackintosh has done it. The retrospect of antient ethics (s. 2) is fairly written, and may have been the result of a careful perusal of Enfield, with occasional references to Cudworth. The retrospect of scholastic ethics (s. 4) bears a like relation to Bayle. The sections on 'Modern Ethics,' the 'Controversies on the Moral Faculties' (5), and the 'Foundations of a more just Theory of Ethics,' contain a review of the principal authors, and some ingenious efforts to establish Dugald Stewart's opinions on the moral sense. There is little to show that Sir James had studied any of the authors whom he criticises, except Stewart; and from the hasty and rather flippant way in which he speaks of some, particularly Mandeville and Mill, it would be less injurious to his memory to suppose that he adopted the opinions of others, than that he expressed his own after actual reading.

The language of the 'Dissertation' is fluent, but not clear and precise, and thought seems to be often sacrificed to expression, or perhaps expression studied as a substitute for thought. As a guide to the student of morals and metaphysics, it is of little value; on the contrary, from the want of clearness and precision in the language, and the habit of mistaking words for thoughts, and paying in the former coin instead of the latter, we should consider it as rather a pernicious book to place in the hands of the young. There is little danger of the more mature (at least of those whose taste has been formed on a severe and masculine standard) reading or being influenced by such works as this.

Besides the above-mentioned works, Sir James Mackintosh contributed largely to the 'Edinburgh Review.'

(*Memoir of the Life of the Right Honourable Sir James Mackintosh*, edited by his son Robert James Mackintosh, Esq., Fellow of New Coll., Oxf., 2 vols. 8vo.,London, 1835.)

MACKLIN, CHARLES, an actor and dramatic writer. His family name was Maclaughlin. The exact place and date of his birth are unknown; but according to the account of a female relative, 'he was two months old at the battle of the Boyne' (July 1, 1690), a few days previous to which event his mother travelled with him from Drogheda to a little village six miles off, in which they resided for some years. At the age of fourteen he was apprenticed to a saddler, but soon ran away and came over to England, where he contracted a marriage with the widow of a publican in the Borough. The circumstance coming to the ears of some friends, the marriage was dissolved on the grounds of *nonage*, and he was sent back to Ireland, when he became a badgeman in Trinity College, Dublin. At the age of twenty-one he again visited England, joined a strolling company, and played Harlequin, returned to Trinity College, and again to England in 1716, when he recommenced actor at Bristol. In 1725 he was a member of Mr. Rich's company at the Lincoln's Inn Fields theatre, London. On the 10th May, 1735, he unfortunately killed a brother performer, named Hallam, by accident in a quarrel, for which he was tried and found guilty of manslaughter. On the 14th February, 1741, Macklin established his fame as an actor in the character of Shylock. In 1753 he took leave of the stage, and on the 11th March, 1754, opened a tavern and public ordinary in the Piazza, Covent Garden, adding to it 'a school of oratory and criticism,' in which he gave lectures, full dressed, only to be laughed at by Foote and other wags of the day. This scheme failing, Macklin became a bankrupt, and in 1757 went to Dublin, where he assisted in laying the first stone of the Crow-Street theatre. In 1759 he accepted an engagement at Drury-Lane, and from thence went to Covent-Garden. On the 18th November, 1773, he was driven from the stage by a cabal, but brought an action, and obtained damages against the ringleaders. On the 28th November, 1788, while representing the character of Sir Pertinax MacSycophant, in his own comedy, 'The Man of the World,' his memory suddenly and entirely failed him. He made a last attempt for his own benefit, May 7, 1789, in the character of Shylock, but was unable to complete the part.

Macklin died July 11, 1797, at the great age (it is supposed) of 107, and was buried in the chancel of St. Paul's, Covent Garden.

There are ten dramatic pieces ascribed to him, but two only have kept possession of the stage, 'Love à la Mode,' a farce, and 'The Man of the World,' a comedy. His memoirs, written by J. T. Kirkman, Esq., were published in two vols. 8vo., London, 1799.

MACKNIGHT, JAMES, D.D., born 1721, died 1800, a divine of the Church of Scotland, of distinguished eminence among the theological writers of the last century. He was born in Argyleshire, studied in the university of Glasgow, but, like many of the Presbyterian divines both of his own country and of England, went abroad and finished his studies at Leyden. On his return he became a minister in the Scotch Church, and was appointed, in 1753, pastor of Maybole. In this situation he spent sixteen years, during which time he prepared two works; one, 'A Harmony of the Gospels,' with copious illustrations, being in fact a life of our Saviour, embracing everything which the evangelists have related concerning him; the other, 'A new Translation of the Epistles.' Both these works were favourably received, and are by many persons highly esteemed. The 'Harmony' has been repeatedly printed, and to the later editions there are added certain dissertations on curious points in the history or antiquities of the Jews. The theology of them is what is called moderately orthodox. While at Maybole he published also another theological work, which is held in great esteem, in defence of 'The Truth of the Gospel History.' For these his valuable services to sacred literature, Dr. Macknight received such rewards as a Presbyterian church has it in its power to give. The degree of D.D. was conferred upon him by the university of Edinburgh. In 1769 he was removed from Maybole to the more desirable parish of Jedburgh, and in 1772 he became one of the ministers of the city of Edinburgh. Here he continued for the remainder of his life, useful in the ministry, though not accounted one of the most attractive and engaging of the preachers in that city. His attention to his theological studies was unabated, and in 1795, at the age of 74, he produced his 'Literal Translation of all the Apostolic Epistles,' with a large apparatus of Commentary and Notes, and a Life of the Apostle Paul.

There is an account of the life of Dr. Macknight by his son.

MACLAURIN, COLIN, one of the most eminent of Scottish mathematicians, was descended of an antient family in Argyleshire, and was born at Kilmoddan, in that county, in February, 1698. His father was a minister of the kirk, and died shortly after the birth of his third son Colin: his mother also died when he was very young, and the care of his education devolved upon an uncle, who sent him to the university of Glasgow at the age of eleven. It is said that in the following year, meeting accidentally with a copy of Euclid, he made himself master of the first six books in a few days, a story utterly incredible upon the mere statement. It is said also, and with much more likelihood, that at the age of sixteen he had invented many of the propositions afterwards published in his 'Geometria Organica.' However this may be, he took the degree of Master of Arts with distinction in the fifteenth year of his age (1713), and afterwards lived in studious retirement till the autumn of 1717, when, after a severe competition and ten days' examination, he obtained the professorship of mathematics at the Marischal college, Aberdeen. In 17[illegible] and in 1721 he visited London, and formed the acquaintance of many eminent men, particularly of Newton. In 1722 he travelled on the Continent as tutor to a son of Lord Polwarth; but the death of his pupil during their tour occasioned his return to Aberdeen.

In 1725 he was appointed to assist James Gregory, whose strength was declining, in the duties of his chair at Edinburgh. The want of funds to pay an assistant placed difficulties in the way of this arrangement, which were removed, but how is not clearly stated. We mention them here to record, in honour of Maclaurin, that Newton, on hearing of the obstacles, offered to pay twenty pounds a year, till Gregory's death, towards the assistant's salary, if Maclaurin were to be appointed. At Edinburgh he remained almost all the remainder of his life. When the Rebellion broke out in 1745, he exerted himself vigorously for the existing government, and the hasty works which were thrown up for the defence of Edinburgh were planned and superintended by him: fatigue and exposure laid the foundation of a mortal disorder. When the pretender entered Edinburgh, Maclaurin withdrew, to avoid making the submission which was demanded of all who had volunteered to defend the town: but he had previously managed to introduce a good telescope into the castle, and to contrive a method of supplying the garrison with provisions. He accepted the invitation of Dr. Herring, archbishop of York, with whom he remained till it was safe to return to Edinburgh. Shortly after his return he died of dropsy, June 14, 1746, aged 48 years and four months. The preceding particulars come originally from a eulogy spoken before the university by his friend and colleague Dr. Monro, the substance of which was affixed, in a biographical form, to the posthumous work on Newton's discoveries, by the editor, Patrick Murdoch. This has been copied into the 'Biographia Britannica,' Martin's 'Biographia Philosophica,' &c.: being the only authentic account of which we know.

Maclaurin married in 1733, and his wife, with two sons and three daughters, survived him. Of his character it can only be stated, from the general eulogy, that it was such as secured him the highest regard of his contemporaries.

The writings of Maclaurin are not numerous, but they have exercised considerable influence upon the mathematical studies of this country; more however we think, in what has been taken from them, or on their model, by others, than in the extensiveness of their own circulation. There is both originality and depth in all of them, and we shall proceed to notice them separately.

1. The various papers which he published in the 'Philosophical Transactions' are on subjects intimately connected with his separate works. The numbers of the 'Transactions' in which they occur are 356, 359, 364, 377, 394, 408, 439, 461, 467, 469, 471.

2. 'Geometria Organica, sive descriptio linearum curva-

rum universalis,' Londini, 1720. This is an elaborate treatise on the description of curves by the intersections of moving straight lines.

3. In 1724 he gained the prize of the Academy of Sciences for an essay, proposed by that body, on the Leibnitzian method of measuring the force of bodies in motion. In 1740 he divided with Daniel Bernoulli, Euler, and Cavallieri, the prize of the same academy for an essay on the tides. This work is printed in what is called the Jesuits' edition of Newton.

4. 'A Treatise of Fluxions,' Edinburgh, 1742 (2 vols. 4to.; a second edition about 1801, 8vo.). The immediate cause of this work was the attack of Berkeley upon the first principles of Fluxions, in his 'Analyst:' it is of great prolixity, as might be expected in an elementary treatise which is written entirely on the defensive; but it must always be remarkable as having been the first work in which the principles of fluxions were placed in logical connexion with each other. The details are very extensive, forming a great body of applications, several of them quite new at the time. Among others is the theorem now known by the name of Maclaurin, but which had been previously noticed by Stirling. [TAYLOR'S THEOREM.] Of all the treatises which have been organised upon the fluxional principle, this is undoubtedly the most sound as well as complete.

5. 'A Treatise on Algebra,' 1748 (sixth edition, 1796). This work certainly surpassed all its predecessors in clearness, though far from being as logical a work as the 'Fluxions.' It contains two appendices on the general properties of curves. It was left not quite complete, and was finished by an editor.

6. 'An Account of Sir Isaac Newton's Philosophical Discoveries,' London, 1748. This work also was published from the author's papers; the editor was Patrick Murdoch. After the death of Newton, his nephew Mr. Conduitt proposed to publish his Life, and applied to Maclaurin for assistance. The latter immediately prepared an account of the philosophical systems which preceded that of Newton. But Mr. Conduitt's death frustrated the plan, and Maclaurin, extending his design to the length of explaining all Newton's mechanical and cosmical discoveries, left this work in the state in which it was printed. The optical discoveries were omitted, and the editor states that the author's intention seems to have been the explanation of those parts only of Newton's discoveries which had been and were controverted. In the present day, when popular explanation of scientific points has been well studied, it would be easy to name works which are preferable to that of Maclaurin in matter and form; but in style it would be difficult to do the same. At a time when the theory of gravitation was hardly admitted by many at home, not yet received by any of note abroad, and really understood by very few, such a work was of peculiar value.

Besides the preceding, Maclaurin edited in 1745 an edition of David Gregory's 'Practical Geometry.' He was also actively engaged in many matters closely connected with scientific publication. We need do no more than mention his exertions to found an observatory at Edinburgh, which did not succeed, and a medical society: to the latter he contributed several papers. He was engaged at one time in promoting the survey of part of the north of Scotland; at another in examining and reporting on the manner of gauging vessels; and he organized and computed tables for a provident society for the widows and orphans of the Scottish clergy, in a manner which secured the stability and usefulness of the scheme.

MACLAURIN'S THEOREM. [TAYLOR'S THEOREM.]

MACLE (*Chiastolite*) occurs crystallized. Primary form a right rhombic prism. Cleavage parallel to the lateral faces of the primary form. The crystals appear to be composed of two substances: one of a yellowish white, sometimes translucent and of a glassy fracture; the other bluish black, opaque and dull. Fracture scaly, slightly concoidal. Hardness 5·0 to 5·5. Streak white. Lustre vitreous, or vitreo-resinous. Specific gravity 2·944.

The white portion is infusible by the blow-pipe, but becomes whiter; with borax it fuses difficultly into a transparent glass. The black portion fuses into a black glass. Nitric acid dissolves it entirely.

It occurs imbedded in clay-slate on Skiddaw in Cumberland, in Wicklow, in the Pyrenees, and in many other places.

It yields, by the analysis of Landgrabe,

Silica	68·49
Alumina . . .	30·17
Magnesia . . .	4·12
Oxide of Iron . .	2·70
Water	·27
	105·75

MACLUREITE (*Condrodite, Brucite*) occurs imbedded in rounded masses, the larger of which present occasional crystalline appearances of rhombic prisms with dehedral terminations. Cleavage parallel to the lateral planes. Fracture uneven. Hardness 6·5. Specific gravity 3·15 to 3·25. Colour yellowish or brown. Lustre vitreous. Becomes negatively electrical by friction. Transparent, translucent.

Infusible by the blow-pipe, but becomes colourless. With borax fuses into a transparent glass, coloured by oxide of iron. Not affected by acids.

It occurs in New York and New Jersey, and also at Pargas.

Analyses—No. 1, by D'Ohssor, from Pargas; No. 2, from New Jersey, by Seybert:—

	No. 1.	No. 2.
Silica . .	38·00	32·66
Magnesia . .	54·00	54·00
Oxide of Iron .	5·10	2·33
Alumina . .	1·50	0·00
Potash . .	0·86	2·11
Fluoric Acid .	0·00	4·09
	99·46	95·19

MACO'MA, Leach's name for the Venus tenuis of De Blainville, and similar species. [VENERIDÆ.]

MÂCON, a town in France, capital of the department of Saône et Loire, situated on the right or west bank of the Saône, in 46° 18′ N. lat. and 4° 50′ E. long.; 205 miles from Paris in a direct line south-east, or 244 miles by the road to Lyon through Sens, Auxerre, Autun, and Châlons sur Saône.

Mâcon was one of the towns of the Ædui, and is mentioned by Cæsar (*De Bell. Gall.*, lib. vii., c. 90) under the name of Matisco, from the oblique cases of which the present name, which was formerly written Mascon, is derived. It is mentioned in the 'Itinerary' of Antoninus, and in the 'Notitia Imperii,' in which latter it is designated Castrum, a fortress, and is noticed for the manufacture of arrows. It suffered much from the barbarians who overran the Roman empire, especially from Attila. It passed into the hands of the Burgundians and the Franks; was included in the kingdom of Bourgogne under Boson, and in the duchy of Bourgogne under the later dukes. It was much injured in the religious wars of the sixteenth century. Before the Revolution it was a bishop's see.

The town is on the declivity of a hill sloping down to the Saône, along the bank of which is a noble quay, from which the distant Alps may be seen. A green island occupies the centre of the stream opposite to the quay: and an antient, perhaps Roman bridge, of thirteen arches, more remarkable for solidity than beauty, connects the town with the village of St. Laurent on the other side of the river, in the department of Ain, which is commonly regarded as a suburb of Mâcon. The streets of Mâcon are crooked, narrow, and ill paved: the houses are usually of stone, and substantially built. Considerable improvements have been made of late years. The ramparts of the town have been demolished and their site laid out in promenades. The former cathedral was ruined in the troubles of the Revolution, but the episcopal residence escaped, and is used for the prefect's office. The chief public buildings are the town-hall, the antient palace of Montrevel, the theatre, and the baths, all on the quay; the general hospital, on the parade; the new church of St. Vincent, and the new prison. Among the Roman antiquities are a triumphal arch and the ruins of a temple of Janus. The population in 1831 was 10,998; in 1836 it was 11,944. The inhabitants carry on a considerable trade in the wines of the district, some of which are excellent. There are some manufactures of hosiery, linens, linsey-woolsey, earthenware, clocks and watches, and especially confectionary. There are several tan-yards and cooperages. There is a well frequented weekly market in the town, and a large corn-market is held in the village of St. Laurent. There are several yearly fairs.

Mâcon has a high school, a school of mutual instruction, and a drawing-school. There is a society of agriculture, science, and art, which possesses a good library. There are three hospitals or poor-houses, and a society for relieving the poor at their own homes. There are a primary court of justice, a tribunal de commerce, and several government offices.

The arrondissement of Mâcon has an area of 474 square miles, and comprehends 133 communes, and 9 cantons, or districts, each under a justice of the peace. The population in 1831 was 114,061; in 1836 it was 115,777. The environs of the town are delightful and productive.

Mâcon had in the middle ages counts of its own. Their county constituted the district of the Mâconnois, which nearly coincided with the present arrondissement. This district had its own states or assembly for assessing the taxes. Louis IX., otherwise Saint Louis, purchased the county of Mâcon and united it to the domains of the crown. It formed part of the duchy of Bourgogne, either at its reformation in the reign of Jéan II., or by subsequent cession of Charles VII. to the duke Philippe le Bon. [BOURGOGNE.] Louis XI. reunited it to the crown of France.

MACPHERSON, JAMES, was born in 1738, at the village of Ruthven in Inverness-shire, and was sent in 1752 to King's College, Aberdeen, with a view to be educated for the Scotch church. On leaving college he was appointed schoolmaster of his native village; and it was while holding this situation that he gave to the world what appears to have been his first publication, a poem entitled 'The Highlander,' in 1758. Before this date however he had written some other poetical pieces, among which are mentioned one called 'Death,' and another called the 'Hunter,' which last is said to have been only a rude sketch of the 'Highlander.' Soon after he sent to the 'Scots Magazine' several contributions in verse, which have been preserved from oblivion by the great controversy that afterwards arose about his capacity for manufacturing the poems ascribed to Ossian, which he professed to have only translated. Some attention appears to have been first given to the traditional poetry preserved in their native dialect among the Scotch Highlanders, by Dr. Adam Ferguson, the well known historian, himself a mountaineer; by him an interest in the subject was communicated to his friends the Rev. Dr. Carlyle, minister of Inveresk, a gentleman of extensive connexions among the literary men of his day, and John Home, the author of 'Douglas.' The two latter met with Macpherson in the autumn of 1759, when he showed them some fragments of Gaelic verse, of which they prevailed upon him to furnish them with translations. These were shown to Dr. Blair, and the poets Shenstone and Gray, by all of whom they were greatly admired; and in 1760 they were published under the title of 'Fragments of Antient Poetry, collected in the Highlands of Scotland, and translated from the Gaelic or Erse Language,' with an anonymous preface by Blair. A reprint of this publication is given in the 2nd volume of Dodsley's 'Fugitive Pieces,' Lond., 1761, pp. 117-163. The fragments are sixteen in number. The effect was to induce the faculty of advocates in Edinburgh to raise a subscription for enabling Macpherson to make a tour through the Highlands with the object of collecting more poetical treasure of the same kind. What he found, or pretended to have found, he brought to London, and published there in two successive volumes, the first of which appeared in 1762, under the patronage of Lord Bute, with the title of 'Fingal, an Epic Poem in six books, with other lesser Poems;' the second in 1763, with the title of 'Temora, an Epic Poem in eight books, with other Poems.' From the first, the genuineness of these Gaelic epics was questioned by many persons; but it was more zealously asserted by more, and to Macpherson himself the notoriety which he acquired was the beginning of a long course of good fortune. In 1764 he obtained the situation of private secretary to Captain Johnstone, on the appointment of the latter as governor of Pensacola; and he was also made surveyor-general of the Floridas, in which capacity he went out to America and the West Indies, and returned to England in 1766, retaining his salary of 200*l.* a year for life. Some of the years that followed he spent chiefly in literary labour, much of it, from the popularity of his name, highly profitable. In 1771 he published, in one vol. 4to., a disquisition on the antiquities of the Scottish Celtic race, under the title of 'An Introduction to the History of Great Britain and Ireland;' in 1773 a prose translation of the 'Iliad' of Homer; in 1775 a 'History of Great Britain from the Restoration to the accession of the House of Hanover,' in 2 vols. 4to., together with 2 vols. of 'Original Papers,' which last work he sold to the booksellers for 3,000*l.* During this period of his life he also wrote several pamphlets for the ministry, in support of the war against the American Colonies, which are now all nearly forgotten. At last his appointment to the lucrative office of agent to the nabob of Arcot turned his versatile mind and pen to Indian affairs, upon which he also produced a succession of publications of temporary interest. This post brought him into parliament in 1780, as member for Camelford, for which he sat till 1790. He then retired to a considerable property which he had purchased in his native county of Inverness, where he died 17th February, 1796. His body was brought back to England for interment in Westminster Abbey. (*Edinburgh Encyclopædia*, the editor of which, Dr. (now Sir David) Brewster, married a daughter of Mr. Macpherson.) [OSSIAN.]

MACQUARIE, river. [AUSTRALIA.]

MACRA'SPIS (*MacLeay*), a genus of Coleopterous insects of the section *Lamellicornes*, and, according to Latreille's classification, belonging to the third division of that group, the *Xylophili*. The genera *Macraspis* and *Chasmodia* constitute two closely allied groups of the family *Rutelidæ*, the species of which inhabit the warmer parts of South America, and are remarkable for the large size of their scutellum. They are of tolerably large size (averaging about three-quarters of an inch in length, or rather more), usually very smooth and glossy, and often exhibit brilliant colours, green, brown, and yellow being the most common hues observable in the various species. There are some however which are of a glossy-black colour, and others which have yellow markings on a black ground (*Macraspis quadrivittata*, Olivier). The body is of an ovate form (the head and thorax having an outline continuous with that of the abdomen, or nearly so), convex above and beneath. The sternum is produced anteriorly into a pointed process, which projects between the anterior pair of legs.

In the genus *Macraspis* the mentum is longer than broad, slightly contracted anteriorly, and without any fringe of hairs on the anterior margin; the mandibles are almost triangular, and have the apex pointed and notched; the maxillæ have several denticulations.

The genus *Chasmodia* (MacLeay) is chiefly distinguished from Macraspis by the obtusely terminated mandibles, which have no notch at the extremity; the maxillæ having a tuft of hairs and only two denticulations, and the mentum being of a somewhat ovate form, distinctly contracted towards the apex and furnished with hairs. The claws of the tarsi are simple, whereas in Macraspis one of the claws of each tarsus, at least of the four anterior legs, is bifid.

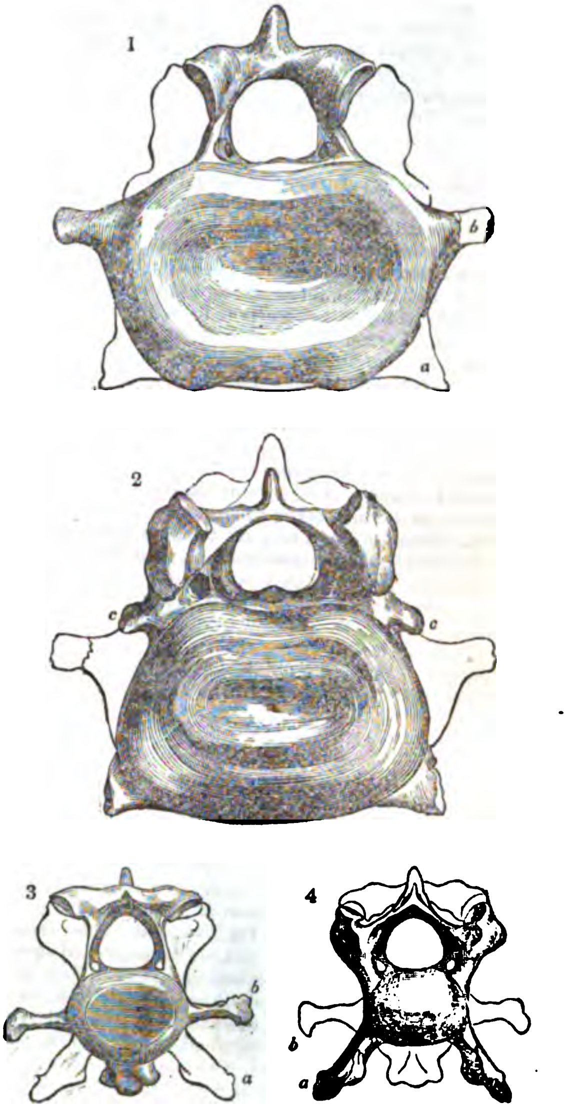
The insects of these two genera fly by day about trees, emitting a humming noise, and feed upon flowers. Collections formed in Brazil usually contain many of these insects.

Dejean, in his 'Catalogue des Coléoptères,' enumerates twenty-six species of *Macraspis* and five of *Chasmodia*.

MACRAUCHE'NIA, Professor Owen's name for a large extinct Mammiferous animal, referrible to the order *Pachydermata;* but with affinities to the *Ruminantia* and especially to the *Camelidæ*.

The remains on which the professor founded this genus included two cervical vertebræ, seven lumbar vertebræ, all more or less fractured; a portion of the sacrum and ossa innominata; fragments of the left scapula; of the right radius and ulna, and right fore-foot; the right femur nearly entire, the proximal and distal extremities of the right tibia and fibula; and a metatarsal bone of the right hind-foot. These portions of the skeleton were discovered by Mr. Darwin in an irregular bed of sandy soil, overlying a horizontal accumulation of gravel on the south side of Port St. Julian, on the east coast of Patagonia, and belonged to the same individual.

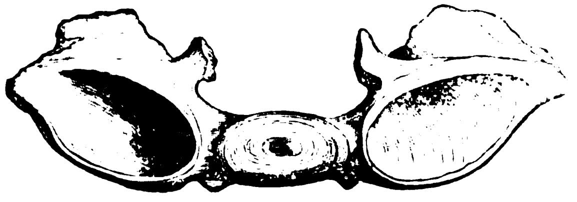
Mr. Owen observes that what is described as a perforation of a single transverse process in a cervical vertebra is essentially a space intervening between two transverse processes, a rudimental rib, and the body of the vertebræ, and the professor alludes to the manifestation of this structure in the cold-blooded saurians and in the *Ornithorhynchus*. He observes that the *Camelidæ* differ not only from the other ruminants, but from all other existing *Mammalia*, in the absence of perforations for the vertebral arteries in the transverse processes of the cervical vertebræ, the atlas excepted; and though it is true that in other *Mammalia* the two transverse processes are manifested on each side with their extremities united by a distinct cartilage, this appears in the fœtal state only, for the cartilage afterwards becomes ossified and anchylosed to them. After referring to the structures of the inferior transverse process or its representatives in the *Hippopotamus*, the *Marsupials*, and the *Giraffe*, Mr. Owen proceeds thus: 'In the long cervical vertebræ of the *Camel* and *Llama*, the upper and lower transverse processes are not developed in the same perpendicular plane on the side of the vertebræ, but at some distance from each other; the lower transverse processes (*fig.* 1, *a*) being given off from the lower part of the anterior extremity of the body of the vertebra; the upper ones (*fig.* 1, *b*) from the base of the superior arch near the posterior parts of the body of the vertebræ. The extremities of these transverse processes do not become united together, but they either pass into each other at their base, or continue throughout life separated by an oblique groove. This groove would not however afford sufficient defence for the important arteries supplying those parts of the brain which are most essential to life; and accordingly the vertebral arteries here deviate from their usual course, in order that adequate protection may be afforded to them in their course along the neck. From the sixth to the second cervical vertebra inclusive in the *Aucheniæ*, and from the fifth to the second inclusive in the *Cameli*, the vertebral arteries enter the vertebral canal itself, along with the spinal chord, at the posterior aperture in each vertebra, run forwards on the outside of the dura mater of the chord, between it and the vertebral arch, and when they have thus traversed about two-thirds of the spinal canal, they perforate respectively the superior vertebral laminæ, and emerge directly beneath the anterior oblique or articulating processes, whence they are continued along with the spinal chord into the vertebral canal of the succeeding vertebra, and perforate the sides of the anterior parts of the superior arch in like manner; and so on through all the cervical vertebræ until they reach the atlas, in which their disposition, and consequently the structure of the arterial canals, resemble those in other Ruminants. The two cervical vertebræ of the *Macrauchenia* present precisely the structure and disposition of the bony canals for the vertebral arteries which are peculiarly characteristic of the *Camelidæ* among existing *Mammalia*.' *Fig.* 2 shows the groove and orifices of the canal for the vertebral artery in a section exposing the spinal canal. Mr. Owen then goes on to show that the vertebræ of the Macrauchenia also closely resemble the middle cervical vertebræ of the Vicuña and Llama in their elongated form; approaching the Auchenial division of the *Camelidæ*, and deviating from the true camels in the relations of the length of the body of the vertebra to its breadth and depth, and in the much smaller size of the inferior processes. The author observes that, excepting the Giraffe, there is no existing Mammal which possesses cervical vertebræ so long as the Macrauchene; but that the cervical vertebræ of the Giraffe differ in the situation of the perforations for the vertebral arteries, and in the form of the terminal articular surfaces. Both the cervical vertebræ described by Mr. Owen are of the same size, and each measures 6½ inches in extreme length, 2 inches 10 lines in breadth, and 2 inches 4 lines in depth. Among the peculiarities of structure, a small longitudinal process (*fig.* 2, *c*) is given off immediately below the base of the anterior process, and this is not observable in any of the cervical vertebræ of the Giraffe or *Camelidæ*. In the form of the articulating surfaces of the bodies of the vertebræ, the Macrauchene deviates from the Giraffe and Camel, but resembles the *Aucheniæ*. The anterior articulating surface is convex and almost hemispheric in the Giraffe and Camel, whilst the posterior surface is proportionally concave, so that the vertebræ of the neck are articulated by ball and socket joints, yet not, as in most reptiles, with intervening synovial cavities, but by means of the concentric ligamentous intervertebral substance characteristic of the Mammals. The degree of convexity and concavity in the articular surface of the bodies of these vertebræ in the Llama and Vicuña is much less than in the Camels, and the former consequently carry their necks more stiffly and in a straight line. The anterior articulating surface in Macrauchenia is less convex than it is in the Llama, and the posterior surface is less concave. From an analysis of the comparative structure of these vertebræ in the Camels, the Llamas, and the Macrauchene, Mr. Owen infers that the latter carried its neck in the same stiff and upright position as is manifested in the Llamas.



Cervical Vertebræ (1, 2) of Macrauchenia, and (3, 4) of Auchenia, half nat. size.

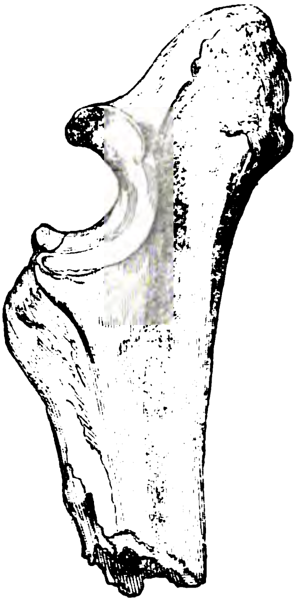
There is not in the collection a fragment of dorsal vertebræ, ribs, or sternum; but the seven lumbar vertebræ form a consecutive series from the same individual as that to which the cervical vertebræ belonged; and though these lumbar vertebræ do not possess such distinctive characters as those of the neck, they contribute not unimportantly to the illustration of the osteology of the animal and its affinities. No existing Pachyderm has more than six lumbar vertebræ; the Camels and Llamas only, among the Ruminants, possess seven; and here Mr. Owen discovered modifications of form in which the Macrauchene deviates from the *Camelidæ* and approaches the *Horse* and *Hippopotamus*. In the Macrauchenia, as in the Rhinoceros, Tapir, Hippopotamus, and Horse, the transverse processes of the last lumbar vertebræ are of considerable thickness and extent, and are joined by enarthrosis to the transverse processes of the sacrum; but the bony structure of these joints would indicate that they were not subject to be obliterated by anchylosis.

Sufficient of the sacrum and ossa innominata remain to enable Mr. Owen to state that the sacrum was anchylosed to the ilia: the lower boundary of this anchylosis is marked below by an external ridge, and by vascular canals and grooves in the substance of the bone, as in the Hippopotamus.



Last lumbar vertebra of Macrauchenia, one-third nat. size.

Of the remaining portions, the anchylosed fore-arm and leg, and the fore-foot, are the most characteristic. The portion of the antebrachium which is preserved presents a condition of the radius and ulna intermediate to those which respectively characterize the same bones in the Pachyderms and Camels. In the former, the radius and ulna are separate bones, united in the same position by a ligament, but so organized that the movement of supination cannot be effected. A bony confluence joins these bones partially in the ordinary Ruminants, but this rarely extends to the proximal extremities. In the Camel and the Llama the anchylosis is complete, so that no trace of the original separation of the radius and ulna is perceptible, and the olecranon, or elbow, appears as a mere process of the radius. The anchylosis in Macrauchenia is also complete, but the boundary-line is clearly defined, and the proportion which each of the bones contributes to the great articulating surface for the distal end of the humerus is easily distinguishable.

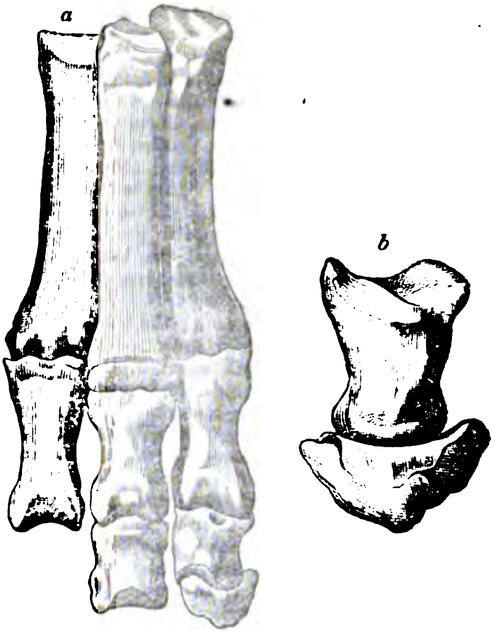


Proximal extremity of anchylosed ulna and radius of the Macrauchene, one fourth nat. size.

Mr. Owen goes on to remark that the confirmation of the close affinity of the Macrauchenia to the Pachydermatous order, which the structure of the cervical vertebræ above might have rendered very doubtful, is afforded by the bones of the right fore-foot.

These are in so perfect a condition as to make it certain that the Macrauchene had three toes on the fore-feet, and not more; and that the fully developed metacarpal bones are distinct, and correspond in number with the toes, not being anchylosed into a single cannon-bone as in the Ruminants. The bones preserved are the metacarpals, proximal phalanges, and middle phalanges of each of the three toes, and the distal or ungueal phalanx of the innermost toe.

The author observes in continuation that the bones of the leg of the Macrauchene exhibit the same transitional structure as is afforded by the definable limits of the anchylosed bones of the fore-arm. In the Pachyderms the fibula is entire and distinct. In the Ruminants (the small musk-deer excepted, and, in an inferior degree, the elk) the fibula appears only as a short continuous process sent down from the under part of the external condyle of the tibia. In the *Camelidæ* the only trace of the fibula is a still more rudimental state of this process, whilst in the Macrauchene the fibula is indeed entire, but it is confluent with the tibia through nearly its whole extent. The fibula and tibia are distinct bones in both the Palæothere and Anoplothere. It is to the former genus, and especially to *Palæotherium magnum*, that the Macrauchene presents the nearest approach in the general form of the tibia, the principal leg-bone; but in the Macrauchene the tibia is relatively shorter and thicker, and straighter, and less expanded at its extremities, especially the upper one, than in any of the Palæotheres.



a, Bones of the right fore-foot of the Macrauchene, one fourth natural size. *b*, second and last, or ungueal phalanx, one-half natural size.

Of the few bones of the part which are preserved the astragalus is fortunately one. Mr. Owen has compared this bone (which he justly says is the very one that an anatomist would have chosen, had his choice been limited to a single bone) with the astragalus of the Giraffe and other Ruminants, the Camel, the Anoplothere, the Hippopotamus, Rhinoceros, Tapir, and Palæothere; and he comes to the conclusion that it is with the Pachyderms having three toes to the hind-foot that the *Macrauchenia* agrees in the main distinguishing characters of this valuable bone. The results of a paper of minute detail, great research, and happy combination, are thus summed up by the professor.

'Thus we obtain evidence, from a few mutilated bones of the trunk and extremities of a single representative of its race, that there once existed in South America a Pachydermatous quadruped, not proboscidian, which equalled in stature the Rhinoceroses and Hippopotamuses of the Old World. But this, though an interesting and hitherto unsuspected fact, is far from being the sum of the information which is yielded by these fossils. We have seen that the single ungueal phalanx bespeaks a quadruped of the great series of *Ungulata*, and this indication is corroborated by the condition of the radius and ulna, which are fixed immoveably in the prone position. Now, in the ungulated series there are but two known genera—the Rhinoceros and Palæotherium—which, like the quadruped in question, have only three toes on the fore-foot. Again, in referring the Macrauchenia to the tridactyle family of Pachyderms, we find, towards the close of our analysis, and by a detailed comparison of individual bones, that the Macrauchenia has the closest affinity to the Palæotherium. But the Palæotherium, like the Rhinoceros and Tapir, has the ulna distinct from the radius, and the fibula from the tibia; so that even if the Parisian Pachyderm had actually presented the same peculiarities of the cervical vertebræ as the Patagonian one, it would have been hazardous, to say the least, while ignorant of the dentition of the latter, to refer it to the genus *Palæotherium*.

'Most interesting indeed will be the knowledge, whenever the means of obtaining it may arrive, of the structure of the skull and teeth in the Macrauchenia. Meanwhile we cannot but recognise in the anchylosed and confluent state of the bones of the fore-arm and leg, a marked tendency in it towards the Ruminant order, and the singular modifications of the cervical vertebræ have enabled us to point out the precise family of that order with which the Macrauchenia is more immediately allied. In first demonstrating this relationship it was shown in how many particulars the *Camelidæ*, without losing the essential characters of Ruminantia, manifested a tendency to the Pachydermatous type; and the evidence which the lost genera, *Macrauchenia* and *Anoplotherium*, bear to a reciprocal transition from the Pachyderms to the Ruminants through the *Camelidæ*, cannot but be viewed with extreme interest by the zoologist engaged in the study of the natural affinities of the animal kingdom.'

'The Macrauchenia is not less valuable to the geologist in reference to the geographical distribution of animal forms. It is well known how unlooked-for and unlikely was the announcement of the existence of an extinct quadruped entombed in the Paris basin, whose closest affinities were to a genus (*Tapirus*), at that time regarded as exclusively South American. Still greater surprise was excited when a species of the genus *Didelphys* was discovered to have co-existed in Europe with the *Palæotherium*. Now, on the other hand, we find in South America, besides the Tapir, which is closely allied to the Palæothere, and the Llama, to which the Anoplothere offers many traces of affinity, the remains of an extinct Pachyderm, nearly akin to the European genus *Palæotherium*; and, lastly, this Macrauchenia is itself in a remarkable degree a transitional form, and manifests characters which connect it both with the Tapir and the Llama.' (*Zoology of the Voyage of H.M.S. Beagle*, 1839.)

MACRI'NUS, OPI'LIUS, a native of Mauritania, was præfect of the prætorium under Antoninus Caracalla, whom he accompanied in his expedition against the Parthians, and caused to be murdered on the march. [CARACALLA.] Macrinus was immediately proclaimed emperor by the army, A.D. 217, and his son Diadumenianus, who was at Antioch, was proclaimed Cæsar; both elections were confirmed by the senate. Macrinus, after a battle with the Parthians near Nisibis, concluded peace with them. On his return to Antioch, he reformed many abuses introduced by Caracalla. But his excessive severity displeased the soldiers, and an insurrection, excited by Mœsa, the aunt of Caracalla, broke out against Macrinus, who, being defeated near Antioch, fled as far as Calchedon, where he was arrested and put to death, A.D. 218, after a reign of about fourteen months. He was succeeded by Elagabalus. (Dion Cassius; Capitolinus.)

MACRO'BIUS, AMBRO'SIUS AURE'LIUS THEODO'SIUS, probably lived about the middle of the fifth century of the Christian æra. We possess hardly any particulars of his life; he is generally supposed to be the person who is mentioned in the *Cod. Theod.*, vi. 8, as 'chamberlain of the royal bed-chamber' (*sacri cubiculi præfectus*), during the reigns of Honorius and Theodosius the younger, but this does not appear certain. It has also been disputed whether he was a Christian or a pagan; it has been supposed, from his occupying so high a rank at the court of a Christian emperor, that he must have belonged to the Christian religion; but this opinion seems quite at variance with the whole scope and tenor of his writings. The place of his birth is uncertain; but he informs us himself, in his preface to the 'Saturnalia,' that the Latin language was not his mother-tongue.

Three works of Macrobius have come down to us; a commentary on the 'Somnium Scipionis' in the sixth book of Cicero's 'Republic;' 'Dialogues' which were supposed to have taken place during the Saturnalia at the house of Vettius; and a 'Treatise on the Latin and Greek Verb,' which however is imperfect.

The commentary on the 'Somnium Scipionis,' which is divided into two books, is addressed to his son Eustathius. It is principally occupied with the opinions of the later Platonists respecting the laws which govern the earth and the other parts of the universe. There is a Greek version of this commentary by Maximus Planudes, in the king's library at Paris.

The 'Saturnalia' is however the most important and interesting of the works of Macrobius. Although written in very bad Latin, and full of trifling absurdities, it contains much valuable information on many subjects relating to antiquity. It is divided into seven books; the first contains a discussion on the origin of the Saturnalia and the principal Roman festivals, and on the character and history of several of the Roman deities: the second is of a more discursive nature; it unfolds at great length the whole art and mystery of joking according to the Roman notions, and relates some of the best jests of Cicero, Augustus, and other celebrated Romans, which however would scarcely excite a smile in modern society; it also gives a long account, among other things, of the luxury of the Romans, and contains a particular description of their favourite dishes. The third, fourth, fifth, and sixth books are occupied with an examination of Virgil's poems, in which a list is given of the principal passages which he imitated or copied from the Greek or preceding Latin poets; and the seventh is principally occupied with a discussion respecting the different kinds of food, and their effect on the human system.

The best editions of Macrobius are by Gronovius, Leyden, 1670; Zeunius, Leip., 1774 (which is said however, in the literary notices prefixed to the Bipont edition, to be very inaccurately printed); and the Bipont, 2 vols., 1788.

MACRODA'CTYLES, Cuvier's name for a family of Wading Birds (*Echassiers*) [GRALLATORES], which have very long *feet*, formed for running over marshy or water plants, or even for swimming, especially in those numerous species which have the feet fringed or bordered. There is not however any membrane between the bases of their toes, not even between those of the external ones. The *bill*, which is more or less compressed on the sides, is lengthened or shortened according to the genera, without however arriving at the fineness or weakness of Cuvier's preceding family. [LONGIROSTRES.] The body of these birds is also singularly compressed, a conformation which is governed by the narrowness of the sternum: their wings are moderate or short, and their flight weak. The hind toe in all is rather long. Cuvier observes that this family has been divided into two tribes, according to the presence or absence of the spur on the wing; but he adds that this character is not without exceptions. The following genera are arranged by Cuvier under this family, which terminates his order *Echassiers*:—*Parra*, *Palamedea* (including *Charina*), *Megapodius*, *Rallus*, *Fulica* (including *Gallinula* and *Porphyrio*), *Chionis*, Forst. (*Vaginalis*, Lath.), *Glareola*, Gm., *Phœnicopterus*. Cuvier's sixth order, *Palmipedes*, immediately succeeds this family, which is somewhat heterogeneous, and composed of birds whose habits are not similar. *Phœnicopterus* cannot be said to be without any membrane 'between the bases of the toes, &c.,' for its anterior toes are united to the nails by a lunated membrance. [FLAMINGO.]

MACRODI'TES. [FORAMINIFERA, vol. x., p. 348.]

MA'CROPA. [MEGALOPA.]

MACROPHTHA'LMUS. [GONOPLAX.]

MACROPO'DIANS, a tribe of brachyurous decapod Crustaceans, being the first of the family of *Oxyrhynchi* (Milne Edwards), and nearly corresponding with the genus *Macropus* of Latreille, remarkable for the enormous length of their feet, which has obtained for them the name of *Sea-Spiders*.

Form of the *Carapace* various, but in general triangular, very often not extending upon the last thoracic ring. The anterior *feet* short, and nearly always very slender; those of the succeeding pairs always more or less filiform; the length of the second pair often nine or ten times the length of the post-frontal portion of the *carapace*, and always much exceeding the double of that portion; the succeeding feet in general very long also. The basilary joint of the *external antennæ* nearly always constitutes the major part of the lower wall of the orbit, and proceeds to solder itself to the front. In the greater portion of the tribe the third joint of the *external jaw-feet* is inclined to oval or triangular, longer than it is wide, and does not support the succeeding joint on its anterior and internal angle, as in the other *Oxyrhynchi*. (M. Edwards.)

Habits, Food, &c.—The localities of the Macropodians are considerable depths in the sea, where they lie hid among the sea-weeds; they are also found on oyster-banks. They walk slowly and unsteadily. The weakness of their claws must render them not formidable to other marine animals, and the probability is that they live principally on *Annelids*, *Planariæ*, and small mollusks. (M. Edwards.)

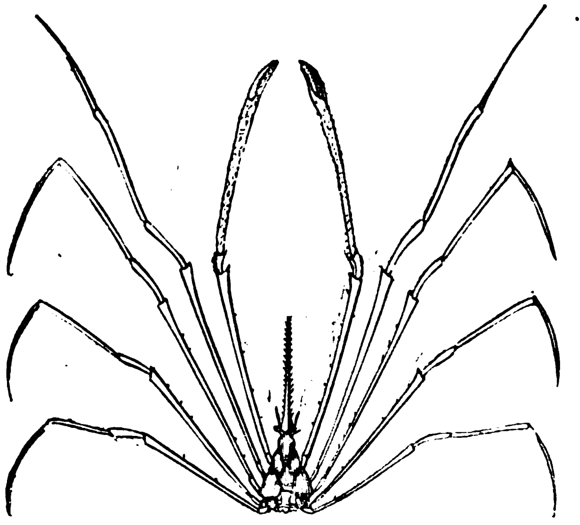
Genera. Leptopodia. (Leach.)

Established at the expense of the genera *Inachus* of Fabricius and *Macropus* of Latreille. M. Milne Edwards observes that it is very remarkable for the general form of its body and the excessive length of the feet; and states that it presents in an exaggerated manner all the distinctive characters of the family and of the tribe to which it belongs.

Generic Character.—Carapace nearly triangular, and not covering the last ring of the thorax; *rostrum* styliform and of enormous length; *eyes* large and not retractile; *internal antennæ*, when folded back, following the longitudinal direction of the body. First joint of the *external antennæ* very long and completely confounded with the neighbouring parts of the shell, the second inserted at a considerable distance in front of the orbits and below the rostrum. *Epistome* much longer than it is wide. Third joint of the *jaw-feet* nearly triangular, and carrying at its external angle the succeeding joint, which is very much developed. The *sternal plastron* as long as it is wide, but very much narrowed between the first pair of *feet*, which are very slender and extremely long, but less than any of the rest; the length of those of the second pair equals nine or ten times the length of the post-frontal portion of the carapace. *Abdomen* in both sexes composed of six joints, of which the first, which is very much developed, and as long as it is wide, occupies the dorsal surface of the body, while the last is formed by the soldering of the sixth and seventh abdominal rings. (M. Edwards.)

Geographical Distribution of the Genus. — Coasts of America and of the Antilles, as far as is at present known.

Example, *Leptopodia sagittaria*, Leach· (*Cancer seticornis*, Herbst.; *Inachus sagittarius*, Fabricius).



Leptopodia sagittaria.

Latreillia. (Roux.)

Generic Character.—Carapace triangular, truncated anteriorly, and not covering the last ring of the thorax; *epistome* much longer than it is wide; second and third joints of the external *jaw-feet* very narrow; *feet* filiform and very long; *abdomen* of the female of five joints only, though the sutures of two others may be distinguished; structure of that of the male not known.

Example, *Latreillia elegans*, the only species known.

Description.—Carapace smooth, front armed above with two large divergent horns, and with a spine directed forwards between the antennæ; feet of the four last pair with the third joint spiny, the penultimate joint a little dilated above towards its extremity, and the tarsus very short; abdomen armed with six spines, two of which are situated on the median line, and four near the edges; length about an inch; colour yellowish.

Locality.—The coasts of Sicily.

M. Milne Edwards thinks that the *Maia seticornis* of Bosc should be placed near this species.

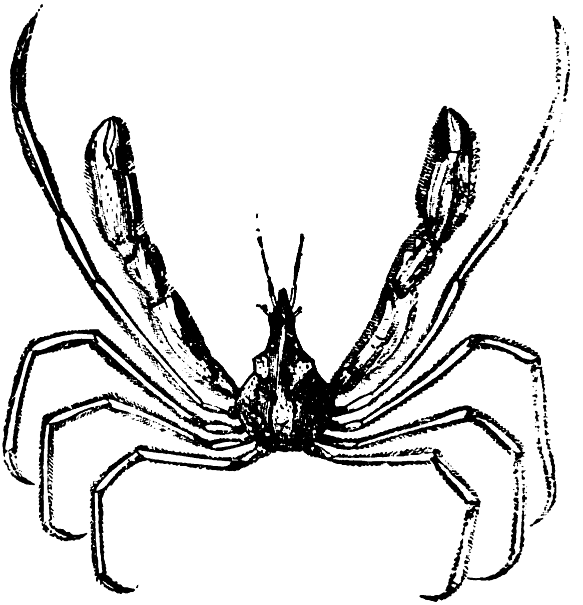
Stenorhynchus. (Lamarck; Latreille.)

Generic Character.—Carapace triangular and not prolonging itself above the last thoracic ring. *Rostrum* advanced, bifid, and sharp; *orbits* circular, eyes rather projecting and not retractile. Internal *antennæ* capable of being folded back longitudinally, and the fossets in which they are lodged not completely separated from each other. The first joint of the external antennæ confounded with the neighbouring parts and very narrow; the second inserted on the sides of the rostrum, and the third much longer than the second. *Epistome* longer than wide, and the *pterygostomian regions* rudimentary; *buccal frame* longer than it is wide: *external jaw-feet* narrow; third joint oval and the fourth rather long. *Sternal plastron* narrow between the anterior feet, but afterwards wider and presenting on the median line a suture which occupies the last segment of it. *Feet* of the first pair short, but much larger than the succeeding ones, the claw (manus) which terminates it convex, and the fingers a little curved inwards. Four last pair of feet filiform and extremely long; the length of those of the second pair equal five or six times of the width of the carapace; the others become progressively shorter; their penultimate joint is a little dilated towards the end, and the last joint is styliform and a little recurved. *Abdomen* in both sexes composed of six joints, the last of which is formed by the union (soudure) of the sixth and seventh rings. (M. Edwards.)

Geographical Distribution of the Genus.—European seas.

Example, *Stenorhynchus Phalangium* (*Cancer Phalangium*, Pennant; *Cancer rostratus*, Linn.; *Macropus Phalangium*, Latreille; *Macropodia Phalangium*, Leach).

Locality.—Coasts of the English Channel, &c.



Stenorhynchus Phalangium.

Achæus. (Leach.)

This genus is very nearly allied to *Stenorhynchus* and *Inachus*, but is distinguished from all the other genera of this family by the form of the posterior feet and some other characters.

Generic Character.—Carapace, as in the greater part of the family, not extending on the last segment of the thorax, nearly triangular, and convex on the branchial regions. *Rostrum* nearly null; eyes not retractile, and curved upon rather long peduncles; first joint of the external antennæ soldered to the front and advancing above the level of the internal canthus of the eyes; the second joint inserted on the sides of the rostrum and entirely exposed above. *Epistome* nearly square; third joint of the external jaw-feet longer than wide, nearly triangular, and giving attachment to the succeeding joint near its anterior and external angle. *Sternal plastron* suddenly narrowed between the anterior feet, which are slender and short, while those of the succeeding pairs are filiform; the second pair are nearly twice and a quarter longer than the post-frontal portion of the carapace, and terminate by a styliform and entirely straight joint; the succeeding feet are much shorter, and the terminal joint of the four last is large, compressed, and falciform. *Abdomen* composed of six joints in both sexes. (M. Edwards.)

Geographical Distribution of the Genus.—Achæus has, hitherto, been only found in the British Channel.

Example, *Achæus Cranchii.*

Description.—Rostrum formed of two small triangular teeth and not extending beyond the second joint of the external antennæ; a spine on the anterior face of the ocular peduncles; genital and cardial regions elevated in the form of tubercles; feet with very long hairs, and hooked. Length from six to eight lines. Colour brown.

Locality, Habits, &c.—Falmouth in England, and the mouth of the Rance near Saint Malo. The species lives among the sea-weeds and oysters.

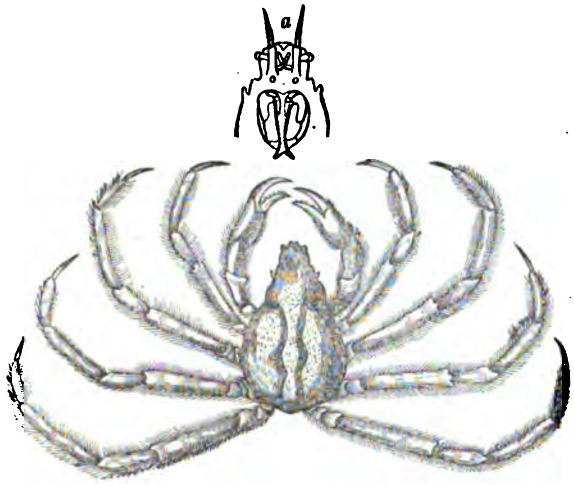
Camposcia. (Leach; Latreille.)

Generic Character.—Carapace convex and nearly pyriform, but truncated anteriorly; *rostrum* rudimentary and scarcely reaching beyond the internal canthus of the orbits. *Eyes* supported upon peduncles, which are rather long, recurved anteriorly, and very large at their base; they are capable of being reflected backwards, but they are not retractile, for there is no post-foraminary orbital cavity for lodging them, their extremity being only protected by a spine of the lateral part of the carapace. The internal antennæ are reflected a little obliquely forwards; the fossets which lodge them have this particularity, viz. that they are not separated, as they are ordinarily, by a longitudinal portion, and form only a quadrilateral cavity. The first joint of the *external antennæ* is long and delicate, and is continued nearly as far as the rostrum, carrying at its extremity a moveable stem, which is consequently completely exposed. The *epistome* is nearly square, and the external jaw-feet are very much elongated and only close the mouth imperfectly. The *feet* are slender and very long; in the female the first pair are the shortest and are not stouter than the succeeding ones; those of the third, the fourth, and the fifth pair are a little longer, and are also terminated by a cylindrical nail slightly curved downwards. Form of the feet of the male, and disposition of the abdomen in this genus, not known. (M. Edwards.)

Geographical Distribution of the Genus.—The seas of Asia.

Example, *Camposcia retusa.*

Locality unknown.



Camposcia Retusa.

a, details of head.

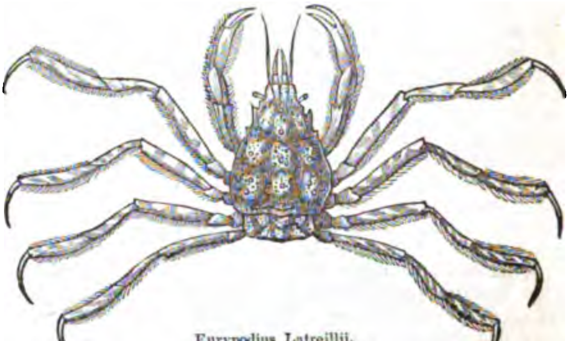
Eurypodius. (Guérin.)

A genus forming in certain points a passage between the *Macropodians* already noticed and some of the *Maiidæ*, such as *Halimus auritus;* approaching the latter in the form of the feet, and resembling the former in the length of those members and in the disposition of the eyes.

Generic Character.—Carapace triangular, twice as long as it is wide, rounded posteriorly, narrow anteriorly, convex and unequal above; *rostrum* formed by two long and horizontal horns; *eyes* carried on peduncles of moderate length and not retractile; disposition of the internal and external *antennæ* nearly the same as in *Stenorhynchus, Inachus,* &c.; *epistome* wider than it is long; third joint of the external jaw-feet nearly square, as wide as it is long, and deeply notched anteriorly and internally, in order to give insertion to the succeeding joint. Anterior *feet* of the length of the body in the male and much shorter in the female; they are a little convex and the fingers are slightly curved inwards. The succeeding feet are very long, their third joint is cylindrical, but the fifth is compressed and dilated below; its greatest width is below the middle; the finger is large, recurved, very sharp, and capable of being bent back against the lower edge of the preceding joint, after the manner of a subcheliform claw; the length of the second pair of feet is nearly twice and a half that of the post-frontal portion of the carapace, and the succeeding feet diminish successively in length but very little. *Abdomen* composed of seven joints in both sexes. (M. Edwards.)

Geographical Distribution.—Indian Sea.

Example, *Eurypodius Latreillii.*



Eurypodius Latreillii.

Locality.—Falkland Islands.

Amathia. (Roux.)

This genus agrees in some respects with the *Pericera* of Latreille; indeed the aspect of both is the same, but the external antennæ of *Amathia* have not the peculiar disposition which is visible in *Pericera,* and the space which the orbits leave between them is scarcely wider than the base of the *rostrum,* whilst in Pericera it is more than double.

Generic Character.—Carapace in the form of an elongated triangle with a rounded base; its upper surface and its borders beset with enormous spines; the *rostrum,* which is terminated by two large divergent horns, nearly as long as the post-orbitary portion of the carapace. *Eyes* small and partially protected by a spine which occupies their external canthus, but, as in the preceding genera, they are not retractile and always remain projecting. *External antennæ* presenting nothing remarkable; the basilary joint is long, very narrow, and soldered to the front; the stem is inserted under the rostrum, at some distance before the level of the eyes; it is very slender, and its two first joints are of equal length. *Epistome* large and nearly as long as it is wide; the third joint of the external jaw-feet is dilated outwards and truncated at its two internal angles. The first pair of *feet* are shorter than the succeeding ones; they are filiform in the female and a little convex or swollen in the male. The succeeding feet are long and filiform; the second pair are more than thrice as long as the post-orbitary portion of the carapace, without including the posterior spine; the others are much shorter, their terminal joint is long, sharp, and without either spines or teeth on its inferior surface. *Abdomen* composed of seven joints in both sexes. (M. Edwards.)

Example, *Amathia Rissoana.*

Description.—Carapace armed with thirteen enormous spines, three of which elevate themselves from the stomachal region, one from the cardial, and the others occupy the border of the buckler; one on the intestinal region, three on each side upon the branchial region, and one upon each of the hepatic regions: there is a small spine in front of the eyes, and a larger one at the anterior angles of the buccal frame. Feet, as well as the carapace, covered with a sort of down. Length about two inches; colour yellowish, with two spots, red upon the front.

Locality.—Toulon.

Inachus. (Leach.)

The genus *Inachus,* as established by Fabricius, comprehended nearly all the *Oxyrhynchi,* with the exception of the *Parthenopidæ.* The genus is now much restricted.

Generic Character.—Carapace nearly triangular, not much longer than it is wide, and highly embossed above.

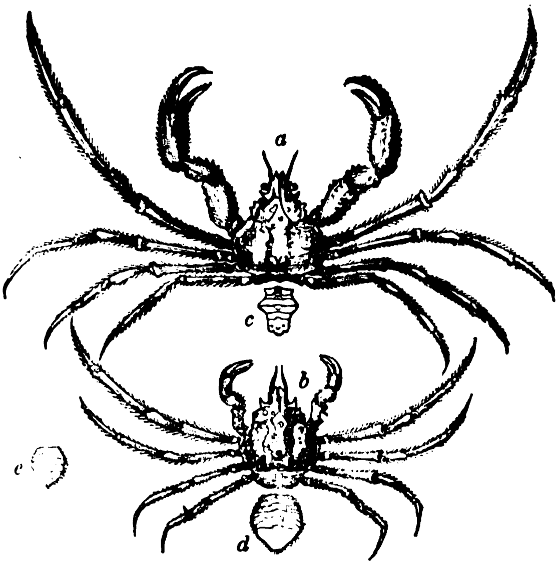
Rostrum very short; disposition of the eyes different from that in the previous genera in the system of M. Milne Edwards, the peduncles being capable of being reflected backwards, and being lodged in an orbitary cavity, which, though not deep, is very distinct. Internal *antennæ* without anything remarkable; the first joint of the external antennæ soldered to the front before the internal canthus of the eyes, and the second advanced on the sides of the rostrum. Epistome rather wider than it is long; third joint of the *jaw-feet* much longer than it is wide, nearly of the form of a triangle with its base in front, and giving attachment to its succeeding joint near its anterior and external angle. *Sternal plastron* narrowed suddenly between the feet of the first pair, and with its length not equal to its greatest breadth. *Feet* of the first pair very small in the female, but very large in the male, and sometimes thrice the length of the body; the claws always pointed and curved inwards. The succeeding feet cylindrical, slender, and more or less filiform; the second pair, always longer than the first, are thrice or four times the length of the post-frontal portion of the carapace; the others diminish successively in length, and all terminate in a very long cylindrical joint, which is pointed and but little or not at all curved. The *abdomen* is composed of only six distinct joints.

Localities and Habits of the Genus.—All the species are small, and have hitherto been found on the coasts of Europe, particularly those of England and France. In the latter country they have been taken both on the northern and Mediterranean shores. They often haunt coves where there are oysters, and all of them have the body covered with down and hairs, to which sponges and corallines attach themselves. Colour brownish. (M. Edwards.)

M. Milne Edwards divides the genus into three sections: the first containing one species, having the stomachal region furnished with five spines or tubercles, including one (median and posterior) very strong, and four small ones anteriorly on a transversal line.

Example, *Inachus Scorpio*.

Locality.—The British Channel, &c.



Inachus Scorpio.

a, male; *b*, female; *c*, abdomen of male; *d*, abdomen of mature female; *e*, abdomen of immature female.

The second section consists of *Inachi dorynchus* and *thoracicus*, and the third of *Inachus leptorhynchus*.

Egeria.

This genus is Asiatic in its geographical distribution, and M. Milne Edwards divides it into two sections; the *first* with the third joint of the external jaw-feet deeply notched at its anterior and external angle (*Egeria arachnoides* and *E. Herbstii*), and the *second* with the third joint of the external jaw-feet not notched at its anterior and internal angle (*Egeria Indica*). [Egeria, vol. ix., p. 304.]

Doclea. (Leach.)

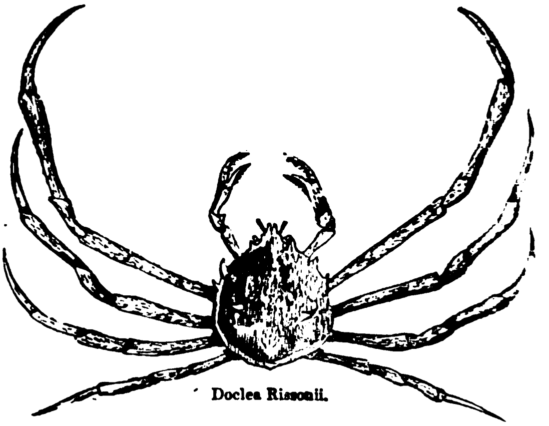
Generic Character.—*Carapace* nearly globular, hairy, and more or less beset with spines; *front* raised, and the lateral edges of the carapace, instead of joining the orbits, directed towards the anterior border of the buccal frame; *rostrum* short and very narrow; the *orbits* directed obliquely forwards, and entirely lodging the eyes, which are very small, and have no trace of a spine at the anterior angle of their upper border, a character which renders them easily distinguishable from the *Libiniæ*. The basilary joint of the external antennæ advances much beyond the internal canthus of the eyes, and terminates nearly in a point under the front, to which it is intimately united; the second joint of these antennæ is short and placed near the edge of the rostrum; the third and the fourth joints are very small. *Epistome* very little developed, and much wider than it is long. The third joint of the external jaw-feet is nearly square, slightly dilated outwards, and rather deeply notched at the internal and anterior angle. *Sternal plastron* nearly circular; the anterior *feet* weak and very small, not more than once and a half of the length of the carapace, the hand nearly cylindrical. The succeeding feet very long, though not always equalling those of the *Egeriæ*, slender, and cylindrical; their terminating joint long and styliform; the second pair from twice to thrice as long as the post-frontal portion of the carapace, and the succeeding pairs diminishing progressively. The *abdomen* varies; sometimes only five distinct joints are to be detected in that of the female; sometimes there are seven, as in the male.

M. Milne Edwards, who gives the specific character here stated, observes that the *Docleæ* bear the greatest analogy to the *Egeriæ*, and establish the passage between those *Macropodians* and the *Libiniæ* which belong to the tribe of *Maiians*. [Maiidæ.]

Geographical Distribution of the Genus.—Where known, the Indian Seas.

Example, *Doclea Rissonii*.

Locality unknown. (*Hist. Nat. des Crustacés.*)



Doclea Rissonii.

MA'CROPUS, the scientific name for the Kangaroos. [Marsupialia.] The term is also used by M. Latreille to designate a genus of brachyurous decapod crustaceans. [Macropodians.]

MACRORHAMPHUS. [Scolopacidæ.]

MACROURA, or MACRU'RA, the scientific name for that section of Crustaceans which have the abdomen, usually called the tail, long in contradistinction from that section (*Brachyura*), which have the tail short. The common lobster is an example of a Macrurous crustacean, and the common crab of a Brachyurous crustacean. [Crustacea, vol. viii., p. 197.]

MADAGASCAR (called by the natives Madecasse), a large island in the Indian Sea, about 240 miles from the coast of Mozambique on the eastern shores of Africa, extends from 12° S. lat. to 25° 45′ S. lat., and between 43° and 51° E. long. From north to south, between Cape Ambré, or Natal, and Cape Mary, or Romain, it is 960 miles long with a width varying from 200 to 500 miles: it is estimated to cover a surface of 225,000 square miles, or somewhat more than the extent of France. It is separated from the continent of Africa by the Channel of Mozambique.

Though a short description of this island occurs in Marco Polo, and it was discovered by the Portuguese in 1506, we are still very imperfectly acquainted with its natural features and riches. It is stated that a mountain-range traverses the island in its whole length, and that some of the summits rise to an elevation of 10,000 or 12,000 feet. Its offsets cover the greater part of the interior, and in some places approach to the very shores of the sea, especially along the western coast between Cape Passadava and Cape Ambré, where the stupendous peak of Matowla raises its head not far from the shore, and also south of Cape St. Andrew in different places. But between Cape St. Andrew and Cape Passadava a low marshy plain extends along the shore, and runs 60 or 80 miles inland. This part of the coast is indented by bays, harbours, and rivers, admirably adapted for commerce, but they are all neglected, with the exception of Bembatooka. The eastern coast seems to be high and rocky from Cape Ambré to the large bay of Antongil, one of the most spacious harbours of the Indian Sea. South of this bay the shores are low and swampy to a distance inland varying from 10 to 40 miles, and extremely unhealthy. In the interior the country in many places contains extensive plains, which are excellent pasture-ground, and frequently possess a soil adapted to all kinds of tropical plants.

Bambatooka Bay, on the western coast, is the æstuary of several rivers. It is 17 miles deep and three and a half wide at the entrance; but inside it is nearly eight miles wide. Bambatooka itself is an inconsiderable village, but Majunga, on the north side of the bay, is a large town and the harbour of Thanaan-arive, the capital of the Ovahs, the most powerful, industrous, and civilized nation of the island. Vessels drawing 15 feet water can proceed to Majunga and 15 miles up the bay. From this point to the mouth of the river Betsibooka, a distance of 10 miles, there is an extensive lagoon, deep enough to be navigated by vessels of considerable burden; in spring-tides the water rises 20 feet at the mouth of the river. From its mouth to Thanaan-arive is a distance of 245 miles by the road. Boats sail 160 miles up the Betsibooka; from the point where the navigation terminates merchandise is carried overland to Thanaan-arive, a distance of about 85 miles. Following the road from Majunga along the Betsibooka to the capital, the country is low and swampy for 60 miles, but well adapted to the culture of rice: 40 miles farther, the land is more elevated and the rafia tree (Sagus rafia) abounds. Then for 70 miles a barren country intervenes, and the remaining distance of 75 miles to the capital is rather a level country, in which rice, sugar-cane, and cotton are cultivated.

Thanaan-arive is situated in 18° 56′ S. lat. and about 47° E. long., at an elevation of about 4000 feet above the sea-level. In 1817 it had more than 80,000 inhabitants, but has since much increased. It contains some well-built houses, and a few in the European fashion have been erected in modern times, under the reign of Radáma. It does not seem that there is a frequent communication between this place and Tamatave, a seaport on the eastern coast (18° 10′ S. lat. and 49° 31′ E. long.), which has a good anchorage with a hard and sandy bottom. The entrance to Tamatave however is between reefs, and ships are exposed to easterly winds. It carries on some commerce, though it was destroyed by the French in 1819.

South of Tamatave is the mouth of the river Manooroo, or Mangarow. It traverses an extensive country, which is generally level and of great fertility, and contains extensive pastures. The Mangarow seems to be the most important river which descends from the eastern declivity of the interior mountain-range.

According to all accounts the climate of Madagascar is not so hot as might be expected from its geographical position. The elevated range in the interior, and the wind constantly blowing from the sea, render the heat supportable. The interior is very healthy, but the low swampy coast, which contains numerous lakes, and in certain seasons large sheets of stagnant water, is as destructive to the health of Europeans as any place in the East or West Indies. The year is divided between the dry and the wet seasons. The first occurs when the sun is in the northern hemisphere, and then the south-east monsoons prevail. During the north-west monsoons, which blow when the sun is in the southern hemisphere, rains are abundant, and sometimes incessant for several days.

It seems that Madagascar contains a very large proportion of fertile soil, and will produce nearly every kind of grain. Rice is the principal object of agriculture; there are eleven varieties indigenous in this island, and it is cultivated either on high or low ground, but with little care. Other plants which are raised are manioc, or cassava root, Indian corn, and sweet potatoes. These plants have been imported, and their culture spreads more and more over the island. Indigenous plants used as food are the prickly yam (*Dioscorea aculeata*), and another species (*Dioscorea bulbifera*), the eatable arum, or bread fruit, and many varieties of plantain; also the *Maranta Madagascariensis*, which produces arrow-root, and is very nutritious. The *Sagus rafia* is much cultivated on account of its leaves, the fibres of which are ingeniously woven into cloth which is worn by the greater part of the natives. The dresses of the higher classes are manufactured of silk or cotton. The silkworms of this island are of a large size, and suspend their cocoons from the branches of trees. They feed on the leaves of *Cytisus Cajun*, or Pigeon-pea, which is indigenous in Madagascar. Of the sugar-cane there are also several indigenous varieties. The fruits of the allspice of Madagascar (*Agathophyllum aromaticum*), of the grand cardamum (*Amomum angustifolium*), and the negro-pepper of the Indies (*Capsicum frutescens*) are used as condiments. By an incision into the bark of the *Urania speciosa*, a glutinous juice is obtained which is very nourishing; and the leaves of this tree are used in building and thatching houses. There are eleven varieties of tobacco indigenous in this island. Coffee has been introduced by the French, and succeeds very well. The cocoa-nut tree and the mangrove abound along the shores.

Only cattle, sheep, fowls, ducks, and geese are kept. Wild swine are numerous, and on the western coast it is stated that wild cattle are found, some of them without horns. The large wild animals of the African continent are not met with, but macaucos, caimans, and serpents abound.

The mineral wealth of the island is not much known. It is certain that iron-ore, potters' clay, plumbago, and tin abound; and it is stated that silver and copper also occur in the mountains.

The population is estimated to amount to between four and five millions. The inhabitants seem to belong to different races, which have mixed together, and speak only one language, which contains a great number of Malay words. The inhabitants of the shores are short, rather darker than mulattoes, with low foreheads, broad and flat faces, and large eyes and mouths. Their hair is long but crisped. The Ovahs, who inhabit the elevated plains in the interior, are in height rather above the European standard, portly in their person, and of all shades of colour from deep black to copper (the latter colour however is prevalent), and their hair is long and lank. The Madegasses have made considerable progress in the arts of civilization, which is evinced by the houses they build in a climate which does not require such substantial dwellings. In agriculture and the arts connected with it they are perhaps not inferior to the inhabitants of Java, and certainly not to those of Sumatra. The Ovahs are distinguished by their superior skill in manufacturing silk and cotton dresses, in forging iron, which they apply to various purposes, from the blade of a lance down to a needle, and in the making of silver and gold chains, balances, and other articles, in which great ingenuity is displayed Their language is written in the Arabic character. Their religion is idolatry, not founded on any sacred writings; a circumstance which may partly explain why the exertions of the Christian missionaries who have been sent to this island in recent times have been more successful here than in most other countries. It appears that by a royal edict of 1835, the public profession of Christianity was forbidden in the island. Those who violated the edict have been punished with confiscation of their property; and the married men who professed Christianity have been sold into slavery, with their wives and children. One native woman, after being in vain menaced, with the view of inducing her to impeach her companions, endured an ignominious and cruel death (August, 1837) with all the constancy of a Christian martyr. (*Missionary Register*, Jan. 1838.)

Madagascar is said to be divided into twenty-two states, governed by kings; but in the present century most of them were subjected to the sway of the Ovahs, by King Radáma, who died in 1828. This extraordinary man, who in energy of character resembled Peter the Great, introduced into his country the arts and civilization of Europe. He established a communication with the English in the island of Mauritius. He received and protected the missionaries, and promoted the establishment of schools, the number of which at the time of his death had increased to more than 100, in which nearly 5000 children were instructed. Several young people were sent to the Mauritius and even to England to receive instruction. European mechanics were well received and employed by Radáma. He introduced into his army the discipline and arms of the English. Besides the Ovahs, the Seclavas have distinguished themselves, but only as pirates. They inhabit the north-western shores, from whence they send fleets consisting of several small vessels to the Comoro Islands and even to the coast of Mozambique for the purpose of making slaves; but since the abolition of the slave trade, which Radáma, their conqueror, effected at the request of the English, their excursions have been less numerous and destructive. Still however slavery exists in Madagascar.

The French alone have tried to establish colonies on this island. The first attempt was made in 1665, and several others were made afterwards. These settlements never prospered, partly on account of the unhealthiness of the low western coast, where they were formed, and partly on account of the warlike character of the inhabitants. Since the return of peace in Europe the French have again made some attempts in two or three places. In 1821 they settled on the Isle Madame St. Mary, which is north of the harbour of Foule Point, and is 31 miles long, and from two to three miles in breadth. This settlement is improving, though the French at first suffered much from the climate. There is another settlement at Foule Point Bay, but it is inconsiderable. There are also small settlements at S. Luce (24° 44′ S. lat.), and on the tongue of land called Tholangar (25° 10′), where the French have built a small fortress, called Fort Dauphin. In these establishments the French cultivate sugar, coffee, and other tropical productions, which are sent to the island of Bourbon. The English of the Mauritius fetch from the harbour of Tamàtave, rice, cattle, tortoise-shells, amber, and some minor articles. Some parts of Madagascar keep up a commercial intercourse with the southern coasts of Arabia.

(Owen's *Voyages to explore the Shores of Africa, Arabia, and Madagascar;* Locke Lewis's 'Account of the Ovahs,' in the *London Geographical Journal*, vol. v.; and *History of Madagascar*, by the Rev. W. Ellis.)

MADDALO'NI. [LAVORO, TERRA DI.]

MADDER (*Rubia tinctorum sativa*, Linnæus), a plant which is cultivated in particular districts for the roots, which produce a fine red dye. It was formerly more extensively cultivated in England than it is now, when it can be imported at a less expense than it can be raised. It requires a very rich and deep soil, and much labour and attention, besides occupying the ground for three years before it comes to perfection.

Any soil which is deep and dry, and in which there is a good proportion of humus, will suit this plant. A rich loam, inclining to a sand, in which the roots can spread and swell, while they find sufficient nourishment, is preferable to the stiffer soils. If it has lain for a considerable time in grass before it is ploughed up, it will be all the better.

The preparatory tillage of the land must be such as to pulverise the soil to a great depth, and so mix the manure, which must be abundant, with every part, that, wherever the roots spread, they may find sufficient nourishment. The land is usually laid in beds, with deep intervals dug out with the spade, somewhat like asparagus beds. The width of these beds differs according to the natural moisture of the climate; in Belgium they are only three feet wide; and that width seems the best for a moist climate like that of England, except upon very light soils, where a greater width may be more advantageous. Trenching with the spade is generally preferred to ploughing, and is most economical in the end; for, however well and deep the land may be ploughed, it must be forked or dug over again several times before the plants are put in.

The manure used for madder must be well rotten and mixed with earth in a compost a considerable time before it is used. Good stable dung which has heated to a certain degree, and been turned over two or three times before it is mixed with earth, is the best. This earth should be sods taken from water-furrows in meadows and laid in a heap for some time. The dung should be put in layers with this earth, and if the whole can be well watered with urine or the drainings of the yard, and then mixed up by the spade, the compost will be much superior to fresh dung alone. This should be ploughed or dug in before winter. In spring another tillage may be given to destroy all weeds, and make the soil uniform to the depth of two feet at least. The land, having been harrowed flat, may now be laid into narrow beds by digging out the intervals with the spade; the surface being raked or harrowed smooth, the planting may begin.

The plants are raised in a seed-bed, or they are shoots and suckers from old plants. The first are a twelvemonth old from the sowing. The seed should be fresh; for if old seed is sown, it may not rise the first year. When a good variety of madder has been in cultivation, the shoots are preferred to seedlings; but when there is any appearance of the plants degenerating, a fresh sowing is had recourse to.

The suckers or shoots are taken off from the crown of old plants, when they have thrown out fibrous roots. They will then readily grow if transplanted. In southern climates this is done in autumn or winter, that they may not be scorched by the summer's heat. In northern climates June or July is the proper season, as there is never a deficiency of rain at that time. They may be also planted in February or March, if the ground is ready and dry: a showery time is advantageous. The plants are put in by means of a dibble, or rather a narrow trowel, which opens the soil, and then lets the earth fall upon the roots; a slight pressure sets them firmly in the ground. On a three-foot bed there are only two rows about 16 inches apart, and each 10 inches from the side. They are set by a line, from four to six inches from plant to plant in the rows. A watering with diluted urine, after sunset, greatly assists their taking root.

In some places the madder plants are put in with the plough. A deep furrow is drawn, and the plants are placed against the furrow slice turned up; the return of the plough covers them, and makes a fresh bed for the next row. This may do on very rich, dry, light loams, but would not be advisable in heavier and moister soils. At every eighth or tenth furrow a water-furrow should be ploughed out, and deepened with the spade: with these precautions the plants may thrive, and a great saving may be made in the labour when a considerable amount of madder is planted.

When the madder plants begin to grow, they must be well weeded and earthed up with the hoe. Liquid manure should be poured into the intervals, and the earth impregnated with it thrown around the plants.

The same attention to weeding and earthing up must be continued till the roots are fit to be taken up, which is in the third year.

The stems and leaves of madder are often cut as fodder for cattle, which are very fond of them: it is said that the colouring matter is so penetrating, that the bones of cattle fed on madder for a considerable time have been found tinged of a red colour. This practice however is not to be recommended, as it must injure the growth of the root, which is the valuable part. When the roots are taken up it is best done by means of a fork, so as not to break or cut them. The earth is loosened all around, and the roots laid bare. They are carefully taken out of the ground without breaking them, and laid on the surface to dry partially and become tough, after which they may be gathered into heaps under a shed, or protected from the weather by straw, if it be rainy. They are afterwards dried in a kiln, and are then fit to be sold to the dyers. If the quality is good, the root on being broken has a bright red colour verging towards purple. A yellow hue indicates inferiority. The produce of an acre of madder is from 10 to 20 cwt. If the rent and expenses of three years are taken into consideration, and the manure and labour required, it will be readily seen that unless the price be 4*l.* per cwt. it will not pay so well as a common crop of potatoes, carrots, or parsnips, which will not require so good a soil nor so much manure. This is a sufficient reason for the decrease of the cultivation of madder in England. In some particular instances great profits have been realised by madder; but the demand is limited, and the price fluctuates so much, that it is not a crop to be recommended, except in peculiar situations and circumstances.

Chemical and Colouring Properties of Madder.—The root is the only part of the plant used for the purpose of dyeing: it is subjected to the operations of picking, drying, freeing from the earth and epidermis, and powdering. The powder is of a yellowish-red colour, and contains three different colouring matters, two of which, *alizarin* and *purpurin*, are red, and one, *xanthin*, is yellow. *Alizarin* (from *alizára*, the Levant name for madder) is obtained by gradually mixing madder in fine powder with an equal weight of sulphuric acid, and allowing the mixture to remain for some days; by this all the vegetable products but alizarin are carbonized; the residue is to be washed with water to separate the acid, then dried, and treated first with alcohol to separate a little fatty matter, and afterwards with repeated portions of boiling alcohol, which dissolves the alizarin; this alcoholic solution is to be treated with water, the alcohol to be separated by distillation, and the residual liquor being thrown on a filter, the alizarin remains on it.

The alizarin may also be separated from the charred mass after it has been washed with water and alcohol, and dried by exposing it to a temperature of about 480° Fahr.; the alizarin then sublimes, and concretes in long brilliant needles of a very fine red colour.

The properties of alizarin are—that it is inodorous, insipid, neutral to test papers, very slightly soluble in cold water, and but little is dissolved by it even when boiling; it dissolves in alcohol and æther in all proportions; the aqueous solution is of a pure rose-red colour, and the æthereal solution is of a fine golden yellow. Diluted acids do not dissolve it, but concentrated sulphuric acid readily takes it up, and the solution is of a blood-red colour, from which water throws down the alizarin; concentrated nitric acid decomposes it, but chlorine acts feebly upon it.

Ammonia, potash, and soda, and their carbonates, all dissolve alizarin, and yield with it solutions of a most beautiful violet colour. Alizarin combines readily with various tissues which have been mordanted, and forms with them very fixed colours, which resist even the action of soap and boiling water. It is stated to be composed of 20 hydrogen, 18 carbon, and 62 oxygen.

Purpurin.—In order to obtain this, madder-root is to be treated with a solution of carbonate of soda till it ceases to yield colouring matter; it is then to be washed, and treated for some hours with a hot solution of alum; a little sulphuric or hydrochloric acid is then to be added, which occasions a precipitate of a fine slightly-orange red colour; this, after being collected and washed on a filter, and treated with alcohol, yields a solution which, when subjected to distillation, deposits purpurin. The properties of this substance are—that it is but little soluble in water, whilst alcohol, especially when hot, and æther, both hot and cold, dissolve it readily; the alcoholic and æthereal solutions are of a brilliant cherry-red colour, and yield by spontaneous evaporation acicular crystals of four to five lines in length. This substance is distinguished from alizarin not only by difference of colour, but because it is soluble in a solution of alum, and insoluble in carbonate of soda and protochloride of tin; it dissolves in this last solution by the addition of a few drops of potash. The colours which it imparts to different tissues are of a reddish or purple tint, and are extremely brilliant, but less durable than those of alizarin.

Xanthin, or the yellow colouring matter of madder, is obtained by very tedious processes; it possesses the smell of the root, is very soluble in water and alcohol, but less so in æther. It forms red compounds with bases. Concentrated sulphuric acid renders a solution of xanthin green, and precipitates a powder of this colour, which is soluble in water. According to Berzelius it is most probably modified alizarin.

Madder yields colours of the greatest permanence. It is employed for dyeing linen and cotton red, and two kinds of it are fixed on cotton; one is called simply madder red, and the other, which possesses a much higher degree of lustre and fixedness, is called Turkey or Adrianople red, because it was for a long time obtained from the Levant. It does not afford a colour of sufficient brilliancy for dyeing on silk, and linen takes it with greater difficulty than cotton. It is also employed in calico-printing and in the preparation of madder lakes.

Independently of the colouring principles above described madder contains lignin, gum, sugar, resin, a bitter substance, a vegetable acid, vegeto-animal matter, and salts.

Trade in Madder and Madder Roots.—The quantity of this dyeing stuff imported in its natural state and ground, in each of the ten years from 1829 to 1838, has been as follows:—

	Madder Root. Cwt.	Ground Madder. Cwt.	Total. Cwt.
1829	33,541	70,017	103,558
1830	37,074	51,624	88,698
1831	52,449	43,935	96,384
1832	54,449	79,435	133,884
1833	56,662	61,397	118,059
1834	80,296	72,003	152,299
1835	66,323	94,102	160,425
1836	85,251	108,906	194,157
1837	109,235	84,841	194,076
1838	73,669	97,443	171,112

Nearly the whole of these importations are obtained from Holland, France, and Turkey. In 1837, the latest year for which we have such particulars, there were brought from Holland 34,279 cwt., nearly all of which was ground; from France we received 102,574 cwt., of which about one-half was in the like state of preparation; and from Turkey 36,673 cwt. of the unprepared roots. Some small quantities are brought from Spain and Italy. Of late years we have received from 2000 to 3000 cwts. annually from India. The duty chargeable on consumption is 2*s*. per cwt. on the prepared madder, and 6*d*. per cwt. on the roots.

MADEIRA, an island situated in the Atlantic Ocean, between 32° 30′ and 32° 50′ N. lat., and 16° 40′ and 17° 20′ W. long., and about 400 miles from the north-western coast of Africa. It is nearly 45 miles long, and its greatest breadth nearly 20 miles. The area is said to be 360 square miles, or nearly that of Huntingdonshire.

This island is one mass of basalt, rising with a rather steep ascent from the south and from the north towards the interior, where the highest part of the mass runs from south of east to the north of west, between Cape de S. Lourenço on the east to Cape de Pargo on the west. This, the most elevated portion of the rock, rises to 4000 and 5000 feet: the Pico Ruivo, the highest summit, attains 5993 feet above the sea-level. Both declivities of the mountain-mass are furrowed by deep and generally narrow valleys and depressions, traversed by streams of clear water. These valleys contain the gardens and vineyards. The vineyards are formed on the declivities of the rocks, to the height of 2300 feet above the sea. The rocks in most places come down to the very shore of the sea, and enter it with so rapid a descent, that soundings are to be only found close to the shores, and even there on a rocky and unequal ground, and at a depth of 35 to 50 fathoms.

The climate of Madeira is very mild. The mean temperature of the year does not exceed 68°. In the months of December and January the thermometer rarely sinks below 60°; the mean temperature of that season being 63°. The mean temperature of the hottest months (August and September) is between 73° and 74°; but when the eastern and south-eastern winds bring to the island the hot air from the African desert, the thermometer sometimes rises as high as 85° and even 90°. Rain is not confined to a certain season of the year, but occurs at all seasons. Madeira sometimes suffers from hurricanes. The climate is considered very healthy, and many persons in England who are suffering from or in danger of consumption withdraw to it for the purpose of diminishing their sufferings and prolonging their life.

In the lowest region of the island, to about 750 feet above the sea-level, many tropical plants are cultivated, as the date palm-tree, the plantain, two kinds of cactus, the sweet potato, Indian corn, coffee, and the American agave (*Agave Americana*), as well as the sugar-cane, the olive-tree, the pomegranate, and the fig. Above this region, to a height of from 750 to 2500 or 2800 feet above the sea-level, the fruits and grain of Europe, especially wheat and maize, are raised; and in this region are also the extensive vineyards, which furnish the most important article of exportation. Then follows a tract covered with high trees, which rises to 3200 feet and higher, where many plants and trees are found which do not occur in Europe. This region contains also extensive forests of chesnut-trees, the fruit of which is the common food of the inhabitants. Its surface is extremely broken, and bare rocks appear in many places. The highest portion of the rocks is covered with heath, fern, and in some places with fine grass, which preserves its verdure through the greater part of the year, this region being frequently enveloped by dense fogs, and subject to heavy dews.

Few horses are kept, and most of them are imported. Cattle are more numerous, and of a large size. Asses are the most common domestic animals, and best adapted to the roads of the country as beasts of burden. Hogs are rather numerous, as well as fowls. In the interior there are many wild swine and rabbits. Birds are not numerous, and fish is rare, on account of the great depth of the sea which surrounds the island. Salted cod constitutes one of the most important articles of import.

Funchal, the capital, and the only town of the island, is on the southern coast. It has only an open roadstead, with a rocky and very uneven anchorage, in which vessels are exposed to great danger from November to February, when gales from the south-east and south-west prevail. Yet this place is frequently visited by ships bound to S. America, the Cape of Good Hope, or the E. Indies, as a place of refreshment, and from it all the produce of the island is exported. The town consists of a pretty wide street along the sea-shore, where there are several good buildings, and numerous small lanes, which extend to a considerable distance up the slope of the hill. The number of houses amounts to about 2000, and that of the inhabitants to 20,000. The town is defended by four forts, and has eight churches and several convents. In the midst of the town is an open square, planted with exotic trees, as Dracæna Draco, Jasminum azoricum, and Datura arborea.

The population of the island is estimated at 80,000, who are descendants of the Portuguese, but with a considerable mixture of African blood. The number of negro-slaves is still considerable, and was formerly much greater. The inhabitants are a very industrious and enterprising people.

The commerce of Madeira is considerable. The exports are stated to amount to 500,000*l*., of which about 400,000*l*. in value go to England. The principal article is wine. During the late war, when the Spanish wines were not brought to England, 30,000 pipes were exported from Madeira, according to the statement of Lord Valentia. The importation of Madeira wine into England in 1833 was 301,057 imperial gallons. In 1825 the export was 14,425 pipes, and in 1826, 9391. The wine exported is Madeira wine and Malvasia de Madera. The latter is cultivated on the northern coast, near the village of Machico, and amounts to about one-sixth of the whole quantity exported. Minor articles of export are, fruits, dragon's-blood, honey, wax, orchil, a lichen collected from the rocks and used as a red dye, and tobacco, besides provisions for the vessels bound to more remote places. The imports consist of manufactured goods, corn, fish (herrings and cod), oil, salt-beef, salt, and some tropical productions.

Madeira is said to have been visited by Robert Machin, an Englishman, during the reign of Edward III. It was discovered in 1419 or 1420 by Gonzalves Zarco. It was then covered by an immense forest, whence its name is derived, Madera in Spanish signifying wood. The forest was set on fire, and it is said that the conflagration lasted seven years. Soon afterwards it was settled by the Portuguese, and the culture of sugar and wine was introduced. Sugar was grown to a considerable extent before the islands in the West Indies were settled; but upon that event the culture decreased, and was replaced by that of wine, which now seems to be giving way to coffee.

About 40 miles north-east of Madeira lies the small island of *Porto Santo*. It is a basalt rock, which does not exceed 500 feet in height. Indian corn and vegetables are cultivated for consumption, and a little wine for exportation. The population amounts to about 1200, of whom 600 live in the small town of Porto Santo, the roadstead of which is much exposed to southerly winds.

To the south-south-east of Cape St. Lourenço are three small basalt rocks, lying in a row from north to south. They are called *Ilhas Desertas*, and are only inhabited by sea-fowl, but they are visited from Madeira for the purpose of collecting the orchil, with which the greatest part of their surface is covered.

(Lord Valentia's *Voyages and Travels to India;* Prior's *Voyage to the Indian Seas;* Spix and Martius, *Travels in Brazil;* Holman's *Voyage round the World.*)

MADHOUSE. [LUNATIC ASYLUMS.]

MA'DIA, a genus of South American herbaceous plants of the Composite order, one of the species of which, M. sativa, is of value for the oil yielded by its seeds upon pressure. The genus forms the type of Madieæ, a division of the senecionideous tribe of De Candolle, and is distinguished among its congeners by its roundish one-rowed involucre, the bracts of which are keeled and envelop the grains, by a plane receptacle paleaceous at the margin and naked in the middle, and by its bald achænia, which have four or five angles, and taper to the base. **Madia sativa**, which forms the only species, is an upright hairy glandular viscid Chilian annual, with oblong entire leaves, half amplexicaul, opposite at the bottom of the stem and alternate at the top; the flower-heads are racemose, and the flowers pale yellow. It has long been cultivated in Chili, and apparently in California, for the sake of its oil, which is of excellent quality. It has lately attracted attention in Europe in consequence of Mr. Bosch, the superintendent of the gardens of the king of Wirtemberg, having successfully cultivated it in Germany on a large scale. He found that as compared with rape and poppies the amount of oil yielded per German acre was as follows:—

Rape	yields	240 lbs	of oil	per acre German.
Poppies	„	264 lbs.	„	„
Madia	„	442 lbs.	„	„

This oil does not congeal at 19° below zero of Réaumur, but only becomes a little less fluid, which makes it a valuable material for keeping machines in order. The seeds are sown in October, and from four to six pounds are required per acre (German). The crop is of the easiest management, and the only precaution to be taken by the cultivator, which it is important to notice, is that the seeds must be thrashed out soon after the crop is cut, otherwise the glutinous stalks, when heaped up, ferment and injure the seeds. (*Gardener's Magazine*, March, 1839, p. 142.)

MADISON, JAMES, was born on the 5th of March (o. s.), 1751, at the seat of his maternal grandmother, near Port Royal, on the Rappahannock river in Virginia. His parent's home however was then at Montpellier, in Orange County, Virginia, where Mr. Madison always resided.

He received his first instruction from Donald Robertson, a Scotch teacher in King and Queen County, Virginia, with whom he was placed at twelve years of age. During the three or four years that he was under Robertson's care he acquired some knowledge of Greek, Latin, and French, with the elements of mathematics. He afterwards studied about two years at home under the Rev. *J. Martin. In* 1769 he was sent to the college of *Princeton in New* Jersey, in preference to William and Mary College in Virginia, which was considered unhealthy to students from the upper parts of the country. In 1772 he took the degree of B.A., to obtain which however it was necessary to compress the studies, which usually occupy two years, into one, a circumstance which so much impaired his health, that it was thought advisable for him to remain in Princeton another winter. He returned to Virginia in the spring of 1773, and commenced a course of reading to prepare himself for the bar; but the dispute between the colonies and Great Britain having then commenced, he was soon induced to take an active part in it. He particularly distinguished himself as a friend to religious freedom by his efforts in behalf of the preachers of the Baptist persuasion, who were then persecuted with great zeal by the established church, and occasionally thrown into prison for preaching in defiance of prohibitory laws. In the spring of 1776 his political career commenced by his being chosen a member of the Virginia convention, which formed the first constitution of Virginia. He continued a member of the legislature till 1777, when he lost his election, in consequence, it is said, of his conscientious refusal to treat the freeholders, according to the practice then prevailing. The legislature however named him a member of the council, in which office he continued two years, until he was appointed a member of congress, in which body he took his seat in the month of March, 1780.

His letters and papers, which will shortly be published, show that he took a very active part in the proceedings of that body during the three years that he was a member of it.

Returning to private life after the peace, he resumed his legal studies, but intermingled them with miscellaneous and philosophical reading. Natural history, to which the genius of Buffon had then given unusual attraction, seemed to have been his favourite branch of science, and he has left some notes of his observations on European and American animals of the same species. In 1784 he was again elected to the legislature of Virginia, and continued a member of that body for the years 1785 and 1786. Here he formed the scheme, and drew up a resolution for that purpose, of inviting the meeting at Annapolis, which led the way to the convention that formed the constitution of the United States. He was one of the three commissioners from Virginia who assembled at Annapolis, where he met Alexander

Hamilton, with whom he was afterwards so closely united in forming the new constitution, and from whom he was so widely separated in carrying it into execution. It should be remarked that he did not offer the resolution which he had drawn up, on account of the jealousy even then entertained by state politicians of the federal authority and those who had been in congress, and it was confided to a member who was exempt from that suspicion.

While he was in the Virginia legislature he drew up the memorial and remonstrance against the project for a compulsory support of religion, which was perhaps made with a view to a permanent establishment; and he succeeded in defeating it. (Tucker's *Life of Jefferson*, chap. 4.) His talents and acknowledged influence at this time were all exerted in favour of a policy as liberal as it was practical and wise. Finding that Kentucky was determined to separate from Virginia, he furthered her purpose, instead of making a fruitless opposition to it. He opposed the attempt to introduce paper-money; he was the efficient supporter of the laws introduced into the code prepared by Jefferson, Wythe, and Pendleton; and he favoured the recovery of the debts due to British creditors. He proposed liberal donations to General Washington and to Thomas Paine: the latter effort failed; the former succeeded; but the donation was refused. He carried on an extensive correspondence at this time with some four or five friends, which gives the best view of the state of Virginia at that period. In the convention which formed the present constitution of the United States he bore a very conspicuous part; and anticipating the interest which future times would take in the proceedings of that body and in the opinions of its members, he was at the pains to keep a record of the debates, the only one extant which is either complete or authentic. He commonly wrote out at night what had been said in the day. After the constitution was formed, he united with Alexander Hamilton and John Jay in recommending it to the American people in newspaper essays, under the signature of Publius, which have been since published under the title of 'The Federalist.' The debates, which he would never consent to publish during his lifetime, congress have lately purchased for 30,000 dollars, and they will soon be published.

After the federal constitution was submitted to the several States for their adoption, Mr. Madison went into the legislature of Virginia, where Patrick Henry headed the opposition to it; and it was to Mr. Madison's cool and powerful reasoning that its adoption in that state was mainly due. If it had failed there, it would have failed altogether. Mr. Madison had also more agency than any other individual in inducing Virginia to make a cession of all her claims to the lands north-west of the Ohio (now comprehending the states of Ohio, Indiana, and Illinois), to which she asserted a right, both under her regal charters and by conquest during the Revolution.

He was chosen a member of the first congress under the constitution in 1789, and contined a member of that body until 1797. In 1794 he married Mrs. Todd, a widow of Philadelphia, whose parents were Virginians, but, being Quakers, had removed to Philadelphia. From this time he felt the strongest inclination to retire from public life, and to devote himself exclusively to the cultivation of letters and science, and the pursuits of agriculture. But his countrymen appreciated his worth too highly to permit him to retire into private life. In congress no one had more weight personally; but soon finding that his views and those of Mr. Hamilton did not coincide as to the principles and spirit in which the federal government should be administered, he separated himself from the administration, and was thus on most great measures in a minority. When the public debt was funded, he made an unavailing attempt to secure to the soldiers and other original creditors the benefits of the rise in value of the public claims, which speculators had purchased at about one-eighth of their nominal amount. This was the first great measure in which he opposed the ministerial policy of which Hamilton was the chief author. He also opposed the unqualified assumption of the state debts by the federal government. After the French revolution broke out, European politics mingled in those of the United States, and for a time gave them their chief form and colour. Mr. Madison, who always inclined to the side of liberal principles, was a warm friend of the Revolution; and though its excesses were more uncongenial to no one than to himself, characterised as he was through life by mildness of temper, humanity, and love of order, yet he considered it as likely in the end to advance the cause of civil freedom, and it therefore had his hearty wishes for its success.

Though thus leading an organized opposition to General Washington's administration, this circumstance for a long time seemed to have no influence on their friendship, and it never produced positive alienation. Before his first term had expired, General Washington, being bent on retirement, conceived the purpose of a farewell address; and after making an outline of his views, he requested Mr. Madison to fill it up. Some years afterwards he greatly enlarged Mr. Madison's draft, which he then submitted to Messrs. Hamilton and Jay, and the document as published is found to contain some of Mr. Madison's original forms of expression. The intimacy and correspondence of these two great men continued until 1796.

After it was known that General Washington would retire in March, 1797, parties prepared themselves for the struggle of electing his successor, the federalists uniting in favour of Mr. Adams, and the republicans in favor of Mr. Jefferson. Mr. Adams succeeded by three votes. When parties were so nearly balanced, each redoubled its efforts for the ascendancy. The administration party prepared two laws for removing dangerous and suspicious aliens, and for punishing libels on the government (called Alien and Sedition Laws), which gave their adversaries a fit occasion to make a powerful appeal to the people. To further this object Mr. Madison, who was now withdrawn from congress, went into the Virginia legislature; and in the session of 1798 prepared resolutions denouncing these acts of congress as infractions of the constitution, and inviting the concurrence of the other States. As some of the States opposed the doctrines, and the subject produced much discussion in pamphlets, in the following year Mr. Madison prepared new resolutions, with a preamble, in which he examines the whole subject in one of the closest and profoundest pieces of reasoning which our language contains. It is thought to have contributed more than anything else to the revolution of parties which soon followed. This Report has since become a text-book for politicians on constitutional law and the relative rights of the States and general government. When Mr. Jefferson was elected president, Mr. Madison was made his secretary of state, and from that time until his retirement his life is comprehended in the history of the United States. But the principal parts which he acted will be briefly noticed here.

His pen was put in requisition in maintaining the claim of the United States to the right of deposit at New Orleans, under the treaty with Spain; in discussing the question of the true boundary of Louisiana; in corresponding with Mr. Rose and Mr. Jackson, ministers of Great Britain, on the subject of the attack on the Chesapeake; in drawing up instructions to Mr. Monroe concerning the treaty with England, and the objections to that which was made; and in corresponding with the American ministers on the French Decrees and British Orders in Council. Besides these official papers he wrote an 'Examination of the Doctrines of National Law' asserted by Mr. Stephens, which is perhaps the most compact piece of logic that he ever produced, and the most satisfactory exposition of the relative rights of neutrals and belligerents that is extant.

In 1809 he succeeded Mr. Jefferson as president of the United States; he obtained 122 votes out of 176. General Pinckney, of South Carolina, his opponent, obtained 47 votes. In Virginia the State appeared at first nearly divided between him and Mr. Monroe, but a majority of the legislature declaring informally a preference for Mr. Madison, the State followed their example.

It is known that after many fruitless efforts to induce Great Britain and France to respect neutral rights, war was declared against Great Britain during his administration, and that it continued with various success until 1815. It is said that Mr. Madison, being aware how unprepared the United States were for war, and anxious to preserve peace as long as it could be preserved consistently with the neutral rights of America, wished to postpone the declaration of war, but was urged into it by Mr. Clay and some ardent spirits whose patience was exhausted. If this be so, had his counsels prevailed, the war would have been prevented, for he has often told the writer of this notice that the administration had afterwards indubitable evidence that the British ministry had decided on revoking the offensive Order in

Council, in which case the principal cause of war would have been removed.

After serving two terms Mr. Madison retired to private life, in March, 1817; and it may be questioned whether the eight years which he served as president were not the least happy of his life. In 1829, when the constitution of Virginia was submitted to revision, he consented to serve as a member of the convention, and no doubt contributed largely to soothe the irritation which the conflict of local interests created. He also acted as a visitor of the university of Virginia, and succeeded Mr. Jefferson as its rector. [JEFFERSON.] Except in the discharge of these duties, he not only held no office after his retirement, but, we believe, never left his county after he quitted Washington. Although Mr. Madison lived to the age of eighty-five, he had a very delicate constitution, and never enjoyed good health. He died on the 28th of June, 1836. His physician said that he had two or three diseases, any one of which was commonly sufficient to shorten life.

Montpellier, his patrimonial estate, is a large tract of good land in Orange County, from which there is a fine view of the Blue Ridge, about twenty miles distant. The house, a large brick building, with a Tuscan portico, was sufficient for himself and his father. He was much visited in his retirement. His character and former station attracted many visitors, and his almost juvenile spirits and delightful conversation, with the very pleasing manners of Mrs. Madison, often tempted his guests to protract their visits longer than they had intended. His visitors thus became a tax on his purse, which he very seriously felt, and which compelled him from time to time to sell portions of his land. Though he was incapable of giving an active superintendence to his farm, he managed it with great judgment and with tolerable success.

In person Mr. Madison was below the middle size; though his face was ordinarily homely, when he smiled it was so pleasing as to be almost handsome. His manner with strangers was reserved, which some regarded as pride, and others as coldness; but on further acquaintance these impressions were completely effaced. His temper seemed to be naturally a very sweet one, and to have been brought under complete control. When excited, he seldom showed any stronger indication of anger than a slight flush on the cheek. As a husband Mr. Madison was without reproach. He never had a child. He was an excellent master, and though he might have relieved himself from debt, and secured an easy income, he could never be induced to sell his slaves except for their own accommodation (to be with their wives or husbands). The writer has sometimes been struck with the conferences between him and some trusty servant in his sick chamber, the black seeming to identify himself with his master as to plans of management, and giving his opinions as freely, though not offensively, as if conversing with a brother. Mr. Madison has more than once told the writer that he should have been a great gainer in a pecuniary point of view if he had many years before emancipated his slaves. It was his deliberate conviction that the colonization of the slaves in Africa was practicable. He endeavoured to keep aloof from party feelings, but regularly read the newspapers, and remembered their contents better than most people. Though he was cautious in expressing his sentiments, he could not forbear taking the liveliest interest in public concerns, especially in those of the general government, towards which he seemed always to feel a parental solicitude. He stood well with all parties, and was solicitous so to stand, both from a sense of duty and a love of popularity. Of all the present public men Mr. Clay seemed to be his favourite. He felt great solicitude about the irritating discussions between the North and South on the subject of slavery, and remarked that Mr. Clay had been so successful in compromising great questions, he wished he could have done something on this; and then, he added, 'perhaps all parties would join and make him president.'

With great powers of argument he had a fine vein of humour; he abounded in anecdote, told his stories very well, and they had the advantage of being such as were never heard before, except perhaps from himself. But distrusting the infirmity of old age, he would often say, 'I believe I have told you this story before.' Such were his conversational powers that to the last his house was one of the most pleasant to visit, and his society the most delightful that can be imagined. Yet more than half his time he suffered bodily pain, and sometimes very acute pain. He left pecuniary legacies to some nephews and nieces; 1500 dollars to the university of Virginia, about 3000 or 4000 to the Colonization Society, and the rest of his property, in value above 100,000 dollars, to Mrs. Madison. His writings will be published in six volumes (exclusive of the Debates of the Convention): vol. i., Papers relative to the Old Confederation and Constitution of Virginia, Letters to Jefferson, Monroe, Washington, &c., down to 1789; ii., Letters to the same and others during the Administration of Washington and Adams; View of the Policy of these Administrations; Conversations with Washington, &c.; iii., Letters to Foreign Ministers, Heads of Departments, Presidents, &c., showing the Policy of the Jefferson and Monroe Administrations; iv., Letters and Writings on Constitutional Subjects; v., Essays and Letters on Political Economy, the Law of Nations, Natural History, &c.; and vi., Miscellaneous. (*Communication from Virginia.*)

MADOC, the second son of Owen Gwynnedd, prince of Wales, is said by some authors to have discovered America long before Columbus. The Welsh chronicles are said to state, that Madoc, having been compelled by civil disturbances to leave his native country, set sail in 1170 with a small fleet, and directing his course westward, landed after some weeks on a continent which produced abundantly the necessaries of life, and the inhabitants of which differed greatly from those of Europe. After remaining in the country a long time he left there 120 persons, and returned to Wales, where he equipped a fleet of ten vessels, and set sail again, but was never afterwards heard of. Some of those who adopt this narrative suppose Madoc to have landed on the coast of Virginia or Carolina, and support it by an account of the discovery of an Indian population in North America who spoke the Welsh language. If however there is any truth in the story, Madoc probably landed in a higher latitude than Virginia. See Filson's 'Discovery, Settlement, and present State of Kentucky; *with* an Account of the Indian Nations within the *United States*,' London, 1793, 8vo.; also Bertuch, 'Ephémérid. *Géograph.*,' September, 1819. The above narrative of Madoc's voyage (which has been copied by Hakluyt in the third vol. of his 'Voyages') is given in the 'Historie of Cambria, now called Wales, a part of the most famous Yland of Brytaine, written in the Brytish language, above 200 years past, by Caradoc; translated into English by H. Lloyd, gent.; corrected, augmented, and continued out of records and best approved authors, by David Powell,' London, 1584, 4to. Owen's 'British Remains' (London, 1777, 8vo.; 1785, 12mo.) contains 'An Account of the Discovery of America by the Welsh 300 years before the voyage of Columbus,' written by Dr. Plott. Herbert, in his 'Travels,' defends the claims of his countryman Madoc as the discoverer of the New World with more warmth perhaps than good sense. But the Northmen are said to have discovered America some time before the date of Madoc's alleged voyage; and this fact appears to be established by evidence of a much stronger kind than that of the expedition of the Welsh prince.

(*Biog. Univ.*; *Journal of the London Geog. Soc.*, vol. viii., p. 114.)

MADOX, THOMAS. Of the personal history of Madox little is known. He resided in the Middle Temple. He always writes from the Middle Temple. Thomas Madox of London was called to the bar by that Society in 1704, and the son of a clergyman of Wales of the same name, in 1705. His first work appeared in 1702, entitled 'Formulare Anglicanum; or a Collection of antient Charters and Instruments of divers kinds, taken from the originals, from the Norman Conquest to Henry VIII.': to which is prefixed a very learned dissertation on antient charters and instruments. In 1711 he published his great work, entitled 'The History and Antiquities of the Exchequer of the kings of England, in two periods: from the Norman Conquest to the end of the reign of King John; and from the end of the reign of King John to the end of the reign of Edward II., taken from records: together with a correct copy of the antient dialogue concerning the Exchequer, generally ascribed to Gervasius Tilburiensis; and a dissertation concerning the most antient great roll of the Exchequer, commonly styled the Roll of Quinto Regis Stephani.' This work, which was reprinted in two vols. quarto, with the valuable addition of an index, in 1769, begins with a dedication to the queen, followed by a long prefatory epistle to Lord Somers, in which the author says, 'The records which I here vouch were taken by my own pen from the authentick membranes, unless where it appeareth by my references to be otherwise, and except haply in two or three instances, which it is not material to recollect; and in giving an account of the antient state of the Exchequer, I have for the most part contrived, as far as the subject-matter would permitt, to make use of such memorials as serve either to make known or to illustrate the antient laws and usages of this kingdom: for which reason the present work may be deemed not only a history of the Exchequer, but likewise an apparatus towards a history of the antient law of England.' This epistle concludes with 'a large digression concerning the Romanick dialect.'

The 'History of the Exchequer' treats of the court of the kings of England during the two periods comprised in it, its great offices, the jurisdiction of the king's exchequer, its officers and business; of the exchequer of the Jews, showing the peculiar mode in which they were governed and protected as 'the king's villeins;' of the different sources of the royal revenue, fully considered in all its branches; the whole illustrated by references to an immense mass of documents. The dialogue concerning the exchequer (which Mr. Madox ascribes to Richard Fitz-Nigel, bishop of London), treats, in the form of questions put to the author and his answers, of the functions of the different officers of the exchequer in the reign of Henry II., and of some other miscellaneous matters, in the first book, and of the mode of collecting the king's revenue in the second. It is preceded by an epistolary dissertation addressed to Lord Halifax. The dissertation, with which the volume concludes, relating to the great roll of the exchequer, commonly called the roll of Quinto Stephani, is addressed to Lord Somers. It has lately been ascertained by that eminent antiquarian the Rev. Joseph Hunter, that this roll ought to be referred to the 31 Henry I., a discovery which has removed some of the obscurity in which this part of the reign of Stephen is involved. Though Mad[illegible] doubted whether this roll belonged to the reign of Henry I., Stephen, or Henry II., yet in his table of the barons of the exchequer from the Conquest, subjoined to the 'History of the Exchequer,' all who are placed in the list in the time of Stephen are so placed upon the supposition that it relates to the 5th year of that king, at which time many of these barons were and long had been the adherents of the rival claimant of the throne, the empress Maud.

In 1726 Mr. Madox published his 'Firma Burgi, or an Historical Essay concerning the cities, towns, and boroughs of England, taken from records.' A posthumous work from the pen of Mr. Madox, entitled 'Baronia Anglica,' a history of the land-honors and baronies, and tenure in capite, verified by records, in which he corrects the errors into which Lord Coke and others have fallen in the use of these terms [Manor], appeared in 1736, and, with merely an alteration of the date in the frontispiece, in 1741.

Mr. Madox was indefatigable and successful in collecting his materials, and skilful in arranging them, but he has left it for others to apply them to the political and statistical history of the kingdom. A large body of documents, collected as materials for the works which he prepared for publication and for others which he projected, were deposited by his widow in the British Museum.

Mr. Madox held the office of historiographer royal.

MADRAS, one of the presidencies into which the British empire in India is divided. It comprehends the whole of the peninsula of Hindustan south of the river Krishna, and some territory on the north side of that river acquired from the Peshwa, and the province called the Northern Circars. The whole of this great territory, the area of which is upwards of 160,000 square miles, with nearly fourteen millions of inhabitants, is under the immediate government of the governor and council of Madras, but subordinate to the authority of the governor-general of India and his council.

The several districts contained within this presidency are —Northern Arcot, Southern Arcot, Bellary, Canara, Chingleput, Northern Circars, Coimbatore, Cuddapah, Dindigul, Ganjam, Guntore, Masulipatam, Madura, Malabar, Nellore, Rajahmundry, Salem, Seringapatam, Shevagunga, Tanjore, Tinnevelly, Trichinopoly, and Vizagapatam.

The gross revenue collected within the presidency in the three years from 1833-34 to 1835-36 was as follows:—

1833-34 .	£4,358,208
1834-35 .	4,480,025
1835-36 .	4,599,261

The value of the imports and exports from and to all parts of the world in the year 1835 was—

Imports .	£1,311,404
Exports .	1,955,697

The greater part of this trade was maintained with the other British presidencies and Ceylon. The trade with Great Britain was valued at—

Imports .	£224,031
Exports .	326,786

MADRAS, or FORT ST. GEORGE, the capital of the southern part of British India, is situated on the Coromandel coast, in the Bay of Bengal, in 13° 5′ N. lat. and 80° 21′ E. long. Madras is in an open roadstead, and peculiarly ill adapted for a place of trade on account of the rapid current which runs along the coast, and the dangerous surf which beats against the shore. This surf is so violent that a peculiar kind of boat is necessarily employed for communicating between ships and the shore. These boats are large and very light; they are made by sewing planks together with straw between the seams, so that they yield to the shock without breaking when thrown upon the shore. They require to be managed with great dexterity by persons well experienced. Boats that belong to the ships, and which are built in the ordinary manner, are not allowed to approach nearer to the shore than the back of the surf, where they anchor and transfer their passengers or lading of goods to the Madras boats already described. In rough weather even these boats cannot venture out, and all intercourse with the shipping is stopped except by means of a contrivance called a catamaran used by fishermen. These catamarans are made with two or three logs of light wood, each about ten feet long, lashed together. They are each managed by two men using paddles. It is very common for these men to be washed off from their vessel, which they regain by swimming. This is a service of much danger, not only for the reason just stated, but because of the sharks in the Bay of Bengal, by which the men are frequently attacked.

Fort St. George stands within a few yards of the sea. It was begun in 1639 by Mr. Francis Day, who obtained permission for the purpose from Sree Rung Rayeel. This fortress was soon surrounded by a town, which has since become very populous; the inhabitants in 1822 were ascertained to amount to 462,000. With the exception of one handsome street in the north-east quarter of the town, the whole is inhabited by natives. The street here mentioned contains the dwellings of Europeans, but the greater part of the English merchants and officers reside in what are called garden-houses in the neighbourhood of the city. The government-house is a handsome building, adjoining the esplanade. The native population for the most part reside in streets placed to the north and east of the fort, from which they are separated by a spacious esplanade.

Fort St. George was taken in 1746 by a French force under M. de la Bourdonnais, who obtained on that occasion a booty of 640,000*l*. On this occasion every British inhabitant was compelled to leave the place. It was restored to the English at the peace of Aix-la-Chapelle. It was again attacked by the French under M. Lally in 1758, but after investing the fort for nine weeks they were obliged to raise the siege and retire with considerable loss. Madras has since been threatened with attacks by Hyder Ali in 1767 and 1781, but has never again been actually besieged.

Madras is 1030 miles from Calcutta, 758 from Bombay 1158 from Agra, 1103 from Benares, 1275 from Delhi, 352 from Hydrabad, and 1661 from Lahore, all travelling distances.

MADRASTRÆA. This name is given by De Blainville to a subsection of the Madrephylliœa, including Astræa, Echinastræa, Oculina, and Branchastræa. He attaches but little importance to it as a division. [Madrephylliœa.]

MADREPHYLLIŒA, the first section of the Stony Zoantharia of Blainville, who styles the other section of this family of Zoantharia Madreporæa. The Linnæan genus Madrepora included nearly all the species, and obviously required analysis, the more so that geological naturalists referred to the same genus a vast number of previously unknown forms, and thus encumbered recent and impeded fossil zoology, and prevented any right notion of the successive forms of zoophytic life on the globe.

Solander proposed some useful divisions of this unmanageable genus, derived from the growth of the coral;

Lamarck established many important genera, especially characterising some fossil groups; Lamouroux also laboured to improve the classification. Of late years Goldfuss has described additional fossil groups; and M. de Blainville has reorganised the labours of his predecessors, with a special regard to the soft animal parts figured and described by Lesueur, Quoi, Gaimard, and other voyagers.

The Madrephylliœa of this writer seldom acquire that highly ramose figure which belongs to the Lamarckian genera Madrepora, Pocillopora, &c.; they are furnished with cells of various figure, always however radiated by lamellæ, which are frequently numerous. There is no general distinctive character of the soft parts, or 'polypi,' as they have usually been termed.

GENERA.

Cyclolites (fossil).

Animal unknown; solidified by a calcareous *polyparium*, of a short, simple, orbicular, or elliptical figure, flattened, and marked with concentric lines below, convex above, with a great number of very fine entire lamellæ, convergent to a sublacunose centre.

Lamarck founded the genus; Goldfuss includes it with the Fungiæ. Only fossil species are known; they occur in the tertiary and upper secondary strata chiefly; Mr. Lonsdale notices it in the Silurian system.

Example. Cyclolites numismalis (Madrepora porpita, Linn.). Goldfuss, tab. 14, fig. 4, a, b.

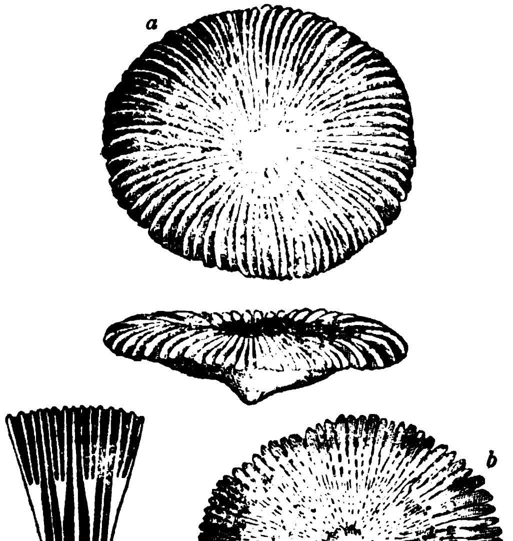
Montlivaltia (fossil).

Animal unknown; solidified by a calcareous *polyparium* of subconical or pyriform figure (fixed); transversely wrinkled below; enlarged, excavated, and lamellato-radiate above. From the oolite of Caen. Goldfuss refers it to Anthophyllum of Schweigger; and Blainville says it is closely allied to Cyclolites.

Example. Montlivaltia caryophyllata. Lamx., 'Zooph.' t. 79, figs. 8-10.

Fungia.

Animal gelatinous or membranous, generally simple, depressed, orbicular or oval; mouth superior, transverse in a large disk, which is covered by many thick cirriform tentacula; the disk is solidified internally by a calcareous solid *polyparium*, of a simple figure (seldom complex), ornamented above by a star of radiating aculeated lamellæ, and below by simple rugose rays.



Fungia patellaris.

a, upper face; *b*, lower face.

There are about nine recent (mostly from Indian Seas), and as many fossil species. Blainville arranges them in three groups: simple and circular; simple and compressed; complex and oblong.

The animal, according to Quoi and Gaimard, is very like that of Caryophyllia: it covers the upper face, and returns over the lower, so that the whole polyparium is internal. M. Stutchbury has described the growth of this coral in the 'Linnæan Transactions.'

Example. Fungia patellaris. Ellis and Soland., t. 28, figs. 1-4.

Polyphyllia.

Animals numerous, confluent, with a rather prominent mouth, lobed at the margin; numerous tentacula, not round the mouth, but scattered on the surface of a fleshy part, which entirely envelopes and encloses a calcareous solid *polyparium*. *Polyparium* a free, oval, elongated plate; above rather convex, and covered with lamellar ridges, which are denticulated, prominent, very slender, and transverse, but without stelliform disposition; below rather concave, and roughened by close-set tubercles.

The whole mass is free on the sea-bed.

Example. Fungia talpa of Lamarck. 'Actinologie,' pl. 52, fig. 1.

Anthophyllum.

Animal unknown, containing a calcareous *polyparium* of a conical or pyriform figure, fixed in the lower part, enlarged, flattened, excavated, and multilamellous in the upper part. This genus includes fossil species from antient rocks, and appears imperfectly distinguished from Turbinolia, unless the species of that genus were all free, which is at least doubtful.

Example. Anthophyllum Guettardi, Defr.

Note. Ehrenberg unites in one genus, Monomyces, the Anthophylla Montlivaltiæ, and the two first groups of Fungia.

Turbinolia.

Animal simple, conical, ribbe[illegible]xternally *with larger* and smaller ribs; terminated above by a *mouth begirt* with numerous tentacula, and solidified by a calcareous *polyparium.*

Polyparium free, conical, furrowed externally, attenuated to one extremity, enlarged at the other, and ending in a large shallow radiated cell.

Most of the species are fossil: they occur in rocks of all ages, particular species belonging to each; but if the genus is not very obscurely characterised, the use of the term is not very accurate. According to Blainville, the recent T. amicorum has twenty-four ribs; but this number is exceeded vastly in some of the fossil species referred to the genus; and in others there are fewer than twenty-four.

Diploctenium of Goldfuss is a compressed turbinolia, according to Blainville.

Example. Turbinolia amicorum, Bl. South Seas.

Turbinolopsis (fossil).

Animal unknown, solidified by a calcareous *polyparium*, of a simple turbinated figure, and free. This polyparium is lacunose, furnished above with radiating lamellæ, united at short equal intervals, and marked externally by longitudinal flexuous striæ, inclosing between their united edges vertical lines of pores or cells.

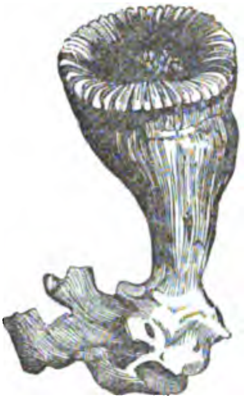
M. Lamouroux describes this genus. It has been recently adopted by Mr. Lonsdale for specimens which occur plentifully in strata below old red-sandstone. ('Silurian System,' by Murchison.) De Blainville appears to think it should be reunited with Turbinolia, but he had not examined the specimens noticed by Lamouroux.

Example. Turbinolia ochracea, Lamouroux. 'Gen. des Polyp.,' t. 82.

Caryophyllia.

Animals actiniform, subcylindrical, provided with a simple or double crown of short, thick, perforated tentacula, which project from the surface of stars or cylindriconical cells: cells furnished with radiating lamellæ internally complete, externally striated, and aggregated into a solid conical polyparium, fixed at the base. The species are grouped according to the simple or fasciculated character of the mass. There are both recent and fossil examples of each group.

Lamarck is the author of this genus, distinguishing it from Turbinolia and from Oculina: he has been followed by nearly all zoologists; but Goldfuss has reunited Caryophyllia and Oculina into his genus Lithodendron.



Caryophyllia cyathus.

Example. Caryophyllia cyathus. Ellis and Sol., t. 28, f. 7.

Ehrenberg divides this genus, and forms the following new ones:—

Desmophyllum.	*Example,*	C. dianthus.
Cyathina.	„	C. cyathus.
Cladocera.	„	C. calycularis.

Sarcinula.

Animals unknown, contained in cells at the end of long cylindrical tubes; cells lamelliferous, stelliform; tubes striated externally, parallel to the axis, united, by a cellular transverse mass, into a solid calcareous *polyparium,* whose upper and under surfaces are plane and parallel.

This genus, established by Lamarck, includes both recent and fossil species. It seems to bear the same relation to Caryophyllia that certain tubular astrææ bear to the ordinary forms of that genus. There is no sufficient reason for the conjecture of De Blainville, that 'Lithostrotion' of Llwyd should be referred to this genus; it has more resemblance to the following group, with which indeed De Blainville has joined it.

Columnaria (fossil).

Animals unknown, contained in shallow, multi-radiate, stelliform *cells,* at the ends of prismatic tubes; tubes aggregated, contiguous, more or less parallel, forming by their union a solid, thick, calcareous *polyparium.*

This is a genus of Goldfuss; established on fossils of the 'Transition' strata.

Stylina (fossil).

Animals entirely unknown, contained in radiated cells at the end of long cylindrical vertical tubes; tubes furnished internally with distinct lamellæ, which radiate from a solid more or less prominent axis, and are united by a cellular mass so as to form a stony *polyparium,* more or less extended, thick, and echinated above.

A genus of Lamarck (originally named *Fascicularia* by him), which includes perhaps only one species. The prominent axis occurs however in several madreporic fossils not usually referred to this genus—as certain *Cyathophylla* of Goldfuss. Sarcinula conoidea of this author is ranked by Blainville as a Stylina.

Catenipora (fossil).

Animals unknown, contained in tubular cells; cells terminal, often oval, *furnished with radiating plates,* and united laterally into a calcareous *polyparium,* which may be described as of a conical figure, fixed, composed of vertical anastomosed lamellæ.

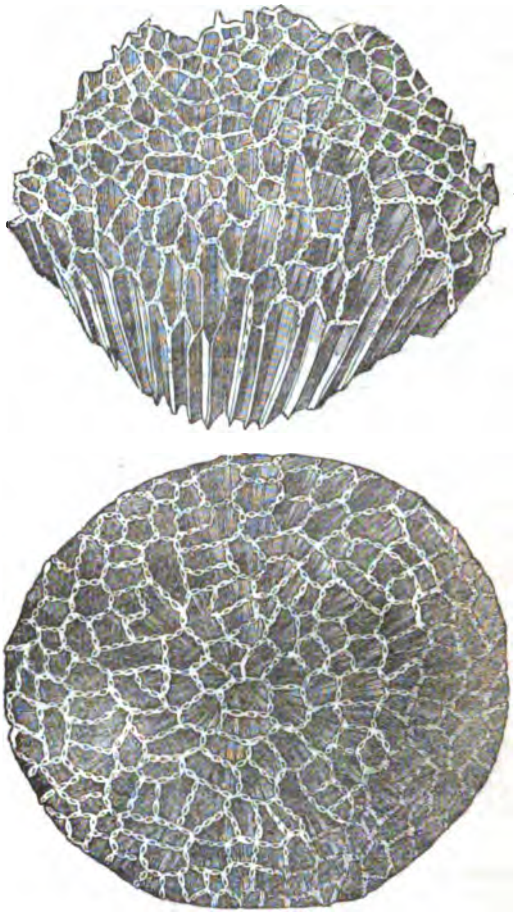
Tubipora catenulata of old writers is the type of this Lamarckian genus, which, with some surprise, we found to be, as Blainville states, really a lamelliferous coral. He draws this inference from examining a fine specimen, at Bonn, of Catenipora escharoides, which he considers the only species. It is peculiar to the 'Transition' rocks, though not, perhaps, to the 'Silurian system.'

Example. Catenipora escharoides, Lamarck. Goldfuss, t. 25.

Fischer's genus Halysites is identical with Catenipora.

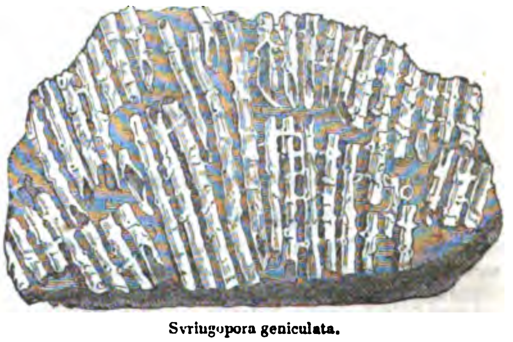
Syringopora (fossil).

Animals unknown, contained in long, subflexuous, tubular, vertical cells; opening of the cells round, terminal; numerous small horizontal tubuli branch off from the cells, and unite, by anastomosis, the whole ramified mass into one *polyparium.*



Catenipora escharoides.

Goldfuss is the author of this genus, the species of which were, by older writers, always ranked as Tubiporæ. In our own examinations of Syringopora from the carboniferous limestone (S. ramulosa? Goldfuss), we have had reason to think the interior of the tubes had formerly been radiated, but the traces of the lamellæ are never clear, or even certain. The species belong to Silurian and carboniferous rocks chiefly, perhaps not exclusively.



Syringopora geniculata.

Examples. Syringopora verticillata. Goldfuss, t. 25, f. 6. S. geniculata. Phillips, 'Geol. of York.,' ii., t. 2, f. 1.

Dendrophyllia.

Animals actiniform, furnished with a great number of bifid tentacula, in the midst of which is a polygonal mouth: the cells containing the animals are rather deep, and radiated by numerous prominent lamellæ; the *polyparium* which these compose is widely attached, arborescent, striated externally, lacunose internally, and truncate at the extremities. The species are both recent and fossil.

Example. Dendrophyllia ramea. Sol. and Ellis, t. 38.

Lobophyllia.

Animals actiniform, furnished with many cylindrical tentacula; cells conical (sometimes elongated or sinuous),

with a subcipoular opening, laciniato-lamelliferous, terminating the few branches of the ***polyparium*****, which is fixed, of a turbinated shape, externally striated, and internally lacunose.**

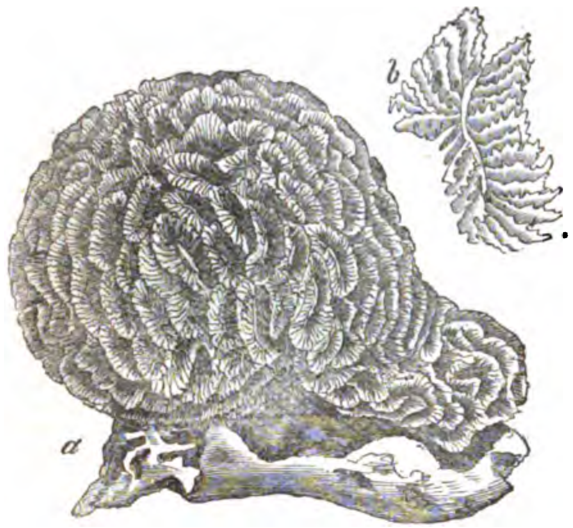
The species were included in Lamarck's genus Caryophyllia: the fossil species are chiefly from the oolitic formations.

Example. Lobophyllia carduus. (Caryophyllia carduus, Lamck.)

Meandrina.

Animals more or less confluent, in one surface, in long sinuous series, having each a distinct mouth and lateral series of very short tentacula, contained in shallow *cells*, which are not really separate, but form by their lateral union sinuous valleys; these valleys are furnished on each side of the mesial line with transverse subparallel lamellæ, ending against ridges which separate the valleys; the whole calcareous *polyparium* is fixed, simple, turbiniform when young, and globular when old.

This genus, established by Lamarck, is universally adopted by zoophytologists. The recent species belong to the Indian or South Atlantic Seas. The fossil species are few, and chiefly belong to the oolitic formation.



Meandrina dædalæa.
a, entire figure reduced; *b*, portion, nat. size.

Example. Meandrina dædalæa. Ellis and Sol., t. 46, f. 1.

Dictyophyllia (fossil).

Animals unknown, contained in polygonal, rather irregular *cells* of a considerable size; cells separated by partitions denticulated on both sides; the calcareous *polyparium* which results is fixed, deeply reticulated on the surface, and encrusts other bodies. (The base of the cells is finely tuberculated.)

The best marked species (D. reticulata) is found in the chalk of Maastricht. Goldfuss, t. 21, *fig.* 3.

Agaricia.

Animals wholly unknown, contained in cells, which often appear incomplete or confused, and sublamellar internally: they constitute by their union a stony *polyparium*, fixed, formed of flattened foliaceous irregular expansions, stelliferous on one side only.

The recent species are not numerous; we receive them from the Indian Ocean and South Sea. Goldfuss refers some fossils to this genus.

Example. Agaricia cucullata. Ellis and Sol., t. 42 f. 1, 2.

Tridacophyllia.

Animals actiniform, confluent, very depressed, enlarged, and attenuated to a finely crenulated edge; mouth central, a little tuberculous, *but without tentacula;* cells deep, irregular, foliaceous in the borders, lamellato-radiate, and denticulate within, externally and irregularly striated; the *polypiferous* mass thus formed is calcareous, foliaceous, not porous, striated, turbinated and fixed at the narrow part.

Lamarck included the principal species (T. lactuca) in his genus Pavonia; another he named Explanaria aspera.

Example. Tridacophyllia lactuca. Ellis and Sol., t. 54.

Monticularia.

Animals unknown, contained in cells *imperfectly circumscribed*, sometimes even confused or confluent; the lamellæ of these cells are very prominent, very distinct, rather numerous, and diverge from a tubercle; the union of the cells is marginal and in one surface; the *polyparium* is calcareous, very lacunose and polymorphous: sometimes it encrusts other bodies, is agglomerated into a heap, or spreads in sinuous expansions, striated externally.

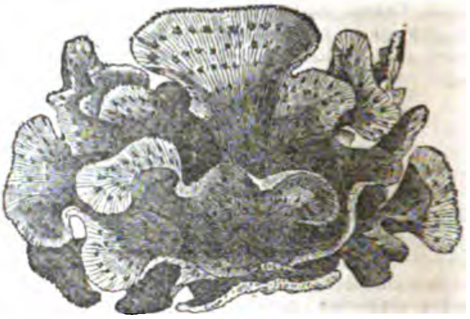
This genus of Lamarck is supposed to be identical with Hydnopora of Fischer. The recent species are from the Indian Seas. Mr. Lonsdale refers a fossil species of the Silurian system to this genus.

Example. Monticularia exesa. Sol. and Ellis, t. 49 f. 3.

Pavonia.

Animals without tentacula; the cells which contained them confluent, conical, small, rather oblique, furnished with many very close lamellæ disposed irregularly, though sometimes in series; the *polyparium* thus composed is solid, fixed, running into various agglomerations and expansions, with sharp edges.

The recent species are from the East and West Indian Seas. The few fossil species are from transition and oolitic formations.



Pavonia boletiformis.

Example. Pavonia boletiformis. Ellis and Sol., t. 32, f. 3, 4.

The following genera, viz.: Astræa, Echinastræa, Oculina, and Branchastræa, are grouped by De Blainville under the subsectional title of Madrastræa :—

Astræa.

Animals short, more or less cylindrical; mouth rounded, placed in the midst of a disk covered with few and rather short tentacula; *cells* shallow, lamellæ radiating, and forming by their union a fixed polymorphous *polyparium*, which often encrusts other bodies, or is agglomerated on itself. This great genus is divided into sections.

Section A. *Astræoides* of Quoi and Gaimard.—Stars *round* and often disjoined.

Example. Astræa calycularis (*Caryophillia calycularis* of Lamarck). Mediterranean.

Section B. *Meandriniform Astrææ.*—Stars distinct, unequal, *oblong*, more or less *diffluent*, forming encrusting or agglomerated masses.

Example. Astræa uva.

Section C. *Gemmastræa.*—Stars *circular*, very *distant*, *prominent*, and forming encrusting masses.

(These are chiefly fossil.)

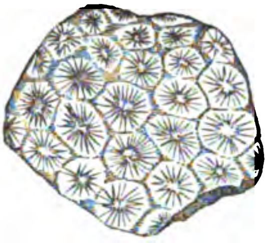
Example. Astræa Lucasiana, Defr., from the oolite of Besançon.

Section D. *Tubastræa.*—Cells tubular, vertical, more or less distant, with a round opening, the edges being hardly prominent, and radiated by a moderate number (12 to 24) of *complete* lamellæ. This section includes many recent and fossil species.

Example. Astræa faveolata. Ellis and Sol., t. 53.

(The animal is described by Quoi and Gaimard.)

Section E.—Cells roundish, *approximate*, sometimes irregular, rather shallow; the lamellæ very distinct, cutting, complete, *extended over the rounded interstices*; mass encrusting or agglomerated.



Astræa ananas.

Example. Astræa ananas. Ellis and Sol., t. 47.

Section F. *Siderastræa.*—Cells superficial or shallow, indefined, with numerous very fine lamellæ, radiating from an *excavated centre*, and continued to meet or even to join those of neighbouring cells.

Example. Astræa siderea. Ellis and Sol., t. 49.

The fossil species are numerous, especially in the later secondary and tertiary rocks.

Blainville makes several groups of them according to the manner of their growth.

Section G. *Dipsastræa.*—Of a globular figure; cells profound, infundibuliform, subpolygonal, contiguous, with common partitions, which are elevated, *sulcated*, and *echinulated* on the edges.

Example. Astræa dipsacea, Lamarck; Madrepora favosa, Ellis and Sol., t. 50.

There are fossil species in the secondary and tertiary strata.

Section H. *Montastræa.*—In thick masses composed of tubular cells, which acquire a polygonal figure from juxtaposition; their edges not prominent; the cavity not deep, furnished with numerous lamellæ united to a solid prominent axis. The known species are fossil.

Section I. *Favastræa.*—In a thick mass composed of large polygonal excavated cells, pluriradiate, depressed in the centre, and hollowed towards the margin. (*Acervularia* of Schweigger; *Cyathophyllum* of Goldfuss.)

Goldfuss's generic name is much employed for fossils of the Silurian rocks.

Example. Recent, Astræa magnifica. Indian Sea. Fossil, Astræa Baltica, Bl. (A. ananas, Linn.)

(Mr. Lonsdale has proposed a new genus, allied to *Cyathophyllum;* and from its vesicular internal structure calls it *Cystiphyllum.* From Silurian rocks.)

Section K. *Strombastræa.*—In corticiform masses composed of infundibuliform, polygonal, radiato-lamelliferous cells, which are proliferous, or succeed one another vertically. Goldfuss calls the group Strombodes. Its distinctness is doubted by Blainville.

Example. Strombodes pentagonus, Goldfuss. Fossil, in the North American limestone.

Section L. *Cellastræa.*—The species of this group differ from the Dipsastrææ principally by the fineness of their radiating lamellæ, and by a peculiar cellular structure. The fossil species are found in tertiary strata.

Example. Astræa incerta. Sol. and Ellis, t. 47, 3.

In concluding his examination of the great genus Astræa (which includes several other genera adopted by Goldfuss, Schweigger, &c.), De Blainville acknowledges the probable imperfection of the arrangement above given, and notices the transitions which it presents to the generic groups of Caryophyllia, Pavonia, Oculina, &c. Perhaps until the relation of the lamelliferous cells to their contained polypi is known from a very general investigation of recent types, zoologists will do wisely not to propose new genera from ill-understood specimens of antient corals.

Echinastræa.

Animals unknown, contained in raised cells which are strongly radiated, rather irregular, echinulated, and *occupy only the upper surface of the coral.* The mass is either fixed or free, expanded into a lobate or reflexed plate, internally echinated, striated, but not porous externally.

(Part of Explanaria, Lam., is included in this new group, as well as Echinophora of that author.)

Example. E. ringens, Lam.

Oculina.

Animals unknown, contained in regular, round, radiated cells, more or less prominent, and scattered on the surface of a solid, compact, arborescent, fixed polyparium. Lamarck established the genus; Schweigger has united it to Astræa, and Goldfuss to Caryophyllia.)

Oculina axillaris.

Example. Oculina axillaris. Ellis and Sol., t. 13, f. 5.

Branchastræa.

Animals unknown; the cells which contained them are of a cylindrical figure, channelled internally, prominent, radiating from the general mass, and united into a ramose, cylindrical, solid coral. Only one species, *B. limbata*, Goldfuss, t. 8, f. 7: from the Jura limestone, Suabia.

MADREPORÆA, the second section of the Stony Zoantharia of De Blainville, and placed by him after MADREPHYLLIŒA.

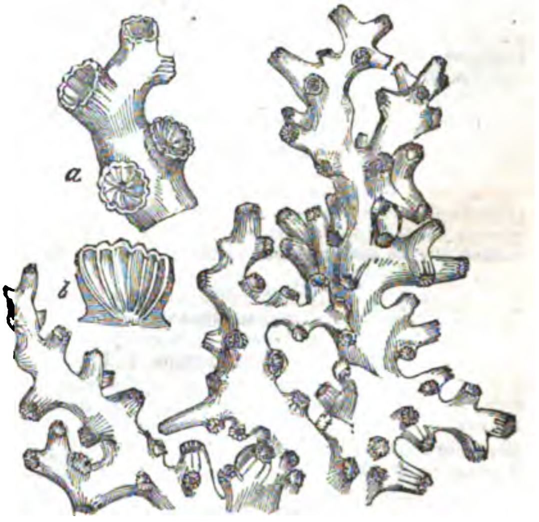
The Corals of this section are generally arborescent, with small partially lamelliferous cells, and constantly porous in the interstices and walls of the cells. This last is the most important character. The Lamarckian genus Madrepora included many of the genera of De Blainville.

GENERA.

Dentipora.

Animals unknown; cells deep, circular, mammillated, furnished with ten dentiform lamellæ prominent towards the margins, scattered in the *polyparium*, which is compact, expanded, its parts anastomosing together, and echinulated with strong interstitial tubercles.

The species are ranked with Oculina by Ehrenberg and earlier authors.



Dentipora virginea.

a, magnified; *b*, section of the lamelliferous cell.

Example. Dentipora virginea. Ellis and Sol., t. 36.

Astræopora.

Animals unknown (probably provided with a single crown of 12 tentacula): the cells which contained them are prominent, mammillary, internally sulcated, and irregularly scattered on the surface of the polyparium. Polyparium extremely porous and echinulated, enlarged into thin expansions.

Example. Astræa myriophthalma of Lamarck.

Sideropora.

Animals unknown; *cells* deep, immersed, circular or subhexagonal, with six deep notches at the border, and a prominent central axis, irregularly dispersed on the arborescent, palmated, finely granulated, but not porous *polyparium.*

(Several of Lamarck's Porites are placed in this group.)

Example. Sideropora digitata. In the Leyden Museum.

Stylopora.

Animals unknown; *cells* with few lobes at the circumference, internally striated, with a pistilliform axis, irregularly aggregated into an arborescent or subpalmated fixed polyparium, whose interstices are porous and echinulated.

(This group of Schweigger is not considered as really generic.)

Coscinopora.

Animals unknown: *cells* infundibuliform, quincuncial, forming the openings of capillary tubes laterally adherent into an attached, polymorphous polyparium.

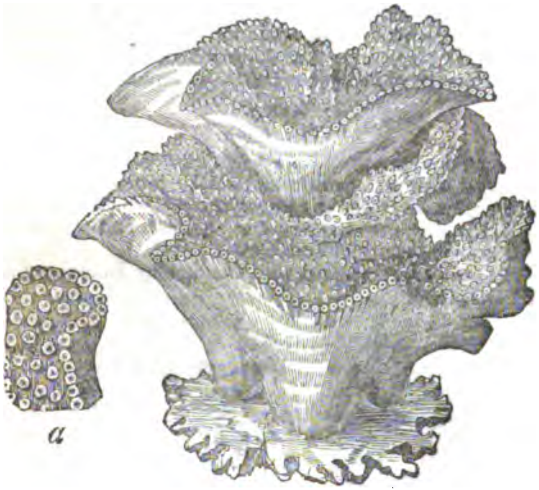
(This group, established by Goldfuss, is ranked by that author near to Retepora. There is apparently no evidence that it should be placed among the Madreporæa.)

Example. Coscinopora infundibuliformis. Goldf., pl. 9, and pl. 30, f. 10.

Gemmipora.

Animals without tentacula: *cells* deep, cylindrical, channelled, and almost lamelliferous within, *prominent in a mammillary form* on the surface of a fixed, porous, arborescent, or laminiform polyparium.

(Several of Lamarck's Explanariæ come into this group.)



Gemmipora mesenterina, diminished.
a, Portion, nat. size.

Example. G. mesenterina. Ellis and Sol., t. 43.

Montipora.

Animals actiniform, short, provided with small tentacula, to the number of twelve, placed in a single series; *cells* very small, rounded, impressed, regular, with few internal grooves. *Polyparium* incrusting or agglomerated, very porous, much echinulated, and marked by mammillary prominences on the free surface.

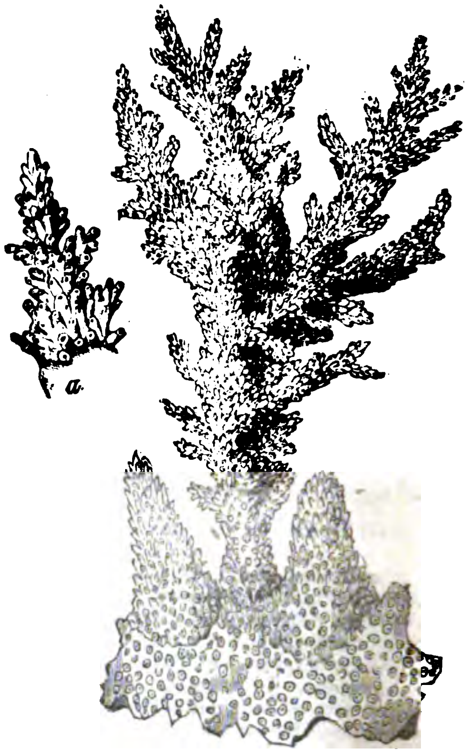
(Some of Lamarck's Porites are included in this genus.)

Example. Porites verrucosa, Lamck. Australasia.

Madrepora.

Animals actiniform, rather short, with twelve simple tentacula; *cells* deep, prominent, scarcely stelliferous, irregularly scattered on the surface, and accumulated towards the terminations of the polyparium, which is very porous, arborescent or frondescent, and fixed.

(This restricted genus includes several recent species, and a few fossils.)



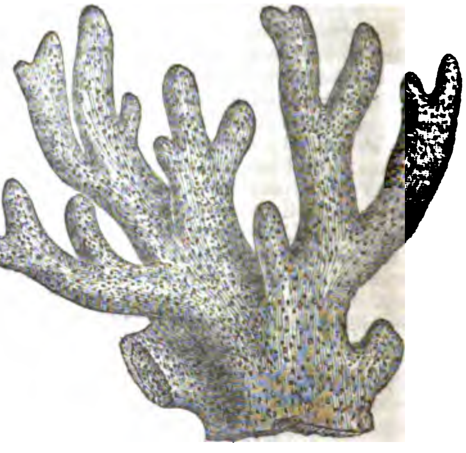
Madrepora abrotanoides, diminished.
a, Termination of one of the branches, nat. size.

Example. Madrepora abrotanoïdes, Lamck. Madrepora muricata, Linn. Ellis and Sol., t. 57.

Palmipora.

Animals unknown; *cells* very small, unequal, completely immersed, *obsoletely* radiated, scattered: polyparium fixed, cellular within, very finely porous and reticulated externally, expanded in a palmate or digitated form.

(The genus includes Millepora alcicornis of Linn. and others like it.)

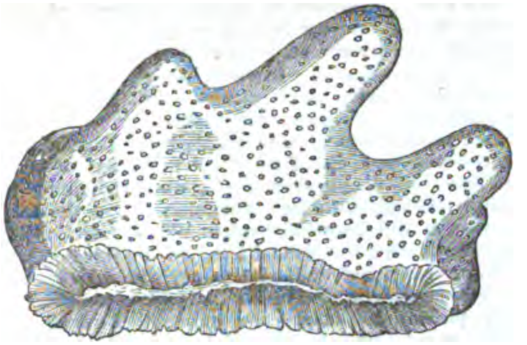


Millepora alcicornis.

Example. Millepora alcicornis, Linn.

Heliopora.

Animals short and cylindrical, with a crown of 15 or 16 broad and short tentacula; cells cylindrical, vertical or subdivergent, *immersed, internally crenulated* by partial lamellæ; polyparium largely porous in the interval of the cells.



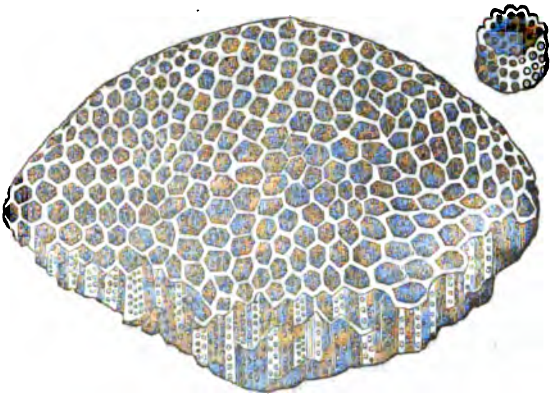
Heliopora cærulea.

Example. Heliopora cœrulea. Madrepora cærulea. Ellis and Sol., t. 12, f. 4. Pocillopora cærulea, Lamck. From equatorial seas.

A fossil species in the transition limestone (astræa porosa, Gold.), usually ranked in this genus, is put in Porites by Ehrenberg and Lonsdale. (Murchison's 'Silurian Region.')

Alveopora.

Animals actiniform, with twelve simple tentacula; *cells* deep, polygonal, irregular, unequal, *internally tuberculiferous*, with perforated or reticulated parietes, echinulated on the terminal edges; polyparium porous, cellular.



Alveopora retepora.

Example. Alveopora retepora. Madrepora retepora, Linn. Ellis and Sol., t. 54, f. 3-5.

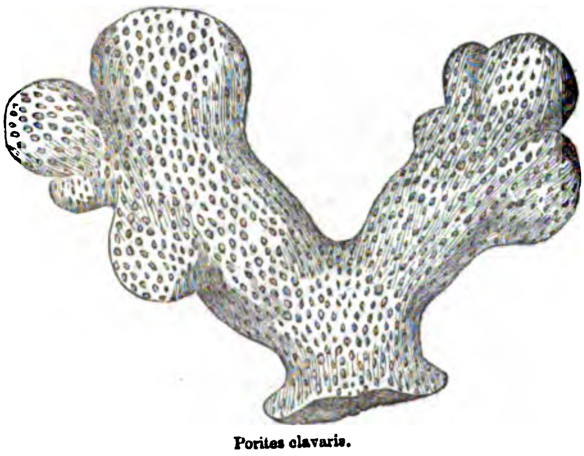
Goniopora.

Animals actiniform, elongated, cylindrical, with a crown of more than twelve simple tentacula; *cells* polygonal, internally sulcated, echinulated on the edges; polyparium extremely porous.

One recent species (G. pedunculata of Quoi and Gaimard).

Porites

Animals urceolate, with twelve very short tentacula; *cells* polygonal, unequal, imperfectly defined, incompletely radiated by filamentous pointed rays, with echinulated intervals; polyparium diversiform, porous and echinated.



Porites clavaris.

(A genus of Lamarck, but somewhat contracted by Blainville.)

Example. Porites clavaria, Lamck. Ellis and Sol., t. 47, f. 1.

Seriatopora.

Animals without tentacula?; *cells* immersed, ciliated on the edges, but not internally lamelliferous, ranged in longitudinal series on the cylindrical branches of a porous finely ramified polyparium.

(A genus of Lamarck, modified. It includes only a few species, much like the type, Madrepora *seriata*, Linn.: figured in Ellis and Sol., t. 31, f. 1-2.) Ehrenberg ranks them with Millepores.

Pocillopora.

Animals without tentacula?; *cells* small, shallow, subpolygonal, echinulated on the edges, and sometimes rather lamelliferous within; towards the terminations of the branching polyparium the cells are contiguous and adherent, but separated by granular interstices near the base of attachment. The polyparium is not porous.

(Lamarck established the genus, which is generally adopted. Ehrenberg doubts if there be any tentacula.)

Ex. P. damicornis, Lamck. Recent, in the Indian Sea.

MADREPORITE.—*Anthraconite; Columnar Carbonate of Lime.*—Occurs in roundish masses, the structure of which is columnar and diverging. Fracture indistinctly lamellar. Hardness 3·0; yields easily to the knife. Colour greyish-black. Lustre vitreous. Opaque, or only translucent on the edges. Specific gravity 2·7. It is found in Norway at Stavern, in transition rocks; at Gyphytta in alum slate; in Greenland, and in Salzburg.

Analysis by Klaproth:—

Carbonate of Lime .	93·
Carbonate of Magnesia .	10·30
Carbonate of Iron .	1·25
Silica . . .	4·50
Carbon . . .	0·50
	99·55

MADRID, the capital of New Castile and of Spain, and now also of the province of Madrid, stands on a range of small hills rising in the middle of the extensive plain of New Castile, which is bounded on the north by the mountains of Guadarrama, and on the south by those of Toledo, in 40° 24′ 18″ N. lat., and 3° 42′ W. long. of Greenwich. Madrid is supposed to occupy the site of the Mantua Carpetanorum of the Romans, which was called Majoritum by the Goths, whence its present name Madrid is derived. Some antiquarians contend that it was so called by the Spanish Arabs, in whose language the word *Magerit* meant a 'well-aired house.'

During the occupation of the peninsula by the Arabs the place served as a frontier town, and its castle was often taken from the Arabs and retaken by them until 1086, when it was finally taken by Alphonso VI., the conqueror of Toledo, who annexed it to the bishopric of Toledo, to which it now belongs. It continued to be a mere village until the reign of Henry III. of Castile, who, being passionately fond of hunting the wild boar and the bear, both which animals were then abundant in the mountains near Madrid, made the place his residence during the hunting season. Charles V. occasionally lived in it, and it was at last made the capital of the Spanish dominions by his son Philip II., in opposition to the opinion of his ministers, who strongly advised him to fix his court at Lisbon.

Madrid is more than 2000 English feet above the level of the sea, a circumstance which accounts for the coldness of its winters. In summer the heat is excessive, in some measure owing to the want of trees in the neighbourhood. The thermometer in 1837 rose to 117° of Fahrenheit in the open air. In winter the same thermometer sometimes descends as low as 18°.

Madrid is on the left bank of the Manzanares, a small rivulet which has its rise in the mountains of Guadarrama, about 36 miles from the capital, and which, after flowing under the walls of Madrid, joins the Xarama, a considerable stream, at some distance from the capital. Two majestic bridges, called Puente de Toledo and Puente de Segovia, are thrown over the Manzanares; but such is the contrast between the imposing grandeur of these bridges and the scanty stream which flows beneath them, that it has given rise to the witty saying 'that the kings of Spain ought to sell the bridges, and purchase water with the money.' In winter however the heavy rains, and in spring the sudden melting of the snow on the neighbouring mountains, sometimes swell the Manzanares into an impetuous torrent.

Madrid is surrounded by a brick wall twenty feet high, which contains fifteen gates, mostly built of coarse grey granite. Among these the gate of Alcalá, and that of San Vicente, built in the reign of Charles III., and that of Toledo, erected in the reign of Ferdinand VII., are characterised by purity of design and solidity of structure. During the present civil war, some slight fortifications have been erected on the principal points leading to the city.

The general aspect of Madrid from all the approaches is anything but inviting. The numerous fantastic spires of churches and convents, the tiled roofs of the houses, the sterility of the neighbourhood, and the total absence of good houses, pleasure-gardens, or other buildings which indicate the approach to a great city, give to the capital of Spain the most gloomy and forbidding appearance.

The interior however is not devoid of beauty. The wide and well-paved streets, the extensive and well-planted public promenades in and near the city, with the fountains in many of the squares, the gorgeous churches, and handsome public buildings, remind the traveller that he is in the capital of Philip II. The houses are well constructed: the foundations and some of the ornamental parts are of granite, and the rest of red brick, stuccoed and generally painted. Each house is four or five, and frequently six stories high, and contains, as in Paris, several families. The principal streets, with few exceptions, are moderately wide and handsome: that of Alcalá, for instance, is wider than Portland-place in London, and contains many splendid buildings. The Calle Mayor, Carrera de San Geronimo, Calle de Atocha, &c., would be ornaments to any capital; the rest of the streets are generally narrow and crooked. There are 42 squares, of which the principal are—that of the Royal Palace; that of Santa Catalina, where a beautiful bronze statue of Cervantes has been lately placed; the Puerta del Sol, where the five principal streets of Madrid meet, and which is a place of resort both for the idle and the busy, being the spot where, owing to the proximity of the Exchange, or Bolsa, all commercial transactions are conducted in the open air; the Plaza de la Cevada, where criminals were formerly executed; and lastly, the Plaza Mayor, which is the finest of all. This square is now used as the rallying point for the garrison of Madrid in case of alarm, on account of the strength and solidity of the buildings and the difficulty of approaching it through the narrow crooked streets. Its form is quadrilateral, 434 feet by 334, and it is surrounded with stone buildings six stories high, ornamented with pillars of grey granite, which form a fine piazza all round.

The population of Madrid, as to which no official returns have been published since 1807, was stated by Miñano to be 201,344 in 1826, but this number is generally supposed to be too great for that time, although it may at present be nearly correct. The circumference of Madrid is not above five miles; and there are no suburbs.

The royal palace of Madrid, though unfinished, is one of the finest royal residences in Europe. The interior is decorated in a style of costly magnificence. It stands on the site of the old Alcazar, or palace, inhabited by Philip II., which was burnt to the ground in 1734. Philip V. began the building, which was continued by his successors. It has four fronts, 470 feet in length, and 100 feet high. The custom-house, a noble building, erected by Charles III., to whom Madrid is chiefly indebted for its embellishments; the Casa de Correos (Post-office) in the Puerta del Sol; the palace called de Buena Vista, formerly belonging to the dukes of Alba, now converted into an artillery museum; the royal printing-office in the street of Carretas, and the palace of the duke of Berwick, are among the public and private buildings which adorn the capital. Among the numerous churches and convents which fill the streets of Madrid, scarcely one can be mentioned as a specimen of a pure style of architecture. That of San Isidro, formerly belonging to the Jesuits, has a very fine portal; the convent of the Saleras, founded by Ferdinand VI. and his wife Barbara, is likewise a fine building, and the interior of the church is ornamented with the richest marbles. The convent of San Francisco el Grande, built in 1777, is justly admired for the severity and correctness of the design, its beautiful proportions, and a dome built in imitation of that of Saint Peter's at Rome.

There are 67 churches in Madrid, exclusive of private chapels. Before the year 1834 there were 66 convents, 34 for men and 32 for women. Some of them have been recently pulled down, either to widen the streets or to form squares; others have been converted into barracks, hospitals, magazines, and government offices.

Public promenades abound in Madrid. That which is most resorted to is the Prado, which consists of various alleys lined with double rows of trees, and ornamented with beautiful marble fountains. Adjoining to it is the Retiro, an extensive and beautiful garden. The garden suffered greatly, both from friends and foes, during the Peninsular war, but was restored by the late king, who added to it an extensive menagerie. Another favourite promenade is a vast plantation outside the gate of Atocha, called las Delicias, leading to a canal known by the name of Canal de Manzanares. This canal, which extends only six miles from Madrid, was intended to unite the capital with the river Tajo at Toledo, by means of the Xarama.

The literary and scientific establishments are generally of old date and insufficient to meet the wants of the present day. Miñano mentions 166 primary schools as existing in 1826, besides two colleges, both conducted by ecclesiastics. This number however has recently diminished. There are two extensive libraries open to the public; one founded by Philip V. in 1712, which contains 150,000 volumes, besides a very large collection of manuscripts, chiefly Greek, which have been described by J. Iriarte, and a museum of medals and antiquities. The library of San Isidro, belonged formerly to the Jesuits. Both have been considerably increased of late by the addition of the libraries of the suppressed convents within the capital. There are also four academies: 1, 'La Academia de la Lengua,' founded in 1724, in imitation of the Académie Française, confines its labours to the publication of works in the Spanish language, such as grammars and dictionaries, and to editions of the best Spanish writers. 2, the Academy of History originated in a society of individuals whose first object was the preservation of historical records. It was confirmed by Philip V., who, in 1738, granted the present statutes. The labours of this body have been far more useful than those of its sister institution: and the nine volumes in quarto already published by them form a valuable addition to the history of Spain. 3, the Academy of the Fine Arts, instituted in 1738, holds weekly meetings at its rooms in the street of Alcalá, but it has hitherto done little or nothing: lastly, the Academy of Medicine. A fine botanical garden, well stocked with exotic plants, forms a delightful spot in the spring, when it is much frequented: attached to the establishment are various professors, who lecture upon botany, agriculture, and geology. The Museum of Natural History in the Calle de Alcalá is not worthy of the praise bestowed upon it by travellers: it certainly contains a splendid collection of minerals from the Spanish dominions in America, but they are badly arranged, and worse kept. It contains however the interesting skeleton of the Megatherium described by Cuvier.

Along the east side of the Prado is the National Gallery, a noble building of colossal dimensions, with a beautiful Tuscan portico and Doric colonnades. The collection of paintings which it contains has been lately pronounced by competent judges to possess a greater number of good pictures with fewer bad ones than any other gallery in Europe. The Armoury, a fine building of the time of Philip II., contains some of the most beautiful specimens of armour in Europe, especially of the *Cinque Cento*, or the fine times of Benvenuto Cellini. There are several complete suits of armour, which formerly belonged to Ferdinand V., Charles V., the Great Captain, John of Austria, Garcia de Paredes, and other illustrious Spaniards. The most interesting of all perhaps is a coat of mail with the name and the arms of Isabella upon it, which she is said to have worn in her campaigns against the Moors. An account of this collection, with drawings of the best pieces of armour, is now in course of publication.

Madrid has two small theatres, 'La Cruz' and 'Principe,' both managed by the Ayuntamiento, or municipal corporation, where Italian operas and Spanish plays are alternately acted. Another, of much larger dimensions, called the 'Teatro de Oriente,' has been lately built in the centre of the square, opposite to the royal palace, but is still unfinished for want of funds.

The inhabitants of Madrid repair, every Monday during the season, to a vast amphitheatre outside of the gate of Alcalá, where the favourite spectacle of bull-fights is exhibited.

The police of Madrid is not good. The streets are generally dirty, and the approaches to the city sometimes blocked up by heaps of rubbish. The city has no common sewers. Notwithstanding the great number of fountains, the want of good water is severely felt in summer. The city itself is considered to be extremely unhealthy; and if Philip II. chose it for his residence on account of the purity of the air and the quality of its waters, as we are told, Madrid must have undergone a complete change since that time. The sharp winds which blow from the Guadarrama mountains in winter produce the endemic pulmonia or pneumonia, which often proves fatal in a few hours. A sort of colic, caused by the dryness of the atmosphere, is likewise a prevalent complaint in summer.

Charitable and benevolent institutions are numerous, and some are amply provided with funds; but the management having always been in the hands of the clergy, the funds have been spent in building monasteries and churches, rather than applied to the charitable purposes intended by the donors. An institution, supported by voluntary contributions and patronised by the government, has recently been established outside of the city, for the reception of beggars, who were formerly objects of horror and disgust in the streets of Madrid.

On the 23rd of March, 1808, Madrid was entered by the French troops under Murat, and the royal family was decoyed into France. The heroic rising of the inhabitants of Madrid on the 2nd of May of the same year obliged the French to evacuate the town, and aroused the whole Spanish nation. Madrid was again occupied by Napoleon in person in December following, and by his brother Joseph in 1809.

Madrid has little manufacturing industry. A manufacture of porcelain and another of tapestry are both the property of the crown.

(Laborde's *View of Spain*, vol. iii.; *Viage Artistico de España*, vol. vi.; Miñano, *Diccionario Geografico de España y Portugal*, vol. v.; Quintana, *Grandeza de Madrid;* Capt. Cook's *Sketches in Spain;* and chiefly, Mesonero, *Manual de Madrid.*)

MADRIGAL, in music, an unaccompanied vocal composition, sometimes in three parts, but commonly in more; and as the true madrigal is written in what is termed the learned style—abounding in points of the fugal or imitation kind—it is, almost necessarily, as much the produce of study as of genius. Morley—himself a renowned writer of madrigals—says that in this sort of composition 'no point is to be long stayed upon, but once or twice driven through all the parts, and sometimes reverted [inverted], and so to the close, then taking another. And that kind of handling points is most esteemed when two parts go one way, and two another way, and most commonly in tenths or thirds. Likewise the more variety of points be showed, the more is the madrigal esteemed: and withal you must bring in fine bindings (sincopations) and strange closes, according as your ditty shall move you. Also in compositions of six parts (or five) you must have an especial care of causing your parts to give place one to another, which you cannot do without resting; nor can you cause them to rest till they have expressed that part of the dittying which they have begun.' (*Treatise*, 1597.)

The madrigal is to be traced to a very early period in the history of vocal music in parts: to the Flemings we are indebted for its birth, about the middle of the sixteenth century, and the Italians took it up shortly after, with what success the names of Palestrina, Marenzio, Conversi, Ferretti, &c., will bear witness. Nor were the English deficient in emulation or slow in manifesting it; Morley's first book of madrigals was published in 1594, Weelkes's in 1597, Wilbye's in 1598, Bennet's in 1599, and only a few years later, John Ward's and Orlando Gibbons's appeared. Dowland's and Ford's lovely compositions, the former published in 1597, and the later in 1607, have the title of madrigal bestowed on them, but they are more properly part-songs, or what would now be called glees. And here it may not be improper to say, that we are among the many who are of opinion that the English madrigalists have no superiors. To which we will add, that for the preservation of this high order of composition, the art has long been, and still continues to be, indebted to the *Madrigal Society*, a club, consisting chiefly of amateurs, founded in London in 1741, and which, by zeal and perseverance, has succeeded in diffusing throughout the British Isles a taste for a species of music as delightful as it is scientific, and exactly suited to the choral societies already existing, or springing up, in all our great manufacturing and commercial towns.

Every attempt to fix, with any precision, the derivation of this word, has been baffled. Menage thinks that *Mandra*, 'a sheep-fold,' is its source, for he supposes it to have been, in its origin, a pastoral song. Bishop Huet considers it a corruption of *Martegaux*, a name given to the inhabitants of a district of Provence, who, according to a learned French writer, excelled in the species of poetical composition called the *Madrigale*. Dr. Burney agrees with Doni, who derives it from *Alla Madre*, the first words of certain short hymns addressed to the Virgin. And Sir John Hawkins remarks, that there is a town in Spain named Madrigal. But all these conjectures—for they amount to no more—are merely plausible, and we only offer them in the absence of a more satisfactory etymology.

MADURA, an island in the Eastern seas, separated by a narrow strait from the north-east coast of Java. This strait is sufficiently deep to allow the largest ships to pass through, but the guidance of a pilot well acquainted with the navigation is required for that purpose. Madura lies between 6° 58′ and 7° 30′ S. lat., and between 110° 20′ and 111° 50′ E. long. Its extreme length from east to west is 90 miles, and its mean breadth 17 miles. The island is politically divided into three districts, each of which is nominally under the government of a native chief, but the whole are subject to the authority of the Dutch governor of Java. These divisions are:—Bangkalan, occupying the western; Pamakassan, the centre; and Sumanap, the eastern portions of the island. Each division contains a town or capital, bearing the name of the district. In the year 1746 the Dutch exercised so much authority over the chiefs or panumbahans of Madura, that they settled the order of succession, and obliged them to pay a tribute, partly in money and partly in the products of the country. For some services rendered to the Dutch government in 1825, during the insurrection in Java, the chief of Sumanap received the title of sultan.

The population of Madura in 1815, according to a census made by the English government, which was then in the possession of the island, was 218,659 souls, of whom 6344 were natives of China. The inhabitants reside in villages, of which there are about 1100 in the island. The character of the natives resembles very nearly that of their Javanese neighbours; but they are more warlike, and are more readily disciplined as soldiers: they speak a peculiar dialect, which has but little resemblance to that in use in Java. The religion of the Madurese is Brahminical, and the practice of widows burning themselves with the bodies of their husbands is prevalent.

The soil of Madura is fertile, and produces abundance of fine rice, part of which is exported to Java. Buffaloes and sheep are also bred for exportation, and a considerable quantity of coco-nut oil is also prepared for the same purpose; but the principal export-trade of the island consists of salt, many cargoes of which are taken every year to Java, Sumatra, and Borneo. (Stavorinus's *Voyages;* Crawfurd's *Indian Archipelago.*)

MÆANDER. [ANATOLIA.]

MÆCE'NAS, CAIUS CI'LNIUS, belonged to the equestrian order (Horat., *Carm.* i. 20, 5; Velleius Paterc., ii. 88; Tac., *Ann.* vi. 11), and was descended from an antient Etruscan family (Horat., *Carm.* i. 1, 1; iii. 29, 1; *Serm.* i. 6, 1) at Arretium. (Liv., x. 3.) The cognomen Mæcenas is derived, according to Varro, from a town of the same name. (*De Ling. Lat.*, vii., *end.*) We are ignorant of the place and time of his birth; but he appears to have received a superior education, and was well acquainted with the Greek language. (Hor., *Carm.* iii. 8, 5; *Epist.* i. 19, 1.) He early became acquainted with Octavianus (Augustus Cæsar), and continued through his life an intimate friend and chief adviser of that emperor. While Augustus was engaged in opposing Sextus Pompeius, and also during many of his other wars, Mæcenas was entrusted with the charge of the city; and it appears to have been owing in a great degree to his prudence and sagacity that peace was preserved in Rome during the absence of Augustus. (Tac., *Ann.*, vi. 11; Dio., xlix. 16; Seneca, *Epist.* 114; Hor., *Carm.* iii, 29, 25; and LEPIDI.) Mæcenas is said to have dissuaded

Augustus from his purpose of restoring the antient Roman constitution, which Augustus however could never have seriously intended. (Sueton., *Octav.*, 28; Seneca, *De Brev. Vit.*, 5.) Mæcenas was held in the greatest honour by Augustus, although during the latter part of his life he appears to have been for a short time in disgrace with the emperor, principally owing to the intrigues of his wife Terentia (Tac., *Ann.*, iii. 30; Dio., liv. 19, lv. 7); but he was probably received into favour again before his death, which happened B.C. 8, four years after that of Agrippa. Mæcenas enjoyed with Agrippa the full confidence of Augustus, and his death was considered by Augustus as an irreparable loss. (Seneca, *De Benefi.*, vi. 32.) If we may believe a tale related by Dion, he sometimes rebuked the emperor with the utmost freedom (lv. 7).

Mæcenas was a great patron of literature; and it was principally owing to his assistance and support that Virgil and Horace were raised from a state of poverty and indigence, and enabled to devote themselves to poetry. They were both admitted to his friendship, and Horace in particular appears to have lived on terms of the greatest intimacy with him.

The health of Mæcenas was not good (Pliny, *H. N.*, vii. 52), and was probably injured by his luxurious and voluptuous habits. (Sen., *Epist.* 120; Juv., xii. 39; Petron., 81; Dio., liv. 30; Tac., *Ann.*, i. 54; Plutarch, *Erotica*, c. 16.) He lived in a magnificent house on the Esquiline Hill, from which Nero is said to have witnessed the burning of Rome. (Suet., *Nero*, c. 38; Sen., *Epist.* 114)

Mæcenas wrote several works, none of which have come down to us. Their loss however is not much to be deplored, since, according to the testimony of many antient writers, they were written in a very artificial and affected manner. (Suet., *Octav.*, c. 86; Sen., *Epist.* 114; Tac., *Dial. de Orat.*, c. 26, who speaks of the *calamistros Mæcenatis.*) They consisted of poems, tragedies (one entitled 'Prometheus,' and another 'Octavia'), a history of the wars of Augustus (Hor., *Carm.* ii. 12, 9), and a symposium, in which Virgil and Horace were introduced. (Servius on Virg. *Æn.*, viii. 310.) The few fragments which remain of these works have been collected and published by Lion under the title of 'Mæcenatiana, sive de C. Cilnii Mæcenatis Vita et Moribus,' Göttingen, 1824.

There is a curious passage in the 'Saturnalia' of Macrobius (ii. 4), in which he gives an extract of a letter from Augustus to Mæcenas, in which the emperor ridicules the style of his friend: 'Vale, mel gentium, melcule, ebur ex Etrutria, lafer (lacer?) Aretinum, adamas supernas, Tiberinum margaritum, Cilniorum smaragde, jaspis figulorum, berylle Porsenæ, carbunculum habeas, *ἵνα συντέμω πάντα μάλαγμα* (*ἵνα συντείνω πάντα μαλάγματα?*) mœcharum.'

MAELSTROM. [TRONDHEIM.]

MÆNU'RA, or MENU'RA, Dr. Shaw's and Dr. Latham's name for a singular genus of birds, whose place in the system has occasioned some difference of opinion among ornithologists.

In 'An Account of the English Colony of New South Wales, from its first settlement in January, 1788, to August, 1801, &c. &c., to which are added some particulars of New Zealand, compiled by permission from the MSS. of Lieut.-Governor King; and an Account of a Voyage by Captain Flinders and Mr. Bass, &c. &c., abstracted from the Journal of Mr. Bass, by Lieut. Collins of the Royal Marines,' &c. (4to. 2 vols., 1802, London), it appears that in January, 1798, in consequence of the determination of certain Irishmen to go out for the discovery of a settlement for themselves, the governor, after ineffectually trying corporal punishment, determined, with a view of checking the spirit of emigration, to convince these Irish by their own experience of the danger and difficulties which attended it, and accordingly he caused four of the strongest and hardiest among them to be chosen by themselves, and properly prepared for a journey of discovery. They were to be accompanied by three men, upon whom the governor knew he could depend, and who were to lead them back when fatigued and exhausted with their journey over the worst and most dangerous part of the country. A conspiracy to murder the guides was discovered, and counteracted by the addition of four soldiers to the guides, and on the 14th they set off from Paramatta. On the 24th the soldiers returned with three of the deputies, who, having gained the foot of the first mountains, were so completely sick of the journey, and of the prospect before them, that they requested to return with the soldiers, whose mission here terminated. The three persons who had been sent out with the Irishmen returned on the 9th of February. 'On arranging their courses and distances on paper, they appeared to have travelled in a direction south-west three-fourths west about 140 miles from Paramatta. They brought in with them one of the birds which they had named pheasants, but which, on examination, appeared to be a variety of the Bird of Paradise. The size of this curious and handsome bird was that of a common hen; the colour a reddish-black, the bill long, the legs black and very strong. The tail, about two feet in length, was formed of several feathers, two of which were the principal, having the interior sides scalloped alternately of a deeper or lighter reddish-brown inclining to orange, shading gently into a white or silver colour next the stem, crossing each other, and at the very extremity terminating in a broad black round finishing. The difference of colour in the scallops did not proceed from any precise change in the colour itself, but from the texture of the feather, which was alternately thicker and thinner. The fibres of the outer side of the stem were narrow, and of a lead colour. Two other feathers of equal length, and of a blueish or lead colour, lay within those; very narrow, and having fibres only on one side of the stem. Many other feathers of the same length lay within those again, which were of a pale greyish colour, and of the most delicate texture, resembling more the skeleton of a feather than a perfect one.' Lieut. Collins then gives a figure of the bird 'from the pencil of a capital artist,' which seems to have been handed down from author to author, and is indeed upon the whole correct, with the name of *Mænura superba*.

M. Temminck arranged the form under his order of Insectivorous Birds (*Insectivores*), among the Thrushes, giving it a position between *Cinclus* and *Pitta*.

Cuvier does not differ much in his views from M. Temminck; for he places it among his great group of *Passereaux* (Cuvier's 2nd order), and it stands in the '*Règne Animal*' in the following relative position: '*Oriolus*, *Gymnops*, *Mænura*, *Motacilla*.'

M. Vieillot differs almost entirely from both Temminck and Cuvier; for, though he includes it in his second order, which corresponds with the *Insessores* of Mr. Vigors, the *Lyriferi* stand in M. Vieillot's 'Analyse' at the extremity of that order, and near the groups of *Columba* and *Penelope*.

Illiger, in his *Prodromus*, arranged it among the *Rasores*.

Before we proceed to a consideration of the views of more modern authors, it is right to put the reader in possession of Cuvier's description, with his reasons for classing *Mænura* as he did. He says that the size of the bird (a little less than that of a common pheasant) has caused it to be referred to the Gallinaceous Birds, but that it belongs evidently to the Passerine order from its feet, whose toes (excepting the first articulation of the external and middle toe) are separated, while the form approaches the Thrushes (*Merles*) in the structure of the bill, which is triangular at its base, elongated, and a little compressed, and notched towards its point; the membranous nostrils are large and partially covered with feathers as in the Jays. *Mænura*, he adds, is to be distinguished by the great tail of the male, which is very remarkable for the three sorts of feathers that compose it. The twelve ordinary feathers are very long, with loose and very distant barbs; two more in the middle are furnished on one side only with close-set barbs, and two external ones are curved in the form of an S, or like the branches of a lyre, whose internal barbs, which are large and close-set, represent a broad ribbon, while the external ones are very short and do not become enlarged till towards the end of the feathers. The female has only twelve feathers of the ordinary structure.

Mr. Vigors (*Linn. Trans.*, vol. xiv.), who alludes to the position assigned to the bird by the authors above mentioned, places it at the extreme of his third order (*Rasores*), among his family of *Cracidæ*, for reasons which the reader will find stated in a former volume. [CRACIDÆ, vol. viii., p. 128.]

M. Lesson speaks of the position of the *Mænura* as far from being fixed, and though he follows Cuvier in placing it among the *Passereaux*, he observes that some authors think that it would stand better at the side of *Megapodius*, in the Gallinaceous order. After quoting the words of Cuvier given above, he says, 'The Mænura has then been arranged sometimes among the gallinaceous birds under the name of the *Lyre-Pheasant* or *Pheasant of the Woods*, and sometimes at the end of the *Calaos* [Hornbill, vol. xii.] and the *Hoazins* [Cracidæ, vol. viii., p. 132], as M. Vieillot classed it, while, scientifically speaking, it is near the *Thrushes* that *Mænura* ought to take its place, though it departs distinctly from them in the form of the body.'

Mr. Swainson ('Classification of Birds,' vol. ii., 1837) alludes to the place assigned to *Mænura* and *Megapodius* by Mr. Vigors, and says that they certainly accord more with that family than with any other group of the Gallinaceæ. Mr. Swainson observes that both these genera have the feet uncommonly large, and that both seem to represent the scansorial genus *Orthonyx*, a bird indeed scarcely larger than a sparrow, but agreeing in the very remarkable scansorial character of having the three fore toes of nearly the same size. 'If,' continues Mr. Swainson, 'the *Cracidæ*, as we believe, is the scansorial family of the *Rasores*, this singular analogy is precisely what we should expect in two groups representing the same tribes.' In the synopsis at the end of the volume Mr. Swainson cancels the term *Cracidæ*, and substitutes in its place the family *Megapodinæ* (Megapodidæ?), remarking, that as he has every reason to believe, from an attentive study of this family, that *Crax* is an aberrant genus, he has thought it better to correct his former error, and to name the whole from that group which is one of the chief types; and he makes *Mænura* the first genus of his 'Family *Megapodinæ*, *Greatfoots*,' with the following

Generic Character.—*Bill* moderate, depressed at the base, straight; the tip obsoletely notched. *Nostrils* naked and placed near the middle of the bill. *Feet* very large, strong and robust; nearly all the anterior toes equal; the claws enormous for the size of the bird, obtuse, and slightly curved. *Wings* short. *Tail* very long, lyre-shaped; the feathers singularly developed. The typical or conirostral form of the whole family.

Example, *Mænura superba*, *Mænura Lyra* or *Lyrata*, *Mænura Novæ Hollandiæ*, Shaw, Lath., *Mænura paradisea*,* Vieill., the only species known.

Description. — Lieutenant Collins, in the work above quoted, gives, towards the end of his second volume, 'a more minute and ornithological description (with which he had been 'favoured') than that stated above. The second description is as follows. 'The bill of this bird, which has been named the *Mænura superba*, is straight, having the nostrils in the centre of the beak. The base of the upper mandible is furnished with hairs like feathers turning down; the upper mandible is at the base, somewhat like that of the pigeon. The eye is a dark hazel, with a bare space around it. The throat and chin are of a dark rufous colour; the rest, with the body, of a dusky grey. The feathers on the rump are longer than those of the body, and more divided. The colour of the wings, which are concave, is dark rufous. The legs and claws are large in proportion to the bird, particularly the claws. The outward toe is connected with the middle one as far as the first joint. The tail is long, and composed of three different sorts of feathers, of which the upper side is of a dark grey, with ferruginous spots. The first two lower feathers, which are a little curved in two directions, are beneath of a pearly colour, enriched with several crescent-shaped spaces, of a rich rufous and black colour. The laminæ are unwebbed, turned round toward the extremity, and ornamented with a black bar, the breadth of an inch, and fringed at the end. The shaft of the second, which is likewise long, is fringed with long hair-like filaments; and the third, which is also long and curved, is plumed on the inner side only, except at the extremity, where there are a few separated filaments of a dark-grey colour.'

'The female *Mænura superba* differs very little from the male, except in the tail, which is composed of twelve feathers, a little curved and plumed, having the upper side dark rufous and grey, and the under of a pearly colour.'

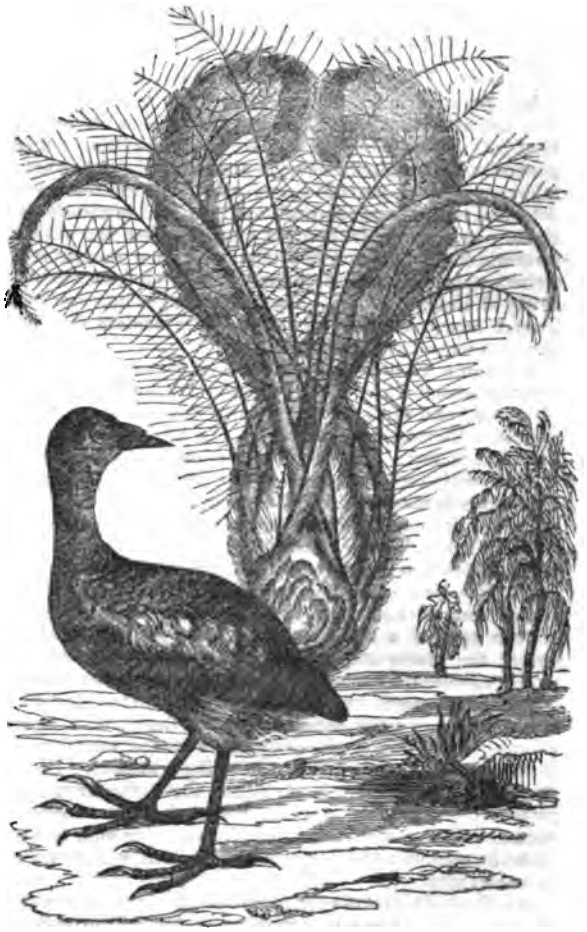
The more modern descriptions of the tail of the female state it to be simply brown, and composed of long uniform feathers, which are straight and graduated.

Notwithstanding the sombre hues of this extraordinary bird, the magnificence and peculiar structure of the beautiful tail of the male, which imitates the form of an antient Grecian lyre, give it a superb appearance.

Locality.—New South Wales, principally in the forests of *Eucalyptus* and *Casaurina* which cover the Blue Mountains, and in their rocky and retired avenues.

Habits.—Lieutenant Collins says that 'the following particulars relating to these birds were observed by persons resident in the country, and who were eye-witnesses of what is here told. They frequent retired and inaccessible parts of the interior; have been seen to run remarkably fast, but their tails are so cumbrous that they cannot fly in a direct line. They sing for two hours in the morning, beginning from the time when they quit the valley, until they attain the summit of the hill, where they scrape together a small hillock with their tail spread over them, imitating successively the note of every bird known in the country. They then return to the valley.' If dependence could be placed upon this account as far as relates to the singing, it would assist the views of those who would place *Mænura* near the Thrushes; among the gallinaceous birds, singing, in the common acceptation of the word as applied to birds, is not known. But this sort of statements, taken as they mostly are from the relation of those who are not very careful as to the truth of their communications, if they can only surprise and please their auditors, must be received with many grains of allowance. The 'song' is not corroborated by subsequent observers.

Mr. Caley informed Mr. Vigors, that from the observations he was enabled to make on these birds during his stay in New Holland, it was his opinion that these birds were gallinaceous. Mr. Caley generally found them in flocks, and for the most part on the ground. M. Lesson states that they come forth in the evening and the morning, remaining quiet during the day on the trees whereon they perch. He says that they are becoming more and more rare, and that he only saw two skins during the whole of his stay at New South Wales. Mr. Swainson informs us that chief-justice Field of Gibraltar, who was long a resident in New Holland, assured him (Mr. S.) that *Mænura* in all its habits was a gallinaceous bird, living on the ground in small societies, and being very fond of rolling in the dust.



Mænura superba, the Lyre-tail (male).

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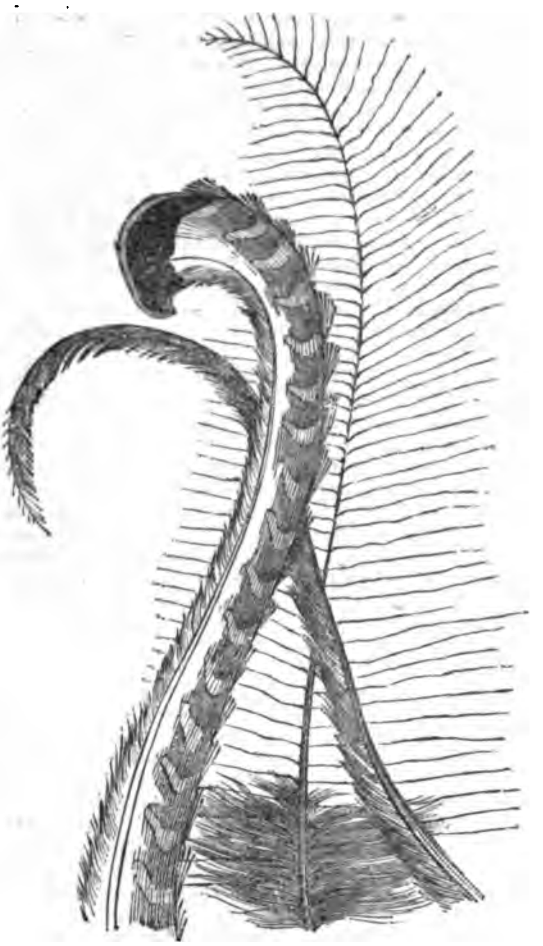
* This is the name adopted by Mr. Swainson.



Some of the tail-feathers of Mænura superba.

Mr. Bennett in his 'Wanderings in New South Wales,' &c., remarks that this 'Native Wood-Pheasant,' or 'Lyre Bird' of the colonists; the 'Béleck-Béleck' and 'Balangara' of the aboriginal tribes, is abundant about the mountain-ranges in all parts of the colony. The tail feathers are detached entire from the bird, and are sold in the shops at Sydney in pairs. Mr. Bennett observes that the price was formerly low; but now that the bird, from continued destruction, has become rare, their tails fetch from twenty to thirty shillings the pair. About the ranges however of the Tumat country, where they have been seldom destroyed, they are more frequently seen.

The same author states that it has its young in December, the season when all the wild animals in the colony are produced, and can be then procured with facility. 'It is,' says Mr. Bennett in continuation, 'a bird of heavy flight but swift of foot. On catching a glimpse of the sportsman it runs with rapidity, aided by the wings in getting over logs of wood, rocks, or any obstruction to its progress; it seldom flies into trees, except to roost, and then rises only from branch to branch: they build in old hollow trunks of trees which are lying upon the ground, or in the holes of rocks; the nest is formed merely of dried grass or dried leaves scraped together; the female lays from twelve to sixteen eggs of a white colour, with a few scattered blue spots; the young are difficult to catch, as they run with rapidity, concealing themselves among the rocks and bushes. The Lyre Pheasant, on descending from high trees, on which it perches, has been seen to fly some distance; it is more often observed during the early hours of the morning, and in the evenings, than during the heat of the day. Like all the gallinaceous tribe, it scratches about the ground and roots of trees, to pick up seeds, insects, &c. The aborigines decorate their greasy locks, in addition to the emu feathers, with the splendid tail feathers of this bird, when they can procure them.'

Mr. Bennett laments the rapid disappearance of the races of animals found in a new country, and which are pursued, whether useful or dangerous, even to extermination. He states that in the settled parts of the colony, the harmless kangaroos and emus are rarely seen, when they might easily be domesticated about the habitations. 'The same remark,' he adds, 'applies to the Lyre Pheasant. Why are they not domesticated, before, by extermination, they are lost to us for ever?'

We trust that this may meet the eye of some spirited individual who will *not* suffer the loss to take place, but bestir himself to import these magnificent birds. That they would live in this country, as well as the Emus and Kangaroos, with ordinary care, there can be little doubt; and they would form a striking addition to our aviaries,—perhaps even to our homesteads.

MÆOTIS, PALUS. [AZOFF, SEA OF.]

MÆRA, Dr. Leach's name for a genus of Amphipodous crustaceans.

Example, *Mæra grossimana*, Leach (*Cancer Gammarus grossimanus*, Montagu). 'Linn. Trans.,' ix., tab. 4, fig. 5. Very common on the English coasts, where it is found under stones and rocks at low water.

MAESTLIN, MICHAEL, a German astronomer, born about the year 1542, probably at Tübingen, in Wirtemberg, at the university of which place he held the appointment of professor of mathematics. While resident in Italy he became acquainted with Galilei, whose conversion from the doctrine of Ptolemy to that of Copernicus is partly attributed by some authorities to the arguments adduced by Maestlin in favour of the latter. Upon his return to Germany he became tutor to Kepler, to whom he behaved with marked liberality; for notwithstanding the great benefit which Kepler must have derived from his instruction, he declined accepting any pecuniary remuneration whatever; indeed Kepler does not appear to have been wanting in gratitude towards him, for both in his 'Mysterium Cosmographicum,' and in a letter prefixed to the 'Narrative of Rheticus,' he acknowledges the great encouragement he had invariably received from his tutor; and at a later period, when struggling with disappointment and poverty, he presented him with a handsome silver cup, bearing an appropriate inscription. Maestlin died at Tübingen, in 1590. His published works are: 1, 'De Stellâ nova.' 2, 'Ephemerides, according to the Prutenic Tables by Erasmus Reinold,' 1551. 3, 'Thesis de Eclipsibus.' 4, 'Observatio et Demonstratio Cometæ anni 1577 et 1578,' Tübing., 1578, 4to. 5, 'Consideratio et Observatio Cometæ,' 1580; Heidelb., 1581. 6, 'Alterum Examen Gregoriani Kalendarii,' Tübing., 1586, 4to. 7, 'Epitome Astronomiæ,' Tübing., 1597, 1610, &c.)

(Watt's *Bibliotheca Brit.*; Hutton's *Mathematical Dictionary*, &c.)

MAFFE'I, SCIPIO'NE, Marquis, born at Verona in 1675, of a noble family, was educated in the college of Parma, and showed an early aptitude for poetry and literature in general. When the war of the Spanish succession broke out, he entered as a volunteer the Bavarian service, in which his brother Alessandro Maffei held the rank of general. After passing some time in Germany he left the army for Italy with the view of devoting himself entirely to study. He wrote upon many and various subjects, and he generally wrote well. His principal works are—1, 'La Merope,' a tragedy, the first written in Italian which deserves the name; it was received with great applause, and went through seventy editions in the author's lifetime. 2, 'Verona Illustrata,' which is the principal work of Maffei, and full of antiquarian and historical learning. The first part contains a history of Verona from its foundation to the time of Charlemagne; the second is a literary history of Verona, with biographical notices of the native writers; the third is a stranger's guide to all the remarkable objects in Verona and its neighbourhood; in the fourth the author illustrates the Roman amphitheatre in that city, which is one of the best preserved remains of the kind. The whole work is written in a spirit of sound criticism, and exhibits the various features of the social, political, and intellectual state of that part of Italy during a long course of ages. 3, 'Della Scienza chiamata Cavalleresca libri trè,' dedicated to Pope Clement XI., in which he combats the absurdity of duelling. 4, Three treatises against the belief, then still prevalent, in magic: 'Arte Magica dileguata,' 1749; 'Arte Magica distrutta,' 1750; 'Arte Magica annichilata,' 1754. Maffei was charged by one Tartarotti with being almost an infidel because he did not believe in sorcery. 5, 'Trattato dei Teatri antichi e moderni,' in which he took up the defence of theatrical performers against the denunciations of

Father Concina, a Dominican, who attributed to them all the corruption of the age. Pope Benedict XIV., in a brief dated the 5th of October, 1750, addressed to Maffei, testified his full approbation of this defence, saying that 'theatres ought not to be suppressed, but that the performances ought to be as much as possible honest and decorous.'

Maffei had a controversy with the Jansenists on account of something which he wrote concerning the bull Unigenitus [JANSENISTS]; and also because he maintained, against two priests of Verona named Ballerini, that it was lawful to receive a moderate interest on a loan of money, 'Impiego del Danaro.' The Jansenist party, which was powerful in North Italy, prevailed on the Venetian senate to exile Maffei, who was then seventy years of age. But the senate soon perceived their error, and Maffei was honourably recalled after four months, and re-entered Verona in triumph.

Maffei, in union with Vallisnieri and Zeno, originated the first literary Journal which appeared in Italy, 'Giornale dei Letterati,' begun in 1710, and which was continued till 1730. After the discontinuance of that journal he wrote a sort of continuation of it under the name of 'Osservazioni Letterarie,' of which he published six volumes.

In 1733 Maffei visited France, where he collected the materials for his work, 'Galliæ Antiquitates,' which he afterwards published. He was numbered among the members of the Academy of Inscriptions. From France he visited England, and was well received at the court of George II., especially by the Prince of Wales, who was very fond of Italian literature. He was made a member of the Royal Society, and the university of Oxford, which he also visited, conferred on him the degree of LL.D. He travelled through Holland and Germany, and returned to Italy after an absence of four years.

Maffei died at Verona in the year 1755, being eighty years of age, with the well merited reputation of one of the first Italian scholars of the eighteenth century.

(Corniani, *Secoli della Letteratura Italiana*; J. Pindemonte, *Elogio di Scipione Maffei*.)

There is another but much older writer of the same name, Giovanni Maffei, who wrote a 'History of the East Indies,' in Latin, in 16 books, of which an Italian translation was published at Florence in 1589.

MAFRA is the name of a vast and magnificent pile of buildings, which contain a church, royal palace, and convent, situated in a bleak solitary country about 20 miles northwest of Lisbon, and about three miles from the sea-coast. It was founded by King John V. in the year 1717, in imitation of the Escurial of Spain. The plan of the edifice forms a quadrangle, measuring from east to west 760 feet, and from north to south 670 feet. In the centre of the west front is a sort of Ionic hexastyle portico, which leads to the church; and at each side is a pavilion, one for the accommodation of the royal family, the other for the patriarch of Lisbon and mitred canons. Another part of the building is the monastery, which contains 300 cells, a college, and a library, said to consist of between 40,000 and 50,000 volumes. The church is adorned with numerous columns of Carrara marble, and six very fine columns of red marble, besides large pannels and tables of perfectly black marble, highly polished. The number of apartments in the whole building is reckoned at 866, and the doors and windows at 5200. The whole of this building is vaulted and covered over with flags, forming a vast terrace. The gardens attached to the building are very extensive, and enclosed by a wall; they are well stored with a variety of exotics, imported from Asia, Africa, and America. Father Joam de Prado published a full description of Mafra in 1751. The small town of Mafra has grown up round the monastery. (Kinsey, *Portugal Illustrated*; Murphy, *Travels in Portugal*.)

MAGADOXO, or **MUKDEESHA**, a town on the eastern shores of Africa, on the coast of Ajan. The town is situated about 2° 30′ N. lat. and 45° E. long., and is the only important place on the whole coast. The harbour is formed by a long coral reef, and the town is divided into two parts, Umarween and Chamgany; the latter consists entirely of tombs. Umarween contains nearly one hundred and fifty stone houses, built in the Spanish style. It carries on some commerce with Arabia. Its exports are ivory, gum, and a particular kind of cloth; it imports sugar, dates, salt-fish, arms, and slaves. Its sovereign is dependent on the Iman of Muscat in Arabia. (Owen's *Voyages to explore the Shores of Africa, Arabia, and Madagascar*.)

MAGALHAENS, FERNANDO, commonly but incorrectly called *Magellan* was one of the most distinguished sea-officers of his time, and as a navigator and discoverer only inferior to Columbus. He was born about 1470, in some place in Alemtejo, and entered the Portuguese navy at an early age. He was afterwards sent to the East Indies, where he served for five years under Alfonso Albuquerque, and distinguished himself at the conquest of the town of Malacca in 1511. He afterwards returned to Europe, either from discontent, because the recompense which he thought due to his services, and which he had demanded, had been refused, or through fear of punishment for having embezzled some money intrusted to him. Being desirous to distinguish himself by some great enterprise, and finding that the numerous voyages to America had made it evident that this continent extended to a great distance towards the south, and being at the same time aware that the Moluccas, or Spice Islands, discovered a few years before, were situated much farther to the west, he revived the idea of Columbus of sailing to Asia by a westerly course. According to some authorities he proposed the enterprise to King Emanuel, who rejected it; but others assert that he made the proposal in the first instance to the court of Spain, where it was favourably received by Cardinal Ximenes, the regent, and afterwards approved by the emperor Charles V. A squadron of five vessels, with 236 men on board, was fitted out for that purpose, and Magalhaens left S. Lucar de Barameda on the 20th September, 1519. His object being to discover a strait or open sea, which would take him to the Moluccas, he directed his course with great judgment to the southern shores of Brazil, and entered the La Plata river, but he was soon convinced that it was not a strait. He then sailed southward, along the eastern coast of America, and was obliged to pass the winter in the harbour of S. Julian (near 50° S. lat.), where a conspiracy was formed against him. In detecting and putting down this conspiracy he showed great sagacity, prudence, and resolution. He discovered and entered the strait, which bears his name, about the end of October, 1520, and reached its western extremity on the 27th of Nov., when he entered the Pacific Ocean. He navigated the Pacific for 3 months and 20 days without finding an island, but during this course he enjoyed continuous fair weather, with such favourable winds, that he bestowed on this ocean the name of Pacific, which it still bears. The length of the voyage however reduced the crew to the greatest distress for want of food, and they began to suffer also from the scurvy. So great were their hardships, that Pigafetta, who wrote an account of this voyage, is firmly persuaded that an expedition round the world would never be undertaken again; and indeed more than fifty years elapsed between the voyage of Magalhaens and that of Drake (1577). On the 6th of March, 1521, Magalhaens arrived at a group of islands, which he called Los Ladrones, from the inclination to theft which the inhabitants displayed. After having refreshed his crew, he continued his course westward, and discovered the extensive group of the Philippines, which he called the archipelago of S. Lazaro. He induced a chieftain of the island of Zeba to acknowledge the sovereignty of the king of Spain, promising to assist him in subduing his enemies. With this view he undertook an expedition against the chieftain of the small island of Matan, but he was courageously resisted by the inhabitants, and killed in the contest. The command of his vessels devolved on Juan Sebastian del Cano, who conducted them to the Moluccas, and thence to Spain.

MAGALHAENS, STRAITS OF, commonly called the *Straits of Magellan*, is the most extensive known strait on the surface of the globe. Its length in a straight line is above 200 miles; but if the three great bends are taken into the account, it is rather more than 300 miles. It divides the continent of South America from the South American Archipelago, commonly called Tierra del Fuego. The eastern entrance is formed by Cape de las Virgines on the continent and by Cape del Espiritu Santo, or Queen Catherine's Foreland, which is on King Charles's Southland, the largest of the islands composing Tierra del Fuego. At its western entrance are Cape Pillar on the south, on the island of South Desolation, and Cape Victory on the north, on a small island belonging to Queen Adelaide's Archipelago. The most northern bend of the Strait approaches 53° 10′ S. lat., and the most southern inlet, called Admiralty Sound, 55° S. latitude. The eastern extremity of the strait is situated in about 68° 20′ W. long., and the western in about 74° 40′.

This strait may be considered as divided into three parts. The eastern part extends from Cape de las Virgines to Cape Negro, and its direction as far as the first Narrow is nearly west, but afterwards to the south of west. In two places the strait contracts to a width of five or six miles, forming the two Narrows, of which the eastern is called De la Esperanza, and the second that of S. Simon. It is extremely difficult and dangerous to pass through these Narrows from east to west, as western winds prevail in them nearly all the year round, and the western currents, which set through them, sometimes acquire such strength as to run more than seven miles an hour, a rate which approaches the rapidity of a mountain-torrent. The eastern part of the strait is not encumbered with islands and cliffs, except at its western extremity near Cape Negro, where there occurs the island of Isabella and some smaller ones, as well as some shoals. The country on both sides of this part of the strait is rather level, except that at some distance from the shore a range of hills rises on each side to a moderate height, but with rather a precipitous ascent. No trees grow in this country; the bushes are few in number and stunted, and the grass coarse though abundant.

The central portion of the strait, from Cape Negro to Cape Froward, lies north and south, and is the widest part, extending in two large inlets, called the Useless Bay and Admiralty Sound, deep into King Charles's Southland. This part of the strait is the easiest to navigate, being free from islands and cliffs, except the large island of Dawson. The country on both sides rises into high mountains, especially in the neighbourhood of Cape Froward and on the opposite coast of King Charles's Southland. Some of the peaks are above the snow-line, which here occurs at about 3500 feet above the sea-level. Mount Sarmiento on Tierra del Fuego attains the height of 6000 feet. Between the mountains there are valleys of some extent, which, as well as the lower part of the mountains themselves, are covered with a heavy growth of timber-trees.

The western part of the strait extends from Cape Froward to Cape Pillar, in a direction nearly south-east and north-west. This part is very difficult to navigate on account of its narrowness, the width varying between 5 and 25 miles, and also by reason of the numberless cliffs and islets, with which the shores, especially on the north side, are lined. To these disadvantages must be added the north-western gales, which sweep with incredible force along the channel of the strait. The mountains on each side are not so high as along the central portion, and rarely attain the snow-line; but their huge masses approach so close to the shores that in many places it is difficult to find as much level ground as is required to place a boat upon. Land-locked basins of moderate extent however occur in several places, and afford safe harbours. The mountains, which consist mostly of granite and greenstone, are irregularly heaped together; most of them for two-thirds of their height are covered with trees of a stunted growth. Two large inland salt-water lakes are united with this portion of the strait. Nearly opposite the south-eastern extremity of the large island of South Desolation [Fuego] a channel opens eastward into the continent. This strait, called Jerome Channel, leads to Otway Water, a large inland sea 50 miles long, trending to the north-east, and separated from the eastern portion of the strait only by a narrow isthmus. From this lake another channel, called Fitzroy Channel, 12 miles long, leads in a north-west direction to another inland lake, called Skyring Water, which is about 34 miles long and 12 wide. The country bordering these lakes on the south and west is high, rocky, and mostly covered with trees; whilst that which encloses them on the east and north is a low, undulating, grassy plain, without trees.

The Strait of Magalhaens was discovered by Fernando Magalhaens in 1520. The Spanish government caused a settlement to be made on the northern shore, in the central part of the strait, by that skilful navigator Sarmiento, in 1583 or 1584. The settlement was called San Felipe, and was visited in 1587 by Cavendish, who found the settlers perishing with cold, hunger, and disease. From that time the place was called Port de Hambre or Port Famine, and was soon after abandoned.

The strait was formerly much navigated by vessels bound for the harbours on the western coast of America; but the navigation was always dangerous and tedious. Magalhaens had the good fortune to traverse it in less than thirty days, but his successors have frequently employed double or triple that time in passing through the strait from east to west. The difficulty is produced by the nearly continuous western gales, the great strength and irregularity of the currents, the numerous rocks and cliffs in the western part of the strait, and the great humidity of the climate, which engenders scurvy and other diseases. In sailing round Cape Horn only the first two difficulties are encountered, but the climate is much colder, and snow and sleet are common. The great improvements in navigation in modern times have deprived the voyage round the Cape of most of its difficulties, but they have not in the same degree lessened those which are encountered in traversing the strait. At present a vessel rarely enters the strait unless sent by some government for a special purpose.

(Cordova's *Voyage of Discovery to the Strait of Magellan;* Capt. Phillip Parker King's *Observations upon the Geography of the Southern Extremity of South America,* &c., in the *London Geogr. Journal,* vol. i.; *The Chart of the Strait of Magalhaens, surveyed by* Captain P. P. King, R.N., 1826, 1830.)

MAGAS. [Branchiopoda, vol. v., p. 313.]

MAGAZINE, a strong building, constructed generally of brick or stone within a fortified place, or in the neighbourhood of a military or naval station, in order to contain in security the gunpowder or other warlike stores which may be necessary for the defence of the place, or for the use of the troops who are to perform military duty in the province or district.

On account of the liability of gunpowder to become deteriorated by humidity and by variations in the state of the air, the buildings in which it is contained are constructed with every precaution necessary to ensure dryness, and, as nearly as possible, a uniformity of temperature within them. They are generally in places remote from other buildings; they are furnished with metallic conductors, in order to avert danger from lightning; and, for security against the attempts of ill-disposed persons, they are surrounded by a wall and ditch. When in situations where they may become the objects of hostile measures, they are made *shell-proof.*

A magazine within the walls of a fortress is usually formed on an esplanade; and, if small, it may be in the interior of some bastion remote from the front against which an attack of the enemy is likely to be directed. But it would be preferable that such buildings should be in some work beyond the main rampart of the place, that an accident may be attended with as little detriment as possible.

The powder required for the immediate service of the works on the front attacked is taken from the general magazine, and placed in what are called *expense magazines;* that is, in temporary bomb-proof buildings, or in casemates formed in the rampart along that front, from whence it is conveyed to the batteries. These casemates or *souterreins* should be as well ventilated as possible, by having doors and windows in the interior side of the rampart, and loop-holes or small perforations on the side next to the main ditch. They sometimes constitute the only bomb-proofs belonging to a fortress; and then they become of the utmost importance, serving as well for the abode of the troops, when not on duty, as for the preservation of the powder and stores. [Bomb-proof; Casemate.] In such situations however, as magazines, they are subject to some disadvantages from which isolated buildings are free; for besides the humidity, which the means they possess for ventilation are not sufficient entirely to remove, the blowing up of any one by an accident would evidently destroy the rampart, and expose the place to the risk of an immediate assault. And when the vault springs from the back of the wall which constitutes the exterior revêtment of the rampart on any face of the work, its lateral pressure would facilitate the formation of a breach by overturning the wall as soon as the latter became weakened by the fire from the enemy's battering artillery.

The dimensions of magazines are necessarily dependent on the quantity of powder which they may be required to contain. Vauban, in his 'Traité sur la *Défense des Places,*' speaking of such as are made in the ramparts of fortresses, recommends them to be from eight to twelve feet wide, with semicircular-headed vaults; and he proposes that the barrels of powder should be placed in them in two rows, with a passage from three to four feet wide along the middle. The great magazines which have been constructed in this country consist of several parallel vaults, separated from each other by brick partition-walls, in which are doorways for affording lateral communication. Each vault is about ninety feet long and nineteen feet wide internally, and it has a door at each extremity. The side walls are from eight to ten feet thick, and are strengthened by buttresses built at intervals against them. The concave or interior surface of each vault, in a vertical and transverse section, is nearly of a parabolical figure, above the springing courses; and the exterior surface has the form of two inclined planes meeting in a longitudinal ridge-line above the middle of the vault. The thickness of the brickwork forming the vaulted roof is therefore various: at the crown it is seven or eight feet, and on the hances about three feet, this being considered sufficient to resist the shock of falling shells. The vault, on the exterior of the inclined planes, is covered with flat tiles, and the gutter between every two roofs with sheet-lead or copper. The height interiorly, from the level of the floor to the crown of the arch, is nineteen feet; and the lines at which the vaulting springs from the side walls are at half that distance above the floor. The narrow vertical perforations which are made through the side and end walls, for the purpose of giving air to the interior, are cut so as to leave a solid block or traverse of the brickwork in the middle of the thickness of the wall; the line of the perforation branching laterally from its general direction, and passing along the two sides of the traverse. By this construction, while air is admitted, no object capable of doing mischief can be thrown in from the exterior of the building. The flooring-planks are, of course, laid on joists raised considerably above the ground. One vault, of the dimensions above given, would contain 2500 barrels, or 225,000 lbs. of powder.

When the roof of a magazine is covered with earth to the height of several feet, for the purpose of securing it effectually against the effect of falling shells, the rain-water absorbed by the earth may at length penetrate through the brickwork to the interior of the building. In order to prevent this effect it has been proposed that the roof should be covered with common hollow tiles, having their concave surfaces upwards, and that, over these, boards should be laid to carry the earth. The absorbed water would thus drain off in the channels formed by the tiles, and be conveyed away by the gutters between the roofs.

MAGDALEN COLLEGE, Oxford, was founded in 1456, by William of Waynfleet, successively head master of Winchester and Eton schools, and provost of Eton, bishop of Winchester, and at the same time lord high chancellor of England, for a president, 40 fellows, 30 scholars called *Demies*, a schoolmaster, an usher, four chaplains, an organist, eight clerks, and 16 choristers. Of the Fellows five must be of the diocese of Winchester; seven of the county of Lincoln; four of the county of Oxford; three of the county of Berks; four of the diocese of Norwich; two of the diocese of York or Durham, one of the county of York, but in both cases with preference to priests; two of the diocese of Chichester; two of the county of Gloucester; two of the county of Warwick; one of the county of Buckingham; one of the county of Kent; one of the county of Nottingham; one of the county of Essex; one of the county of Somerset; one of the city of London; one of the county of Northampton; one of the county of Wilts. The Demies may be elected from any of the above-mentioned dioceses or counties, with the exception of York and Durham. The Visitor is the Bishop of Winchester.

The patronage of this College consists of rectories and vicarages in different counties, with two perpetual curacies, thirty-seven in number.

The number of members upon the college books in 1838 was 197.

Among the eminent persons who received their education at this college are cardinals Wolsey and Pole, bishops Warner, Hough, and Horne, dean Colet, Linacre, Lily the grammarian, Fox, the martyrologist, Godwin, the Hebrew antiquary, Sir Thomas Roe, Hampden, Dr. Hammond, Dr. Heylin, Elisha Coles, Dr. Thomas Smith, Addison, Gibbon, and Dr. Chandler.

Magdalen College stands upon a plot of ground at the entrance of Oxford from London, bounded on its east side by the Cherwell. The buildings are extensive. In one corner of the entrance court stands the stone pulpit from which the University sermon on St. John the Baptist's day used to be preached. This court leads into a larger quadrangle, which contains the chapel, hall, and library. South of the chapel and on the south side of what is called the Chaplain's court stands the tower of the college, the beautiful proportions of which render it one of the chief ornaments of Oxford. The great quadrangle was begun by the founder in 1473, though not finished till after his death. The foundation of the tower was laid in 1492. Previous to the Reformation a mass of requiem for the soul of Henry VII. used to be performed upon the top of this tower every May-day early in the morning; this was afterwards commuted for a few pieces of music, which are still executed on that day by the choristers, for which the rectory of Slimbridge in Gloucestershire pays annually the sum of 10*l.* The foundations of what are called the 'New Buildings' of this college, on the north side of the great quadrangle, were laid in 1733.

The chapel of this college, which had been refitted and decorated in an incongruous manner in the time of Charles I., was restored to its former magnificence under the direction of Mr. Cottingham in 1833. The fine picture of 'Our Saviour bearing his Cross,' over the communion table, ranks among the best paintings in Oxford. It has been attributed by some to Guido, and by others to Ludovico Caracci, but it is now given to Moralez. It was brought from Vigo in 1702.

(Gutch's *Coll. and Halls of Oxford; Chalmers's Hist. of the Univ. of Oxf.*, 8vo. Oxf., 1810; *Oxford Univ. Calendar*, 1838.)

MAGDALEN HALL, Oxford. The school, with the refectory and chambers erected by Bishop Waynfleet for students previous to admission into his college, and adjoining its buildings, obtained the appellation of St. Mary Magdalen Hall as early as 1487, and was governed by one of the Fellows till 1602, when it became an independent hall. The President and Fellows of Magdalen College, being desirous of recovering this site, obtained, in 1816, an act of parliament which authorised them to prepare for the reception of this society Hertford College, which had lapsed to the crown, and the Principal and other members removed there on its completion in 1822.

This Hall is possessed of one benefice, the rectory of South Moreton in Berkshire. It has also several exhibitions and scholarships, open to competition, left by different founders.

The original foundation of Magdalen Hall boasted among the names of its more eminent members those of bishop Wilkins, Warner and Daniel the poets, Sir Harry Vane, Sir Julius Cæsar, Lord Clarendon, Sir Matthew Hale, Sydenham, Dr. Pocock, afterwards of Corpus College, Dr. Hickes, afterwards of Lincoln, Dr. Plot, Sir George Wheler, and Dr. Nichols, the commentator on the liturgy.

The buildings of the old Hall were destroyed by an accidental fire, Jan. 9th, 1820.

(Chalmers, *ut supr.*, vol. ii. 453; *Oxford Univ. Calendar*, 1838; *Gent. Mag.*, vol. xc., P. ii., p. 78.)

MAGDALEN COLLEGE, Cambridge, was built by Edward Stafford, duke of Buckingham, in the year 1519, under the name of Buckingham House, on the site of an antient hostel belonging to the abbeys of Ely, Ramsey, and Walden, in which some of the monks of those monasteries resided from time to time. At a much more remote date it is supposed by some to have been the original site of Barnwell Priory. The Duke of Buckingham not having completed the building at the time of his attainder, the college fell to the crown and was granted to Thomas, lord Audley, lord high chancellor of England, who in 1542 endowed it for a Master and four Fellows.

Beside the foundation fellowships left by lord Audley, this College has thirteen bye-fellowships; one of them is a travelling fellowship left by the Rev. Drue Drury, worth upwards of 200*l.* per annum, but tenable for only nine years, and appropriated to the county of Norfolk. The Master has the sole appointment to this fellowship, and the holder must be in holy orders or designed for such.

The mastership of this College is in the gift of the possessor of Audley End.

Beside the fellowships, there are 43 scholarships belonging to this College, founded by different benefactors, some of considerable, others of smaller value; four of them are appropriated to Shrewsbury school; two to natives of Shropshire; two to scholars from Wisbeach school; four to Leeds, Halifax, and Haversham schools; and one to King's College, London.

The foundation-estate of lord Audley consists of the impropriate parsonage of St. Catharine Cree Church, in London, and also a considerable part of the city antiently called Covent Garden Christ Church. The benefices in the gift of the College, exclusive of the vicarage of St. Catharine Cree in London, are, the rectory of Stanton St. Michael in Cambridgeshire, the rectories of Anderby and Comberworth united, and the perpetual curacy of Grainthorpe in Lincolnshire; the rectory of Ellingham in Norfolk (annexed to the mastership by act of parliament); the rectory of Aldrington in Sussex, and the vicarage of Steeple Ashton in Wilts. The Master has the sole patronage of Steeple Ashton.

Among the eminent persons who have been members of Magdalen College are lord keeper Bridgman, bishop Walton, editor of the Polyglot Bible, Dr. Howell, the historian, bishop Cumberland, and Dr. Daniel Waterland.

This College, which stands on the north side of the Cam, consists of two small courts. On the north side of the second is a stone building, the body of which is appropriated to the reception of the Pepysian Library. This library was bequeathed to the College by Samuel Pepys, Esq., Secretary of the Admiralty in the reigns of king Charles II. and king James II., and is one of the most interesting in the University. Its contents are matchless both in variety and condition. With a few exceptions in morocco and vellum, they are all in a uniform binding in calf, gilt. Beside numerous manuscripts, this library is remarkably rich in works from the presses of Caxton, Wynkyn de Worde, and other early English printers. It contains a curious collection of engraved English portraits, numerous topographical prints and drawings, and a very rare and extensive collection of early ballads. There is an enumeration of some of the most interesting works in this library in Hartshorne's *Book Rarities in the University of Cambridge*, 8vo., London, 1829, p. 217-269.

The number of members on the boards of this College, March 12, 1838, was 188.

(Lysons's *Cambridgeshire*, pp. 123, 124; *Cambridge University Calendar* for 1838.)

MAGDALE'NA, River. [Granada, New.]

MAGDEBURG, one of the three governments of the Prussian province of Saxony, is composed of the antient duchy of Magdeburg, the county of Barby, the bailliwick of Gommern (without the circle of the Saal), the Altemark (Old Mark), on the left bank of the Elbe, the bailliwick of Klötze, the principality of Halberstadt, with Derenburg, Quedlinburg, Wernigerode, and Schauen. Its area is 4410 square miles, and the population, according to the census of 1837, amounted to 598,981. The government is divided into fifteen circles. The country is one of the finest parts of the Prussian monarchy, consisting chiefly of a fertile and level tract; the hills in the south-west, which are offsets of the Harz, are low, and in other parts the surface is merely varied by gentle elevations. [Saxony, Prussian Province of.]

The duchy of Magdeburg is not to be confounded with the government of the same name; which contains only a part of the duchy, the other part being in the government of Merseburg.

MAGDEBURG, the capital not only of the government but of the province of Saxony, is situated on the left bank of the main arm of the Elbe, in 52° 8′ N. lat. and 11° 39′ E. long. It is a fortress of the first rank, and one of the most important bulwarks of the Prussian monarchy. The city consists of four parts and two separate suburbs:—1, The old town, or principal fortress along the Elbe, with eleven bastions and ten small ravelins between them, with various other works. They are everywhere strengthened by a double, and in some parts by a triple-covered way, and by mines. South of the old town lies—2, the Stern, a square casemated tenaille, built under Federick II. by General Wallrave, who died here in a prison erected by himself, where he was confined for treachery. Between the Stern and the old town there was formerly a suburb called Sudenburg, which was pulled down in 1811 by the French, who built on the site Fort Napoleon, now called Fort Scharnhorst. The long bridge, over the broadest arm of the Elbe, leads from the city to—3, the citadel, built in 1680, on an island, by king Frederick I. Over the two smaller arms of the Elbe, beyond it, there are drawbridges; and beyond lies —4, Friedrichstadt, or Thurmschanze (*i.e.* Tower Fort), which defends the entrance on the right bank of the Elbe, where the newly-built Frederick-William bridge, 1080 feet long, leads over the low ground on the bank of the river. The suburb of Neustadt, lying to the north, as being too near to the fortifications, was partly destroyed in 1806 by the Prussians, and entirely demolished in 1811 and 1812 by the French, together with the adjoining suburb of Sudenburg. It has been partly rebuilt since 1818.

Magdeburg, like most old continental towns, has in general narrow and crooked streets, but having been rebuilt since its destruction by Tilly in 1631, it is better constructed than many antient cities. Among the more remarkable buildings are—the townhall, built in 1691, the ducal palace, the provincial assembly-house, the artillery barracks, the government-house, and the theatre. The celebrated cathedral was completed in 1363, after having been 150 years building. It has two steeples 350 feet high, a lofty nave supported by twelve pillars, a high altar of jaspar, forty-five smaller altars, a pulpit of alabaster, and a font of one block of porphyry. There are twelve churches, one of which is Roman Catholic. There are two large squares, the old market-place, in which is the statue of the emperor Otho the Great, erected in 973, and the cathedral square, which is surrounded by handsome buildings and avenues of trees. The public establishments and charitable and scientific institutions are numerous and well conducted; and as the city, with a population of 50,000, is the capital of the province of Saxony, as well as of the government and circle, the residence of the chief president*, of a Protestant bishop, and the head-quarters of the fourth corps of the Prussian army, with several public libraries, collections of pictures, literary and other clubs, and all kinds of public amusements, such as theatres, balls, concerts, &c., it is accounted a very agreeable place of residence. It has also considerable manufactures, extensive breweries and distilleries, and a very active trade. Magdeburg is rich in historical recollections; the most celebrated and unfortunate event in its annals is its capture by storm on the 10th of May, 1631, by the Austrian general Tilly, when it was given to pillage for three days, and 30,000 of the inhabitants were put to the sword; the whole city, except the cathedral, one of the churches, and about 130 houses, was at the same time reduced to ashes.

(Rathmann, *Geschichte der Stadt Magdeburg*; Schiller *Thirty Years' War*; Hassel, Stein, &c.)

MAGELLAN. [Magalhaens.]

MAGELLANIC CLOUDS. [Nebulæ.]

MAGGIO'RE, LAGO. [Lago Maggiore.]

MAGI, the name of the priests among the Medes and Persians, whose religious doctrines and ceremonies are explained under Zoroaster. The Magi formed one of the six tribes into which the Medes were originally divided (Herodot. i. 101); but on the downfall of the Median empire they continued to retain at the court of their conquerors a great degree of power and authority. It would appear however that they did not witness with indifference the sovereignty pass from the Medes to the Persians; and it was probably owing to the intrigues of the whole order that a conspiracy was formed to deprive Cambyses of the throne by representing one of their order as Smerdis, the son of Cyrus, who had been previously put to death by his brother. Herodotus, who has given the history of this conspiracy at length, evidently regarded it as a plot on the part of the Magi to restore the sovereignty to the Medes, since he represents Cambyses on his death-bed as conjuring the Persians to prevent the Medes from obtaining the supremacy again (Herodot., iii. 65); and the Persians themselves must have looked upon it in the same light, since after the discovery of the conspiracy, and the murder of the pretended Smerdis by Darius Hystaspes and his companions, a general massacre of the Magi ensued; the memory of which event was annually preserved by a festival, called the 'Slaughter of the Magi' (Μαγοφόνια), in which none of the Magi were allowed to appear in public. (Herodot., iii. 79; Ctesias, *Pers.*, c. 15.) This event does not appear to have much impaired their influence and authority, for they are represented by Herodotus, in his description of the Persian religion, as the only recognised ministers of the national religion (i. 132).

The learning of the Magi was connected with astrology and enchantment, in which they were so celebrated that their name was applied to all orders of magicians and enchanters. Thus the Septuagint translates the Chaldee

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* The Prussian governments, or provinces, have each a regency, at the head of which is a chief president.

אַשָּׁף, 'enchanter,' by the word *Magus*, *μάγος*. (*Dan.*, i. 20; ii. 2, 27; compare *Acts*, xiii. 6, 8.) The word was also applied to designate any men celebrated for wisdom; whence the wise men of the East who came to see Christ are called simply Magi. (*Matt.*, ii. 1, 7, 16.)

It would appear from a passage in *Jeremiah* (xxxix. 3), that the Babylonian priests were also called Magi, if at least the interpretation of *Rab-Mag* (רַב-מָג), 'chief of the Magi,' be correct. (Gesenius, *Hebrew Lexicon*, under מָג.)

The etymology of this word is doubtful. In Persian the name for priest is *mugh;* and it is not improbable, as Gesenius has conjectured, that the word may be connected with the root meaning *great*, which we have in the Greek *μέγ-ας*, the Latin *mag-is* and *mag-nus*, the Persian *mih*, and the Sanskrit *mah-at*. It is a curious fact that the Hindu grammarians derive *mah-at* from a verb *mah*, signifying 'to worship.' (Wilson's *Sanskrit Dictionary*, under *mah-at*.)

MAGIC SQUARE. This term is applied to a set of numbers arranged in a square in such a manner that the vertical, horizontal, and diagonal columns shall give the same sums. Such arrangements were known very early to the Hindus, Egyptians, and Chinese, among whom, as also among the Europeans of the middle ages, a belief existed that such squares had astrological and divinatory qualities. Emanuel Moschopulus,* of Constantinople, wrote on them in Greek in the middle of the fifteenth century. Others who have written on the subject are Leibnitz, Frenicle, Bachet, La Hire, Saurin, &c. (See Montucla's *History*, vol. i., p. 346; *Encyclopédie Méth.*, article 'Quarrés magiques;' Hutton's *Dictionary;* and the *Mathematical Recreations* of the same author.)

Though the question of magic squares is in itself of no use, yet it belongs to a class of problems which call into action a beneficial species of investigation. Without laying down any rules for their construction, we shall content ourselves with destroying their magic quality, and showing that the nonexistence of such squares would be much more surprising than their existence.

Take any set of numbers in arithmetical progression, and such that their number shall be a square number: say the first sixteen numbers—

1	2	3	4	5	6	7	8
16	15	14	13	12	11	10	9

any one of these in the first half, with its corresponding number in the second half, makes up 17. Write the numbers in the following manner:—

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Take four of these in such a manner as to take one out of each row, and one out of each column, and it will be found, and may easily be proved, that the sum of numbers in every such set must consist of two pairs of corresponding numbers, so that their sum must be twice 17, or 34. The different ways in which this can be done are in number 4 × 3 × 2 × 1, or 24, as follows:—

1	6	11	16	5	2	11	16	9	2	7	16	13	2	7	12
1	6	15	12	5	2	15	12	9	2	15	8	13	2	11	8
1	10	7	16	5	10	3	16	9	6	3	16	13	6	3	12
1	10	8	15	5	10	15	4	9	6	15	4	13	6	11	4
1	14	7	12	5	14	3	12	9	14	7	4	13	10	7	4
1	14	11	8	5	14	11	4	9	14	3	8	13	10	3	8

Out of these subdivisions a set may be taken from each, so that no number shall be repeated, in 24 different ways, as in the following sample, which shows the four ways that begin with 1 6 11 16:—

1	6	11	16	1	6	11	16	1	6	11	16	1	6	11	16
5	2	15	12	5	2	15	12	5	10	15	4	5	14	3	12
9	14	7	4	9	14	3	8	9	14	3	8	9	2	15	8
13	10	3	8	13	10	7	4	13	2	7	12	13	10	7	4

Now in each of these 24 squares, every horizontal row can be written in 24 orders [COMBINATIONS], and in putting the different orders together, each square admits of 24 × 24 × 24 × 24, or 331,776 arrangements, without altering the horizontal rows, but only the order of the figures in each row. But the order of the horizontal rows can be varied 24 ways in each square, and there are 24 squares; so that we have 331,776 × 24 × 24, or 191,102,176 squares, no one of which repeats any number more than once, and in every one of which the sum of any horizontal row is 34, made by two pairs of numbers which give 17 each. But the number of ways of forming 34 out of four of the first sixteen numbers is not yet exhausted: for, taking any one set, say

1 16 11 6

in which 1 and 6 correspond to 16 and 11, we may write 2 and 5, or 3 and 4, for 1 and 6, so that we have not included in the preceding list

2 16 11 5
3 16 11 4

with all their variations of order; and similar ones for all the rest of the list. It would be almost impossible to doubt that in many of this enormous number of squares, the vertical columns will sometimes be cases of these new sets: and it would be something short of magic if some should also have diagonal columns which fulfil the same condition. In fact, Frenicle has shown 880 methods of making these squares magical, a few of which are as follows (*Divers Ouvrages*, &c., Paris, 1693):—

1	16	11	6	4	11	14	5	13	4	5	12	16	3	10	5
13	4	7	10	6	13	12	3	16	6	11	1	8	2	13	11
8	9	14	3	9	2	7	16	3	9	8	14	9	15	4	6
12	5	2	15	15	8	1	10	2	15	10	7	1	14	7	12

8	12	5	9	8	10	3	13	8	12	5	9	10	11	5	8
11	1	16	6	15	1	12	6	10	1	16	7	15	2	16	1
13	7	10	4	9	7	14	4	13	6	11	4	6	7	9	12
2	14	3	15	2	16	5	11	3	15	2	14	3	14	4	13

In Frenicle's list of 880, only those squares are included which are essentially different: thus the following four, which may be made by turning the last square into different positions, count only as one.

10	11	5	8	8	1	12	13	13	4	14	3	3	6	15	10
15	2	16	1	5	16	9	4	12	9	7	6	14	7	2	11
6	7	9	12	11	2	7	14	1	16	2	15	4	9	16	5
3	14	4	13	10	15	6	3	8	5	11	10	13	12	1	8

The methods which have been given for the formation of magic squares are divided into different rules, according as the number in each side is odd, evenly even, or oddly even. A general method which shall apply to all cases is yet wanting. For a full account of these rules see Hutton's *Mathematical Recreations.*

MAGI'LUS, De Montfort's name for a genus of testaceous mollusks, the form of whose shell varies very much according to its different stages of growth and the circumstances in which it is placed.

The genus was placed by Lamarck among his *Annelids*, in the family *Serpulacea*, containing the genera *Spirorbis*, *Serpula*, *Vermilia*, *Galeolaria*, besides that under consideration.

M. de Blainville arranged it among the mollusca (family *Cricostomata*), between *Siliquaria* and *Valvata*, observing at the same time that Guettard clearly saw the relation of the form to *Vermetus*.

Cuvier, in his last edition of the 'Règne Animal,' gives it a position between *Vermetus* and *Siliquaria*, in his seventh order of Gastropods (*Tubulibranchiata*).

M. Rang remarks that when he was seeking the animal in India he was struck, like M. de Blainville, with the analogy which the genus presents not only to *Vermetus*, but also to many other genera of *Pectinibranchiata*. This analogy, M. Rang further observes, is especially remarkable when a young individual whose shell has not yet become tubular is examined.

Description.—Animal:—M. Rang states that he saw some fragments of the animal, and that it is certainly a Gastropod. In his description however he notes the animal as unknown. Dr. Rüppell states that it is furnished with an operculum.

Shell.—Young:—Fragile, with an epidermis, pyriform, ventricose, with a short spire of from three to four turns; aperture longer than it is wide, oblong, without any notch anteriorly, where the lip nevertheless forms an angle. Dr. Rüppell thinks that M. Rang, when he wrote the above description, had before him the young of *Leptoconchus*. Adult:—The last whorl abandoning altogether the spiral form to produce an elongated tube, which is irregularly sinuous, or irregularly contorted, conical, compressed laterally, especially on the side of the base of the shell, carinated beneath, and free; aperture elliptical.

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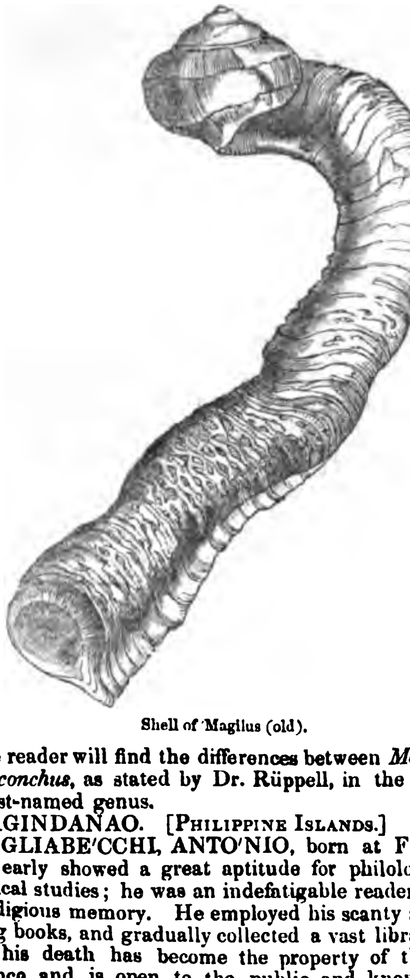
* Some think this work was written by Emanuel Moschopulus the elder, a Cretan, who lived at the end of the thirteenth century.

Shell of Magilus (young).

When in this state the shell presents all the characters of a regularly spiral univalve. The animal establishes itself in the excavations of Madrepores (*Astrææ*, &c.), and as the coral increases around it the *Magilus* is obliged, in order to have its aperture on a level with the surrounding surface, or near it, to construct a tube, which is more or less eccentric according to circumstances, the growth of the coral determining the length of the tube. As this tube goes on increasing, the animal abandons the spiral for the tubular part of the shell, and in this operation it leaves behind no *septa*, or partitions, but secretes a compact calcareous matter which reaches to the very summit of the spiral part, and is deposited from time to time as the tube is lengthened; so that in an old specimen the posterior part of the shell presents a solid and almost crystalline mass. Indeed the fracture of this mass is radiated and saccharoid. One species only, *Magilus antiquus*, is known. The colour is white, more or less pure.



Shell of Magilus (old).

The reader will find the differences between *Magilus* and *Leptoconchus*, as stated by Dr. Rüppell, in the article on the last-named genus.

MAGINDANAO. [PHILIPPINE ISLANDS.]

MAGLIABE'CCHI, ANTO'NIO, born at Florence in 1633, early showed a great aptitude for philological and historical studies; he was an indefatigable reader, and had a prodigious memory. He employed his scanty savings in buying books, and gradually collected a vast library, which since his death has become the property of the city of Florence, and is open to the public, and known by the name of Magliabecchiana.

Magliabecchi, in consequence of his immense erudition, was considered as an oracle, and was consulted by scholars from every part of Europe. Several princes showed by compliments and gifts their regard for him. His own sovereigns, the grand-dukes Medici, appointed him their librarian. Magliabecchi left no work of his own. Some of his letters have been published in various collections: 'Lettere di Uomini Illustri,' Macerata, 1782; 'Lettere di Uomini Dotti,' Venezia, 1807; 'Prose Fiorentine,' &c. Unfortunately Magliabecchi was very vain, irritable, and abusive, and his temper involved him in personal quarrels with several of his contemporaries. He died at Florence, in 1714, at eighty one years of age.

MAGNA CHARTA. The terms of the compact between the feudal chief and his dependants underwent frequent changes in the middle ages, the consequence for the most part of resistance made by the tenants, and struggles to regain liberties which had been originally surrendered or taken from them by the force and power of the chief. When a material alteration was made in the terms of the compact, a record was made of it in writing. These records are called charters, in the restricted use of a term which is popularly applied to almost every species of early diplomas. The tenants of the various honours, or great tenancies in capite, are seldom without one or more charters which have been granted to them by their lords, by which exemptions or privileges are given, base services are commuted for payments in money, and the mode is settled in which justice shall be administered among them. And even in some of the inferior manors there are charters of a similar kind by which certain liberties are guaranteed by the lord to his tenants. These charters run in the form of letters, '*Omnibus*,' &c. from the person granting; they set forth the thing granted, and end with the names of persons who were present when the lord's seal was affixed, often ten, twelve, or more, with the date of place and time of the grant.

Such a charter is that called the Magna Charta granted by King John, but acting in his twofold character of the lord of a body of feudatories, and the sovereign of the realm. This charter is often regarded as the constitutional basis of English liberties, but in many of its provisions it seems to have been only a declaration of rights which had been enjoyed in England before the Conquest, and which are said to have been granted by King Henry I. on his accession. However, if it did not properly found the liberties which the English nation enjoys, or if it were not the original of those privileges and franchises which the barons (or the chief tenants of the crown, for the names are here equivalent), ecclesiastical persons, citizens, burgesses, and merchants enjoy, it recalled into existence, it defined, it settled them, it formed in its written state a document to which appeal might be made, under whose protection any person who had any interest in it might find shelter, and which served, as if it were a portion of the common law of the land, to guide the judges to the decisions they pronounced in all questions between the king and any portion of the people.

Beside the great charter there was granted at the same time a charter relating to the forests only. There were very extensive tracts of land in England which were actually forests, uncultivated, and reserved for the pleasure of the king; and there were purlieus to these forests, all of which were subject to a peculiar system of law, many parts of which were felt to be oppressive, and from some of which this charter exempted the people.

The independence and rights of the church were also secured by the great charter.

Magna Charta has been printed in a great variety of forms; there are fac-similes of a copy of it which was made at the time, and still exists in the British Museum, and of another preserved at Lincoln, and translations of it into the English language. It is thus so easily accessible, that it will not be expected that we shall give a copy of it, or even a complete abstract of its multifarious provisions, some of which are completely obsolete, and the terms obscure. Instead of this, we shall give the satisfactory abridgement of Blackstone, in his 'Commentaries,' who has besides an express treatise on this charter.

'The great charter,' says he, 'confirmed many liberties of the church, and redressed many grievances incident to feudal tenures, of no small moment at the time; though now, unless considered attentively and with this retrospect, they seem but of trifling concern. But besides these feodal provisions, care was also taken therein to protect the subject against other oppressions, then frequently arising from unreasonable amercements, from illegal distresses or other process for debts or services due to the crown, and from the tyrannical abuse of the prerogative of purveyance and preemption. It fixed the forfeiture of lands for felony in the same manner as it still remains; prohibited for the future the grants of exclusive fisheries, and the erection of new bridges so as to oppress the neighbourhood. With respect to private rights: it established the testamentary power of the subject over part of his personal estate, the rest being distributed among his wife and children; it laid down the law of dower as it hath continued ever since; and prohibited the appeals of women, unless for the death of their husbands. In matters of public policy and national concern, it enjoined an uniformity of weights and measures; gave new encouragements to commerce by the protection of merchant-strangers, and forbad the alienation of lands in mortmain. With regard to the administration of justice: besides prohibiting all denials or delays of it, it fixed the Court of Common Pleas at Westminster, that the suitors might no longer be harassed with following the king's person in all his progresses; and at the same time brought the trial of issues home to the very doors of the freeholders, by directing assizes to be taken in the proper counties, and establishing annual circuits; it also corrected some abuses then incident to the trials by wager of law and of battle; directed the regular awarding of inquests for life or member; prohibited the king's inferior ministers from holding pleas of the crown, or trying any criminal charge, whereby many forfeitures might otherwise have unjustly accrued to the exchequer, and regulated the time and place of holding the inferior tribunals of justice, the county court, sheriff's tourn, and court-leet. It confirmed and established the liberties of the city of London, and all other cities, boroughs, towns, and ports of the kingdom. And lastly (which alone would have merited the title that it bears of the *great* charter), it protected every individual of the nation in the free enjoyment of his life, his liberty, and his property, unless declared to be forfeited by the judgment of his peers or the law of the land.'

Such a concession from the king was not gained without a violent struggle; in fact he was compelled to yield it by an armed force, consisting of a very large portion of the baronage, which he was far too feeble to resist with effect. The names of the chiefs are preserved by the chroniclers of the time, and in the charter itself; and whenever recited, they call up to this day a mingled feeling of respect and gratitude, the respect and gratitude which men pay to those who have obtained for them the extension of political privileges, though it may appear that those privileges were nothing more than rights of which they had been deprived, and to which therefore they may be said to have been justly entitled. They appear the patriots of a rude age, and the mists of distance and antiquity obscure to us the selfishness and the other evils (if such existed) which were manifested in the contest. The first name is that of Robert Fitz Walter, who belonged to the great family of Clare. The title given to him as head of the host was Marshal of the Army of God and of the Holy Church. Next to him come Eustace de Vesci, Richard de Percy, Robert de Roos, Peter de Brus, Nicholas de Stutevile, Saier de Quenci, earl of Winchester, the earls of Clare, Essex, and Norfolk, William de Mowbray, Robert de Vere, Fulk FitzWarine, William de Montacute, William de Beauchamp, and many others of families long after famous in English history, the progenitors of the antient baronial houses of England.

The charter was signed, or rather sealed, not in any house, but in the open field, at a place called Runnymede, between Windsor and Staines; but it was not merely by an accidental meeting of two armies at that place that this act was done there, for it appears by Matthew of Westminster that Runnymede was a place where treaties concerning the peace of the kingdom had been often made. All was done with great solemnity. The memorable day was June 5, 1215.

What was unwillingly granted, it could scarcely be expected would be religiously observed. John himself would gladly have infringed or broken it, as would his son King Henry III., but the barons were watchful of their own privileges, those of the church, the cities, the boroughs, and of the people at large; and King Henry was led to make one or more solemn ratifications of the charter. To keep the rights thus guaranteed fully in the eyes of the people a copy was sent to every cathedral church, and read publicly twice a year.

See the work of Sir William Blackstone, entitled 'The great Charter and Charter of the Forest, with other authentic Instruments; to which is prefixed an Introductory Discourse concerning the History of the Charters,' Oxford, 1759, 4to. The late Board of Commissioners on the public Records caused to be engraved and published an exact fac-simile of the charter, from a copy preserved in the archives of the cathedral church of Lincoln, with other of the greater charters. In the first volume of their work, entitled 'The Statutes of the Realm,' these charters are all printed, with English translations of them.

MAGNA GRÆ'CIA, or MAJOR GRÆCIA (Liv., xxxi. 7; Justin, xx. 2), was used to designate the south of Italy, in consequence of the numerous and flourishing colonies which were founded by the Greeks in that part of the country. There is some difficulty in determining how far north this name extended; but it does not appear to have been applied to the country beyond Cumæ and Neapolis; and some geographers have thought, though without sufficient reasons, that it was confined to the colonies on the Gulf of Tarentum. Pliny apparently considers Magna Græcia to begin at the Locri Epizephyrii (*N. H.*, iii. 15); but Strabo even includes the Grecian towns of Sicily under this name (vi. 175, *Casaubon*, 1587).

The time in which the name of Magna Græcia was first applied to the south of Italy is uncertain. It does not occur, as far as we are aware, in the early Greek writers, Herodotus, Thucydides, &c.; but it is used by Polybius (ii. 126, B, *Casaubon*) and succeeding Greek and Roman writers.

Taking the name in the widest signification which is given to it by Strabo, Magna Græcia may be justly considered as an appropriate name; since it contained many cities far superior in size and population to any in Greece itself. The most important of these places were, Tarentum, founded by the Lacedæmonians; Sybaris, Croton, and Metapontum, by the Achæans; Locri Epizephyrii, by the Locrians; and Rhegium, by the Chalcidians—all in Italy; and in Sicily—Syracuse, founded by the Corinthians; Gela, by the Cretans and Rhodians; and Agrigentum, by the inhabitants of Gela.

MAGNE'NTIUS, commander of the Roman army in Gaul, revolted against Constans, son of Constantine the Great, and emperor of the West, and caused him to be killed near the Pyrenees, A.D. 350. Constantius, the brother of Constans, and emperor of the East, marched against Magnentius, and a battle was fought between them on the banks of the Drave, A.D. 351. Magnentius, being defeated, fled to Italy, from whence he escaped into Gaul, where Constantius followed him and defeated him again, A.D. 353. Magnentius, finding himself forsaken by his troops, killed himself; and his brother Decentius, whom he had made Cæsar, followed his example. Constantius thus became sole master of the whole empire.

British Museum. Actual Size. Copper.

MAGNE'SIA. [Anatolia.]

MAGNESIA. [Magnesium.]

MAGNESIA, MEDICAL PROPERTIES OF. Oxyde of magnesium, termed also, from the mode of procuring it, calcined magnesia, or magnesia usta, is an alkaline earth possessing the usual qualities of alkalies in their habitudes with acids, and likewise the peculiar property of exciting generally purgative action of the intestines. This last-mentioned power gives it a distinctive character among alkaline remedies, as it can be employed not merely to counteract acidity, but also to remove the exciting cause when that consists in the presence of crude or undigested acid-yielding materials in the stomach. Its action as a purgative seems mainly to depend upon its meeting with acids in the stomach, and so forming soluble salts. When these are not present the magnesia remains undissolved, and if used repeatedly may accumulate in the intestines, and, becoming agglutinated by the mucous secretions, give rise to much uneasiness. [Antacids.] When however acidity exists, either along with constipation or diarrhœa, more particularly in children, from the milk disagreeing, or from a diet unsuited to their delicate organs of digestion being forced upon them, magnesia is a very proper medicine, especially as it appears to possess a specific power of diminishing gastro-intestinal irritation. (Hufeland, quoted in Pereira's *Materia Medica.*) It is generally expedient to add rhubarb to it, and combine it with some carminative. In such a state of combination it is peculiarly useful in what is termed diarrhœa crapulosa, arising from too great a mixture or too large a quantity of food.

Where it is determined to use magnesia, and sufficient acid does not exist in the stomach to ensure the formation of a soluble salt, a little lemon-juice may be added to it. The subcarbonate of magnesia has nearly the same action as the calcined magnesia, but when it meets with acids in the stomach effervescence takes place, accompanied with a disengagement of carbonic acid gas, which in some cases is inconvenient, in other instances extremely beneficial. In some almost uncontrollable irritations of the stomach, where food and medicines are alike rejected, subcarbonate of magnesia will be retained, and, by allaying the irritability, allow other remedies to be subsequently employed. Both the subcarbonate and the calcined magnesia are much used to correct heartburn, and to check the lithic acid diathesis; but their employment requires much judgment and attention. [Antacids; Antalkalies.]

Sulphate of Magnesia, or Epsom salts, in the ordinary form, as met with in the shops, are small acicular crystals. This renders them liable to be confounded with those of oxalic acid; to avoid which the sulphate may be dissolved, and by recrystallization they are obtained in large four-sided prisms, or four-sided pyramids. The taste of sulphate of magnesia is bitter and very unpleasant; but this is very much lessened by large dilution in water, which at the same time increases the purgative action of the salt, or by adding magnesia, or by giving it in compound infusion of roses and adding a few drops of dilute sulphuric acid, which augments the refrigerating property of the medicine. The addition of a little common salt to a solution of sulphate of magnesia increases its cathartic powers.

No saline medicine is so extensively employed as the sulphate of magnesia as a purgative; it is more rarely used as a diuretic or diaphoretic. Its action as a purgative is in general mild and certain, causing a considerable evacuation of the serous secretions of the intestines, and so producing a cooling or lowering effect. At the commencement of most inflammatory complaints and of fevers its employment is most beneficial. Its utility is often much increased by adding to the solution a very minute portion of tartarized antimony, so as to form the emetico-cathartic solution, which was very serviceable in the fevers of India, and in those of the summer and autumn of European countries.

Small doses of sulphate of magnesia in bitter infusions are valuable in the treatment of dyspepsia accompanied with constipation. Many of the saline mineral waters resorted to for the cure of indigestion are chiefly indebted to the sulphate of magnesia for their purgative properties.

Sulphate of magnesia is a convenient antidote in cases of poisoning by the salts of lead or baryta.

Magnesian limestone is sometimes employed for building, and is a very durable stone: it is however one of the most deleterious stones for masons to hew, as the gritty particles very speedily occasion disorders of the lungs, followed by early death. The mouth and nostrils of the workmen should therefore always be defended by wearing a gauze mask.

MAGNESIAN LIMESTONE, in English geology, a 'formation' of the pœcilitic or new red-sandstone system; also the name of a group of limestone beds, which constitute the principal part of that formation, and generally contain a notable quantity of magnesia in their composition. Details regarding the formation will be more usefully combined in the account of the system of which it constitutes the base. We shall here confine ourselves to a notice of the limestone. This rock is seen to greatest perfection in England between the rivers Tyne and Tees, between the rivers Wharf and Dun, and between this last river and Nottingham. We mention these parts of the great line of magnesian limestone in the north of England for the purpose of pointing out some interesting differences in the composition and other characters of the rock. It is in the middle part of the course here indicated, from north to south, that the stratification of the rock is most developed. Between the Dun and Wharf, and for some space north and south of these rivers, this limestone occurs, in fact, in two rocks separated from each other by beds of red and bluish clay, with gypsum (indistinguishable from some of the upper or Keuper marls of the red-sandstone formation), but in the northern and southern parts this difference does not obtain. Of the two limestones thus separated, the upper one has but a limited extent (see Mr. Smith's 'Geological Map of Yorkshire'), the lower one is almost uninterrupted from beyond the Tyne nearly to the Trent. The upper rock is about 12 yards thick; the lower one reaches 50, or perhaps in some cases 100 yards; the upper one contains almost no magnesia, and lime burnt from it is extensively employed in agriculture; the lower one is very often composed of atomic aggregations of carbonate of lime and carbonate of magnesia, and, both as stone and when burnt to lime, is more useful in building. Its mode of aggregation varies extremely. In many situations (Thorp Arch, in Yorkshire) it is a soft powdery stone traversed nevertheless by veins of calcareous spar; about Tadcaster, and generally between the Nid and the Dun, it is a firm though hardly compact rock, often traversed by sparry veins and full of irregular crystallized cavities. The crystals are generally carbonate of lime, sometimes mixed with oxide of iron. In a few cases sulphate of barytes appears in the form of veins dividing this rock, as at Huddleston, near Ferrybridge, &c. Still less commonly thin veins of carbonate of copper (sometimes apparently epigene, on sulphuret) line the joints of the rock, about Newton Kyme, near Tadcaster, and in other places.

Some of the best building-stone of this description is dug in the quarries of Huddleston, Broadsworth, and Warmsworth, and it is generally really or nearly an atomic combination of carbonate of lime and carbonate of magnesia. (This fact was communicated to us by the *late Dr. Henry* of Manchester.)

A further state of arrangement of the materials of this rock is noticed in several localities between the Aire and the Dun, where the rocks assume locally and for limited areas the oolitic texture; and, finally, as one of the most valuable building-stones in the range of the magnesian limestone, may be signalized the white limestone of Roche Abbey, which in that noble ruin has stood the ravages of time better than almost any 'freestone' of the north of England.

Farther south, the grain of the rock changes; it becomes continually more and more crystalline, and from Bolsover to Nottingham the magnesian limestone may be described, with little inaccuracy, as a real dolomite, partially debased by small admixtures of sand. The small rhomboidal crystals of this rock are very evident in specimens which we collected many years ago at Mansfield Woodhouse and near Nottingham.

A crystalline structure of the magnesian limestone rock is however not confined to the southern portion of its range, though there it is manifested in connexion with very useful qualities in architecture. In the county of Durham we find it exhibited in the purely calcareous rocks of Hawthorn Hive near Easington, in the romantic, contorted, and broken cliffs and pinnacles of Marsden, and in the singular coralloidal quarries of Building-hill. At Marsden it is curious to notice in near contrast, in the cliff, the flexible laminated limestone, and in the detached pinnacles an equally laminated rock traversed by complete planes of crystalline structure. What does this teach? obviously, the important fact, that, since its deposition in laminæ, the sedimentary mass of carbonate of lime has been subject to a new molecular arrangement, which, predominating over the original structure, has readjusted the particles and generated a new structure. In the same vicinity are brecciated rocks, which seem to require the hypothesis of reaggregation of fragmented portions of previously indurated magnesian limestone beds. Thus various are the aspects of the mineral aggregation of the magnesian limestone of England. These diversities belong almost exclusively to the lower rock, for the upper laminated non-magnesian portion is usually of a uniform close texture, except in the lower beds, which are somewhat cellular (and of little value to the limeburner) at Knottingley.

It should be added that the general colour of the magnesian limestone (lower portion) is white, yellow, rich pale brown, or reddish, while the upper rock is commonly of a grey, smoky, or purplish hue. This rock is usually interstratified with thin clay partings, the lower one very rarely.

The specific gravity of magnesian limestone is usually greater than that of common carbonate of lime. This however may be overlooked in the usual incomplete mode of trying such experiments, unless the observer makes the easy correction due to the absorption of water by many of these stones. Tried in powder (for example, by Leslie's process), the magnesian limestones of England betray, by their weight, their affinity to the dolomitic rocks of the Alps and the Eifel, though the introduction of the magnesia is probably not at all due to the same cause in the two cases.

Professor Sedgwick, in his admirable memoir in the 'Geological Transactions,' on the Magnesian Limestone, has pointed out clearly the most common organic fossils of this rock. We shall only observe here that in respect of fishes (Palæonisci, &c.), mollusca (Producta, Spirifera, &c.), and zoophyta (Retepora, &c.), this rock shows an extreme analogy with the carboniferous system. Its place, by mineral analogies, may be rightly fixed in the pœcilitic system; but, by the affinities of organic existence, it will be classed with the more antient rocks. Let any one, for example, contrast its marine fossils, whether derived from Durham, Yorkshire, or the Thuringerwald, with those of the muschelkalk; the former are seen to be analogous to forms common in the mountain limestone, the latter to those of the lias. In neither case is the resemblance perfect; the species are not identical, but the result above announced is unequivocal, and must soon be felt in geological classification.

(Sedgwick in *Geol. Trans.*; Smith's *Geological Map of Yorkshire*, &c. Notices of contemporaneous deposits in the midland and southern counties of England occur in Murchison's *Silurian System*; Conybeare and Phillips, *Geol. of England and Wales*, &c.)

MAGNE'SIUM, a peculiar metal, of which magnesia is the oxide, a substance that was originally sold under this name by a Roman canon in the beginning of the eighteenth century. It is stated to have been first procured by calcining the residue left after evaporating the mother-waters of nitre. The method by which it is at present obtained will be presently stated.

The existence of magnesium was first demonstrated by the electro-chemical researches of Sir H. Davy: he found that when moistened magnesia was negatively electrized with mercury, an amalgam was obtained which decomposed water and gave rise to magnesia, by the oxidizement of the peculiar metal amalgamated with the mercury; he did not however obtain a sufficient quantity to enable him to examine its properties. In 1830 M. Bussy procured this metal by decomposing chloride of magnesium by means of potassium. This was effected by placing some small pieces of potassium in a glass tube, with fragments of the chloride put over them; this was fused by the application of heat, and the potassium was allowed to run through it by slightly inclining the tube; light was evolved, and the mass, when cold, was washed with water, which dissolved the chloride of potassium formed, and left the magnesium unacted upon in the state of small globules.

Magnesium is of a white colour, like silver; its lustre is metallic and brilliant, it is very malleable, and fuses at a red heat; in dry air it undergoes no change, but in moist air it is superficially oxidized; it may be boiled in water without suffering any change. When heated to redness in the air or in oxygen gas it burns brilliantly, and, combining with oxygen, becomes magnesia. In chlorine gas it burns spontaneously. It dissolves in diluted sulphuric and hydrochloric acids, with the evolution of hydrogen gas, and it is oxidized and dissolved by dilute nitric acid, and nitrate of magnesia results.

Oxygen and Magnesium, from what has just been stated, combine very readily, but only in one proportion; and the result is oxide of magnesium, or magnesia. The mode in which this substance was first obtained has already been mentioned. It is now procured by decomposing sulphate of magnesia by means of carbonate of soda, and subjecting the washed and dried carbonate precipitated to a strong heat in an earthen crucible: by this the carbonic acid is expelled, and the magnesia, or oxide of magnesium, remains, which has the following properties: it is colourless, inodorous, and tasteless, if pure; it does not, like lime, become hot when mixed with water, and it is very nearly insoluble in it, although when moistened it exhibits the alkaline property of turning vegetable yellows brown; by exposure to the air it attracts carbonic acid, and is reconverted to the state of carbonate, combined with some hydrate. It appears, from indirect experiments, to be composed of

1 equivalent of Magnesium .	12
1 equivalent of Oxygen . .	8
Equivalent	20

Chlorine and Magnesium act readily upon each other, the metal burning spontaneously in the gas; it may also be procured by transmitting dry chlorine gas over a mixture of magnesia and charcoal, heated to redness in a porcelain tube. According however to Liebig it is best obtained by dissolving magnesia in hydrochloric acid, evaporating the solution to dryness, mixing the residue with an equal weight of hydrochlorate of ammonia, and projecting the mixture in small portions at a time into a red-hot platina crucible. When the ammoniacal salt has been expelled, fused chloride of magnesium remains, which on cooling becomes a transparent colourless mass; it is inodorous, intensely bitter, very deliquescent, and soluble both in water and alcohol. This salt is one of the saline ingredients of sea-water, and exists in the bittern left after preparing common salt, mixed with sulphate of magnesia. It is also found in some mineral waters, and was formerly called muriate of magnesia.

When a solution of chloride of magnesium is concentrated by evaporation, and exposed to a very cold atmosphere, it yields deliquescent prismatic crystals which contain much water.

It is applied to no direct use; sometimes however the bittern which contains it is decomposed by an alkaline carbonate, for the purpose of forming carbonate of magnesia. It consists of

1 equivalent of Magnesium .	12
1 equivalent of Chlorine . .	36
Equivalent	48

Bromine and Magnesium may be obtained in combination by dissolving magnesia in hydrobromic acid; by evaporation small acicular prisms of bromide crystallize, which have a sharp taste, are very deliquescent, and soluble both in water and alcohol. When heated in the air these crystals are resolved into hydrobromic acid and magnesia.

Fluorine and Magnesium unite when magnesia is dissolved in hydrofluoric acid. The compound formed is insoluble in water, or in hydrofluoric acid, and is not decomposed by a red heat.

Carbon and Magnesium.—No compound of these is known.

Sulphur and Magnesium do not combine when heated together, nor is a perfect sulphuret formed when sulphur is heated with magnesia. The compound is not soluble in water; by heat the sulphur burns off. When however a solution of sulphuret of barium is added to one of sulphate of magnesia, then, according to Berzelius, sulphate of barytes is precipitated, and sulphuret of barium remains in solution.

Iodine and Magnesium.—A compound of these is obtained when magnesia is dissolved in hydriodic acid; it is very soluble in water, and known only in solution. It is stated also that when magnesia is heated with iodine in water, both iodide of magnesium and iodate of magnesia are procured.

Magnesia, or *Oxide of Magnesium*, combines with most acids to form salts, two of which are of great importance in medicine; but we shall first mention the

Hydrate of Magnesia.—This is a saline compound, and was first discovered in serpentine in New Jersey, and since in Unst. It is white, with a greenish tint, foliated, and easily splits into thin flexible laminæ. It has a pearly lustre, translucent on the edges. Specific gravity 2·35; hardness 1. It is stated to occur at Hoboken, in New Jersey, in diverging needleform crystals. It is composed of about 31 water and 68 magnesia, with a little oxide of iron and manganese; these are nearly in the proportion of one equivalent each of water and earth.

Hydrate of magnesia may be obtained artificially by precipitating a solution of the sulphate with soda. The precipitate, after drying at 212°, retains about one-fourth of its weight of water.

Nitric Acid and Magnesia readily combine, and yield nitrate of magnesia. The solution is colourless, and extremely bitter. By evaporation it yields, though with difficulty, rhombic crystals, which contain a large quantity of water, and are very deliquescent. It is decomposed at a red heat, and is sometimes found in crude nitre. The anhydrous salt is composed of

1 equivalent of Nitric Acid .	54
1 equivalent of Magnesia .	20
Equivalent	74

It is now applied to no use, but is the salt from which magnesia was originally obtained.

Carbonic Acid and Magnesia form carbonate of magnesia, and it has been found native in New Jersey. It has a yellowish white colour, with a flat conchoidal and sometimes earthy fracture. It is opaque, hardness 4·5, and very difficult to break. Specific gravity about 2·8 to 2·9. The purest was found by Klaproth to consist of carbonic acid 49, and magnesia 48, with 3 of water. It may therefore be considered as composed of very nearly one equivalent of acid and one of base.

Carbonate of magnesia, or rather a compound of carbonate and hydrate of magnesia, is artificially prepared for medicinal use by decomposing the sulphate of magnesia by means of carbonate of soda. The carbonate of magnesia is precipitated as an insoluble white powder. This substance, when pure, is colourless, inodorous, tasteless, and unalterable in the air; it is decomposed by the stronger acids with effervescence, and by heat the carbonic acid is also expelled. It appears to be composed of

4 equivalents of hydrated carbonate of Magnesia	204
1 equivalent of bihydrated Magnesia . .	38
Equivalent	242

Sulphuric Acid and Magnesia constitute the salt long and well known by the name of Epsom salt, having been first obtained from a spring at that place. Sulphate of magnesia, which is its proper name, was afterwards obtained by evaporating and crystallizing the bittern remaining after preparing common salt from sea-water; but it was mixed with so much chloride of magnesium that it was extremely liable to become damp. The late Dr. Henry invented a very ingenious process for preparing it from magnesian limestone, in which this inconvenience and impurity are totally avoided.

Sulphate of magnesia is a salt which crystallizes very readily; and although the crystals are usually small, they may be obtained of considerable size by slowly cooling a large quantity of the solution. The primary form of the crystal is a right prism, with a rhombic base. This salt is extremely bitter, readily soluble in cold water, which dissolves an equal weight, and boiling water one-third more. It is but slightly altered by exposure to the air, yet is rather inclined to effloresce. It is not decomposed by heat, but the water of crystallization is expelled. It is composed of

1 equivalent of Sulphuric Acid .	40
1 equivalent of Magnesia .	20
7 equivalents of Water . .	63
Equivalent	123

It is extensively employed as a purgative, and for the preparation of magnesia and its carbonate.

This salt combines with various others to form double salts: as, for example, with sulphate of ammonia, of potash, and of soda, forming the ammonio sulphate, the potash and soda sulphates of magnesia, which are all crystalline salts, but they are not important.

Phosphoric Acid and Magnesia are best obtained in combination by mixing concentrated and hot solutions of sulphate of magnesia and phosphate of soda: after some hours crystals of the phosphate are obtained. They effloresce slowly in the air, and are soluble in fifteen times their weight of cold water, and by hot water they are decomposed into a subsalt which is insoluble, and an acid one which remains in solution. The crystals are composed of

1 equivalent of Phosphoric Acid .	36
1 equivalent of Magnesia . .	20
7 equivalents of Water . .	63
Equivalent	119

This salt is applied to no use; combined with ammonia it forms the ammoniaco-magnesian phosphate, a compound which exists in urine, and is a common ingredient in urinary calculi. [Calculus.]

Magnesia forms a great number of double salts, and one of these, the magnesian limestone, which is a double carbonate of lime and magnesia, is found in immense quantities in different parts of England. [Magnesian Limestone.] Magnesia is found also in a great number of mineral bodies: as steatite, talc, asbestos, &c.

Magnesian salts are mostly soluble in water; by the addition of soda they yield hydrate of magnesia, and by adding carbonate of soda, hydrated carbonate of magnesia.

The sesqui- and bi-carbonates of potash and soda occasion no precipitation in solutions of magnesian salts, until heated so as to repel the excess of carbonic acid. Phosphate of soda added to magnesian solution gives no immediate precipitate, but on the addition of ammonia an extremely insoluble ammoniaco-magnesian phosphate is formed; and this is the best mode of testing the presence of magnesia, when the requisite precautions are adopted.

MAGNET (derived from the Greek *μάγνης*) is a metallic body possessing the remarkable property of attracting iron and some other metals. It is said to have been found abundantly near Magnesia in Lydia, from which circumstance its name may have been derived. The attracting power of the magnet was known at a very early period, as references are made to it by Aristotle, and more particularly by Pliny, who states that ignorant people called it *ferrum vivum*, or quick-iron; a name somewhat analogous to our load-stone. The same author appears to have been acquainted with the power of the magnet to communicate properties similar to its own to other bodies. When found native, it is generally a heavy ferruginous ore of a dull greyish colour, but the ores of cobalt and nickel also frequently possess the magnetic properties.

The universal law, that reaction is coexistent with action, implies, that iron must react on the magnet, and we find in fact, that if a piece of iron is fixed, and a small magnet be suspended by a string near it, *the magnet will then be moved towards the iron*; thus *all the iron* in the mass of the globe acts upon a magnet. It is also now known that electrical currents influence magnetic bodies [Electro-Magnetism]; while heat has an influence on magnetic intensity. Hence it follows as a mechanical consequence, that if a magnetic needle or cylinder be suspended by its centre of gravity, so as to be free to move in any direction round that point, it will not take an arbitrary position like unmagnetized bodies, but must take a specific direction, namely, that which represents the resultant of all the magnetic forces to which it is subject. Its position in a given place can be defined by two angles; the one called the *variation* or declination, the other the *dip*. The first is the angle formed by the vertical plane in which the needle lies with the plane of the meridian; the second is the inclination of the line of the needle to the plane of the horizon. The latter is avoided in the compass-needle by sustaining it horizontally on a point which is necessarily different from its centre of gravity, and the variation is then the angle made by the direction of the needle with that of an exact and horizontal north-and-south line. This property of the needle is called its polarity, and is a consequence of its other properties above noticed; the fact however escaped the notice of the Greeks and Romans of antiquity, but the Chinese appear to have been acquainted with it from a very remote date. It is the most useful of the known properties of the magnet, being of the most essential importance to the mariner, when the magnet is constructed in the form of the compass-needle.

Dr. Gilbert, who was physician in ordinary to Queen Elizabeth, states that P. Venetus brought a compass from China in 1260. Gilbert bestowed much attention on the subject of magnetism, and to some extent inculcated the doctrine of gravitation, by comparing the earth to a great magnet. His theory on this subject is given in a work entitled *Tractatus sive Physiologia nova de Magnete* (1600), and the term 'poles of a magnet' arose from that theory, which is remarkably consonant with the notions of the present day; for the north pole of the magnet he denominated the south pole, in connection with his theory, while Poisson, in his elegant 'Memoirs on Magnetism,' calls the magnetic fluid at that extremity of the magnet the *Austral Fluid*, because, as like electricities repel [Electricity], so, on his hypothesis of the magnetic fluids, that occupying the north end of a magnetized needle is repelled by the austral fluid of terrestrial magnetism.

The application of the compass to the purposes of navigation must speedily have led to the discovery of its variation, and in the 'Life of Columbus,' written by his son, it is distinctly assigned to that celebrated man; and though its amount in 1492 must have been small in France, Spain, &c., yet it was doubtless a very observable quantity in many of the regions visited by Columbus. Some have carried back the date of this discovery to the year 1269, but on very doubtful grounds. When its amount came to be observed with some accuracy, we find it at Paris, in 1541, 7½° E.; in 1550, 8½° E.; in 1580, 11½° E.; in 1630, 4½° E.; and at Rome, in 1670, 2° W. At the present moment it has passed its maximum in London, and is now moving easterly.

It is not improbable that Columbus was acquainted also with the diurnal variation, but nothing very accurate on this subject was known before the numerous and valuable observations made by Canton, in 1750. He showed that the needle vibrates, during the day and the night, through an arc as great as 13½′ in the midsummer, the minimum 7′ occurring in the winter season; he ascribed the diurnal variation to the action of solar heat affecting the intensity of the magnetism of the earth. The principles of thermo-electric currents were at that period unknown, but Hooke in 1684 showed that iron and steel rods could be magnetized, by rapidly heating and cooling them in the magnetic meridian. Graham, instrument-maker, of London, was the the first who distinctly announced the diurnal variation, in 1772; the maximum declination being then 14° 35′ west. The variation of the variation was first observed by GUNTER.

The *dip* was first observed by Robert Norman in 1576. His mode of adjusting the compass-needle led him to this discovery; for he accurately balanced the needle on its pivot, previous to magnetizing it. After it became a magnet, it would no longer balance on the same point, without attaching a small weight at the south extremity. When freely suspended by the centre of gravity, the north extremity became depressed; the dip then being about 71° 50′. The dip undergoes diurnal variations, as well as the declination; but observations on the former are far the most difficult. The dip also changes by elevating the needle to considerable heights; on which subject Biot has made some very delicate experiments. A very simple law relative to the amount of the dip at different parts of the earth's surface was remarked by professor Krafft, of St. Petersburg, in 1809; namely, if we measure the latitude from the magnetic equator, the tangent of the dip is double the tangent of such latitude. Mr. Barlow has illustrated this law by experiments on magnetized iron *balls* acting on small needles at the surfaces; and Biot has deduced the same law from theory.

The law of the magnetic forces was a long time undiscovered: Newton supposed it to follow the inverse cube of the distance, or some higher power; for in his experiments, the variation of intensity and the effect of the mutual influences of the magnetic fluids in the bodies themselves being overlooked, an erroneous result was necessarily consequent. However, Mitchell, by a careful revision of the experiments of Dr. Brooke Taylor and of Hauksbee; Coulomb, by his elegant apparatus, the torsion balance; Biot, by the method of observing the times of the oscillations of the small needles acted on; and finally, Hansteen of Christiana, by a series of refined experiments and calculations, have demonstrated the true law of magnetic action; namely, directly as the intensity, and inversely as the square of the distance.

One essential property by which a magnet differs from soft iron under the magnetic influence, is this: if we separate a magnetic bar into any number of minute parts, each such part will be endowed with polarity, similar to the whole: the position of those poles, or foci of greatest attraction, is permanent in a magnet of a given form; but in soft iron it will change when the distance of the iron from the influencing magnet is altered.

Halley was sent out, under William and Mary, with the command of two ships, to make magnetic observations in different latitudes, both in the Atlantic and Pacific (in 1698-9); and was the first who constructed a magnetic chart, which possessed at the time great merit for accuracy: the most valued at the present day are those by Hansteen, constructed from observations subsequent to Halley, by various scientific travellers and nautical men, such as Humboldt, Ross, Parry, Scoresby, &c. [MAGNETISM.]

During a thunder-storm, the poles of a magnet are frequently inverted, the explanation of which belongs to ELECTRO-MAGNETISM: and the appearance of the aurora borealis is often attended with vibrations of the compass-needle, to the extent of several degrees. The actual mode in which the aurora is produced being still unknown, it is impossible to decide whether the aurora is itself the cause of this magnetic phænomenon, or whether both are attributable to some unknown common cause.

MAGNETIC INTENSITY. When a magnetic needle is freely suspended by its centre of gravity, it is then acted on by all terrestrial bodies containing the magnetic fluids, whether in a fixed state, as in loadstone-ores, or in a state susceptible of change, as in masses of soft iron, and also by electrical currents, whether produced by the chemical changes which various substances in the globe continually undergo, or arising from the unequal distribution of heat both in the interior of the earth and on the surface in different latitudes. The direction of the resultant of all such forces may be regarded as possessing parallelism throughout the extent of the needle, and the latter acquires in consequence a like direction in the plane of the magnetic meridian, of which the position becomes in this manner known.

If a needle thus suspended be made to oscillate in the plane of the magnetic meridian, and the time in which a certain number of oscillations are performed be observed, and thus the time of a single oscillation deduced; the connection of this time with the intensity of the magnetic force is expressed by the formula $t = \pi \sqrt{\left(\frac{l}{F}\right)}$ similar to that used for the common pendulum. In this equation t represents the time of one oscillation, π the number 3·14159, l the distance between the centres of oscillation and gravity, and F the accelerating force of magnetism. Hence we deduce also $F = \frac{\pi^2 l}{t^2}$; consequently when one and the same needle is used in different experiments, the force F is inversely as the square of the time t of one or of a given number of oscillations. But it is in practice extremely difficult to produce oscillations in the magnetic meridian, and ingenious contrivances to that end have often been suggested and used, but the object of ascertaining the relative value of F is equally attained by supporting the needle horizontally, as in the compass, and observing the time of the horizontal oscillations. If θ represent the dip, then by the resolution of forces the horizontal part of the magnetic force is $F \cos \theta$; if now T represent the time of (suppose 300) oscillations, then by the preceding formula we must have $F \cos \theta$ inversely proportional to T^2; let F', θ', T', represent quantities corresponding to F, θ, T, for a different latitude or longitude, then $\frac{F}{F'} = \frac{T'^2 \cos \theta'}{T^2 \cos \theta}$; by which formula the relative intensities of terrestrial magnetism at different places may be ascertained with little trouble.

The times of 300 oscillations in seconds at the following places are taken from a table computed by Hansteen:— Stockholm 815, Edinburgh 820, Christiansand 820, Oxford 780, Danzig 770, Gottenburg 812, Liverpool 801, London 775, Berlin 760, Paris 753, Lübeck 776, Altona 776, Johnsknuden 861, Christiania 814, Ingolfsland 833, Copenhagen 788, Breslau 741.

The locus of all the points at which the intensity of terrestrial magnetism is the same quantity as at one given place is called the *isodynamic line* passing through it. These lines are generally of double curvative; but neglecting this, which may also be said of the lines of equal dip, they run generally parallel to each other and to the latter lines, in the temperate zone, but in other cases these two classes of lines intersect at a considerable angle. M. Hansteen states that the intensity of magnetism is less in the southern than in the northern hemisphere. M. Biot has given a formula deduced from hypothetical considerations, which has been found nearly coincident with the observed cases of terrestrial intensity, viz. intensity $\propto \frac{1}{\sqrt{(4 - 3 \sin^2 \theta)}}$; θ being the dip as before.

As the declination and dip have diurnal variations, so also has the magnetic intensity; the minimum being between ten and eleven in the morning, and the maximum in about six hours afterwards. The intensity is also greatest in December, and least in June.

An interesting series of observations made by M. Quetelet, of Brussels, shows that in the gradual ascent from Geneva to the Col de Balme the intensity of terrestrial magnetism increases; for instance, the horizontal intensity at the village Simplon is greater than that at Bonneville nearly in the ratio of 44 to 43.

Similar methods (and sometimes the balance of torsion) have been used to discover the relative intensities of magnetism as distributed in bodies; in straight and narrow laminæ it has been found by Coulomb to be nearly proportional to the square of the distance from the middle point.

MAGNETISM. If we take a natural or artificial magnet, and, spreading over a piece of paper a quantity of fine iron filings, place the magnet on the paper, on taking it up, we shall find that the iron filings are attached to it in some degree over all its surface, but they will be principally accumulated at two points situated near the ends of the magnet; these points are called the poles of the magnet. Sometimes when a magnetic bar is rolled amongst iron filings, we may find several such points along the bar; the magnet is then said to have consecutive points. At present we shall consider only the first or simple case of two poles, which we may represent by the letters N and S. When a needle formed of this material is suspended horizontally on a pivot armed with agate, it assumes a particular direction, nearly north and south. [Magnet.] The pole N, at the north extremity of the needle thus adjusted, is commonly called the north pole of the needle; the other, S, the south pole, though the contrary names, as used by Dr. Gilbert, would be more correct in connection with the theory of magnetism.

If we now bring a piece of soft iron near the pole N, it will be attracted to that pole and become attached to it, so that the exertion of a mechanical force is necessary to separate them. In this way a magnet held vertically will sustain a piece of iron, provided the weight of the iron does not exceed the magnetic force. The pole S has a similar attractive power on iron; the cause of this attractive power is called Magnetism.

We have observed that in a magnetic needle placed horizontally on a pivot, the pole N is turned northwards, and S southwards, nearly: if such a needle be attached to a piece of cork floating on water, it will adjust itself to this direction, the deviation of which from the true north-and-south line is the declination of the needle. If now we invert the position of the needle, so that S is brought into the place previously occupied by N, and *vice versâ*, the needle and cork will make a complete revolution, and acquire its original position. Hence we see a distinction between the magnetisms *predominant* at N and at S; the former is called *Austral*, and the latter *Boreal* magnetism. It will be easy to observe the analogy between the mutual relations of the two magnetisms, and those of positive with negative electricities.

We must insulate a conducting electrized substance in order to preserve its electricity, but this is not necessary in the case of a magnet; each fragment of the latter is itself a magnet, possessing its north and south poles, and the same view may be extended to its constituent particles. A nonconducting energy, called the *coercive power*, exists therefore in magnetic substances, by which the loss of magnetism when developed is prevented, and by which also the poles N and S are situate in a determinate position relative to the body of the magnet. This is not the case with soft iron, which has not the coercive force.

The force of magnetism is exerted without alteration through substances which are not magnetic; the same is true with respect to the electrical forces when nonconducting bodies are interposed in the direction of their action. On the other hand, the effect of the magnetic forces is considerably modified when substances which are capable of becoming magnetic by influence are situated near the magnet; and a similar effect takes place by the decomposition of the neutral electricities when under the influence of an electrized body. [Electricity.] The transmission of the magnetic force through interposed bodies may be observed familiarly by placing a common sewing-needle on a smooth horizontal board, and moving a strong magnet underneath the board: the needle will roll or revolve along the board according to the peculiar motions given to the magnet.

Let us next consider the action of magnets on each other. For this purpose make two magnets or magnetic needles to float on water, distinguishing the poles of one as before by N and S, and of the other by N′ and S′. Bring either the pole N near to N′, or S to S′: the needles or magnets will separate to a greater distance, and with the greater energy the nearer these poles are placed to each other. On the contrary, if we bring N and S′ near each other, the needles will approach and unite those points; and the same happens when the points N′ and S are made contiguous: hence this law—*magnetisms of the same name are mutually repulsive; those of contrary name are mutually attractive.* In the article Electricity above referred to, we have shown that the same law is true with respect to the two electricities.

The mass of the globe contains various sources of magnetism [Magnet]; and since a magnetic needle freely suspended acquires a determinate position, it follows from this law that the magnetism at the south extremity S is Boreal, that is, of the same name as the terrestrial magnetism which is predominant in the northern hemisphere, being repelled therefrom; and the magnetism at the north extremity N is for a like reason Austral. The law of magnetic force at different distances is expressed by the inverse square of the distance: the best mode of verifying this law is by observing the times of the oscillations of a small fine wire, suspended in a plane perpendicular to the magnetic meridian (in order to neutralize the magnetizing influence of the earth), and subjected to the action of a powerful magnet.

We can, by combining these laws, explain the manner in which soft iron, cobalt, and nickel are attracted or suspended by a magnet. These metals, when unoxygenated, contain both the austral and boreal magnetism in a combined state, in consequence of their want of coercive power. When a piece of soft iron is brought near the pole N, which contains the austral fluid, the austral magnetism of the iron is repelled to the farther extremity, and the boreal attracted to the nearer extremity of the iron relative to the point N: this disposition of the fluid takes place immediately, and the law of force above announced relative to the distances causes the attraction of the fluid at N, on the boreal fluid of the soft iron, to exceed its repulsion on the austral, which is more remote from N: the total effect, in virtue of this excess, is therefore necessarily attractive. When the iron however is removed from this influence, the natural magnetisms again recombine. This will not be the case if, instead of soft iron, we use hardened iron or steel: the decomposition of the natural magnetisms takes place with greater difficulty, in consequence of the coercive power which protects their actual disposition; but if we use a powerful magnet at one extremity of a steel needle, or, which is more effectual, a pair of strong magnets at both extremities, the north pole of one and the south pole of the other being brought in contact with the needle, the decomposition will be partially effected, and will likewise be retained by the same coercive power which opposed its development; and agreeably with the magnetic laws of repulsion and attraction, that point of the needle in contact with the south pole will become a north pole of the needle and the other a south pole. This method of producing magnetism is liable to the objections both of producing false magnetism and also producing consecutive points.

The quantities of the austral and boreal magnetic fluids in all magnetic bodies are equal; for when we bestow magnetic qualities on iron or steel by the influence of loadstones, hammering, sudden cooling in the magnetic meridian, &c., no new magnetism is communicated; but the natural magnetisms, which previously neutralized each other, are now decomposed. Again, if a magnetic needle be freely suspended by its centre of gravity, the action of terrestrial magnetism produces no linear motion, but only imposes a direction on the magnetic axis: now all the boreal fluid in the globe attracts all the austral fluid of the needle, and *vice versâ*, while the like fluids in both repel: hence a motion of progression would be generated, unless the resultant of the repulsive forces on the needle was exactly equal and of an opposite direction to the resultant of all the attractive forces; and the rotatory motion of the needle shows that the points of application of these forces are different; but the intensity of terrestrial magnetism may be regarded as uniform throughout the extent of the needle, and its direction parallel. In order therefore that the resultants should be equal and contrary, the sums of the boreal and austral forces of the needle must be equal. In this respect magnetism resembles the natural electricities of all substances.

The development of magnetism in bodies, whether by terrestrial action or the influence of loadstones, is analogous to the decomposition of the natural electricities in a system of conducting bodies separated by non-conductors under the influence of an external body and their own natural action: hence when magnetism is communicated by a loadstone, even when in contact the latter loses none of its own magnetism, as it acts solely by influence; whereas in conducting electrized bodies, contact will communicate electricity: the coercive force of magnets therefore extends even to their surfaces. In fact the reaction of the substance magnetized by influence tends to a further decomposition of the fluids of the magnetizing body, and this gives it greater energy, unless when it is magnetized to saturation, that is, when the internal magnetic forces are equal to the coercive power; for then any further development of the fluids would be only temporary, and a reunion would take place immediately.

The dipping-needle is a magnetic needle, the opposite poles of which possess equal magnetic intensities. It is attached to the centre of a vertical circle, and its motion is confined to the plane of this circle. The circle has a motion in azimuth about a vertical axis, and within a fixed horizontal circle, both circles being graduated. When the vertical circle is turned round its axis until the needle acquires a vertical position, the plane of the circle is then perpendicular to that of the magnetic meridian, and hence by means of the horizontal circle the position of this meridian plane becomes known. The vertical circle with the needle is now brought to coincide with the meridian plane, and the angular depression of the north pole of the horizon, or more strictly of the magnetic axis, may be read off the graduated limb of the vertical circle, and measures the dip. The right line joining the north and south poles of the needle is nearly coincident with the magnetic axis, but the latter may be ascertained more accurately by inverting the needle and taking the mean direction between its two positions of equilibrium. There are other methods of adjusting the dipping-needle, but in every method it requires great delicacy and minute attention to all parts of the adjustment.

If we place a bar of soft iron, suspended by a collection of silk strings at its middle, in a direction parallel to the magnetic axis of the dipping-needle, the action of terrestrial magnetism will have full effect on the bar, its natural magnetisms will be decomposed, and it will acquire a polarity similar to that of the needle, its poles repelling the similar poles of the needle, and attracting the contrary poles. Its want of coercive power prevents it from retaining the polarity of its different parts when the bar is moved into other positions; for if we invert the position of the bar, that point which was primitively the north pole will now become the south, and *vice versâ*, under the effects of a new decomposition of its magnetisms by terrestrial influence. If however the bar be left for a long time in the direction of the magnetic axis, so as to acquire some oxygenation, or if it be heated to a red heat and suddenly cooled by immersion in water, it will acquire a coercive force, and become permanently magnetic. Iron crosses, weathercocks, &c., which have been long kept in a fixed position, or have been struck by lightning, acquire magnetic properties in the manner above described.

It is a remarkable circumstance connected with the change of molecular disposition caused by the action of heat, that if we gradually heat a bar of iron, the intensity of its action on a magnet increases, and arrives at a maximum when the bar is brought to a cherry-red heat; with higher degrees of heat the intensity is diminished, and is totally inappreciable when the bar has reached a bright white heat; on cooling it recovers its powers of action by similar steps, and the same law holds true if the magnet be heated instead of the bar. Hence in producing the greatest development of magnetism by influence, we see the advantage of using iron or steel bars at a red heat.

Magnetism may be developed in iron, steel, cobalt, and nickel, by other means than the influence of bodies already magnetized, as twisting, hammering, electrical discharges, and galvanic currents. [ELECTRO-MAGNETISM.] If we place a bar of iron in a vertical position, and give it a series of slight blows with a hammer or poker, it will acquire a feeble degree of magnetism; hence it happens that the anvils and other tools employed in smithies are endowed with magnetism. In all such cases the mechanical operations tend to bestow a coercive power, while the terrestrial magnetism separates the fluids in the body.

Cavallo, Benett, and Coulomb remarked the indications of magnetism given by various substances, as copper, silver, &c. It is particularly observable in hammered copper, and scarcely perceptible when the copper has been cast, an attention to which circumstance is of considerable importance in shipbuilding. Coulomb formed very fine needles of various substances, and suspending them by silk strings between the opposite poles of two powerful loadstones, found that they were acted on by the latter. This phenomenon is attributable to the existence of minute quantities of iron, or iron compounds in those different bodies. The intensity of the magnetic action Coulomb found from direct experiments to be proportional to the quantities of iron contained in the bodies, and he afterwards applied this principle to discover the quantity of iron contained in impure metals.

From the preceding observations on the properties of the magnetic fluids it will be easy to understand the principles upon which the various modes of constructing artificial fluids are founded, which we shall now briefly notice. The earliest method of magnetizing a bar of hard iron or steel was by drawing it throughout its whole extent at right angles over one of the poles of a strong magnet. In this case if we suppose that pole which contains the austral fluid to be used, the first contact with the bar decomposes its neutral magnetisms, attracting to the point of contact the boreal and repelling the austral; the successive parts of the bar are subject to a similar decomposition of their fluids, but it is evident that the effect of each previous decomposition neutralizes the succeeding, except at the extremities; the magnetism thus developed is therefore feeble, and apparent only at the extremities of the bars, or in some consecutive points formed by peculiarities in the material of the bar, or in the mode of operation. Dr. G. Knight greatly improved the mode of magnetizing bars in the following manner: he joined two strongly magnetized bars by their ends bearing contrary names, and placing on them in the direction of their length a small steel bar heated to a cherry-red heat, with its middle on the point of junction of the magnetic bars, he made each of them to rub on the corresponding extremity of this steel bar, and the latter when removed was found to be strongly magnetized. In this method not only does the presence of the second magnet favour the decomposition of the magnetic fluids, but the intensity of the action of the magnetic forces is greatly increased by the elevated temperature of the steel bar.

Du Hamel placed two steel bars of equal length parallel to each other, connecting their corresponding extremities by pieces of soft iron interposed; then taking two bundles of magnetic bars, he united their poles of contrary name near the middle of one of the steel bars, and by inclining the bundles made one of them pass towards one extremity of the other bar, the second passing in the contrary direction, and then successively repeated the operation, when both the steel bars became strongly magnetized, but with contrary magnetisms at the corresponding extremities of each. In this method the decomposition of the neutral magnetisms of the interposed pieces of soft iron adds to the effect produced by the contact of the magnetized bundles with the steel bars.

Epinus, adopting a similar method, preferred interposing strong magnets instead of soft iron, the relative position of the poles of the two magnets being reversed; Coulomb combined the advantages of these different methods by composing his magnetized bundles of bars at a cherry-red heat. A fine steel needle may be very strongly magnetized by being placed in the axis of a wire twisted into the form of a helix, the extremities of which are brought in contact with the wires of a powerful galvanic battery. The poles of a bar magnetized to saturation are near its extremities, within generally a few lines, while the intensity becomes insensible at the distance of a few inches; in a thin bar the intensity may be represented by the difference of the ordinates of two logarithmic curves, the origin of one being at the austral, and of the others at the boreal extremity of the needle.

When bodies containing neutral magnetisms are made to rotate rapidly round an axis, the magnetism becomes developed and acts on the needle; thus a plate of copper made to revolve rapidly in a horizontal plane will influence a compass-needle placed over it, and produce in it a rotation in the same direction, on which subject several valuable obs servations have been made by M. Arago, Sir John Herschel, &c. It has also produced a second mathematical memoir from M. Poisson, in which the mechanical force generated by rotation is introduced into the general equations deduced from his theory of the distribution of magnetism in bodies.

The consideration of the distribution of magnetism throughout the globe has led to various explanatory hypotheses since the time of Halley; the position, the number, and the motions of the points which may be regarded as poles of terrestrial magnetism, have been all subjects of discussion and of opinions formed on inconclusive grounds. The excellent tables and maps of Hansteen have given a greater degree of certainty to this subject. The French government having lately sent out an expedition for geographical and scientific discovery, the report of which may be shortly expected; and the British government having appointed Captain James Ross with a view to similar objects in the Pacific, we shall defer to the article Terrestrial Magnetism an account of the dip, variation, and intensity, at different parts of the earth, as well as the consideration of the magnetic equator and poles.

Magnetic observations are now generally made in Europe in observatories, and also by scientific travellers; and something valuable on the subject of terrestrial magnetism is daily added to our previous knowledge.

For the theory of magnetism as connected with electricity consult Robison's *Course of Lectures*; Biot's *Physique*; Becquerel, *Traité de l'Electricité*; and Captain Kater's Papers in the *Phil. Trans.*

For the mathematical theory on this subject—the *Memoirs*, by Poisson; Ampere's *Electro-Dynamic Treatise*; and Murphy's *Electricity*, chap. vii., Cambridge.

With respect to the construction of artificial magnets—Brooke Taylor, *Phil. Trans.*, 1714-25; Michell *On Artificial Magnets*, London, 1750; Cavallo *On Magnetism*, London, 1786; Brewster, in *Encyclopædia Britannica*, last ed.; Barlow, in *Encyclopædia Metrop.*; and Scoresby *On Magnets*, 1839, &c.

MAGNETISM, ANIMAL. [Animal Magnetism.]

MAGNIFYING POWER. [Microscope; Telescope.]

MAGNITUDE. This term is generally used synonymously with quantity, and is sometimes even confounded with number. The distinction between the first two terms is not more marked than this:—he who answers the question 'how much?' describes the quantity, and he who answers 'how great?' describes the magnitude. But since magnitude is generally used in our language as applied to amount of space, we may best describe our own idiom by laying down quantity as the general term, and stating magnitude to mean usually the quantity of space. The term however must be considered, in a mathematical point of view, as originating with Euclid (whose word is μέγεθος), and it is used by him, not particularly as applied to space, but also to everything which admits of the introduction of the notion of greater or less. In this sense then, we have many magnitudes (all moral qualities for instance) which are not the object of mathematical reasoning. So necessary is the notion of magnitude to our conception even of things which we cannot measure, that we borrow idioms from subjects within the province of mathematics. Thus we speak of force of mind, and of it being greater in one individual than in another. According to the definition of magnitude, namely, 'that of which greater or less can be predicated, when two of the same kind are compared together,' it follows that we include both mental as well as material objects of conception. But the mathematics interpose the postulate that no such object can be made matter of exact reasoning, unless in cases which admit of the comparison being performed according to some method the results of which shall be self-evident, and inseparable from our notion of the thing measured. Let A and B be two magnitudes of the same kind; they are then, and then only, the objects of mathematical comparison, when other magnitudes equal to A and B can be found, and added together as often as may be desired; and when, moreover, any collection of As can be compared with a collection of Bs, so as to ascertain which is greater or less than the other. Angles furnish an instance of magnitude the conception of which is exceedingly vague in the mind of most beginners, but which takes precision and certainty in the course of mathematical study. Magnitudes, thus capable of comparison, are the objects of the doctrine of Proportion. [See also Number; Quantity.] That part of geometry which precedes proportion considers only the simple alternative of equal or unequal, modes of inequality being necessarily deferred until after that consideration.

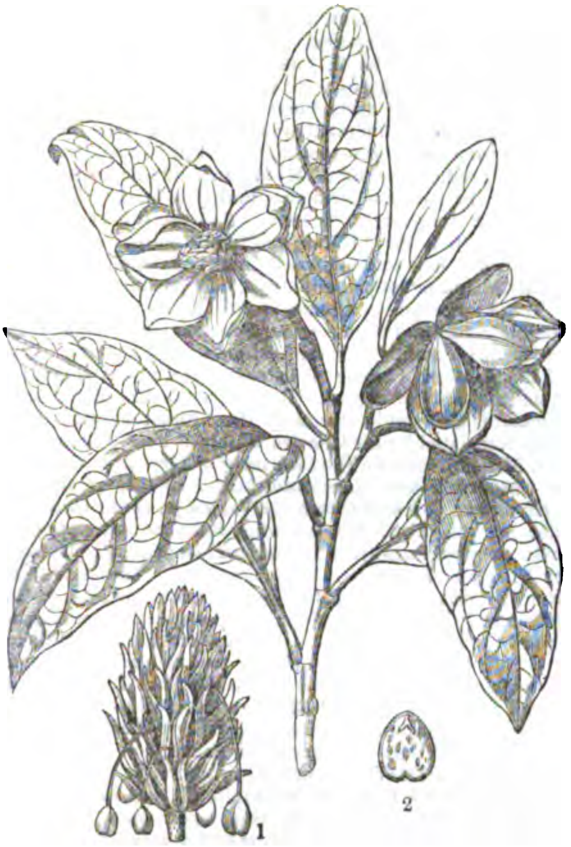
By the magnitude of any bounded space the mathematician means the results of measurement which will be described in Solid, &c. Dimensions: but the common idiom refers to that which the mathematician calls for distinction *apparent* magnitude. It is correct, in the common meaning of the term, to say, that a man at a little distance from the eye is larger than a remote mountain. In thus judging of objects, the angles which they subtend at the eye furnish the means of comparison. Experience, derived from the combination of sight and touch, teaches us how to make those deductions which are necessary before we can learn the absolute from the apparent magnitude.

It is soon found that an object, as it recedes, grows smaller, that is, subtends a less angle. It is also seen that the recess is accompanied by a loss of brightness and distinctness. The former is a consequence of the loss of light which takes place in its passage through the air; were it not for this, the same object would be equally bright at all distances; for though the quantity of light which enters the eye is diminished by increase of distance, yet the surface from which the light appears to proceed is diminished in the same proportion. The loss of distinctness is a consequence, first of the loss of light, next of the different proportion in which different colours are lost: the effect of the interposed atmosphere amounting to laying on more or less of the blue colour of the atmosphere over the whole. Our perception of magnitude depends both on the subtended angle and on the distinctness: we learn from experience, that of two objects seen under the same angle, the less distinct, as being the more distant, must be the larger. That habit is our guide can readily be shown by producing instances *in which* we are deceived, the object being either such as *is not* commonly seen, or seen under unusual circumstances. A colossal statue mounted on a column does not suggest the idea of a man of unusual size to persons in general, unless when some person mounts the same height, and affords means of comparison. In a fog, which diminishes the distinctness of objects, but does not affect the angles under which they are seen, these objects are sensibly increased in apparent size; and distant hills appear nearer in a clear day than in a hazy one. Those who wear spectacles may satisfy themselves, by breathing on the glasses, and watching an object as the moisture evaporates, that increase of distinctness gives apparent approximation.

The angle subtended by an object is inversely as its distance, which is sufficiently near for common purposes, when angles are small, which is generally the case. And a man of six feet high, at the distance of a hundred feet, is seen under an angle of 3° 26′. The sun is seen under an angle of 32′, and the moon under an angle of 29½′ to 33½′.

MAGNOLIA'CEÆ, an important natural order of albuminous polypetalous Exogens, consisting of bushes and trees, inhabiting the temperate parts of both the Old and New World. They have the numerous disjoined carpels and hypogynous stamens of Ranunculaceæ, to which they are closely allied; they differ not only in their arborescent habit, but in the young leaves being enveloped in stipules, either horn-like and convolute, or bivalved, which are thrown off as the leaves unfold. The flowers are usually large and sweet-scented, and the leaves are firm, broad, and large, in consequence of which many of the species are objects of cultivation in all civilized countries. In England, where they are exotics, they are among the most highly valued of ornamental plants, and every species which can bear the climate, or which will thrive in conservatories, has been collected with great care, whenever opportunities have offered, so that few now remain to be imported. Among the most ornamental of the hardy kinds are the M. grandiflora of Carolina; M. glauca, of which there are many varieties; M. macrophylla, the flowers of which are among the largest in the vegetable kingdom; and the Tulip-tree, Liriodendron tulipifera, a large tree with singular truncate leaves. In Bengal the air is often perfumed with the fragrance of the Tsjampac, a species of Michelia; while in China and the Malayan Archipelago others are equally well known for their ornamental characters. Nor are the plants of this order less useful than beautiful. It is probable that they are all valuable for the febrifugal qualities of their bark. Magnolia glauca is among the best bitter and aromatic species known in medicine, and the Tulip-tree affords to the North American settler a substitute scarcely inferior to it.

The genera Talauma and Magnolia have the very singular property of dropping their seeds out of the back of the seed-vessels when ripe, allowing them to hang down, each suspended by a long extensible elastic cord, composed of delicate spiral vessels



A branch of Talauma pumila.

1, a head of ripe fruit with the seeds hanging down by their cords; 2, a vertical section of a seed, showing the minute embryo lying in copious albumen.

In consequence of the seeds of Magnoliaceæ containing an abundance of oil which often becomes rancid soon after they are gathered, it is difficult to transport them to a considerable distance in a living state. The best method of succeeding in that object is to pack the seeds in earth as soon as they are ripe, pressing them close and securing them in a box. Under such circumstances they will preserve their vitality for several months.

MAGNUS, ALBERTUS. [Albertus Magnus.]

MAGO. [Carthage.]

MAGO. [Columella.]

MAGPIE. [Corvidæ, vol. viii., p. 68.] In addition to the habits of this bird and its geographical distribution stated in the article above referred to, M. Temminck quotes M. Boié as authority for its building its nest in edifices, and as being very common in Norway. It lives as high up as Lapland, and is common in the Morea. Dr. Von Siebold and M. Bürger observed it in Japan, where it is known by the name of *Kasasi*, and is precisely identical with the European magpie.

MAHÂBALIPURAM ('the city of the great Bali'), a village on the Carnatic coast, in 12° 36′ N. lat. and 80° 16′ E. long., about 35 miles south from Madras. In the immediate neighbourhood of this village are a great number of antient sculptures in a high state of preservation. They consist of groups of human figures, lions, elephants, bulls, monkeys, and cats, all of the natural size, and various other animals or monsters. These figures are all cut out of solid blocks of granite, and were evidently connected with mythological subjects.

In the face of a granite rock behind the village is an excavated gallery with pillars, and near to it is another large excavation, the walls of which are covered with sculptures, having reference to the Hindu mythology. To the north of the village is a temple containing a statue of Ganesa, thirty feet high, which is cut out of a single block of granite; and about half a mile on the south side is a group of temples from seventeen to thirty-six feet in height, formed of the same material. Some smaller caves are seen in the neighbourhood, and everywhere about are scattered fragments of sculptures similar in character to those above described.

A temple dedicated to Vishnu, a tank, and some architectural ruins on the neighbouring plain, are held by the natives to be of an equally remote antiquity with the sculptures, but this opinion does not appear to be well founded. The inhabitants have a tradition that the city of the great Bali stood on the shores opposite to the site of the present village, but is now covered by the sea. It appears however that the opinion of the sea having swallowed up or washed away several pagodas is groundless, and it is even doubtful if the tradition above referred to does not rather apply to a place on the Malabar coast, where the memory of a prince called Balin is preserved and celebrated by an annual festival. It appears that the true Sanscrit name of this place on the Coromandel coast is 'Mahâmalaipura,' or 'the city of the great mountain.'

(Babington, *On the Sculptures and Inscriptions at Mahâmalaipur*, in *Asiatic Transactions*, vol. ii.)

MAHÂBHÂRATAM, or **BHARATAM** ('belonging to Bhârata and his descendants'), the most celebrated epic poem of the Hindus after the 'Râmâyana.' A passage in the introductory part of the work (1, 2296) has given ground for the assertion that it contains the round number of a hundred thousand distichs or slocâs; but in order to complete this enormous amount, the 'Harivansa,' a mythological history of Krishna, and sundry other pieces, have been added. The eighteen component fictions (Parva) of the 'Mahâbhârata' contain about 85,000 slocâs, and even these may be reduced to 24,000 distichs, of which the original 'Bhârata,' without its episodes, is said to have formerly consisted. (1, 101.) The principal subject of the 'Mahâbhârata,' to which its middle sections particularly are consecrated, is a long civil war between two dynasties of antient India, the Kurus and Pândus. Both were descended from Bhârata, king of Hastinapur, whose first-born son, Dhritarâshtra, the father of Duryodhana and the Kurus, ought to have succeeded to the throne; but this prince being blind, the sceptre was seized by his cousin Yudhishtiras, the eldest of the five Pându princes. At first the usurper was driven off by his uncle Duryodhana, and even banished to a wilderness for twelve years; but as the Pându brethren were favoured by their friend and ally, the heavenly Krishna, and as they were themselves, according to the legend, begotten by several deities, after a long struggle against the Kuru princes, and after many perilous adventures and bloody exploits, they were finally established in the sovereignty of India.

In this main texture of the 'Mahâbhârata' is interwoven a great variety of episodes; or more properly speaking, the history of the Pândus and Kurus is the leading thread by which an immense collection of antient traditions, moral reflections, poetical descriptions, and popular stories of every kind, has been connected. It is very important to observe that these accessory elements, which now form almost three-fourths of the whole epopee, are stated in the poem itself not to be constituent parts of the original 'Bhârata;' in fact they are for the most part very loosely inserted; and as many of them are epic productions of considerable length, the principal theme is not only frequently interrupted by intervening episodes, but often totally lost sight of, even when the most active progression should be expected. Thus, for instance, the metaphysical system of Patanjali is propounded by Krishna, in the eighteen lectures of the much admired Bhagavadgîtâ, just when the army stands disposed in full array and ready for battle. Besides a vast number of various short tales and fictions of every description occasionally inserted, the episodical compositions of the 'Mahâbhârata' may be divided into two general classes of a more distinct character and of peculiar importance. The first class, to which the early sections of the 'Mahâbhârata' are particularly consecrated, is occupied in solving theogonical and cosmogonical problems, blended with those wild and fantastical conceptions by which the metaphysical mind of the Hindus is so deeply attracted. To these, in the last chapters of the work, and after the conclusion of the great war, are added didactic and moral episodes on religious duties and sacrifices, on solitary and penitential life, and on final beatitude, forming almost a complete system of Indian ethics, and a compendium of the Brahminical faith. The second class of episodes, which may, although in some respect improperly, be called historical, consist of various and ample traditions of former epochs, and are occupied in recording the origin, genealogy, and history of antient kings and heroes; in giving an account of their government and practice of warfare, their individual adventures, and their splendid actions; and in exhibiting their piety and devotion in fulfilling those duties of a religious life by which the favours of the heavenly beings are to be acquired. These and similar narratives are chiefly accumulated in the third and longest section of the 'Mahâbhârata,' called Vanaparvan (book of the forest), where they are told by the Brahminical sage Markhandeya, for the purpose of entertaining, consoling, and animating the dejected spirit of the Pandu princes during their exile in the wilderness. In this respect the episodical pieces of the 'Mahâbhârata' may be compared with the rhapsodies sung by Phemius and Demodocus in the Homeric poems, and as many of them are marked with a peculiar simplicity of manners and customs, they might almost seem of an older date than the main body of the epopee, of which they are totally independent. This leads us to the original composition of the 'Mahâbhârata,' which in the introductory part of the poem is thus related.

The most celebrated sages, with their disciples, being assembled at a splendid sacrificial festival, the venerable Krishna Dvaipâyana, with the surname of Vyâsa, who had been an eye-witness of the great civil war, is requested by king Janamejaya to give an account of those bloody events, in which, two generations ago, his own ancestors had played a fatal part. This task, being declined by Vyâsa himself, is readily performed by one of his disciples, Vaisampâyana, who, being duly instructed, and from memory familiar with the heroic poem, recites it at full length to the listening assembly. A similar festival being afterwards celebrated by king Saunaka, the same proceedings are repeated, and Sauti, whose father had been a disciple of Vyâsa, undertakes the recital of what is now considered the original 'Bhârata.' Neither in these nor in other instances is a written copy of the text mentioned; it was in fact only committed to memory and handed down by oral tradition, until the increasing mass of subsequent episodes, more or less connected with the primitive subject, urged the necessity of a final arrangement; and, to avoid further interpolations, a summary of the contents was prefixed to the whole collection, now existing under the name of 'Mahâbhârata.' Notwithstanding the traditional character and the gradual growth of the poem, Vyâsa has been supposed not only its author, but even the operation of collecting its component parts has been attributed to him, as it was he who, according to Hindu tradition, collected the Vedâs and Purânâs, and composed the Brahmasûtras of the Vedântine school. But as these operations could not be executed by the same individual, it has long been acknowledged that the name of Vyâsa (implying *disposition*) does not signify a distinct historical person, but rather an allegorical character, including the important fact that the four great parts of the sacred canon were digested by the same orthodox body of the antient Brahminical schools, by whom almost every branch of the traditional and scientific learning of the Hindus has been successively propagated and preserved. Hence a religious and priestly character prevails in the epic poetry of the Hindus; in this sense the 'Akhyâna' is often styled a fifth 'Veda,' and the 'Râmâyana,' as well as 'Mahâbhârata,' are in fact considered as the 'Sâstra' of the Kshatriya caste, for whose recreation, encouragement, and instruction they were originally designed. Compared with the 'Râmâyana' the 'Mahâbhârata' is wanting in unity and internal coherence; it is rather a collection of antient epic poems, gathered round the central history of the Kurus and Pândus: but for this very reason it far surpasses the former poem by a greater variety of pleasing scenes and attractive situations, particularly in its episodes, the characters of which are very often delineated with so peculiar a delicacy, and with so strongly marked an individuality, as to leave a powerful impression on the reader. Finally, and what is more essential, the 'Mahâbhârata' may be looked upon as a most ample source of every kind of antiquarian lore, and as the only Sanskrit work, if we except the 'Annals of Kashmir,' by which a considerable quantity of the most valuable historical fragments has been preserved. The truth of this will be shown in a series of learned essays lately begun by Prof. Lassen (in *Zeitschrift für die Kunde des Morgenlandes*). The great war itself, which on astronomical calculations has been supposed to have taken place during the twelfth century B.C. (Works of Sir William Jones, iii., 213, vii., 77), is indubitably an historical event; and as Pându (white), Krishna (black), Duryodhana, Dhritarâshtra, and other names are allegorical, Prof. Lassen acutely suggests, that the war might be the long and serious contest between the Brahminical tribes and the native occupants of the country. Leaving aside these questions, we only remark that although the 'Bhârata,' properly so called, is by no means contemporary with the events described in it, its pretensions to a very remote period of Hindu antiquity are sufficiently justified by internal evidence and the unanimous testimonies of subsequent writers. The poem is evidently of later date than the 'Râmâyana,' but neither the precise time in which it was composed, nor even the epoch of its finally assuming its present shape, can yet be ascertained.

Three large quarto volumes have already appeared of a complete edition in the original Sanskrit, carefully collated by learned Pundits with the best manuscripts in the library of the Sanskrit College of Calcutta, and published by the Asiatic Society of Bengal. Besides a number of detached fragments and single stories of the 'Mahâbhârata,' faithfully translated by Sir Charles Wilkins, Prof. Wilson, and Mr. Milman, such as *The Churning of the Ocean*, the *Story of Dushwanta* and *Sacuntalâ*, &c. (*Annals of Oriental Literature; Oriental Quarterly Magazine*, 1825; *Quarterly Review*, vol. xiv.), the following episodes have appeared in the original Sanskrit: 1. *Nala and Damayanti*, published by F. Bopp, Lond. 1819; Berlin, 1832. *Translated* into English verse by H. H. Milman, Oxford, 1635. 2. The *Bhagavadgîtâ*, by A. W. Schlegel, Bonn, 1823. An English prose translation was published by Sir Charles Wilkins, London 1785. 3. *Indralokâgamanam*, *Hidimbabadha*, *Brâhmavilâpa*, *Sundas and Upasunda*, and *Tilottamâ*, by Bopp, Berlin, 1824. 4. 'Diluvium cum tribus aliis Mahâbhârati præstantissimis episodiis,' by Bopp, Berlin, 1829.

MAHANADA. [HINDUSTAN, p. 216.]

MAHANUDDY. [HINDUSTAN, p. 210.]

MAHMOOD I., son of Mustapha II., was raised to the throne of the Ottomans after the deposition of his uncle Ahmed III. in 1730. He continued the war begun under his predecessor against Nadir Shah of Persia, but with no success, and made peace in 1736. A war with Russia followed, in which the Russians took Ockzakow and Kilburn in 1737, and, the Austrians having joined them, invaded Wallachia. The Austrian forces being defeated at Krotska on the Danube, the court of Vienna submitted to a disadvantageous peace in 1739, by which it gave up not only its recent conquests, but also the important town of Belgrade, the conquest of a former war. Peace was soon after made between Turkey and Russia, and the latter power restored Ockzakow. A new war broke out with Persia in 1747, and terminated by a treaty unfavourable to the Ottomans. Mahmood took little part in all these transactions, but left all the cares of state to his ministers and favourites. He died in December, 1754, of the fistula, his death being hastened by an effort which he made to ride to the mosque on a Friday, to show himself to his subjects, among whom reports of his death had been circulated. He was then fifty-eight years of age.

MAHMUD, Soboktegin of Ghisni, the founder of the Gasnevide dynasty, succeeded to the sovereignty of Chorasan and Bokhara (A.D. 997), which his father Emir Nasireddin Soboktegin had occupied under the caliphs El-Thai-Billah and Kader-Billah. After having assumed the title of sultan, which was readily granted to him by the caliph, Mahmud subdued the circumjacent provinces of East Persia, made Ghisni his capital, and totally shook off the yoke of his legitimate sovereign. Bound, as he deemed himself, by the most solemn vow to adhere to the precept of the Koran, which enjoins the propagation of the Islam and war against the unbelievers as a matter of faith; or stimulated rather by ambition and covetousness, ill-concealed under the mask of religious duty, he directed his arms against the quiet and peaceful Hindus, and first attacked Jeipal, the neighbouring king of Lahore, in 1001. This expedition having proved successful, Mahmud invaded Hindustan almost every year, and in no less than fourteen subsequent incursions, made in various directions and as far as the carelessness and the feeble resistance of the Hindu rajahs would permit him to proceed, he devastated the provinces, ravaged and plundered the cities, destroyed the places of religious worship, and murdered the inhabitants, always returning with an immense booty. In the year 1016 the far-famed city of Kanoge was destroyed; and shortly after the antient and magnificent Mathura, whose palaces and temples of marble and alabaster filled even their savage conqueror with respect and religious awe. The remotest expedition of Sultan Mahmud was directed against the celebrated temple of Somnat (Somanâtha) in Guzerat (1025); and although these transitory invasions of Hindustan were only undertaken to satisfy his fanaticism and avidity, and without the intention of permanently occupying the ravaged provinces, he now almost thought of making the city of Naherwaleh his new capital. Nevertheless Mahmud retired to Chorasan, loaded with the inestimable treasures of the Indian temples. After having once more attempted a predatory excursion into Multan, he died at Ghisni, 1030, neither much lamented nor extolled by his contemporaries, whatever flattery had done during his life-time by praising his justice and equity, and softening the leading features of his character, which were cruelty and avarice. All that can be said in praise of Sultan Mahmud is, that men of learning were attracted by the fame of Ghisni, which he adorned with the most splendid buildings, and by the lustre and magnificence of his court; and the new epoch of Persian poetry, of which the Shah-Nameh is the most eminent and imperishable monument, was encouraged by the sovereign. But as the satirical poems of Ferdusi testify, even his liberality and favours were in a great degree dependent on his capricious temper, and were often bestowed in a very niggardly manner. About three miles from the modern city of Ghisni, the tomb of Mahmud is still preserved, and in remembrance of his having been a zealous defender of the faith, Mohammedan priests are maintained, who constantly read the Koran over his grave. (Mirchond, *Historia Gasnevidarum*, ed. Wilken, Berlin, 1832.)

MAHOMET I., son of Bayazid I., was sandjak, or governor, of the town and district of Amasia when his father was defeated and taken prisoner by Timur at the battle of Ancyra (July, 1401). The invader having left Asia Minor, Mahomet's elder brothers Mousa and Solyman disputed their father's succession between them. Mahomet took no part in their quarrel, but continued to administer his province, and strengthen himself in it, until Mousa, having prevailed against Solyman, put him to death, upon which Mahomet declared war against Mousa, who was defeated and killed, and Mahomet became sole sultan of the Ottomans, A.D. 1413.

Mahomet was the restorer of the Ottoman empire, which he found in a state of anarchy. He extended his conquests into Europe, and obliged the princes of Bosnia, Servia, and Wallachia to pay him tribute. He also equipped a fleet to resist the attacks of the Venetians by sea. He died, after nine years' reign, A.D. 1421. He was succeeded by his son Mourad II.

MAHOMET II., son of Mourad II., was proclaimed emperor of the Ottomans after the voluntary abdication of his father in 1444; Mourad however was obliged by a mutiny of the Janizaries, who objected to his son's youth, to resume the reins of government till his death, which happened at the beginning of 1451, when Mahomet, then twenty-two years of age, commenced his reign. He broke the truce existing with the Byzantine emperor, by building a fort on the European side of the Bosporus, opposite to the fort of Anatoli-hissar, which his predecessor Bayazid had built on the Asiatic coast of the straits, by which means Mahomet established a complete command of the Bosporus. This led to remonstrances from Constantine Palæologus, the Byzantine emperor, which were received with scorn by Mahomet, who went on subduing the Greek towns on the Propontis and the Euxine, ravaged Thrace, and invaded the Peloponnesus. At last, having assembled an immense host, stated by some at 300,000 men, with a formidable artillery, and a fleet of 120 sail, Mahomet laid siege to Constantinople in April, 1453. After fifty-four days' siege the Ottomans carried the city by storm on the 29th of May, 1453. Constantine fell bravely fighting in the breach, covered by a heap of the slain. After three days of plunder and massacre Mahomet restored order, released most of the prisoners, granted to the conquered the free exercise of their religion, and gave them the use of one half of the existing churches; the remainder, and the best of them, Santa Sophia among the rest, were transformed into mosques. Mahomet remained nearly three years at Constantinople, after which he returned in triumph to Adrianople, which was then the residence of the Ottoman sultans.

In 1456, after invading Servia, he laid siege to Belgrade, but was opposed and defeated by John Hunnyades, a gallant Hungarian noble, who was regent of the kingdom in the absence of king Ladislas. This was the first check which the Mohammedan arms encountered in their advance towards Western Europe. At the same time Mahomet's generals were defeated in the mountains of Albania by Scanderbeg. The Turks however took Corinth and the Morea. In 1461 they took Trebizond, and put an end to the dynasty of the Comnenes. In 1462 they took Lesbos and other islands of the Archipelago. They next conquered Bosnia, and Mahomet, after promising safety to the prince of that country, had him put to death. In 1465 Mahomet marched against Scanderbeg, but was defeated under the walls of Croia. But Scanderbeg lost all the open country, and dying soon after, left his infant son John Castriot under the guardianship of the Venetian senate. The Venetians attacked and plundered the coasts of Thrace, Asia Minor, and several of the Greek islands. In 1470 Mahomet laid siege to the town of Negroponte, the stronghold of the Venetians in the Ægæan Sea. The Provveditore Erizzo, after a gallant resistance, being obliged to capitulate, Mahomet promised to spare his head, but by a barbarous equivocation he had him sawed in two, saying that he had not promised to spare his sides. The Venetians by means of their commercial agents excited against Mahomet, Husun Hassan, shah of Persia, who invaded Asia Minor, and took Tocat in 1472. [CONTARINI, AMBROGIO.] Mahomet hastened to encounter him, and a battle was fought near Trebizond, in which the Turks had the advantage over the Persians, who withdrew beyond the Euphrates.

In 1475 Mahomet took the Crimea, the khan of which became his tributary. The Turks invaded also Dalmatia and Frioul, in 1478, and advancing as far as the Tagliamento, obliged the Venetians to sue for peace, which was concluded between them and Mahomet, in January, 1479, by which Venice gave up Scutari and other fortresses in Illyria, Albania, and the Morea. In 1480 a Turkish force landed at Otranto, and spread alarm throughout Italy. In the same year the Turks attacked Rhodes, but were defeated by the Knights of St. John, under their grand-master Peter d'Aubusson. Mahomet was greatly irritated at the news of this defeat; and while he was making preparations for resuming the attack in person, he died at Teggiar Zaïr in Bithynia, in May, 1481. His remains were carried to Constantinople and interred with the following epitaph:—'I designed to conquer Rhodes and subdue proud Italy.'

Mahomet was a successful conqueror. He was cruel, like most of the Ottoman warriors; but he was not an illiterate or rude barbarian. He knew several languages, Persian, Arabic, and Greek; was fond of poetry, and was a good letter-writer. Several of his letters have been translated into Latin, and published by Landini, Lyon, 1520. Three of his letters, addressed to Scanderbeg, are found in Melchior Junius's Collection, 1595. He founded two medressés, or colleges, at Constantinople. Several stories of his cruelty, such as that against a Greek female, Irene, and the story about Bellini the painter, rest upon doubtful authority. [BELLINI, GENTILE.] His bad faith however is fully proved, in the instances of the unfortunate Erizzo, of the prince of Bosnia, and others. In Turkish history he is styled Mahomet the Great and the Conqueror. (Knowlles's *History of the Turks*; Mignot, *Histoire de l'Empire Ottoman*.)

MAHOMET III., succeeded Mourad III. in 1595. He began his reign by putting to death all his brothers. Giving himself up to idleness and pleasure, he left the government in the hands of his ministers, who were under the influence of his mother. His troops were beaten in Hungary by the Imperial troops, and by Battori, prince of Transylvania, and they lost Gran and other places. Mahomet, being roused from his apathy, collected a large force, with which he entered Hungary and took Agram; but he soon left the army, and hurried back to his capital. The war was carried on in Hungary by his generals, but with no success to the Ottoman arms. In the meantime revolts broke out, and the Asiatic provinces and the janizaries at Constantinople mutinied. In the midst of all these disorders Mahomet died, in 1603, and was succeeded by his son Ahmed I.

MAHOMET IV., son of Ibrahim I., succeeded his father, who was strangled in a meeting of the janizaries in 1654, when Mahomet was seven years of age. His mother assumed the regency; but a fresh revolt of the janizaries soon overthrew her power, and she also was put to death. Mahomet Kuperli, or Kupruli, was now raised to the post of grand-vizier, or prime-minister. Like many other officers who have distinguished themselves in the annals of the Ottoman empire, Kupruli was an Albanian. He and his son Achmet after him were the ruling ministers during the greater part of the reign of Mahomet IV., who troubled himself little with state affairs, being chiefly engrossed with the sports of hunting and other pastimes. The two Kuprulis spread a last ray of departing glory over the decline of the Turkish state. The elder Kupruli, after repressing by severe measures the spirit of insurrection within, formed a new fleet to oppose the Venetians, who, under the two gallant brothers Mocenigo, threatened to force the passage of the Dardanelles, in 1657. He also sent fresh troops to carry on the war in the island of Candia. Meantime the war was raging in Hungary between the Turks and the emperor Leopold I. The Turks advanced as far as Neuhausel, which they took, spreading alarm to the gates of Vienna; but they were defeated by Montecuccoli, general of the Imperial forces, at the battle of St. Gothard, 1663, after which peace was concluded. The same year Mahomet Kupruli died, and his son Achmet Kupruli became grand-vizier. In 1667 Achmet went in person to Candia, and the siege of the capital town of the same name began in real earnest. The Venetian general Morosini directed the defence. In September, 1669, Morosini, after a most gallant resistance, having exhausted all his resources, made an honourable capitulation, and at the same time concluded a treaty of peace between Venice and the Porte upon terms more favourable than might have been expected. [CANDIA.] Kupruli, unlike the barbarian Mustapha, who in the preceding century had atrociously violated the capitulation of Famagosta [CYPRUS], faithfully kept the conditions granted to the Venetian garrison, and allowed a free passage to all the inhabitants who chose to embark.

In 1671 war broke out between the Turks and Poland, and Mahomet IV. led his army in person; but he was surprised in his camp at Budchaz by John Sobieski, grand-marshal of Poland, and the sultan was obliged to seek safety in flight. In the following year Sobieski took the fortress of Kotzim, and drove the Turks to the south of the Danube. In 1675 a formidable Turkish host, commanded by the bashaw of Damascus, who for his bravery had earned the name of 'Shaitan' (the devil), entered Poland. Sobieski, who was then king, resisted all their efforts with a handful of men, and at last obliged them to ask for peace, which was concluded in 1676.

In 1683 the Turks, after seven years' preparation, put into motion the most formidable army which Europe had seen for a long time. They swept over Hungary like a storm, and marched direct upon Vienna. It is generally admitted that Louis XIV. was privy to their plans. The emperor Leopold and his family left their capital, and Germany and Italy were thrown into consternation. On the 15th of July Vienna was invested by the grand-vizier Kara Mustapha (Kupruli was dead), at the head of 300,000 men, Turks and Tartars. On the morning of the 11th September Sobieski and Charles duke of Lorraine, at the head of their combined forces, 40,000 strong, reached the summit of the Calemberg, from which they beheld the Austrian capital and the wide-spread glittering tents of the Ottomans. On the following day Sobieski attacked and drove the Turks to their formidable entrenchments, against which, at five o'clock in the afternoon, he led a general assault, carried everything before him, and obliged the vizier to fly after making a gallant resistance, leaving his camp, his baggage, and his artillery in the hands of the Christians. The Turks subsequently lost Hungary. In consequence of these disasters the janizaries at Constantinople revolted in 1687, Mahomet IV. was deposed, and Solyman III. was raised to the throne. Mahomet died in confinement in 1691.

MAHOMETANISM. [MOHAMMEDANISM.]

MAHON, PORT. [MINORCA.]

MAHRATTA LANGUAGE. [HINDUSTAN, p. 227.]

MAHRATTAS, or MAHARATTAS. The origin of these people, whose wars have filled so large a space in the history of British India, is involved in much obscurity. The country possessed by them before the modern invasion of India by Europeans is supposed to have included Candeish, Boglana, part of Berar, extending to the north-west as far as Guzerat and the river Nerbuddah, and a tract of country on the west coast lying between Surat and Canara. A great part of these countries consists of mountains and defiles, which offer great natural facilities for the prosecution of predatory and of defensive warfare. It is supposed that the name Mahratta was derived from Mheerut, or Mharat, a district which under the sovereigns of the Deccan formed part of the province of Dowlutabad. The earliest mention that we find of the Mahratta tribes is in 1306, when Cafoor, a slave and general of Alla, is said to have 'subdued the country of the Maharattas, which he divided among his Omrahs.' The Mahratta empire, as it takes a place in modern history, was founded in the latter half of the seventeenth century, in the reign of Aurungzebe, by Sevajee, the son of Shahjee, a Hindu in the service of the king of Bejapore, from whom he received a jaghire in the Carnatic, with the command of 10,000 cavalry. His first act was the seizure of the Zamindary of Poonah, on which occasion he increased the number of his soldiers, and levied contributions in all the neighbouring districts. Sevajee died in 1680, and was succeeded by his son Sambajee, a man of considerable talent, but who was unable to withstand the power of Aurungzebe, and, falling into his hands, was cruelly put to death in 1689. His son Sahoo Raja, who had also fallen into the hands of the emperor, reigned in name only until 1740, when he died; but at the death of Sambajee, a great number of chiefs, availing themselves *of the* natural facilities offered by the country, issued *from various points* in the mountains, and kept up a constant predatory warfare in the neighbouring provinces, plundering and devastating wherever they penetrated. The wealth thus acquired by them caused them to be joined by vast numbers of adventurers, as well as by many Zamindars, and after a long struggle for their subjection, they were, at the death of Aurungzebe in 1707, more powerful than ever. From the death of Sambajee in 1689 till the year 1818, the nominal sovereign or raja of the Mahrattas had no real power, but was a prisoner, confined in the hill-fortress of Satara, while the government was administered by the Peshwa, or minister, whose office became hereditary in the family of Balajee Bishenauth, its first possessor, who fixed his residence at Poonah. He was succeeded by his son Balajee Bajerow, who died in 1761. The next Peshwa was Madhoo Rao, who filled the office for 11 years, and dying was succeeded by his son Narrain Rao. This chief was murdered in 1773, concerning which event very different statements are given. By one it is said that the murder was committed by his uncle Ragoba with the design of usurping his office, but that the usurpation was prevented by twelve chiefs, at the head of whom was Balajee Pundit, better known as Nana Furnavese, who set up Sevajee Madhoo Rao, the posthumous son of Narrain, and administered the government during his minority. Mill (*History of British India*, vol. ii., p. 356) gives a very different version; he states that the murder was committed by the chiefs before mentioned, that the fact of Sevajee Madhoo Rao being the son of Narrain was disputed, and that Ragoba, whose right to the succession was perfect, fled to Guzerat, where he obtained the promise of support from the Guicowar. For some time preceding these events the English government had desired the possession of Salsette and Bassein, then forming part of the possessions of the Mahratta government; and this appearing a favourable opportunity, they formed a treaty with Ragoba, engaging to replace him in his office, and they took possession of Salsette and Bassein, much against the will however of Ragoba, who offered other territory and revenue to a larger amount as the price of British assistance. Upon his giving way on this point, an English force of 25,000 men was put in motion in his favour. Negotiations had at the same time been opened with the authorities at Poonah, who yielding to the cupidity of the English government concerning Salsette and Bassein, the latter was induced to withdraw all active assistance from Ragoba, who retired to Surat with only 200 attendants. Sevajee Madhoo Rao died in consequence of an accidental fall in 1795, and after some considerable dissensions his son Bajerow was declared Peshwa. This chief continued in power until October, 1802, when his forces being totally defeated near Poona by Jeswunt Rao Holcar, he fled to Bassein and placed himself under the protection of the British government. In the following year he was reinstated in his capital by General Wellesley (now the duke of Wellington). Bajerow proved to be of an intriguing disposition and very avaricious. He permitted his officers to practise all manner of extortion, that he might in the end seize on their ill-gotten treasure. In 1815 he was detected in the endeavour to form a general confederacy against the English; his capital was in consequence surrounded, and he was forced to cede in perpetuity districts yielding a revenue of 340,000*l.* and to make a temporary surrender of Singhur, Poorunder, and Ryeghur, as pledges for the fulfilment of existing treaties. In November, 1817, the Peshwa, in defiance of all engagements, suddenly attacked and destroyed, having first plundered, the houses of the British residency near Poonah. This treacherous conduct was speedily punished, his forces were on the following day routed by the English troops, and he became a fugitive, and wandered about in various directions until June, 1818, when he surrendered himself to Sir John Malcolm, and renounced all sovereignty for himself and his family, upon the promise of an adequate pension. On this occasion the greater part of the Poonah territory, estimated at 50,000 square miles, came into possession of the English.

In the early period of Mahratta history the system prevailed of the nominal head of the people conferring large grants of land on the principal chiefs, and of delegating to them extensive powers of government. These chiefs, one by one, assumed the state and attributes of princes, but still, with that attachment to antient forms and that respect for hereditary power for which the Mahrattas have always been remarkable, they acknowledged the supremacy of the nominal head of the state, but either submitted to or evaded his authority as best suited their interest at the moment.

MAIA. [Maiidæ.]

MAIDEN HAIR, the common name of the Adiantum Capillus Veneris, a fern found wild in many parts of Europe, on damp shaded rocks. It is the *adianton* (*ἀδίαντον*) of the Greeks, and has probably gained its trivial name from its having formed a part of the preparations used by ladies for stiffening their hair. (Dioscorides, l. iv., c. 136.)

MAIDSTONE, a corporate town and parliamentary borough, in the parish and hundred of Maidstone and county of Kent, of which it is the county and assize town. Maidstone is situated on a pleasant declivity chiefly on the right bank of the Medway, about two miles above Allington lock, eight miles above Rochester, and 32 miles south-east by east from London. Till the lock was constructed on the river the tide came up to Maidstone. It consists of four principal streets, which are well paved and lighted, and it contains many well-built houses. There are two reservoirs for supplying the inhabitants with water, conveyed from a spring on the opposite banks of the Medway, which river is here crossed by a very antient stone bridge of several arches. The derivation of the name 'Maidstone' is not precisely known; at least, various etymologies are given by Camden, Hasted, and others. According to Nennius (*Catalogue of the Cities of Britain*), this place was called by the British *Caer Meguaid*, or *Medwag*, signifying the town or city of the Medway. At a very early period Maidstone formed part of the possessions of the see of Canterbury, and is entered in the general survey of Domesday under the title of the lands of the archbishop. The charters of incorporation are those of 3 Edward VI., 2 Elizabeth, 2 and 17 James I., 34 Charles II., and 21 Geo. II. The first of these was forfeited in the time of Queen Mary, in consequence of the supposed participation of the leading members of the corporation in the rebellion of Sir Thomas Wyatt.

The revenue of the corporation in 1835, arising from landed property, tolls, &c., was estimated at 1114*l.* The total debt at that time was 15,875*l.*, and the annual expenditure, the chief item in which was the interest on this debt, is supposed to be about equal to the income. Since the establishment of the police under the Municipal Corporation Act the expenditure has been considerably increased. The landed property has lately been sold, and a great part of the debt paid off. The town is divided into six wards: the town-council consists of 6 aldermen and 18 councillors.

The town is said to be in a thriving state. There are manufactories of felt and blankets, but these are of limited extent compared with the paper-mills, which employ upwards of 800 hands. The traffic up and down the river is considerable, and has been materially increased by the construction of the lock for improving the navigation. The imports consist chiefly of coal, timber, groceries, iron, and rags; the exports are mostly fruit, hops, stone from the quarries of Kentish ragstone in this parish and neighbourhood, and paper. The aggregate tonnage of the vessels passing through Allington lock is estimated at 120,000 tons, upon which tolls to the amount of 2600*l.* are annually collected.

There is no borough gaol: the justices of the borough commit all prisoners to the county gaol, and the expense of their maintenance, amounting to one shilling per day for each prisoner, is defrayed out of the borough-rate. On the east side of the river there are cavalry barracks. Nearly opposite to the town-hall is a spacious commercial room used as a Corn Exchange. The archbishop's palace is a Gothic structure, rebuilt about the middle of the fourteenth century. Since that time it has undergone considerable alteration, and in its present state is a pleasant and convenient residence. The chapel of Newark Hospital, which was built in the thirteenth century, is a small but beautiful specimen of the early pointed style. Maidstone formerly contained a college, consisting of a master, sub-master, and four priests, founded by Archbishop Courteney in the reign of Richard II. It was suppressed by Edward VI., at which time its nett annual revenue was 159*l.* 7*s.* 10*d.* Among the persons of literary eminence who were connected with this college was the learned William Grocyn, the friend of Erasmus. He died in 1522, and was interred at Maidstone. (Wood's *Athenæ Oxon.*) There was also a fraternity of Corpus Christi, and upon the suppression of this fraternity the buildings belonging to it, then called 'The Brotherhood Hall,' were purchased by the corporation, who established the free grammar-school, which still exists, but is not at present in a very flourishing condition. Freemen have the privilege of sending their sons to this school, where they receive a classical education gratuitously, but for other branches a charge is made by the master, who receives a salary of 23*l.* 12*s.* per annum from the funds of the corporation, and has the management of certain lands in Romney Marsh confided to him, these lands constituting the principal endowments of the school. There are exhibitions, founded by Robert Gunsley in 1618, for four scholars to University College, Oxford; two to be elected from this school, and two from the free grammar-school of Rochester. Besides the grammar-school there are a proprietory school, four charity schools, nineteen almshouses, a medical dispensary, and other benevolent institutions. Maidstone is in the diocese of Canterbury. The living is a perpetual curacy in the patronage of the archbishop, producing a net income of 720*l.* The parish church of All Saints, which is one of the largest in the kingdom, was built in the fourteenth century; the new church was built a few years ago. There are also nine places of worship for Dissenters. The population of the borough, which is coextensive with the parish, was 15,387 in the year 1831, exclusive of the prisoners confined in the county gaol, and is still increasing. The assessed taxes collected during the preceding year amounted to 4784*l.* Maidstone has returned two members to parliament continuously from the reign of Edward VI. The county gaol at Maidstone is a modern building, constructed in 1818 on the improved radiating plan, at an expense of 200,000*l.* According to the Gaol Returns transmitted to the secretary of state it appears that in the year 1833 the general state of the prisoners as to morals, discipline, employment, &c., was eminently satisfactory. The total number then confined was 403; the gaol is capable of containing 453 in separate sleeping cells. The hours of labour are from six in the morning to half-past five in the evening, when the daylight admits; and at other times of the year from daylight in the morning till half an hour before sunset in the evening. By means of Sunday and day schools, conducted under the direction of the chaplain, provision is made for the instruction of prisoners of all classes. (*Parliamentary Papers*, 1834, vol. xlvi.)

There are four fairs held annually on the 13th of February, 12th of May, 20th of June, and 17th of October; the last is a large hop-fair.

(*Corporation, Boundary, and Church Revenue Reports*; Hasted's *History of Kent*; *Beauties of England*; Camden's *Brit.*, &c.)

MAIIDÆ, or **MAIANS**, the second tribe of the family of *Oxyrhynchi*, according to the system of M. Milne Edwards, composed of brachyurous crustaceans, whose *carapace*, nearly always very spiny, is, with some exceptions, much longer than it is wide. *Rostrum* generally formed of two elongated horns. First joint of the internal antennæ but little developed; that of the external antennæ, on the contrary, very large, and soldered with the neighbouring parts so as to be confluent with them; its external border always constituting a considerable portion of the lower wall of the orbit, and its anterior extremity united to the front before the level of the internal canthus of the eyes. The moveable stem of the antennæ always of considerable length. The *epistome* generally considerably wider than it is long, whilst the *buccal frame* is longer than it is wide. The third joint of the external *jaw-feet* is as wide as it is long, more or less dilated on the external side, and truncated or notched at its anterior and internal angle, by which it is articulated with the fourth joint, which is very small. The anterior *feet* of the female are in general hardly larger or longer than the others, and sometimes they are even shorter. The same conformation obtains in some of the males; but in general the first pair of feet in these last are longer and much larger than the second pair, and their length sometimes is equal to twice that of the carapace. they are directed obliquely forwards and outwards; the hand is never triangular, and the immoveable finger of the claw is not inclined downwards, so as to form a decided angle with the lower edge of the hand. The succeeding feet are generally of moderate length; those of the second pair are most commonly once and a half the length of the post-frontal portion of the carapace, but they are never twice as long as that portion; those of the third pair are hardly ever more than once and a quarter as long as the post-frontal portion of the carapace, and the other feet shorten in succession. The *abdomen* is ordinarily composed of seven distinct joints in both sexes; but sometimes this number varies in the different species of the same genus. (M. Edwards.)

Genera. Libinia. (Leach.)

This genus has the greatest relation to *Doclea* and *Pisa*, between which genera it establishes, in the opinion of M. Milne Edwards, a nearly insensible passage. The general form of the body in *Libinia* approximates closely to that of *Doclea*.

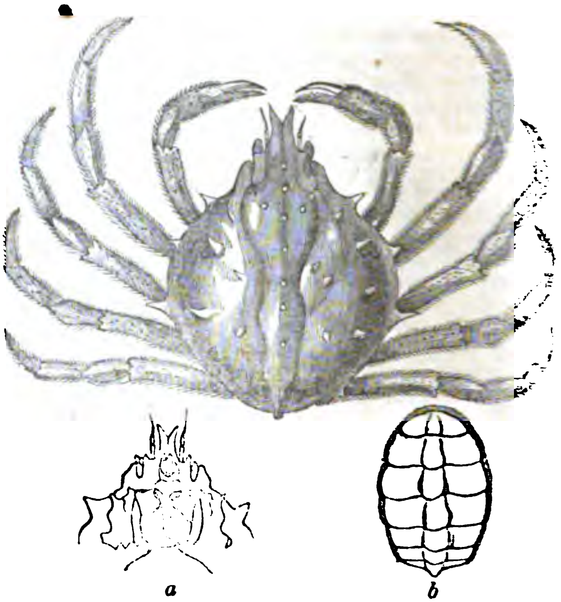
Generic Character.—*Carapace* very convex above, in general nearly circular, with its orbito-frontal portion placed sensibly above the level of its lateral borders, which are prolonged towards the mouth rather that towards the external canthus of the eyes. Sometimes the carapace is elongated a little, and bears a considerable resemblance to that of some of the *Pisæ*. *Rostrum* small, narrow, and notched in the middle; the *front*, measured between the orbits, is much narrower than the anterior extremity of the buccal frame; the anterior angle of the superior orbital border is projecting, but never reaches beyond the basilary joint of the external antennæ; the *orbits* are nearly circular, and directed very obliquely forwards and outwards; their external angle is formed by a large compressed tooth, which is separated from the rest of the wall of this cavity by two fissures; one superior and very narrow, the other inferior and more or less open. The stomachal region of the *carapace* is but little developed, but the branchial regions highly so, and their lateral border, which is armed with spines and very much curved, is directed towards the anterior angle of the mouth. The eyes are small and very short; the basilary joint of the external *antennæ* is short, but very much developed, and always wide in front, a disposition which occurs in *Pisa*, whilst the contrary is to be remarked in *Doclea;* the second joint of these antennæ is stout, short, cylindrical, and inserted on the sides of the rostrum at a distance nearly equal from the orbit and the antennary *fossette;* the third joint is rather smaller than the second, and the fourth is very slender and very short. The *epistome* is very small, and the whole of the *antennary region* is not more than half the length of the buccal frame. The external jaw-feet and the *sternal plastron* have the same form as in *Pisa*. The anterior feet are much longer than in *Doclea*, but less developed than in *Pisa;* they are always nearly of the same size as those of the second pair, and in general are much shorter even in the males; the hand is very nearly cylindrical, and has little convexity; the pincers are rounded or trenchant, and finely dentilated, and touch nearly throughout their length, a disposition which is rare in the *Pisæ*. The remaining feet much resemble those of the *Pisæ*, except that their last joint is longer, and never armed below with horny spines, as in them: the length of the feet diminishes progressively, and those of the second pair are not more than about once and a half as long as the post-frontal portion of the carapace; they are in general much shorter, and this character suffices to distinguish the *Libiniæ* from the *Docleæ*. The *abdomen* is composed of seven joints in each of the sexes.

Geographical Distribution of the Genus.—The seas of America, as far as is known.

M. Milne Edwards divides the genus into two sections: the first consisting of species which have the anterior and external angle of the basilary joint of the external antennæ obtuse, and not prolonged beyond the level of the internal one, and the slit of the inferior orbital border very narrow; the second consisting of species which have the anterior and external angle of the basilary joint of the external antennæ spiniform, and prolonged much beyond the level of the internal angle, and the slit of the inferior orbital border very wide.

Our limits will not permit us to give more than one example, and we select *Libinia spinosa*, a species belonging to the second section. The body is entirely covered with a short and brownish down, and it is about four inches (French) in length.

Locality.—The coasts of Brazil.



Libinia spinosa.

a, under side of head in detail; *b*, abdomen of female.

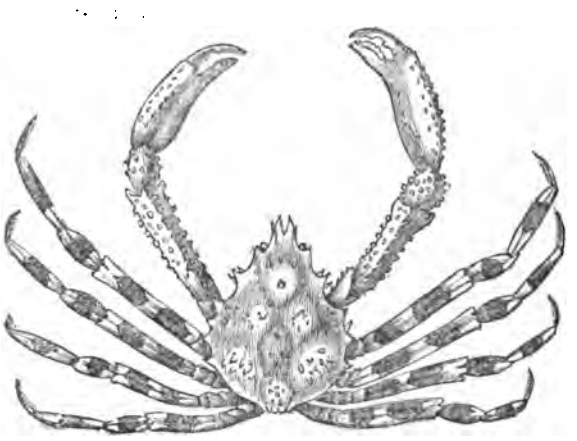
Herbstia. (Milne Edwards.)

Intermediate between the *Libiniæ*, the *Pisæ*, and the triangular *Mithraces*.

Generic Character.—*Carapace* more triangular than in *Libinia;* the stomachal region nearly as much developed as the branchial regions. *Rostrum* small, hardly longer than it is wide, and formed of two flattened horns, which are pointed and divergent, and the base of which occupies all the width of the front. *Orbits* oval-shaped, and directed obliquely forwards, outwards, and upwards; their superior border with two small fissures, which terminate anteriorly in a small spine, less projecting than that situated below and belonging to the basilary joint of the external antennæ; their inferior border is complete, and presents only a small fissure. *Eyes* large and retractile. Disposition of the *antennary region*, the *jaw-feet*, the *sternal plastron*, and the *feet*, essentially the same as in *Pisa*. The tarsi of the four last feet present small horny spines placed irregularly.

The only species known, *Herbstia condyliata*, has the body covered with a thin and fine down, is about two inches in length, and of a reddish colour

Locality.—The Mediterranean



Herbstia condyliata.

Pisa. (Leach.)

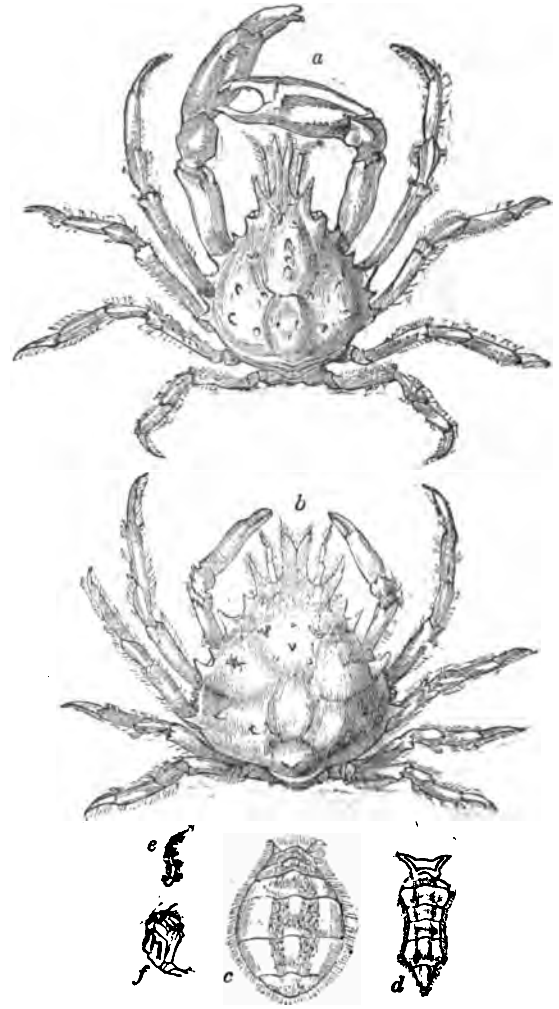
Generic Character.—*Carapace* gradually narrowed anteriorly for about three-fourths, and its latero-anterior borders prolonged obliquely in a nearly straight line up to a small distance from its posterior border; the surface very convex; the regions in general sufficiently distinct, and the stomachal region in particular very much developed. The front wider than the buccal frame, and armed with four horns directed forwards, the two external of which occupy the anterior extremity of the superior orbital border, and the two middle of which form the *rostrum*, which is always at least once and a half as long as it is wide. *Eyes* carried on very short peduncles, and bent backwards in the orbits, which are of an oval shape, and directed outwards and downwards; the upper border of these cavities with two slits, separated from each other by a triangular tooth, and their external angle situated rather below than above the lateral border of the carapace, which is there terminated. The orbital border interrupted below by a large notch. The internal *antennæ* without any peculiarity. The basilary joint of the external antennæ much longer than it is wide, only slightly narrowed forwards, and exceeding the level of the internal canthus of the eyes, but completely hidden above by the spiniform prolongation of the superior orbital border. The second joint of the antennæ slender and cylindrical, and inserted at a distance nearly equal from the antennary fosset and the orbit, a little without the level of the external border of the rostrum, so as to show itself between this prolongation and the lateral horns of the front. The third joint small and cylindrical, and the fourth rather long. *Antennary region* nearly of the size of the buccal frame, and the *epistome* large and nearly square. The second joint of the external *jaw-feet* prolonged from the internal side much beyond the level of its external angle; and the third joint much longer than it is wide, strongly dilated outwards, and deeply notched at its anterior and internal angle. *Sternal plastron* longer than it is wide. In the female the anterior feet are in general nearly of the same length as those of the second pair; but in the male they are remarkably longer and stouter; the hand is convex, and the fingers trenchant and finely dentilated on their terminal moiety. The remaining feet are cylindrical, and of moderate length; those of the second pair are not much longer than the post-frontal portion of the carapace; the length of the other feet diminish successively, and, in nearly all the species, their last joint is furnished below with small horny points, which are placed very regularly on one or two longitudinal lines, like the teeth of a comb. *Abdomen* composed of seven distinct joints

The whole of the body of the *Pisæ* is ordinarily covered with hairs, which are recurved at the end, and catch up foreign bodies which they touch; it is not rare therefore to see these crustaceans covered with sea-weeds and sponges. This disguise most probably answers the double purpose of enabling them to surprise their prey, and of protecting them from their enemies

Geographical Distribution of the Genus.—Nearly all the species live in the European Seas at considerable depths, and are often dredged up by the fishermen. After spring-tides they are frequently found hidden under stones at low-water. They are not used as food.

The species are divided into two sections, depending on the absence or presence of spiniform teeth on the upper border of the third, or third and fourth joints of the four last pairs of feet, &c. The first of these sections is separated into two subdivisions, dependent principally upon the rounded or triangular form of the posterior portion of the carapace. We select as an example one of the species of the first subdivision of the first section, *Pisa tetraodon.* This species is two or three inches in length, and has the body entirely covered with a kind of down and some crooked hairs: it is of a brownish colour.

Locality.—Very common on the English and French coasts.



Pisa tetraodon.

a, male; *b*, female; *c*, abdomen of female; *d*, abdomen of male; *e*, antenna; *f*, pedipalp.

Lissa. (Leach.)

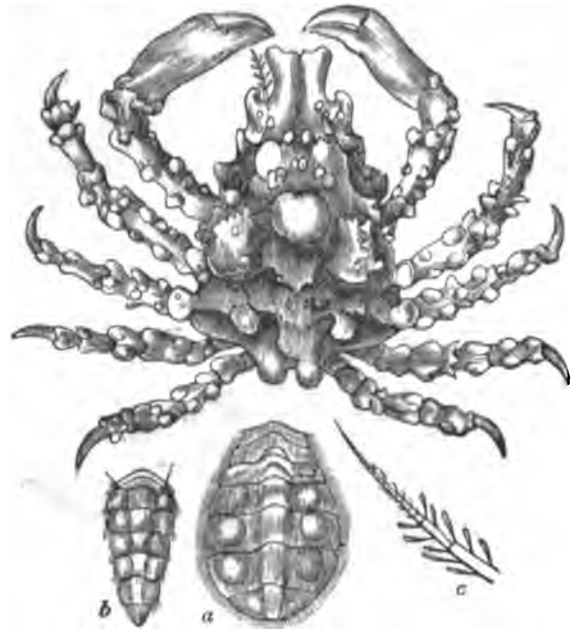
Very much resembling *Pisa*, and perhaps ought not to have been separated from it. The distinguishing characters of *Lissa* consist in the disposition of the *rostrum*, which is formed of two lamellose horns, truncated anteriorly, and wider anteriorly than they are at their base, and in the absence of spines on the tarsi. One species only, *Lissa chiragra*, is known; its length is about two inches, and the colour an intense red. The feet are furnished with some hairs, but the trunk is unarmed.

Locality.—The Mediterranean. Dr. Leach states that it is said to have been taken also on the coast of Cornwall by Mr. Swainson.

M. Milne Edwards remarks that *Lissa fissirostris* of Mr. Say seems to bear much analogy to *Hyas Aranea*; but M. Edwards cannot be certain that it belongs to the same genus from the author's description.

Hyas. (Leach.)

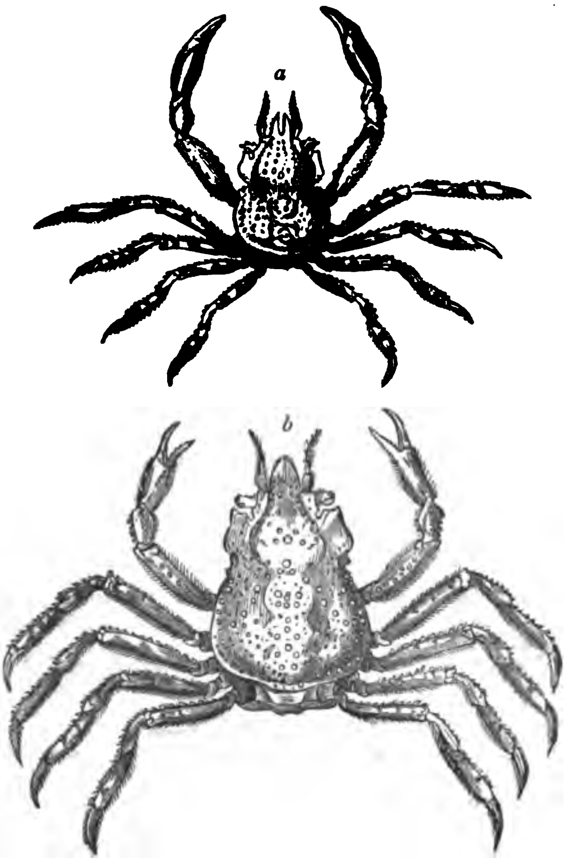
Approaching very nearly to *Pisa*, and especially to *Herbstia*, but easily distinguished by the form of the first joint of the *external antennæ*, which, instead of being cylindrical, as in nearly all the Oxyrhynchs, is flattened and enlarged



Lissa chiragra.

a, abdomen of female; b, abdomen of male; c, antenna.

on the external side. *Carapace* rather large, especially anteriorly; *rostrum*, which is formed of triangular horns that are flattened and convergent, moderate, and leaving the insertion of the moveable stem of the external antennæ completely visible; *front* large; *orbits* directed a little forwards; edges not spiny, and with a single fissure above. External edge of the basilary joint of the antennæ straight, and separated from the external portion of the orbit by a very large notch. The third joint of the *external jaw-feet* a little dilated outwards. *Feet* disposed as in *Pisa*, except that the four last pairs are longer, and have no spines on the inferior surface of the tarsus.



Hyas coarctata.

a, male; b, female.

Example, *Hyas coarctata*, Leach. The carapace of this species is strongly contracted beneath the external orbital angles. Length about two inches; colour yellowish.

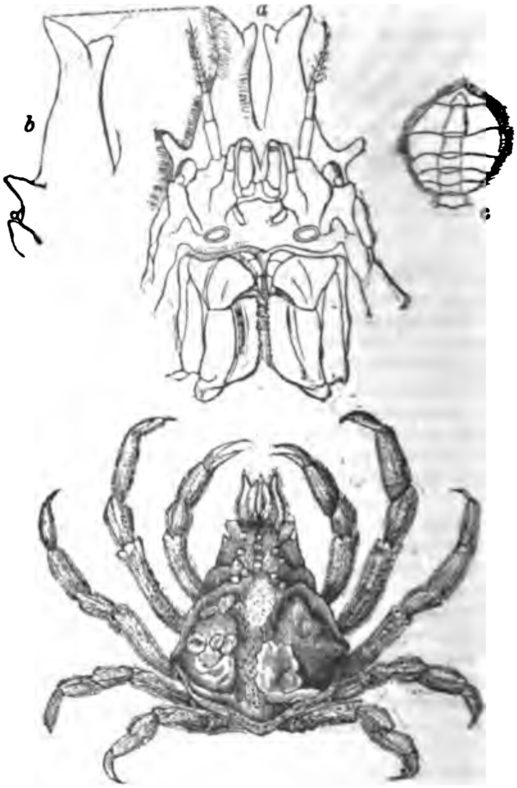
Locality.—English Channel.

Naxia. (Milne Edwards.)

Establishing, in the opinion of M. Milne Edwards, the passage between the genera *Lissa* and *Chorinus* of Leach. General form of the body as in *Pisa* and *Lissa*, and the disposition of the *rostrum* very analogous with that which is proper to *Lissa*. *Naxia* is however distinguished from the preceding genera by the disposition of the antennæ and orbits. *Carapace* nearly pear-shaped, *rostrum* much resembling that of *Lissa*. *Orbits* very small, nearly circular, deep, and marked with a fissure above and below, but without any hiatus at their inferior border. Basilary joint of the external antennæ wide but narrow forwards, very much advanced, and completely hidden by the rostrum and the anterior angle of the superior orbital border; the moveable stem of these appendages inserted under the rostrum, near the antennary fosset, and not beyond the edge of the external border of that prolongation, as in *Pisa*. *Epistome* very large.

Example, *Naxia serpulifera*, *Pisa serpulifera*, Edwards. Length about four inches; body covered with a brownish down, and the carapace often incrusted with *flustræ*, *serpulæ*, *sponges*, and the like.

Locality.—New Holland.



Naxia serpulifera, one-third its nat. size.

a, under side of the head in detail; b, one of the protruding points, with the eye in profile; c, abdomen of the female.

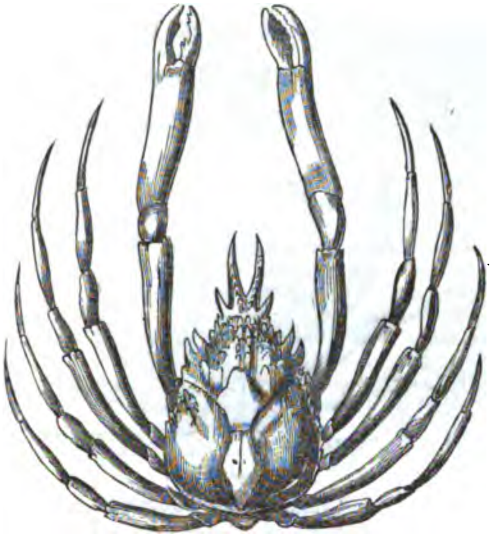
Chorinus. (Leach.)

Carapace longer and narrower than it is in nearly all of the Maians; but, in general form, not differing much from *Pisa*. *Rostrum* formed of two great pointed horizontal horns. *Eyes* retractile, and the *orbits* directed outwards and downwards; but the lower wall of these cavities is very incomplete. Basilary joint of the external *antennæ* narrow: their moveable stem inserted under the *rostrum*, and, in great part, concealed by it. *Epistome*, *jaw-feet*, *sternal plastron*, and abdomen, disposed nearly as in *Pisa*. Anterior feet longest, especially in the males, and the claw strongly curved inwards, dentilated and pointed, but a little hollowed out into a sort of gutter. The succeeding feet are cylindrical; those of the three last pairs of moderate length, but the second pair are very long: in the male they are in general once and a half or even twice as long as those of the third pair.

M. Milne Edwards divides the species of this genus into two sections; the 1st, consisting of three which have the superior orbital border scarcely marked, and formed by three spines, the anterior one very large, and the two posterior rudimentary; the 2nd consisting of those species which have the superior border lamellose and advanced.

We select as an example *Chorinus Heros*, the only species of the first section. Length from two to three inches, or rather more; rostrum, sides of the carapace, and four last pair of feet hairy; colour yellowish red.

Locality.—The seas of the Antilles.



Chorinus Heros (reduced one-half).

Mithrax. (Leach.)

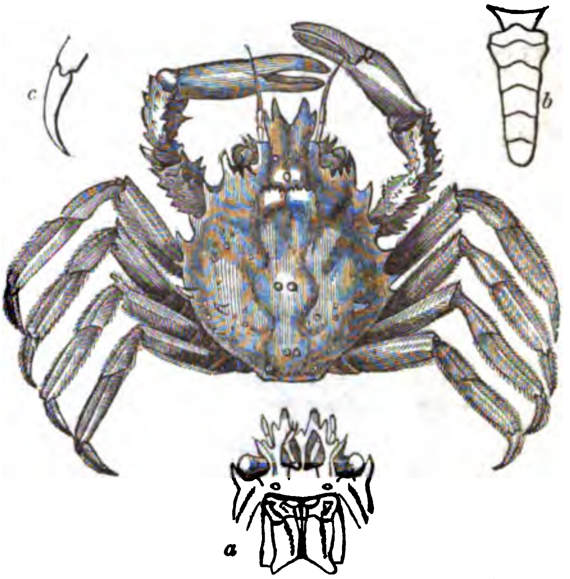
Carapace always a little convex above, and a good deal narrowed forwards; disposition of the different regions as in the other Oxyrhynchs. *Rostrum* bifid, generally very short, and separated from the internal canthus of the eyes by a rather considerable space; orbits nearly always armed with two or three spines at their superior border, one at their external angle, and one or two at their inferior border. Latero-anterior borders of the carapace spiny, or at least toothed. Internal *antennæ* bent a little obliquely outwards, and the frontal portion of the partition which separates them armed with a recurved spine. Basilary joint of the external antennæ large, and nearly always armed forwards with two strong spines. The second joint of these appendages is, on the contrary, narrow and cylindrical, and inserted on the sides of the rostrum, nearer the antennary fosset than the orbit; third joint nearly as large and as long as the second; the terminal and articulated stem rather short. External *jaw-feet* presenting nothing remarkable; *sternal plastron* nearly circular. Anterior *feet* generally, in the male, longer and stouter than that of the second pair, the hand or claw always stout and convex, the pincers distant at their base, enlarged at the end, deeply hollowed into a spoon-shape, and terminated by a semicircular trenchant edge. *Feet* of the second pair about once and a quarter as long as the post-frontal portion of the carapace; the succeeding feet gradually shortened; the tarsi short, hooked, and often armed with some points at their inferior surface. *Abdomen* generally formed of seven joints in both sexes; but sometimes only four are to be perceived in young females, the second, third, fourth, and fifth segments being soldered.

M. Milne Edwards remarks that *Mithrax* establishes some connexion between the family of the Oxyrhynchs and that of the Cyclometopes.

Geographical Distribution of the Genus.—The seas of America for the most part, where some of the species attain to a considerable size.

M. Milne Edwards divides the genus into two sections:—the first consisting of those species which have the superior edge of the orbit armed with strong spines; the second, of those which have the superior border of the orbit unarmed. The first of these sections is further subdivided into two subgenera, the first subgenus consisting of those *triangular* species whose four last feet are not spiny; and the second subgenus, of those *transversal* species whose four last feet are armed with spines. The second section contains the third subgenus, consisting of the *depressed* species.

We select, as an example, a species illustrative of the first subgenus, *Mithrax dichotomus*. Size, about two inches; colour, yellowish. *Locality.*—Coasts of the Balearic Islands.



Mithrax dichotomus.

a, under part of the head; *b*, abdomen of the male; *c*, termination of one of the posterior feet.

Paramithrax. (Milne Edwards.)

Establishing, in the opinion of M. Milne Edwards, the passage between *Mithrax* and *Maia*.

General form of the *carapace* very closely approaching that of the triangular *Mithraces*. *Rostrum* formed of two stout horns, and considerably less wide than the front, which, in its turn, has nearly as much extent as the buccal frame. *Orbits* oval-shaped, their upper border arched forwards as in the *Maiæ*, and with three strong spines posteriorly separated by two notches more or less deep; their inferior border widely notched or incomplete. *Eyes* retractile, with slender peduncles, which are rather long and curved, as in the *Maiæ*. The antennary region and antennary pits resembling those of the *Maiæ*. Basilary joint of the external antennæ large and armed with spines, one of which (the external) advances in general beyond the border of the front, and separates the orbit from the insertion of the moveable stem, which is not covered by the front. *External jaw-feet* and *sternum* nearly as in the *Maiæ*. Anterior feet of moderate strength, and terminated by pointed and rounded claws, which are not dentilated as in *Pisa*, nor hollowed into a spoon-shape as in *Mithrax*. The succeeding feet are cylindrical, very little or not at all spiny, and of variable length, according to the species; there are no small horny points at the lower end of the last joint, as in most of the *Mithraces*.

Geographical Distribution of the Genus.—Australasia.

M. Milne Edwards divides *Paramithrax* into two sections:—the first consisting of those species which have the orbits very incomplete below, and whose eyes do not reach to the external angle of the cavities; the second, of those whose orbits have only one notch below, and whose eyes, when turned back, touch the external orbital angle. *Paramithrax Peronii* is an example of the first section, and *P. Gaimardii* of the second.

Maia. (Lamarck.)

This genus was established by the author of the 'Animaux sans Vertèbres,' for the reception of the genera *Inachus* and *Parthenope* of Fabricius, or, in other words, for all the Oxyrhynchs properly so called. More modern authors have cut the Lamarckian genus down to the group formed by the small number of species which may be arranged in close approximation to *Maia Squinado*.

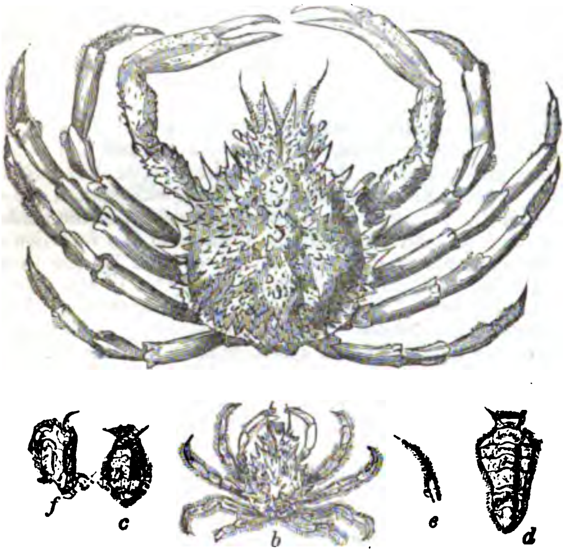
Carapace about a fourth longer than it is wide, and much narrowed anteriorly; its upper surface is rough, with multitudinous tubercles and spines, and the regions are not strongly marked on it; *rostrum* horizontal, and formed of two divergent horns; the latero-anterior border of the carapace armed with strong spines; *orbits* of an oval shape, rather deep, and with their superior border, which is elevated and rounded anteriorly, divided behind by two fissures. Internal *antennæ* exhibiting nothing remarkable, but the portion of the front which separates their fossets or pits is prolonged into a strong curved spine, which is directed downwards. First joint of the external antennæ very large, and constituting more than half of the inferior floor of the orbit, which it only exceeds anteriorly a very little; its extremity is armed with two stout spines, and carries the succeeding joint at its superior and external border, so that the moveable stem of these appendages springs in the internal canthus of the eyes. *Epistome* wider than it is long; *buccal frame* the same. Second joint of the *external jaw-feet* prolonged a good deal, from the internal side. *Sternal plastron* nearly circular, and its median suture, although sufficiently long, only occupying the last thoracic ring. First pair of feet not a great deal shorter than the others, slender, nearly cylindrical, and terminated by a claw, the fingers of which, nearly styliform, are never hollowed into a spoon-shape nor dilated towards the extremity, and present few or no dentilations. Length of the second pair hardly exceeding once and a half the width of the *carapace;* the succeeding feet gradually shorter; their terminating joint is styliform, and presents neither spines nor dentilations on its inferior border. *Abdomen* consisting of seven distinct joints in both sexes.

Geographical Distribution of the Genus.—The seas of Europe.

Example, *Maia Squinado*. Body covered with hooked hairs; length four or five inches; colour reddish.

Locality.—The British Channel, the oceanic coasts of Europe, and the Mediterranean.

This species is often dredged up, and the fishermen sometimes eat it, but its flesh is not much esteemed. It was considered by the antients to be endued with reason, and was by them represented suspended from the neck of Diana of the Ephesians, as an emblem of wisdom. It is also figured on ancient coins and medals.



Maia Squinado (reduced).

b, female, young; *c*, abdomen of female; *d*, abdomen of male; *e*, antenna; *f*, pedipalp.

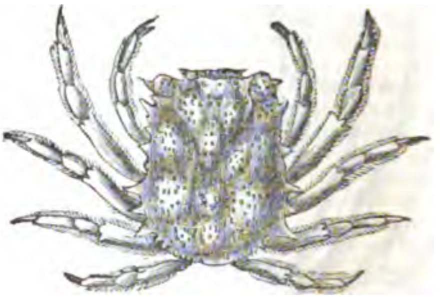
Micippa. (Leach.)

Post-frontal portion of the *carapace* nearly quadrilateral, slightly convex, rounded backwards, and hardly narrowed anteriorly; its fronto-orbital border is straight and very wide, and its lateral borders are armed with spines. *Rostrum* lamellar, and directed vertically downwards so as to form a straight angle with the axis of the body and the epistome. Orbits placed above and on the sides of the rostrum; at their superior border a deep slit; *ocular peduncles* retractile, rather long, narrowed in the middle and prolonged to the extremity of the cornea. The stem of the internal antennæ in bending back remains vertical, instead of becoming horizontal, as in nearly all the other brachyurous crustaceans. The basilary joint of the *external antennæ* very large, and wider in front than it is behind; the second joint of these appendages is inserted against the edge of the rostrum, at a considerable distance from the orbit. The third joint of the *external jaw-feet* is extremely dilated on the external side, and very deeply notched at the point where it articulates with the succeeding piece. *Sternal plastron* nearly circular. *Feet* cylindrical and of moderate length, there being little difference in size and length between the first and succeeding pairs. *Abdomen* consisting of seven distinct joints in both sexes.

Geographical Distribution of the Genus.—The coasts of the Indian Ocean.

Example, *Micippa Philyra.* Length about two inches; colour yellowish.

Locality.—The Indian Ocean and the coasts of the Isle of France.



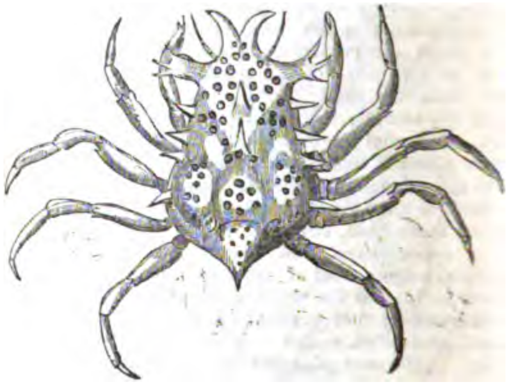
Micippa Philyra.

Criocarcinus. (Guérin.)

The principal characters of this extraordinary genus are found in the disposition of the orbits and of the eyes. The *orbitary cavities* have nearly the form of a long and truncated tube directed outwards; but they do not sheath the eyes as in *Pericera*, for the ophthalmic ring advances nearly to their extremity, and the ocular peduncle, which is long, slender, and like that of *Maia*, is inserted so as to be completely exposed, and to be capable of reflection backwards and of applying itself throughout its length against the external border of the basilary joint of the external antennæ, a position in which it is concealed under the post-orbital spines of the carapace.

Example, *Criocarcinus superciliosus; Cancer superciliosus* (Herbst). Length eighteen lines.

Locality unknown.



Criocarcinus superciliosus.

Paramicippa. (Milne Edwards.)

Approaching nearly to *Micippa*. *Carapace* nearly as wide as it is long, *rostrum* bent back below, and the latero-anterior borders armed with teeth. Disposition of the external *antennæ* nearly the same as in *Micippa*, except that the second joint, which is placed on the same level as the upper part of the front, is flattened, enlarged, very short, and triangular or heart-shaped. The disposition of the *eyes* is very different, for they cannot be reflected backwards, and there is no post-foraminal orbitary cavity; their peduncle shoots much beyond the edges of the orbit, and presents the same disposition as in the *Criocarcini*, except that they are immovable. Form of the external *jaw-feet* the same as in *Pisa;* but the *epistome* is extremely short. The *feet* are short, those of the second pair hardly longer than the post-frontal portion of the carapace; the succeeding feet are gradually shortened. The *abdomen* of the female is composed of seven joints.

Geographical Distribution of the Genus.—The only certain locality stated by M. Milne Edwards is the Red Sea.

Example, *Paramicippa tuberculosa.* There are some hairs on the feet, and even on the carapace. Colour brownish.

Locality unknown.

Pericera. (Latreille.)

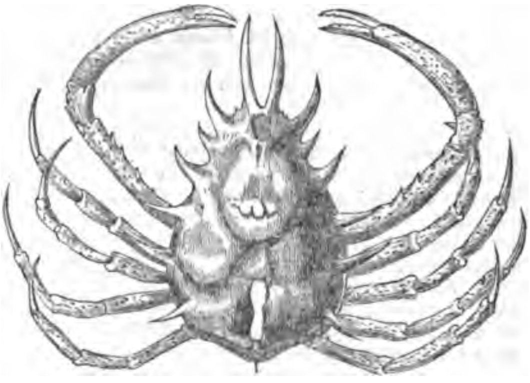
Bearing much resemblance to *Pisa,* but differing from that genus in many characters, and especially in the disposition of the orbits. *Carapace* very much elongated, and more or less triangular, a little convex and unequal above. *Rostrum* horizontal, and formed by two great conical horns. Front very wide, and occupying nearly twice as much space as the base of the rostrum. *Orbits* circular, very small, and extremely deep, directed outwards, and entirely filled by the ocular peduncles, which are enclosed therein as in a sheath, scarcely proceed beyond it, and cannot be reflected forwards or backwards; their upper border is very much produced, and presents a fissure. The basilary joint of the *external antennæ* is very large, and presents nearly the same dispositions as in *Micippa,* for it is much wider in front than it is behind, and terminates by a very extensive transversal border, which is soldered to the front or the sides of the rostrum. The position of the moveable stem of the external antennæ varies a little; sometimes it is inserted under the rostrum, sometimes a little outside the lateral border of that prolongation, but always very near the antennary fosset, and very distant from the orbit. Disposition of the external *jaw-feet,* as well as that of the *sternal plastron,* the *feet,* and the *abdomen,* nearly the same as in *Pisa.*

Geographical Distribution of the Genus.—The seas of the Antilles, as far as is yet known.

M. Milne Edwards divides the genus into two sections. The first, consisting of those species in which the anterior angles of the superior orbitary border are prolonged into a strong spine, which much exceeds the basilary joint of the external antennæ; the second, of those species which have the terminal tooth of the basilary joint of the external antennæ going much beyond the anterior angle of the superior orbital border.

We select as an example, *Pericera cornuta,* M. Edwards; *Cornejo cornuto,* Parra; *Cancer cornudo,* Herbst; *Maia Taurus,* Lam.; *Horned Crab,* Hughes, who describes the whole animal as 'covered with brownish plushy hairs.' Length from three to four inches.

Locality.—The seas of Barbadoes, and the Antilles.



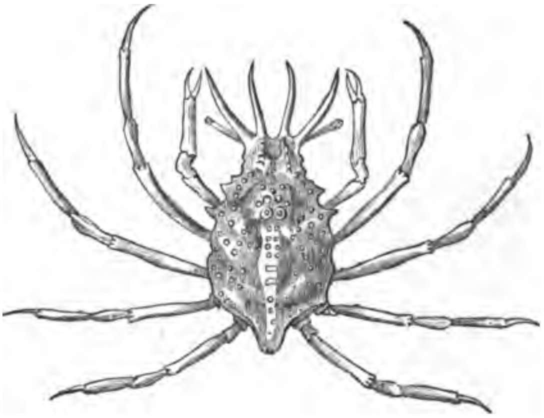
Pericera cornuta (reduced one-fourth).

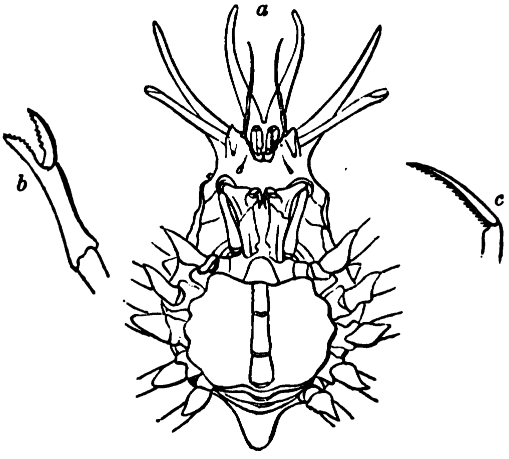
Stenocinops. (Latreille.)

Approaching *Pericera,* the principal difference being in the disposition of the *eyes.* *Carapace* narrow, very unequal, and furnished posteriorly with a large triangular prolongation, which covers the insertion of the abdomen; *rostrum* formed of two styliform and divergent horns; upper border of the orbit armed with a horn analogous to that of the *rostrum,* but directed more obliquely. *Ocular stems* delicate, immoveable and very projecting; internal *antennæ* presenting nothing remarkable; first joint of the external antennæ much longer than it is wide, the second slender, and inserted under the rostrum a little in front of the level of the eyes. *Epistome* nearly square, and the third joint of the *external jaw-feet* dilated towards the external and anterior angle. *Feet* slender and cylindrical; in the female those of the first pair are hardly stouter than the others, and are much smaller than those of the second pair. *Abdomen* of the female composed of five joints only, the three rings which precede the last being soldered together. Neither Herbst, Latreille, M. Guérin, nor M. Milne Edwards appears to have examined a male.

Only one species, *Stenocinops cervicornis* (Latr.), *Cancer cervicornis* (Herbst), is known. Length from about two to three inches.

Locality.—The Isle of France.





Stenocinops cervicornis.

a, Under side in detail; *b,* termination of one of the first pair of feet; *c,* termination of one of the succeeding feet.

Menæthius. (Milne Edwards.)

With much of the habit of *Pisa,* and establishing the passage between that genus and *Halimus.* *Carapace* about once and a half as long as it is wide, very much narrowed anteriorly, and of the form of a triangle rounded at its base. *Rostrum* formed by a large pointed process, which is placed on the median line of the body, and occupies about a third of the total length of the carapace. The anterior angles of the orbits surmounted by a large pointed and horizontal tooth directed forwards; the borders of these cavities without fissures, and exactly surrounding the base of the ocular peduncle, which is short and but little moveable. The disposition of the external *antennæ,* of the external *jaw-feet,* and of the thoracic *feet,* the same as in *Pisa,* except that there exists on the lower surface of the tarsi two rows of horny points. The *abdomen* of the male composed of seven distinct joints; that of the female of five only, of which the penultimate is formed by the soldering of three rings.

Example, *Menæthius Monoceros.* Length about ten lines; rostrum fringed with hairs; colour brownish.

Locality.—The Red Sea and the Indian Ocean.

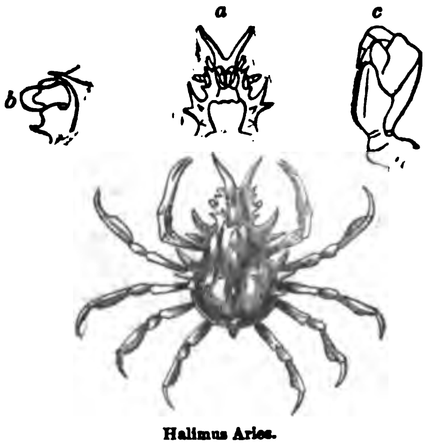
Halimus. (Latreille.)

M. Milne Edwards looks upon this genus as establishing the passage between the Eurypods, the Pisæ, the Menæthii, and the next genus.

Carapace, including the rostrum, about once and a half as long as it is wide, and convex above. *Rostrum* advanced, and formed of two divergent horns; superior orbitary border projecting, and the latero-anterior borders of the carapace nearly always straight, and armed with strong spines. Eyes not retractile, and exceeding considerably the edges of the orbit, which is prolonged backwards with a groove which represents the post-foraminary portion. First joint of the *external antennæ* very long, straight, and nearly of the same width at its extremity as at its base; the insertion of the moveable stem of these appendages not covered by the rostrum. The *epistome* very large, and nearly square. Third joint of the *jaw-feet* strongly dilated outwardly. *Pterygostomian regions* very small. Anterior *feet* slender and of moderate length in the male as well as in the female. The succeeding feet long, slender, and compressed; their penultimate joint enlarged below, and truncated like a subcheliform claw. *Abdomen* of the male composed of seven segments; that of the adult female of five.

Geographical Distribution of the Genus.—The East Indian Ocean.

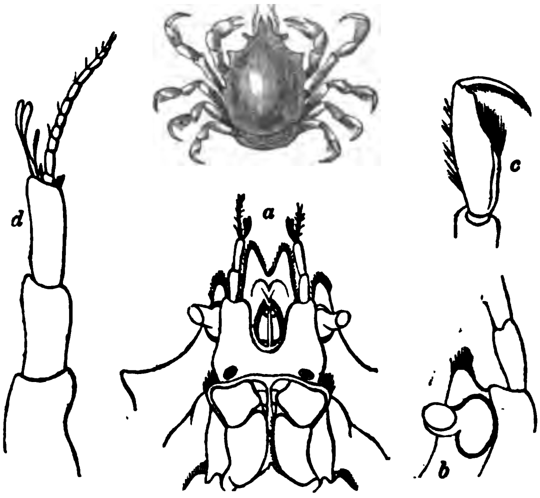
Example, *Halimus Aries*. Length about an inch.



Halimus Aries.
a, head in detail; *b*, eye; *c*, podipalp.

Acanthonyx. (Latreille.)

Carapace nearly as elongated as in *Halimus*, but less convex and much less spiny. *Rostrum* horizontal and formed of two flattened and divergent horns. *Orbits* circular and occupied entirely by the base of the ocular peduncle, which passes beyond them remarkably. Disposition of the *antennæ*, of the *epistome*, and of the *jaw-feet*, nearly the same as in *Halimus*. *Feet* short and stout; those of the four last pair very much compressed; fifth joint enlarged below, notched near the end with a hairy tooth, against which the finger is bent back in manner of a claw; those of the second pair show this structure most clearly.



Acanthonyx lunulatus.
a, head in detail; *b*, eye; *c*, termination of foot of the second pair; *d*, antennæ.

Geographical Distribution of the Genus.—The form is widely spread. Species are recorded from the Mediterranean, from the Antilles, and from the Cape of Good Hope.

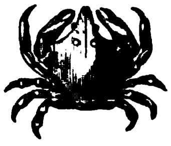
Example, *Acanthonyx lunulatus*. Length about 8 lines; body smooth, with some fasciculi of hairs on the front; colour deep green. *Localities*, the coasts of Provence and the Bay of Naples, where it is found in crevices of the rocks overhung with *algæ*.

Epialtus. (Milne Edwards.)

Establishing in some respects, according to the opinion of M. Milne Edwards, the passage between *Doclea* and *Acanthonyx*, but much more nearly approximated to the latter. *Carapace* between circular and hexagonal, scarcely longer than it is wide, regularly convex and smooth above. *Rostrum* narrow, triangular, and little or not at all divided; latero-anterior borders of the carapace very short, and forming with the lateral borders a very open angle. *Eyes* very short and not projecting much beyond the orbit, which is circular and with entire borders; but the eyes nevertheless appear susceptible of being recurved a little backwards. *Antennary region* very small; moveable stem of the external *antennæ* inserted under the rostrum, at a considerable distance in front of the orbit, and the basilary joint of these appendages nearly triangular and very narrow at its extremity. It would seem to form the whole of the lower orbitary wall. The second joint of these antennæ is a little enlarged and nearly twice as long as the third. *Epistome* small and square; *external jaw-feet* large, and their third joint nearly square, not sensibly enlarged externally, and only a little notched at its anterior and internal angle, where it joins to the succeeding articulation. The *sternal plastron* nearly circular. Anterior *feet* rather strong, and the claws slightly spoon-shaped. The succeeding feet cylindrical, and on their penultimate joint a small setiferous tubercle more or less projecting; their last joint is furnished below with two rows of small spines, and has but little flexibility: the tubercle is only well apparent in the posterior feet. The second pair are much longer than the others. Segments of the abdomen varying from six to seven in the male.

Geographical Distribution of the Genus.—The coasts of Chili, as far as it is yet known.

Example, *Epialtus tuberculatus*. Length three or four lines; colour brownish yellow. *Locality*.—Chili.



Epialtus tuberculatus.

Leucippa. (Milne Edwards.)

M. Milne Edwards sees in *Leucippa* much analogy to *Acanthonyx*, and he is of opinion that the former establishes in some points a passage between the *Maians* and the *Parthenopians*.

Carapace resembling that of *Eurynome*, save that instead of being unequal and beset with spines as in them, its surface is perfectly smooth; its length exceeds its width only a little, its anterior portion is nearly triangular, and its latero-anterior borders are projecting and trenchant. *Rostrum* horizontal, projecting, very wide, and formed of two lamellar horns. *Orbits* incomplete, so that the eye cannot be hid therein completely; the superior border of these cavities is straight, and goes to rejoin the base of the first tooth from the latero-anterior border of the carapace, so as to form a triangular notch; the external edge of the basilary joint of the external *antennæ* constitutes the internal portion of their inferior wall or partition; but backwards and below they are limited by nothing, and it may be said that there is no post-foraminary portion of the orbit. The *eyes* are small and carried on a very short peduncle; when they are folded backwards they only reach a little beyond the transversal line, and they are applied on the angle of the latero-anterior border of the carapace. The first joint of the external *antennæ* is straight throughout its length; the second and the third are completely hidden under the rostrum, and this last is nearly twice as long as that which precedes it. *Epistome* not very much developed. External *jaw-feet* with their third joint very much dilated outwards, and slightly truncated at its anterior and internal angle. *Feet* short, compressed, and surmounted nearly throughout their length by a trenchant crest. *Abdomen* of the female composed of seven segments, and covering the whole of the sternal plastron: that of the male unknown.

Geographical Distribution of the Genus.—This form, as far as is known, belongs to the Pacific Ocean.

The only species known, *Leucippa pentagona*, is about four lines in length; colour pale grey (female).

Leucippa pentagoua.

a, under view of the head, magnified.

(*Histoire Nat. des Crustacés*, &c.)

MAIKOV, BASIL IVANOVITCH, a Russian author who gained some distinction by his talent for comic poetry, was born at Jaroslav, in 1725. Although he had received but a very moderate education, a natural aptitude for writing verses and a turn for humourous satire enabled him to distinguish himself by his 'Yelisei, or Bacchus Enraged,' a burlesque poem in five cantos, the hero of which is a *yamshtshik*, or carter, named Yelisei, whom Bacchus takes under his protection. It is chiefly by this production that Maikov is now remembered; but the fiction itself is so extravagant, and the narrative in many parts so confused, as to detract considerably from the pleasure afforded by the humour displayed in many passages. He also wrote two poems in a similar vein: one entitled 'Igrok Lombera, or the L'Hombre Player;' the other, 'The Most Shocking Fall of the Poets;' each of which is in three cantos. His other works consist of two tragedies and several tales and fables. To these last-mentioned productions the epithet 'Moral,' prefixed to them by the author himself, can hardly be said to belong, for one of them at least is most scandalously indecent. There is also considerable grossness in many parts of 'Yelisei.' Maikov died at Moscow in 1778, but the first entire collection of his poems did not appear till 1809, when they were published in one volume, at St. Petersburg.

MAIL (from the French *maille*), strictly 'the mesh of a net,' but applied in a collective view to defensive armour formed of iron rings or round meshes. Boyer, in his French dictionary, translates *maille* 'a little iron ring.' Mail or malle was also the name given to a bag or small sack, at first probably because made of net-work; since applied likewise to the portmantle or portmanteau.

MAIL, COAT OF (also denominated the Hauberk or Habergeon), armour for the body, of which there were two kinds, one called chain-mail, the other plate-mail. Chain-mail consisted of a number of iron rings interlaced, each ring having four others inserted into it, the whole exhibiting a kind of net-work already described, with round meshes. Plate-mail consisted of laminæ of metal-like scales, fastened down to a strong quilted linen or leathern jacket. [ARMOUR.] Compare also Grose's *Milit. Antiq.*, vol. ii.; Meyrick's *Critical Inquiry into Antient Armour*, fol., Lond., 1824; and his *Observations on the Body Armour antiently worn in England*, and *Upon the Lorica Catena of the Romans*, in *Archæologia*, vol. xix., pp. 120-145, 335-352.

MAIM (in law, 'mayhem') is an injury done to the body of a man by forcibly depriving him of the use of some member serviceable in fight, as a means either of defence or offence, and permanently disabling him from offering such an effectual resistance to further attacks upon his person as he otherwise might have done; as if a foot, hand, or finger, or a joint of the foot or hand, be struck off or made crooked or weakened, or if a bone of the head be removed, or a foretooth broken or displaced, or if an eye be beaten out, or if any other bodily injury be inflicted whereby the party is rendered less capable of making a vigorous defence. But destruction of a jaw-tooth, of an ear, or of the nose, or of other members, the loss of which does not interfere with the means of defence or of offence, does not amount to mayhem. The distinction however is by statutory alterations in the law rendered of little importance.

Mayhem was formerly punished by inflicting the same privation upon the offender which he had caused to the party maimed. It was afterwards punishable by fine and imprisonment, as an aggravated trespass. But now, by 7 Wm. IV. and 1 Vict., c. 85, to stab, cut, or wound, if with intent to murder, is a capital felony, and if with intent to main, disfigure, or disable, is a felony punishable by transportation for life, or for not less than 15 years, or by imprisonment not exceeding three years.

Concurrently with these proceedings in the name of the crown, for the purposes of public justice, the party injured is entitled to compensation in the shape of damages, to be recovered in an action of trespass; and where the damages found by the jury are not commensurate to the injury sustained, the court may increase them upon inspection of the mayhem.

MAIMATSHIN, or MAIMAITCHIN. [KIACHTA.]

MAIMBOURG, LOUIS, born in France in 1620, entered the order of Jesuits, and studied theology at Rome. On his return to France he was employed as a preacher. Having published, in 1682, a work in which he defended the principles of the Gallican Church, 'Traité Historique de l'Eglise de Rome,' the pope caused him to be expelled from the order of Jesuits. Louis XIV. on this occasion gave him a pension, and he retired to the abbey of St. Victor at Paris, where he died in 1686. The four propositions which Maimbourg, with the greater part of the French clergy, maintained, are:—1. That the pope has no authority in temporal matters. 2. That the general councils of the church are superior to the pope. 3. That the pope may err in his decisions, which are subject to the approbation of the church. 4. That the rights, usages, and canons established in the Gallican Church cannot be altered by the pope without the consent of the clergy and the state.

Maimbourg wrote several works on church history, the principal of which are: 1. 'Histoire du Pontificat de St. Grégoire;' 2. 'Histoire du Pontificat de St. Léon;' 3. 'Histoire du Calvinisme,' which has been criticised by Bayle and others; 4. 'Histoire de l'Arianisme;' 5. 'Histoire des Iconoclastes;' 6. 'Histoire du Luthéranisme,' in which he defends indulgences in their fullest extent, as remitting not only the temporal penalty, but the penalty hereafter, both to the living and the dead; 7. 'Histoire de la Ligue.'

Maimbourg is often prejudiced and inexact, but his style is attractive; and several of his works are not destitute of merit. Voltaire, no favourable judge, said of him that 'he had been too much praised at first, and too much neglected afterwards.'

MAIMO'NIDES, or more properly **MOSES BEN MAIMON**, one of the most celebrated of the Jewish Rabbis, was born at Cordova in Spain, about A.D. 1131 or 1133. He studied philosophy and medicine under the celebrated Averroes, an Arabian physician and philosopher; and also paid great attention to mathematics and natural science, as far as they were known at that time. In addition to a knowledge of Hebrew and Arabic, he is also said to have been acquainted with Greek, and to have studied the writings of the most celebrated Grecian philosophers.

In consequence of a violent persecution having arisen against his master Averroes, Maimonides withdrew to Egypt, where he is said to have gained his livelihood at first by working at the trade of a jeweller. His great merits afterwards introduced him to the sultan Alphadel, who appointed him physician to his own household, and treated him with distinguished honour. He died in Egypt at the age of 70.

The learning and abilities of Maimonides have been universally acknowledged both by Jews and Christians, although the independent mode of thinking which characterised most of his writings, as well as his rejection of some of the favourite absurdities of the Rabbis, rendered him an object of suspicion and dislike among many of his contemporaries. The Rabbis of Montpelier in particular attacked his opinions with the greatest vehemence, and burned his writings; but their proceedings were censured by most of the Spanish Rabbis. The controversy continued till about the year 1232, when the celebrated David

Kimchi was chosen by both parties as an arbiter of the dispute. [KIMCHI.]

The most celebrated of the writings of Maimonides are: 1. *Moreh Nevochim*, or 'Teacher of the Perplexed,' originally written in Arabic, and translated into Hebrew by his disciple Samuel Aben Tybbon. This is perhaps the most valuable work of Maimonides; it contains an explanation of difficult passages in the Old Testament, as well as of types, allegories, &c. The original Arabic has not been printed; but the Hebrew translation has been published at various times; the best edition is by Salomon Maimon, Berlin, 1791. The 'Moreh Nevochim' has been also translated into Latin by Justinian, bishop of Nebio, Paris, 1520, and by the younger Buxtorf, Basel, 1629, with a preface, which contains an account of the life of Maimonides. Dr. Townshend has published an English translation of this treatise, under the title of 'The Reasons of the Laws of Moses, from the "More Nevochim" of Maimonides,' London, 1827. 2. *Perush ha-Mishna*, or 'Commentary on the Mishna,' which was also originally written in Arabic, but has been translated into Hebrew by many Rabbis, and has usually been published with editions of the 'Mishna.' Surenhusius, in his edition of the 'Mishna,' Amst., 1698-1703, has given a Latin translation of this work. Part of it was published in the original Arabic by Pococke, Oxford, 1645, under the title of *Porta Mosis*. 3. *Yad Hazakah*, or 'The Strong Hand,' which contains a complete digest of the Hebrew laws. It is written in remarkably good Hebrew. The best edition is that printed at Amsterdam, 1702, 4 vols. fol. 4. *Shelosh Asarah Ikkarim*, or 'The Thirteen Articles of Faith,' printed at Worms, 1529, and Jena, 1540.

Maimonides also wrote several other treatises on different points of the Jewish law, and many works on medical subjects. He also translated, at the command of the sultan of Egypt, the writings of the Arabian physician Avicenna, or Ibn Sina.

Maimonides founded a college at Alexandria for the instruction of his countrymen, in which he delivered lectures on philosophy and the Jewish laws.

MAIN, UPPER AND LOWER. [BAVARIA.]

MAINA, a district of the Peloponnesus, which occupies the south-west part of the antient Laconica, extending along the range of the Taygetus to Cape Matapan. The inhabitants of this mountainous district were never subjugated by the Turks, but lived in a kind of savage independence, often making incursions into and plundering the neighbouring districts occupied by the Turks: some of them also scoured the sea as pirates. Their chief, who was hereditary, was styled Bey, but his authority was much circumscribed by the council of the primati, or heads of the principal families. The number of the Mainiotes has been variously stated, by some as high as 40,000. Thiersch (*De l'Etat actuel de la Grèce*) states the eparchy of Maina to contain about 3000 families; but this includes merely the southernmost part, or rocky peninsula between the Laconian Gulf and that of Coron; but the name of Mainiotes was given in general to all the mountaineers of West Laconica. They are now subjects, though not very docile ones, of the new kingdom of Greece.

MAINE, LE, one of the provinces into which, before the Revolution, France was divided, was bounded on the north by the duchy of Normandie; on the east and south-east by the districts of Chartrain, Dunois, and Vendômois, portions of Orléanais, and by Touraine; on the south by Anjou, and on the west by Bretagne. Its length may be estimated at 113 miles from east to west; its breadth from north to south at about 59: its area may be estimated at 3886 square miles. It was watered in the western part by the Mayenne; and in the central and western parts by the Sarthe and its branches. It was subdivided into Haute (or Upper) Maine in the centre, Bas (or Lower) Maine in the west, and Le Perche in the east. The capitals of these districts were respectively Le Mans, Mayenne, and Mortagne: Le Mans was considered to be the capital of the whole province. Le Maine is now for the most part divided into the departments of Sarthe and Mayenne, except Le Perche, which is for the most part included in the department of Orne. Some small portions are included in the departments of Eure and Eure et Loir.

Le Maine derives its name from the Aulerci Cenomani, one of the Celtic tribes which inhabited it. They possessed the central and eastern parts: the Diablintes (perhaps another division of the Aulerci) occupied the north-western parts; the Arvii, the south-western; the Saii or Essui, a small portion of the north-eastern; and the Carnutes, another small portion of the extreme east. The Aulerci Cenomani were among the nations who filled the north of Italy with a population of Gauls. Le Maine was among the earlier conquests of the Franks, who established here a kingdom, which lost its separate existence when Clovis amalgamated the Frankish tribes under his sway.

Le Maine was early formed into a county. It was ravaged by the Normans, and conquered by William the Bastard, duke of Normandie (A.D. 1063), a little before the conquest of England. The troubles of the province during his government and that of his sons, induced Henry I., his youngest son, to cede the province (A.D. 1100) to Hélie de la Flèche, a rival claimant, on whose death (A.D. 1110) it came to the counts of Anjou. On the accession of Henry, count of Anjou and Maine, to the duchy of Normandie (A.D. 1151), and subsequently to the crown of England as Henry II. (A.D. 1154), Maine again became part of the English possessions in France. On the confiscation of these by Philippe II. Auguste, the county of Maine was granted by that prince (A.D. 1204) to Bérengère or Berengaria, widow of Richard I. of England, on whose death it probably reverted to the crown, and was granted by Louis IX. (Saint Louis), together with the county of Anjou (A.D. 1246), to his brother Charles, count of Provence. Under Philippe VI. de Valois, who had inherited it before he came to the throne of France, it was reunited to the crown; but Philippe, shortly after his accession, invested his son Jéan with the two counties, and when Jéan became king, he bestowed them on his second son Louis, who subsequently became count of Provence and king of Naples, in whose line it continued for some time. In 1440, Réné, who possessed the counties of Lorraine, Provence, Anjou, and Maine, bestowed the last on his brother Charles, who transmitted it to his son: but on the death of the latter (A.D. 1481), the county of Maine was once more reunited to the crown, from which it has never since been permanently alienated.

MAINE ET LOIRE, a department in the west of France, bounded on the north by the department of Mayenne, on the north-east by that of Sarthe, on the east by that of Indre et Loire, on the south-east by that of Vienne, on the south by that of Deux Sèvres, on the south-west by that of Vendée, and on the west by that of Loire Inférieure. The form of the department is irregular; its greatest length is from east by north to west by south, from between Le Lude and Château La Vallière to the junction of the little river Divate with the Loire, 77 miles; the greatest breadth, at right angles to the length, is from the neighbourhood of Pouancé to that of Maulevrier, 60 miles. The area is estimated at 2799 square miles, which is almost equal to the conjoint areas of the English counties of Lancashire and Cheshire. The population in 1831 was 467,871, in 1836 it was 477,270, showing an increase in five years of 9399, or about 2 per cent., and giving 170 or 171 inhabitants to a square mile. In extent of surface and in population, whether regarded as to amount or density, it is considerably above the average of the French departments; but in the last respect far below the English counties with which we have compared it. Angers, the capital, is in 47° 28′ N. lat. and in 0° 33′ W. long., 161 miles from Paris in a direct line, or 178 miles by the road through Chartres and Le Mans.

The department has no mountains, nor are there any very high hills. The high lands which separate the basins of the Vilaine and the Loire occupy a small part of the north-western border, and the southern part is overspread by the prolongations of the heights of Gâtines, which bound the basin of the Loire on the south-west. The surface of the department consists for the most part of low hills covered with vineyards, or of gently undulating plains, divided by ditches and quick hedges, and adorned with clumps of trees, whose foliage gives variety and beauty to the landscape. The eastern side of the department is occupied by the chalk which encircles the Paris basin: a belt of land in the centre, extending across the department, first south-west along the eastern bank of the Sarthe to its junction with the Mayenne, and from thence south-east by Angers, Brissac, and Doué, is occupied by the formations between the chalk and the saliferous sandstone: the western side is occupied by the primitive rocks.

The whole department is included in the basin of the Loire, which river crosses it from east to west. It enters the department just below the junction of the Vienne, and flows westward to Ingrande 53 miles; for 22 miles below Ingrande it separates this department (which extends farther west on the south side of the Loire than it does on the north side) from that of Loire Inférieure. There are numerous islands in this part of the river. The Mayenne, the principal tributary of the Loire, enters the department on the north side, and flows south in a circuitous channel to Angers, a little below which it falls into the Loire: its whole course is about 27 miles. The Sarthe enters the department on the north side, about 12 miles east of the Mayenne, and after a tolerably direct course of 23 miles south-south-west, joins the Mayenne just above Angers. The Loir enters the department also on the north side, but about 12 miles farther east than the Sarthe, and flows south-west, though with one or two considerable bends, about 27 miles into the Sarthe, into which it falls about five miles above its junction with the Mayenne. All these rivers are navigable throughout that part of their course which lies within the department. They have no feeders of any consequence except the Oudon, which enters the department on the north-west, and after receiving the Arraise and the united stream of the Argos and the Verzée, falls into the Mayenne, midway between the border of the department and Angers. Its whole course in this department is about 17 miles, for 10 of which it is navigable. The Aution or Authion enters the department on the east side, 3 or 4 miles from the north bank of the Loire, and has a westward course of 34 miles in this department parallel to that river, into which it falls at Les Ponts-de-Cé near Angers. It receives the Latan and the Couanon. It is not marked in Brué's map of France as navigable, though included in the official statements. All the above tributaries of the Loire join it on the north bank.

South of the Loire are the Thoué or Thouet, with its tributary the Dive; the Laubancy; the Layon, with its tributary the Hyrome; the Evre; and the Divate; which successively fall into the Loire. The Divate, the most westerly of them, separates this department from that of Loire Inférieure. The Thoué, the Dive, and the Layon are given in the official statements as navigable, but only the Thoué is marked as being so in Brué's map. The Sèvre Nantaise skirts the south-west border of the department, and its tributary the Moine waters the south-west part. The statement of the inland navigation of the department is thus given in the 'Statistique de la France,' printed by the French government:—

	Miles.
Loire	54
Mayenne	30
Sarthe	27
Loir	29
Oudon	11
Authion	26
Thoué	11
Dive	9
Layon	37
	234

There were (January 1, 1837) nine Routes Royales, or government roads, having an aggregate length of 246 miles, namely, 89 in repair, 144 out of repair, and 13 unfinished. The principal road is that which leads from Paris by Chartres and Le Mans to Angers, and from thence to Nantes. It enters the department between La Flèche (Sarthe) and Durtal, following the right or north-west bank of the Loir; at Durtal it crosses that river and runs south-west to Angers. From Angers it runs west-south-west along the valley of the Loire by St. George's to Ingrande, beyond which it enters the department of Loire Inférieure. Another road from Paris to Angers by Tours enters the department on the east, and follows the north bank of the Loire, through Roziers and St. Mathurin. Roads lead from Angers along the valley of the Mayenne west of that river, by Le Lion d'Angers, to Laval, and by Les Ponts-de-Cé across the Loire, by St. Lambert, Chemille, Trementine, and Chollet, to Bourbon Vendée and Les Sables d'Olonne (Vendée). A road from La Flèche runs south by Baugé and Longué across the Loire to Saumur, from whence one branch continues southward by Montreuil-Belloy to Parthenay and Niort (Deux Sèvres); another runs south-south-west by Doué, Vihiers, Coron, and Vezins to Chollet. There were at the same date twenty-four Routes Departementales (departmental roads), with an aggregate length of 353 miles, of which 143 were in good repair, 34 out of repair, and 176 unfinished. The number of bye-roads and paths was above eight thousand; their aggregate length more than 8500 miles. Few departments would be so well provided with means of communication by land and water, if the roads were kept in good repair.

The soil is in general fertile, and the quantity of waste land is but small. Nearly two-thirds of the department are under the plough. The quantity of corn raised is considerably above the consumption of the department. The exports amount sometimes to more than 500,000 hectolitres, or more than 170,000 quarters. Pulse of all kinds is grown, especially beans and kidney beans, of which 20,000*l.* worth are sent to Nantes and Bordeaux for sea stores. Hemp and an abundance of excellent fruits are raised, especially melons, almonds, and plums. Pears and apples are cultivated, the latter for cider. The vineyards occupy 85,000 to 90,000 acres, and yield on an average nearly 500,000 hectolitres, or above 11,000,000 gallons of wine of fair quality. The best wines are the red wines of Neuillé and Champigné-le-Sec, and the white wines of Varrains, Clos-Morin, Saumur, Rabelais or Rablay, Faye or Foy, and Bonnezeau. The quantity of meadow-land is considerable, about 200,000 acres. A considerable number of horned cattle are reared, and of sheep of a breed crossed with the merinos. The Thibet goat has been introduced. The breed of horses has been improved by means of the royal stud established at Angers. The woods occupy about 150,000 acres, and consist chiefly of oak and beech trees. Game and fish are abundant.

Among the mineral treasures are granite, marble of various qualities, excellent building-stone, sandstone for pavements, roofing slates of excellent quality and great abundance [Angers], limestone, iron, and coal. The quantity of coal dug in 1835 was 11,556 tons. There was in 1834 only one iron-work, having one furnace for smelting pig-iron, and six forges for the manufacture of wrought iron. Charcoal was the fuel employed.

The department is divided into five arrondissements, as follows:—

		Area in Sq. Miles.	Population in 1831.	1836.	Communes.
Angers,	Central & W.	616	134,538	138,459	88
Baugé,	N.E.	539	81,690	81,025	67
Beaupréau,	S.W.	623	104,947	108,518	75
Saumur,	S.E.	570	89,505	91,159	93
Segré,	N. & N.W.	451	57,191	58,109	61
		2799	467,871	477,270	384

There are thirty-four cantons, or districts, each under a justice of the peace.

In the arrondissement of Angers are, Angers (pop. in 1831, 28,933 for the town, 32,743 for the commune; in 1836, 35,901 for the commune) [Angers], on the Mayenne; St. Mathurin, Les Ponts-de-Cé, Savenières, St. Georges, and Ingrande, on or near the north bank of the Loire; Blaison, Rochefort, and Chalonne, on the south bank of the Loire; and St. Aubin, on the Layon. St. Mathurin is in one of the pleasantest parts of the valley of the Loire, and consists of about 400 houses, the greater part of which are on the north side of the road from Tours to Angers, the opposite side of the road forming a kind of terrace immediately above the bank of the Loire. The town of Les Ponts-de-Cé, formerly written Ponts-de-Sai or Sée, takes its name from a line of bridges and causeways extending nearly two miles in length across the arms of the Loire and the islands encircled by them. The houses on each side the causeway form the town, which comprehends two parishes, forming one commune, with a population of 2490 for the town, or 3665 for the whole commune. The bridges have their foundations of slate, and are in a very dilapidated condition; they do not however present any marks of great antiquity. Near the south end of the bridge, on an island of the Loire, are the ruins of a Roman causeway; and at some distance from the northern end of the bridge, at the confluence of the Loire and the Mayenne, is a large Roman camp, capable of containing 100,000 men, and forming an equilateral triangle, defended on two sides by the rivers and on the third by an entrenchment. Many medals and coins with other antiquities have been dug up here. Ingrande has a large glass-house for the manufacture of bottles; it employs about 500 workmen. Chalonne or Chalonnes (pop. 2289 town, 4969 commune) is in a delightful situation. There are the ruins of an old bridge and castle. The inhabitants are chiefly boatmen and weavers: the latter make serges for home consumption, or handkerchiefs for the merchants of Chollet. Black marble is quarried near the town.

In the arrondissement of Baugé are, Baugé (pop. in 1831, 3433 town, 3553 whole commune; in 1836, 3400 commune) and Beaufort (pop. 3288 town, 5914 commune), on or near the Couanon [Baugé; Beaufort]; Longué (pop. 1577 town, 4491 commune), and Vernantes, on or near the Latan; Durtal (pop. 3465) on the Loir; Moranne, on the Sarthe; and Jarzé. Durtal or Duretal has the remains of an old castle built by Foulques Nera, count of Anjou, consisting of two towers, having a parapet with machicolations. The other parts of the castle are of later date. There is a good stone bridge of five arches over the Loir.

In the arrondissement of Beaupréau are, Beaupréau (pop. in 1831, 3207; in 1836, 3288) [Beaupreau]; Le May (pop. 3315), and Montrevault, on the Evre; Jallais (pop. 3163) on a small feeder of the Evre; St. Florent, on the south bank of the Loire; Maulevrier, La Tessouale, Chollet (pop. 4657 town, 7345 whole commune) [Chollet], and Montfaucon, on or near the Moine; Greslé, not far from Beaupréau; Chemillé (pop. 3694) on the Hyrome; La Jumellière, Trementine, Tour Landry, and Vezins. Handkerchiefs, linens, and woollens are manufactured at Jallais, St. Florent, Chemillé, Trementine, and Vezins. Le May was destroyed in the Vendéan war, but has been restored. La Tessouale has a considerable establishment for bleaching linen.

In the arrondissement of Saumur are, Saumur (pop. in 1831, 9977 town, 10,652 whole commune; in 1836, 11,925 commune) [Saumur]; Montsoreau, and Fontevrault on or near the south bank of the Loire; Roziers, on the north bank; Brissac on the Loubancy; Passavant, Neuil, Les Verches, Doué (pop. 2479), Martigné, Chavaignes, Thouarcé, Rablay or Rabelais, and St. Lambert, all on or near the Layon; Montreuil-Belloy (pop. 1812 town, 1907 whole commune); Coudray, and Puy Notre-Dame, on or near the Thoué; Vihiers, Coron, La Salle, and Gonnord. In the old abbey of Fontevrault, Henry II. and Richard I., kings of England, were buried. Doué has some remains of an old palace of King Dagobert; the ruins of what some have regarded as a Roman amphitheatre hollowed out of a calcareous rock, others as the ruins of an old palace of the kings of Aquitaine; a handsome fountain, and in the neighbourhood some extensive caverns. On the south bank of the Loire below Saumur are the entrenchments, in good preservation, of a camp supposed to be Roman, forming a vast but irregular polygon approaching to an oval. Fragments of Roman pottery and medals of different emperors, from Augustus to the Antonines, have been dug up in this neighbourhood, and round the camp are many vestiges of tombs. At Gennes on the south bank of the Loire, a little lower down, are some other Roman antiquities, and especially the ruins of an aqueduct.

In the arrondissement of Segré are, Segré and Le Lion d'Angers, on the Oudon; Pouancé, near the source of the Verzée; Candé, on the Erdre, a stream which belongs chiefly to the department of Loire Inférieure; and Châteauneuf, on the Sarthe. Segré is a small place, consisting of a few crooked streets or rather lanes, in a situation out of the way of any great thoroughfare, and from the badness of the roads scarcely accessible. The population of the town is probably little more than 800; that of the whole commune was, in 1836, only 2130. Le Lion d'Angers is agreeably situated on the right bank of the Oudon, which is here navigable, a little above its junction with the Sarthe. It is a well built town, favourably situated on the road from Laval to Angers, with a population probably of 2500. Pouancé has some iron-works, with a population probably of about 2000.

The population, where not otherwise specified, is that of the whole commune, and from the returns of 1831.

The manufactures of the department comprehend sail-cloth, handkerchiefs of various colours and of different qualities, coarse linens, and other linens called 'cholettes,' coarse woollen cloths, and woollen stuffs, cotton-yarn, paper, leather, and wax candles. There are also mills or presses for walnut, linseed, and other oils. Trade is carried on in corn, trefoil-seed, dried pulse, wine, brandy, vinegar, paper, cattle, slate, marble, and coal.

The department constitutes the diocese of Angers, the bishop of which is a suffragan of the archbishop of Tours. It is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Angers, and in the fourth military division, the head-quarters of which are at Tours. It returns seven members to the Chamber of Deputies.

In respect of education this department is very backward: of every hundred young men enrolled in the military census of 1828-29 only twenty-three could read and write; the average of France being thirty-nine.

This department originally formed part of the territory of the Andecavi or Andes, north of the Loire; and of the Pictones, south of that river. In the subdivision of Roman Gaul the former was included in Lugdunensis Tertia, the latter in Aquitania Secunda. The chief town of the Andes was called at first Juliomagus; afterwards, from the name of the people, Andes or Andecavi, the modern Angers. Combaristum, now Combrée, a village between Segré and Pouancé, and Robrica, probably the bridges of Longué on the Latan, were towns of the Andecavi. In the middle ages, and up to the time of the Revolution, the department constituted the greater part of the province of Anjou.

MAINE is the most northern of the United States of North America, being bounded on the south-west and west by New Hampshire, on the south by the Atlantic Sea, on the east by the British colony of New Brunswick, and on the north and north-west by Canada. The United States claim as an appurtenance of Maine all the extensive country traversed by the St. John river and its tributaries west of the boundary-line of New Brunswick (67° 50′ W. long.), which is considered by the British as belonging to Canada. This disputed tract lies between 46° and 48° N. lat., and between 67° 50′ and 70° 30′ W. long. Exclusive of this tract, the state of Maine extends from 43° 5′ to 46° 30′ N. lat., and between 67° and 71° W. long. Its greatest length, from south-south-west to north north-east, is about 270 miles; and its greatest width, from east to west, about 180 miles. Its surface may be estimated at about 22,000 square miles, or between 3000 and 4000 square miles less than the area of Ireland.

Coast, Surface, and Soil.—The coast-line extends in a straight line 236 miles. The southern portion, as far north as Casco Bay, is rather high, but comparatively free from rocks and islands. Casco Bay extends from south-west to north-east 20 miles, with a mean width of five miles, and is landlocked by a chain of islands. So far the coast trends from south-south-west to north-north-east. Between Casco Bay and Penobscot Bay the coast of the mainland runs nearly west and east; but numerous long peninsulas stretch out from it southward into the sea, and are divided from each other by narrow and deep indentations, which form excellent harbours. These bays contain numerous small islands. Penobscot Bay extends from St. George's Point (44° N. lat) and the Fox Islands, thirty miles northward, to the mouth of the Penobscot river, nearly in a northern direction. It contains numerous wooded islands, some of which are considerable, as Long Island, which is fifteen miles in length and from two to three in breadth, Fox, Deer, and Haut islands. The remainder of the coast-line, from Penobscot Bay to Passamaquoddy Bay, resembles the coast west of Penobscot Bay, consisting of an alternation of promontories and indentations; but the former are commonly wider, and the inlets do not run so deep into the mainland. The most extensive bays are Frenchman's Bay and Machias Bay. Frenchman's Bay is formed on the west side by the extensive island called Mount Desert Island. The approach to this coast, which runs from the south of west to the north of east, is also rendered difficult by numerous rocks and small islands. Though the frost along this shore is very intense in winter, and the numerous islands favour the formation of ice, the harbours are commonly open all the year round, the strength of the tide, which rises from between 24 to 40 feet, preventing their being closed up. The country rises gradually from the shore, but rather rapidly, which is proved by the tide entering the rivers only a few miles, especially towards the south. The surface of the state is mostly hilly, but it is only in the north-western and northern districts that the hills rise to the height of mountains. The mountain-region may be considered as divided from the hilly country by a line beginning on the south on the banks of the Androscoggin river, at the mouth of Swift river (70° 30′ W. long), and running north-north-east towards the southern extremity of Moose-Head Lake, from which point it extends east to the place where the west or main branch of the Penobscot river unites with the Matawamkeag river

East of this branch of the Penobscot the mountains recede northwards to about 46° N. lat. The region to the west and north of this line is full of high hills and mountains, of which the highest, Mount Kathadino, rises to more than 5330 feet. These hills, though mostly isolated, occupy a considerable surface, perhaps one-fourth of the region, and about as much is occupied by the lakes. The lowest part of this region is probably from 600 to 700 feet above the surface of the sea; and few, if any, settlements have been formed in it, except at the southern extremity, in the valley of the Androscoggin, where the hills are of moderate elevation. This region occupies more than one-fifth of the area of the state.

The remainder of the state is occupied by the hilly region, which is well drained by numerous rivers with a rapid course. Swamps are of rare occurrence in this part and of moderate extent, except along the banks of the Matawamkeag, where they occupy a space fifty miles in length. Along the sea-coast, and from ten to twenty miles inland, the soil is of moderate fertility, and frequently intersected with sandy and sterile tracts; but beyond this region the soil improves, and produces plentiful crops of grain, flax, and hemp.

Rivers and Lakes.—The rivers in the southern district have a short course. The principal are the Piscataqua [NEW HAMPSHIRE], the Saco, and the Presumscot, or Casco. The two latter rise on the southern and western declivity of the White Mountains in New Hampshire, the Saco running about 90 and the Presumscot about 60 miles. The latter traverses a large lake called Sebago Pond, and falls into Casco Bay, a short distance north of Portland.

East of Casco Bay is a deep indentation which receives two considerable rivers, the Androscoggin [ANDROSCOGGIN] and the Kennebeck. The Kennebeck rises in several branches on the eastern declivity of the mountain-range which separates Maine from Canada: these branches, some of which have a course of 40 miles, unite in Moose-Head Lake, a sheet of water about 30 miles long from north to south, with a breadth varying from five to 20 miles. From the south-western side of this lake the Kennebeck issues in a large stream, and the general direction of the remainder of its course is to the south, but with considerable deviations to the west and east, until it reaches the mouth of the Androscoggin, after a course of about 180 miles. Though its course is obstructed by falls and shoals, like that of the Androscoggin, it is of great importance in the transportation of lumber. The tide ascends to Augusta, 70 miles from the open sea. Kennebeck Bay, in which the Androscoggin and the Kennebeck unite, stretches more than 20 miles farther south, being formed by the long peninsula of Phippsbury on the west, and by numerous islands on the east.

The upper branches of Penobscot river are numerous. All the waters which descend from the southern declivity of the high land which forms the southern border of the St. John's river, between 68° and 70° W. long., flow down to the Penobscot. The principal branch is the western, which is formed by several mountain-streams uniting in Chesuncook Lake, from the southern extremity of which it issues with an eastern course. Skirting the southern declivity of Mount Kathadino, it enters Bamedumpcok Lake, and after leaving the lake unites with the north branch and the Matawamkeag, two large rivers which come from the north. At the point of its junction with these two rivers it turns by degrees from an east-south-eastern to a south-western course, in which direction it continues to its junction with the Piscataquis river, a large stream which falls into it from the west. The remainder of its course is a little to the west of south, and it falls into Penobscot Bay after a course of 215 miles, the bay included. The tides come up to Bangor, 30 miles from the bay, and 60 miles from the open sea. Penobscot river is more navigable than the other rivers of Maine, as no obstruction occurs for 20 miles above Bangor, except its rapid current, and it is much used for the transport of lumber.

From Penobscot Bay to that of Passamaquoddy, a distance of 100 miles along the margin of the ocean, no large river empties itself into the sea. The last remarkable river is the St. Croix, or Scodie, which forms the boundary-line in this part between the United States of North America and the British colony of New Brunswick. Its farthest sources are a number of lakes, curving from north to east, and extending in length about 40 miles; they are known by the name of Grand or Chiputnaticook Lake. The river issuing from the lake, called also Chiputnaticook, runs southward until it unites with the outlet of another series of lakes called the Scodie lakes. Hence its course is to the south-east, but with some considerable bends. It enters Passamaquoddy Bay after a course of about 100 miles. Passamaquoddy Bay is of a very irregular form, extending upwards of 20 miles from the mouth of the Scodie river to Quoddy Point; on the side of Maine it forms a bay of considerable extent, called Kopscook Bay.

Climate.—The winter is very severe. From the 1st of November to the 1st of April the ground is covered with snow, and the rivers and lakes with ice. The summer on the sea-shore is very hot. The thermometer frequently rises to 90°, and even 96°, and the weather is subject to sudden and great changes. Drought is frequent. The mean temperature is about 42°, or about eight degrees less than that of London. In the year the thermometer ranges 115°; between 96° above and 19° below zero. In the interior of the hilly region the weather, though not so warm, is much more regular. Little is known of the climate of the mountain region. The climate all over the state is healthy; but perhaps the swampy district on the north-east must be excepted.

Productions.—A very dense forest covered Maine in its natural state, and still spreads over the greatest part of it, the settlements being yet restricted to a comparatively narrow zone along the sea-coast. These forests, consisting principally of white pine, spruce, maple, beech, birch, white and grey oak, constitute the principal wealth of the state; timber being its staple. The cultivated fields do not occupy one-twentieth part of the surface. Indian corn, which constitutes the principal food of the inhabitants, thrives well as far north as the valley of the Lower Penobscot river, but farther north it does not ripen. Other articles cultivated in this state are wheat, rye, barley, oats, peas, hemp, and flax. The fruit-trees of northern Europe thrive very well, especially pears and apples, as well as most of our vegetables.

Cattle and hogs are numerous, and afford articles of exportation. Deer were formerly abundant; wolves, bears, beavers, foxes, and squirrels are still common. The sea abounds in fish, especially cod; and the rivers and lakes are full of fish, especially salmon· large trout are common in the lakes in the interior.

Maine, so far as it has yet been explored, is not rich in minerals, but iron-ore occurs in several places.

Inhabitants.—The population amounted, in 1820, to 297,839, but had increased in 1830 to 398,460; which gives about 18 individuals to a square mile. More than one half of that number is occupied in the forests, cutting the timber, and preparing other articles for exportation, as potash, pitch, &c. Many families along the sea-coast obtain their subsistence by fishing. The inhabitants manufacture coarse cloth and farming utensils; and on several of the rivers there are numerous saw-mills to prepare the timber for the market, which is floated down the rivers.

In the northern part there are still some few natives, who live mostly on the produce of the chase and of their fishery in the lakes. Their numbers seem not to exceed one thousand. The most numerous are the Penobscots, who occupy the upper and part of the central valley of the Penobscot river, in which fish abounds.

Political Geography.—Maine is divided into ten counties and 300 'towns,' a term which is equivalent to townships. The capital is Portland, situated on a promontory in Casco Bay, south of the mouth of Presumscot river. It has a large and safe harbour, which is seldom frozen over. Many vessels are built here, and it carries on a considerable foreign trade. In 1800 its population hardly exceeded 1000 souls, and in 1830 it exceeded 10,000. Along the coast are several towns with good harbours. South of Portland is Arundel with 2500, Wells with 1500, and York with 5000 inhabitants. Falmouth with 4000, Brunswick on the Androscoggin, with 2700, Kennebeck with 2500, Waldonborough with 2200, and Thomaston on the Penobscot Bay, with 3000 inhabitants, are thriving places on the coast north of Portland. At the last-mentioned places many vessels are built. On Passamaquoddy Bay is Lubeck, a town founded in 1815, and having already a population exceeding 1500. In the interior are also a few towns in the southern and most populous districts; as Berwick on the Piscataqua, with 5000, Paris with 2000, and Augusta on the Kennebeck, with 2000 inhabitants.

Bowdoin College, at Brunswick, on the banks of the Androscoggin, 26 miles from Portland, was incorporated in 1796. It is well endowed and has a good library. A medical school, in connection with the college, was established in 1820. There is also a college, founded by the Baptists in 1820, at Waterville on the west branch of the Kennebeck: and there are theological institutions at Bangor and at Readfield. The Gardiner Lyceum, at Gardiner, was established 'for the purpose of giving to farmers and mechanics such a scientific education as may enable them to become skilful in their professions.' Every town is by law required to raise annually, for the support of common schools, a sum equal at least to 40 cents for each person in the town, and to distribute this sum among the several schools or districts, in proportion to the number of scholars in each. A sum raised by a tax on banks is also appropriated to the support of the schools.

Commerce.—The exports consist chiefly of the produce of the forests, as timber, lumber, boards, and potash, and of dried fish, beef, pork, and grain. From the 1st of October, 1832, to 30th of September, 1833, their value amounted to 989,187 dollars; foreign produce exported from the harbours, to the amount of 30,644 dollars, is to be added to this amount, making a total of 1,019,831. The imports amounted in the same year to 1,380,308 dollars, and consisted mostly of manufactured articles from Europe, and salt, iron, and colonial produce from the West Indies, especially Cuba. This state possesses a larger amount of shipping than any other state in the Union except Massachusetts and New York.

History.—It appears that Maine was discovered by one of the Cabots in 1497. It was afterwards visited by the French, who called the southern part, west of the Kennebeck river, Maine, and the eastern part Acadie. In the beginning of the 17th century the English attempted to make some settlements in the southern district, and succeeded about 1635. The first charter was proprietory, and granted in 1639 to Sir Ferdinand Gorges; but in 1652 Maine was united to Massachusetts, under the title of the county of Yorkshire. In 1676 Massachusetts bought the country from the family of the Gorges, and from that time it remained annexed to that state, but thrived slowly, on account of the eternal disputes between the English and French, until in 1712 England obtained its full possession by the peace of Utrecht. Massachusetts opposed the attempts of the inhabitants to separate Maine and Massachusetts; but in 1819 it gave permission to the freemen of Maine to decide this important question, and the majority of votes being in favour of a separation, a constitution was formed and adopted, and in 1820 Maine became an independent member of the Union.

The legislative body consists of a Senate and House of Representatives, chosen annually by all the male citizens of 21 years of age and upwards. The executive is in the hands of a governor, who is chosen annually. Maine sends two members to the Senate, and seven to the House of Representatives at Washington.

(Darby's *View of the United States;* Warden's *Account of the United States of North America;* Pitkin's *Statistical View of the Commerce of the United States of America.*)

MAINIOTES. [MAINA.]

MAINTENO'N, FRANCOISE D'AUBIGNE', Marquise de, was born at Niort in 1635. Her father, Constans d'Aubigné, son of the friend of Henri IV. [AUBIGNE', THEODORE AGRIPPA D'], was a man of profligate character. He was in prison at Niort at the time of the birth of his daughter; he afterwards went, with his wife and child, to the West Indies, where he died in 1645. His wife and daughter returned to France in a state of destitution, and Mademoiselle d'Aubigné was brought up by an aunt, and educated in the Calvinist communion, which was that of her paternal relatives. After her mother's death, her godmother, Madame de Neuillant, took her into her house, and obliged her to become a Catholic. Her situation however at Madame de Neuillant's became so unpleasant and humiliating, that she was glad to leave it by marrying Scarron, the comic poet, a man witty but old, infirm, and deformed, who felt for her the interest of compassion. Scarron's house was frequented by fashionable company, among whom Madame Scarron, by her pleasing conversation and address, made several friends. When Scarron died, in 1660, his widow was left poor; but some of her friends recommended her to Madame de Montespan, the mistress of Louis XIV., as governess to her children by the king. She thus became known to Louis, who gradually conceived great esteem for her, especially for the care which she bestowed on the Duke of Maine, one of his sons. The king made her a present of 100,000 livres, with which she purchased the estate of Maintenon. Madame de Montespan's temper was not one of the mildest, and the governess had much to endure from the imperious favourite. Louis himself was often obliged to interfere to restore peace. By degrees the king, who had grown tired of Madame de Montespan, became more strongly attached to Madame Scarron, whose conversation interested and instructed him. She had learnt, in the school of adversity, great forbearance and much tact. The king at length conferred on her the title of Marchioness of Maintenon. The queen consort of Louis was now dead; Louis was no longer young, and he felt the want of an intellectual companion and friend, to whom he could confide his thoughts. Having consulted his confessor, Father La Chaise, the latter advised a private marriage; and in 1685 Louis, who was then forty-seven years of age, was secretly married to Madame de Maintenon, who was fifty years old, by the archbishop of Paris, in presence of the Père La Chaise and two more witnesses. The marriage was always kept secret, and Madame de Maintenon herself never avowed it. Louis however lived openly with her, visited her several times a day, received his ministers in her apartments, and sometimes in their presence asked her advice upon state affairs. Without appearing to seek any political power, but rather professing to shun it, she undoubtedly exercised great influence over the king in his latter years; the choice of ministers and generals was ascribed to her by common report, and she was accused of many faults committed by the cabinet. But it would be very difficult to discriminate between those acts in which she really had a share, and those in which her influence was only supposed. Madame de Maintenon has been unjustly dealt with by many writers, and by St. Simon among the rest. She was ambitious, but not interested, arrogant, or vain; she was fond of religious discussions, and she exerted considerable power over the conscience of Louis, but she complained that 'she could never make him understand that humility was a Christian virtue.' Madame de Maintenon is still favourably remembered as the founder of the institution or school of Saint Cyr, for the education of poor girls of good families. In the latter years of Louis's life she was made unhappy by his fretful and querulous temper, and the fits of passion to which he was subject. In one of her letters she complains that 'she was obliged to please and amuse a man who would not be pleased or amused.' After the death of the king she retired to Saint Cyr, where she died in 1719.

(*Lettres de Madame de Maintenon*, 6 vols. 12mo, Paris, 1812; *Lettres inédites de Madame de Maintenon*, Paris, 1826; Lemontey, *Essai sur l'Etablissement Monarchique de Louis XIV., Pièces Justificatives, No. V., Observations sur le Mariage de Louis XIV. et de Madame de Maintenon.*)

MAINTENANCE is defined to be when a man maintains a suit or quarrel to the disturbance or hindrance of right; and if he who maintains another is to have by agreement part of the land or debt, &c. in suit, it is called Champerty. Maintenance was an offence at common law, and has also been the subject of several statutes. By the 32 Hen. VIII., c. 9, no person shall bargain, buy or sell, or by any means obtain any pretensed rights or titles to any lands, unless he who bargains or sells, or his ancestors, or they by whom he claims the same, have been in possession thereof, or of the reversion or remainder thereof, or taken the rents and profits thereof, by the space of a year next before the bargain or sale, on pain of the seller forfeiting the whole value of the lands so bargained or sold, and the buyer, knowing the same, also forfeiting the value of such lands. The professed object of the statute was to prevent the inquietness, oppression, and vexation which the preamble mentions as the consequence of the buying of titles and pretended rights of persons not being in possession of the lands sold.

A man may assign his interest in a debt after he has instituted a suit for its recovery, and such assignment of itself is not maintenance. But if the assignment be made on condition that the assignee prosecute the suit, or if the assignee give the assignor any indemnity against the costs of the suit, already incurred or to be incurred, this makes it maintenance.

(Comyn's *Digest*, 'Maintenance.')

MAINZ, or **MENTZ,** or in French *Mayence*, the Roman Magontiacum, or Moguntiacum, is the capital of the province of Rheinhessen in the grand-duchy of Hesse-Darmstadt. It is situated in one of the most beautiful and fertile parts of Germany, on the left bank of the Rhine, a little below the junction of the Maine with that river, on the slope of a hill, and it also occupies a long slip of land on the banks of the river: 50° N. lat. and 8° 11′ E. long. Being connected, by a bridge over the Rhine, with the strongly fortified village of Kastel, or Kassel, Mainz is one of the strongest fortresses in Europe, and a chief bulwark of Germany against France. The extent of the works, which were much enlarged by the French while the city was in their possession, including the work called the Weissenauer Schanze, but exclusive of Kastel and of the small redoubt, is two leagues and a half. Among the principal works are the citadel, with the Eichelstein, and that called the Hauptstein, an extremely strong work projecting beyond all the rest, on an eminence called the Linsenberg. Kastel, which is united with Mainz as an outwork, has very extensive fortifications, which consist of four strong forts besides the strongly fortified island of Petersau, including which latter the works are of greater extent than even those of Mainz itself. The inner works consist of 14 principal and 13 smaller bastions. On the land side there are four great gates with double drawbridges, and toward the river several gates. The Rhine runs from south to north, and the Maine from east to west. About a mile above the junction of the two rivers is the village of Kostheim on the Maine, and a little farther up a bridge of boats, defended by a strong tête-de-pont. On the last settlement of the affairs of Germany by the Congress of Vienna, Mainz was assigned to the grand-duke of Hesse-Darmstadt, but it was decided that, as a fortress, it should belong to the German Confederation, with a garrison of Austrian, Prussian, and Hessian troops. This garrison in time of peace consists of 6000 men. The military governor, who retains his post five years, is alternately an Austrian and a Prussian general. It has been objected to this great fortress, that it is too extensive, as it requires for its defence a garrison of 30,000 men.

Mainz is on the whole an old-fashioned and ill-built town. The streets, with three or four exceptions, are narrow, crooked, and gloomy, though there are many handsome private buildings and some fine public edifices. Of the 27 squares and market-places the principal is the Parade, which is surrounded with avenues of trees. Of the 11 churches, of which only one is for the Protestants, the most remarkable are the cathedral, the church of St. Ignatius, which is considered a model of beautiful ecclesiastical architecture, St. Peter's church, and St. Stephen's. The cathedral, founded in the twelfth century, has frequently suffered by fire. It is 350 feet long, 140 wide, and has 14 altars and 20 chapels. It was much injured in the siege by the French in 1793, and under the government of Napoleon it was intended to pull it down, but it has since been gradually repaired. Nothing however remains of the great treasures which it formerly possessed, or of its library, and even many of the fine monuments have been destroyed. Of the public edifices, we may mention the magnificent grand-ducal palace (formerly the house of the Teutonic order), the arsenal, the palaces of the commandant and of the vice-governor, the episcopal palace, the new theatre, &c. A gymnasium has taken the place of the former university, and there are several schools. The city library consists of above 90,000 volumes, and in the same building there are cabinets of medals, and of natural history, a collection of philosophical and mechanical instruments, a gallery of pictures, and a collection of Roman antiquities, comprising 27 altars and votive tablets, and above 60 legionary stones, all found in its vicinity. The Eichelstein in the citadel is supposed to be a monument in honour of Drusus Germanicus, brother of the emperor Tiberius. Near the village of Zahlbach are the remains of an aqueduct said to have been built by the same Drusus. There are pleasant walks on the Rhine; the environs are very beautiful and the prospects over the surrounding country magnificent. The city has few manufactures; but the trade in wine is considerable.

The history of Mainz is remarkable and interesting. Its origin is supposed to have been under the Mediomatrici, who inhabited the left bank of the Rhine, and whose dominion ended in the year 72 B.C. In 13 B.C. Drusus founded the fortress of Magontiacum, on the site on which Kastel now stands. The town which sprung up near it did not extend, under the Romans, to the Rhine. It was destroyed by the Vandals in 406, and lay in ruins for some centuries, till it was rebuilt by the kings of the Franks. A new and brilliant epoch in its history commenced with Boniface (Bonifacius), the apostle of the Germans, who was the first bishop. Some however affirm that Mainz has had 114 bishops and archbishops, from Crescens, who they say was a disciple of St. Paul's, and suffered martyrdom, A.D. 103, to Frederick Charles von Erthal. In 1798 Mainz became the capital of the French department of Mont Tonnère; in 1816 it was ceded to the grand-duke of Hesse. Among the remarkable men born at Mainz are the Minnesänger Frauenlob, and Gutenberg the inventor or improver of the art of printing, in honour of whom one of the squares in the city is named, and contains a statue erected at the expense of the Cassino club. The population of Mainz is 32,000, of whom about 2600 are Protestants, 1700 Jews, and the remainder Roman Catholics.

(M. K. Curtius, *Geschichte und Statistik von Hessen;* Werner, *Der Dom von Mainz,* and *Schicksale der Stadt Mainz, &c.;* Hassel, Stein, Cannabich, &c.)

MAIRE, JAMES LE, was the son of a merchant established at Egmont, near Alkmaar, and born about 1590. As the Dutch East India Company, which had been formed about that time, had obtained a declaration from the states-general, by which every Dutch vessel not belonging to the company was prohibited from doubling the Cape of Good Hope, some private merchants in the towns of Alkmaar and Hoorn formed a joint-stock company for the purpose of trying to effect a passage to the East Indies without doubling the Cape. Among these was Isaac Le Maire, the father of James. Two vessels were equipped for sea; the command of them was given to Cornelius Schooten, an experienced navigator, and James Le Maire was sent with him as the commissioner of the company. They set sail in June, 1615, and having passed the entrance of the Strait of Magalhaens in the following January, they continued their course southward, in the hope of finding a less difficult route to the Pacific than that through the Strait of Magalhaens. They discovered the strait between Staaten Land and Terra del Fuego on the 24th of January, and gave it the name of Le Maire. In a few days they doubled Cape Horn, being the first navigators who accomplished this undertaking. In traversing the Pacific from the east to the west, they sailed through a part of it, where only a few scattered islands occur. At last they arrived on the northern shores of New Guinea or Papua, where an island near a cape called Good Hope was named after Schooten. After visiting Gilolo, one of the Moluccas, they proceeded to Batavia, then called Jaccatra. From Batavia they sailed for Europe, in a vessel belonging to the East India Company, during which voyage James Le Maire died, the 31st of December, 1616.

MAIRE, LE, STRAITS OF, lie in the Southern Atlantic Ocean, on the eastern shores of Tierra del Fuego, between 55° and 55° 30′ S. lat., and are traversed nearly in the middle by the meridian of 65° W. long. They are formed on the east by the western extremity of the island of Staaten Land, and on the west by the coast of King Charles Southland, along which they extend between Cape S. Diego and Cape Good Success. These straits, which are situated in the route of vessels which intend to double Cape Horn, are about 20 miles in length and width. They are free from rocks and shoals, but still some difficulties are encountered in traversing them from the north, on account of the prevalence of western and south-western winds, and a strong current, which always sets through them from the south. They were first traversed by the Dutchmen Le Maire and Schooten in 1616, from the former of whom they received their name.

MAISTRE, A. and L. [PORT ROYAL.]

MAITLAND, SIR RICHARD, of Lethington, son of William Maitland of Lethington and Thirlstane, by his wife Martha, daughter of George, second lord Seaton, was born in the year 1496. Having completed his grammar education, he proceeded to France, at that time the common resort of his youthful countrymen, particularly for the study of the law. On his return to Scotland he was successively employed by King James V., the regent Arran, and Mary of Lorraine. Of the early part of his life however few particulars are known. In the end of the year 1550 his book of 'Reports of the Decisions of the Court of Session commences; and about the same time he appears in the sederunts of the court as an extraordinary lord of session. Not many years afterwards his eldest son William, having returned from the Continent, whither he had been sent, like his father, in early life, was appointed by the queen dowager secretary of state; but afraid, as it seems, of his safety at that troublesome period, he left her and joined the Protestants in October, 1559, and in August, 1560, acted as speaker of the Convention, in which the Roman Catholic supremacy in Scotland was destroyed. In the meantime his father Sir Richard had become blind. At what time this calamity overtook him is uncertain: it was probably about the year 1559, in the end of which he concludes his 'History and Chronicle of the House and Surname of Seaton.' He continued however to report the decisions of the court of session; and what is remarkable, from about the period of his becoming blind he began to write and collect Scottish poetry. In 1562 he was made lord privy-seal; but this office he in a few years afterwards resigned in favour of his second son John, who was also the next year appointed an ordinary lord of session. His eldest son William had been some time before in the like situation, being in 1561 appointed an extraordinary lord of session, and in 1566 advanced to the place of an ordinary lord of the same court. Old Sir Richard's blindness and peaceful disposition concurred to save him from mixing in the political broils of that period; but nevertheless, in 1570, when his sons were denounced as rebels by the king's party, his lands were ravaged by the English. He lived however to know that his second son was reinstated on the bench as a lord of session, and he died only a month or so before he was advanced to the high office of chancellor of Scotland. He died on the 20th March, 1586, with the character of 'a maist unspotted and blameless judge, ane valiant, grave, and worthy knight;' but it is in his character of a writer and collector of Scottish poetry that he is now chiefly remembered.

His collections consist of two volumes: a folio, comprehending 176 articles; and a quarto, of 96 pieces, in the handwriting of Mary Maitland, his daughter. They are now preserved in the Pepysian Library, Magdalen College, Cambridge. His poetical writings were for the first time printed in an entire and distinct form in 1830, in one quarto volume, by the Maitland club, a society of literary antiquaries, so designated from this distinguished collector of Scottish poetry.

MAITTAIRE, MICHAEL, was born in France, 1688, of Protestant parents, who settled in England at the revocation of the edict of Nantes. Maittaire was educated at Westminster school under Dr. Busby, and obtained at Oxford, whither he afterwards went, a warm friend and patron in Dr. South. He took his degree of M.A. in 1696, and from 1695 to 1699 discharged the duties of second master in Westminster school. In 1699 he resigned that appointment and devoted the remainder of his life to literary pursuits. He died August 4th, 1747, at the age of 79.

Maittaire was a learned and laborious scholar. He edited many of the classical authors, with useful indexes, and also wrote several works, of which the most important are—'De Græcæ Linguæ Dialectis,' London, 1706, 1742; the best edition is by Sturz, Leip., 1807; 'Stephanorum Historia vitas ipsorum ac libros complectens,' Lond., 1709; 'Historia Typographorum aliquot Parisiensium vitas et libros complectens,' Lond., 1717; 'Annales Typographici ab artis inventæ origine ad annum 1557 (cum Appendice ad annum 1664),' Amst. and Lond., 1719-1741; 'Marmora Oxoniensa,' Lond., 1732.

MAIZE, or *Indian Corn*, is a plant commonly cultivated in the warmer parts of the world, where it answers a purpose similar to that of wheat in more northern countries. It is the *Zea Mays* of botanists, a monœcious grass, of vigorous growth, with stems not more than two feet high in some varieties, and reaching the height of eight or even ten feet in others. The leaves are broad, and hang down from large rough sheaths which surround the stem. The male flowers grow in loose, terminal, compound racemes, standing clear of the leaves; the females are arranged in numerous rows on a spike, which is wrapped round by several folds of sheathing bracts, which press upon the grains and give them the flattened figure they eventually acquire when ripe. Each grain has a long thread-like style, which projects beyond the enveloping sheaths; and as there are some hundreds of them upon each spike, the whole form a long tassel, which looks as if made of silk. The ripe grains are regularly arrayed one over the other in rows, are compressed at the sides, flattened at the apex, and of various colours. Their most common colour is pale yellow; some are white, some party-coloured, and there are varieties with blood red and even purple grains. A plant generally bears two full ears, the grains of which vary greatly in number: some of the largest ears in America contain at least 800 grains.

This plant in its wild state is met with in Paraguay, according to Auguste de St. Hilaire. It was also found on the continent of North America by the Europeans on their arrival there. A second species, called *Curagua* by Molina, is said to occur in Chili; but little is known of it further than that the leaves are serrated, and all the parts much smaller than usual.

It seems that there is a particular line on the continent of Europe north of which the maize does not thrive. To the south of this line, which passes through Nancy, formerly the capital of Lorraine in France, it has in a great measure superseded wheat and rye as the common produce of the land. The bread made from maize is not so palatable as wheat or rye bread; but by mixing it in certain proportions with wheat it makes a very pleasant food. In the United States of North America Indian corn forms almost the only bread eaten by many of the people; and in the slave-states it is the only bread that the negroes eat. It is not however in the shape of baked bread that maize is most generally used in Europe, but in boiled messes and soups, as peas are with us: it is not only the ripe grain which is eaten, but the ear in every state, from that of a green vegetable to an unripe corn. It is boiled, stewed, and baked: it is a substitute for cabbage or green-peas in its early stage; and is used in some way or other to its complete maturity. Nothing can be better than ripe maize to fatten hogs or poultry with; and the young stem cut down quite green gives one of the best and most abundant varieties of green food for cattle.

A plant which gives such a return cannot be expected to ripen its grains in poor land, or without attentive cultivation. The land must be naturally fertile, or made so by art; it must be well prepared to receive the seed, and sufficient manure must be given to recruit it. A light, moist, and warm soil suits this plant best. It thrives well on land broken up from grass, as is the case with most plants. As it is always sown in rows, and the plants thinned to a considerable distance, the intervals may easily be ploughed, or stirred with the horse-hoe, by which means the weeds are kept down, and the earth fertilized by exposure to the air. The seed should be taken from the largest and best formed ears; those at the end should be rejected as less perfect. They should not be taken off until they are wanted for sowing, and then steeped in water to soften them. If the seed were steeped in brine and dried with quicklime, as is usually done with wheat, it might probably be advantageous, as this grain is subject to smut and brand as well as wheat; but this is not often done. The time for sowing maize in the south of France is the month of April; farther north it is sown later for fear of frost, which would entirely destroy the plant on its first appearance above ground: this is one of the reasons why it could not safely be sown in England before the middle or end of May, and it could scarcely be expected to ripen its seeds before the winter's frost set in.

The distance between the rows of maize vary from two to four feet. In good ground the latter distance has produced the heaviest crop. The seed is sometimes sown in the furrow after the plough, and sometimes put in with a dibble. The latter seems the best way, and, as the rows are wide and the seeds need not be put in nearer than a foot apart in the rows, an acre will be soon dibbled by hand. Two or three inches deep is sufficient to make the seed germinate readily. In warm moist climates the plant is very soon above ground. In fine weather, and when the seed has been steeped, it will be above ground in five or six days. When the plants are three or four inches out of the ground, and no frost is feared, they are thinned out to two feet apart, and in very rich soils three feet is better. In this case three or four ears may be expected to ripen on each stalk. In thin soils on a retentive subsoil the earth is raised in ridges, or, what is better, in mounds, by crossing the ridges with the plough, and three or four seeds are put into each hillock, which are two or three feet apart. As the plants rise, only one, or at most two are left in each hillock, and the earth is carefully moulded up to the stems; thus a deep dry bed is provided for the plant, and there is sufficient moisture from the impervious subsoil. This method might perhaps be adopted with advantage in England, in experiments on maize, where the situation admits of its cultivation. Maize, however sown, must be repeatedly hoed. At the first hoeing the plants which are too close are pulled up, and where there is a deficiency they are planted in: at least, this is the practice in Europe; but in America the general practice is to plant fresh seeds in the vacant places. When the plants are a foot high, there is a second hoeing, the weeds are then cut up, and some earth is drawn towards the plants, and raised around the stems. The reason of this is, that there are several joints very near each other at the bottom of the stem, and from each of these fibres strike out into the soil which is brought into contact with it, and form additional roots to the plant, as they do from the crown of the roots of wheat. When the flowers are ready to expand, a third hoeing is given, to kill weeds and open the surface of the soil slightly. The earth which is raised around the stems should be flattened a little at top, and even slightly hollowed out near the stem, to collect the dews and rains in dry seasons. If any tillers or shoots appear from the bottom of the stem, they should be carefully removed, as they diminish the nourishment which should go to the main stem. A fourth hoeing and earthing up, at the time when the seed begins to swell, is useful, but seldom given, for fear of unnecessary expense. In many countries they sow or plant various vegetables in the intervals between the rows of maize, of which the most advantageous are turnips and cabbages, which may be sown or planted between the maize, after the last hoeing. French beans, except they be dwarfs, are not so proper, as they shade the maize and prevent its maturity. In warm climates cucumbers and melons are often raised there. In Carolina, where they hoe their maize only twice, a running weed springs up rapidly called *syntherisma*, which is much relished by cattle, and is cut several times before winter.

The time of flowering is very critical for the maize: a cold damp atmosphere may make a great part of the crop fail. In situations where this is to be feared, it is safe to sow maize at several times, with a week's interval: thus the risk is divided, and it is not so likely that the whole crop will be in flower in ungenial weather.

The male flowers, just as they expand, are excellent food for cattle; and it is usual in many places to cut off a great portion of them for this purpose. If it be done judiciously, there is no danger, provided a sufficient number of male flowers be left to impregnate the females: one in a square of about fifteen or twenty feet is thought sufficient. After the seed is set, it is customary, in many places, to cut off the whole top of the stem, with the upper leaves, and give them to the cattle; but this is by no means to be recommended: the wound thus made bleeds, and much of the sap is lost; besides the upper leaves serve to elaborate the sap and assist its circulation; they should therefore be left on as long as they are green, and other food found for the cattle.

All plants which stand too close or have no ears upon them should be pulled up and given to the cows, to give air to the rest; all those also that are very late and have abortive ears should be taken up, as they would at all events not ripen their seed. The young ear is preserved as a pickle, like young cucumbers: when a little advanced it is roasted on the coals, or before the fire, and is pleasant to eat: in the green state, when the grains are still soft and milky, it is boiled, and used as a vegetable, and is considered a delicacy.

Maize is subject to diseases similar to those of wheat and other grain; and it is supposed, as observed before, that the steeping and liming may prevent them in a great measure.

When the maize is fully ripe, which it is not until the sheath of the ear opens and appears quite dead, the ears are twisted off by hand and laid in a dry place; they are turned occasionally that the sheath may not become musty, and are then stored in a dry place: the seed keeps better so than when it is separated. The taking off the seeds from the ear is a laborious operation; it may be done by the flail, but is most easily accomplished by an old blunt sword or iron hoop fixed over a tub. The ears are rubbed hard over this edge, and the seeds fall into the tub. They have a simple machine in America, which does the work quick. The core or rachis is only fit for burning in the oven. The leaves are gathered for fodder a short time before the ears are pulled. In America and in Italy they stuff mattresses with the dry sheath, which makes a cool and elastic bed.

All animals are fond of maize, especially horses, pigs, and poultry; it gives the flesh of the two last a peculiarly fine flavour. The most profitable way to use maize in fattening animals is to grind it into meal, and mix it with warm water into a pottage; and, for horses, to soak it twenty-four hours in water before they are fed with it. In the dry state it is so hard that it wears their teeth, and in young horses is apt to produce blindness by the exertion of the muscles of the jaw in chewing it.

One of the most important uses of maize in Europe is to sow it thick, to be cut green as food for cows, oxen, and sheep. In a proper climate there is no plant which gives so great a mass of green food as maize. The produce is most abundant and nutritive. The largest varieties should be chosen. The seed may be sown in drills in April, and in September a crop might be mown, which would give admirable fodder for every kind of cattle. It is said to exhaust the land; but what will not exhaust it, more or less, which gives much nourishment? Maize will well repay the manure which may be required to restore the humus that it has consumed. If it is sown early, a second crop may be raised the same year; for it does not spring up again, like grass, after being cut. Where the land admits of irrigation, the growth of the maize is most rapid and luxuriant. The time to cut it is when the male flowers are just appearing out of the sheath in which they are enveloped in the early stage of their growth. It may be dried into hay, and will keep good for a couple of years; but in this state it must be bruised or soaked when given to cattle, as the stems get very hard in drying; they may however be cut, as the cane-tops are in the sugar-plantations.

MAJOR (Latin), *Greater*, in music, a term applicable to the imperfect concords, but chiefly to the interval of the 3rd. It is also used to distinguish the mode which takes a major or sharp 3rd, from that having a minor or flat one. The *major* mode has always a greater 3rd – *i.e.* a 3rd consisting of two tones; and the minor mode has always a minor 3rd—*i.e.* a 3rd consisting of a tone and a semitone. [KEY; MODE; THIRD.]

MAJOR, a field-officer next in rank below a lieutenant-colonel, and immediately superior to the captains of troops in a regiment of cavalry, or to the captains of companies in a battalion of infantry. His duty is to superintend the exercises of the regiment or battalion, and, on parade or in action, to carry into effect the orders of the colonel. The major has also to regulate the distribution of the officers and men for the performance of any particular service; and he has a temporary charge of the effects appertaining to any individual of the corps, in the event of the absence or death of such individual.

This class of field-officers does not appear to have existed before the beginning of the seventeenth century; and, at first, such officers had the title of *serjeants-major*, a designation borne at an earlier time by a class corresponding to that of the present majors-general of an army. (Grose, vol. i., p. 243.)

No mention is made of either lieutenants-colonel or majors as field-officers in the account of Queen Elizabeth's army in Ireland (1600). But Ward, in his *Animadversions of Warre* (1639), has given a description of the duties of the latter class, under the name of serjeants-major, from which it appears that those duties were then nearly the same as are exercised by the present majors of regiments. They are stated to consist in receiving the orders from the general commanding the army; in conveying them to the colonel of the regiment, and subsequently in transmitting them to the officers of the companies; also, in superintending the distribution of ammunition to the troops, and in visiting the guard by day or night.

A brigade-major is a staff-officer who performs for a brigade, or in a garrison, duties corresponding to those of a major in a regiment or battalion.

The prices of a major's commission are,—

In the Life and Royal Horse Guards	£5350 :	daily pay £1	4	5.
In the Dragoons	4575	„	0	19	3.
In the Foot Guards (with the rank of colonel)	8300	„	1	3	0.
In the regiments of the line .	3200	„	0	16	0.

A serjeant-major of a regiment is a non-commissioned officer, who in general superintends the military exercises of the soldiers: on parade, he has the care of dressing the line.

MAJOR-GENERAL. [General.]

MAJOR, or MAIR, JOHN, was born at the village of Cleghorn, near North Berwick, in East Lothian, about the year 1470. He appears to have studied for a short time both at Oxford and Cambridge, but he always regarded the university of Paris as his true *alma mater*, whither he proceeded in 1493, and where he attached himself successively to the colleges of St. Barbe, of Montaigu, and of Navarre. Having been made a doctor of the Sorbonne in 1505, he betook himself to the teaching of the scholastic philosophy, or divinity, in the college of Montaigu, and in this department soon came to be reputed one of the most distinguished ornaments of the university. Mair's scholastic writings indeed have been rated by Dupin and others in later times as the ablest that have come down to us from that age.

In 1519 he returned to his native country, and officiated for some time as one of the regents or masters in St. Salvator's college, St. Andrew's; but a dispute with some of his colleagues soon induced him to go back to Paris, and there he remained till 1530, when he was induced once more to transfer himself to St. Andrew's, which he never afterwards left. He became eventually provost or principal of St. Salvator's college, and appears to have died in that office about the year 1550.

Major's works are all in Latin, and the principal are Commentaries on the Four Books of Sentences, some theological expositions and commentaries on parts of the Scripture, and his History of Scotland, entitled 'De Historia Gentis Scotorum, seu Historia Majoris Britanniæ,' first printed in 4to. at Paris, in 1521. The style of all his writings is careless and inelegant to barbarism; but his History appears to have the merit of being a faithful enough chronicle of events, so far as he knew them. It is however as little marked by any spirit of critical or profound research as by classical purity of diction. Both this and some of his philosophical writings are remarkable for a freedom of sentiment upon points both of civil and ecclesiastical government, which he is believed to have derived from his teachers Jean Gerson and Pierre d'Ailly, and to have communicated to his famous pupils Buchanan and Knox. Dr. MacCrie, in his 'Life of Knox,' Edinb., 1813 (vol. i., p. 345), has given some extracts from Major's works, which evince the liberal complexion of his opinions. The well known epigram of Buchanan however, in which he designates him 'Solo cognomine Major,' testifies that the great scholar and wit had no very high opinion of the intellectual endowments of his old master.

MAJORCA. [Mallorca.]

MAKRI. [Anatolia.]

MAKRIZI (or, with his full name, Takki-eddin Abu-Mohammed Abul-Abbas Ahmed Almakrizi), a celebrated Arabic writer, was born at Cairo between A.D. 1358 and 1368. His family originally lived in one of the suburbs of Baalbec, called Makriz, whence he derived the surname by which he is usually known. We have very few particulars of his life; but it appears that he resided at Cairo, during the greater part, if not the whole of his life, that he discharged at different times the duties of several public offices, and that he died, at an advanced age, in A.D. 1442.

Makrizi wrote several historical works; of which copious extracts are given in De Sacy's Arabic Chrestomathy. The most important of these works is his 'Description of Egypt;' which gives an account of the history of the country from its conquest by the Mohammedans, as well as a description of its natural history and antiquities, and of the manners and customs of the inhabitants. De Sacy, in his notes added to his translation of Abd-Allatif, published under the title of *Relation de l'Egypte*, Paris, 1810, has made many interesting quotations from the work of Makrizi.

The only works of Makrizi which have been printed are, as far as we are aware: 'Historia Monetæ Arabicæ,' in Arabic and Latin, by Tychsen, Rostock, 1797, of which a French translation, much superior to the Latin one by Tychsen, was published by De Sacy, under the title of 'Traité des Monnoies Musulmanes,' Paris, 1797; 'An account of the Mohammedan Princes in Abyssinia,' by Rink, Leyd., 1797; 'Narratio de Expeditionibus à Græcis Francisque adversus Dimyatham ab A.C. 708 ad 1221 susceptis,' in Arabic and Latin, by Hamaker, Amst., 1824; 'Historia Coptorum Christianorum in Ægypto,' Arabic and Latin, by Wetzer, 1828.

MALABAR, a province of Southern India, lying between 10° 20′ and 12° 20′ N. lat., and between 75° 18′ and 76° 55′ E. long. Its greatest length from north to south is 118 miles, and its breadth does not in any part exceed 50 miles: its area is about 7250 square miles. It is bounded on the north by Canara; on the east by Coorg, Wynaad, and Coimbatore; on the south by the territory of the Cochin rajah; and on the west by the Indian Ocean.

As to its general features, Malabar may be divided into two portions. One of these, which is by far the most extensive, consists of low hills separated by narrow valleys. The hills have in general steep sides and level summits; the best soil is on the sides, and, to prevent this being washed away, the surface is formed into a series of terraces. The summits of many of the hills are bare, especially towards the north, where they exhibit little besides native rock. The soil in the valleys has been washed down in the course of ages from the hills, and is extremely fertile. The other portion of the province consists of a level plain or belt along the coast, seldom more than three miles wide, and often not so much. The soil is sandy and poor, but being intersected by numerous mountain-streams, it is well adapted for the cultivation of rice. The whole of the province lies immediately below the western ghauts.

The pepper-vine grows most abundantly along the whole coast-line of Malabar, and its produce forms the chief article of export from the province. A great part of it is sent to Europe, but large quantities are also exported to China, or conveyed by native traders to Arabia and the north-west countries of India. Sandal-wood, which is another principal article of export from Malabar, is not produced within the province, but is brought from above the western ghauts. Jaggry, a coarse kind of sugar, is made in large quantities from a species of palm, the *brab-palm*, and is commonly sold at a very low price, less than three shillings per hundredweight. Part of the coast is covered with thick forests of cocoa-nut trees, from the produce of which a revenue is drawn by the government.

The province is divided for the purposes of internal government into 2212 villages, which do not however consist, as in most other parts of India, of aggregations of houses, but rather of territorial divisions answering more to our parishes. The dwellings of the natives are for the most part scattered over the face of the country. Almost the only collections of houses are found in the seaports. The principal of these are Tellicherry, Mahé, and Calicut. [Calicut.] Tellicherry is in 11° 45′ N. lat. and 75° 35′ E. long. In 1683 a factory was established there by the presidency of Surat, for the purchase of pepper and cardamom seeds. It is still the residence of the richest native merchants, and is the principal market for the sandal wood brought from the interior; but a great part of the export trade has of late years centred at Mahé, a small town and port about five miles to the southward, which was settled by the French in 1722.

Malabar is one of the few parts of Hindustan in which the ownership of the soil is recognised as belonging to individuals, and not to the supreme government. Landed property is held in this province, as well as in Canara, Cochin, Travancore, and Bednore, on tenures which from time immemorial have never been questioned. It might be more correct to say that the English government has not committed the same error with regard to those provinces as it has in other parts of India, that of considering the property in the land to belong to the state. The succession to lands in Malabar follows the same rules as those that regulate succession to other kinds of property.

The population consisted almost wholly of Hindus until the invasion of Hyder Ali in 1760, since which time there has been an accession of *Moplays* (Mohammedans), Christians, and Jews, but not in considerable numbers. Among the Hindu population the distinctions of caste are kept up with the greatest scrupulosity. The distances within which an individual of an inferior may not approach one of a superior caste are accurately defined. The distinctive names of the castes are—1st, Namburics or Brahmins; 2nd, Nairs or Sudras; 3rd, Tiars, who are free cultivators of the land; 4th, Malears, who are musicians and conjurors (these are free also); 5th, Poliars; these are slaves, and are properly below all caste; but there is an outcast tribe inferior even to these, called Niadis. There are several subdivisions of the first three castes. The Poliars are bought and sold like cattle, either with or separate from the land, one of them being generally reckoned of equal value to two buffaloes. They are often treated with severity, and are of a miserable appearance, squalid, and diminutive.

The whole province was subdued in 1760 and 1761 by Hyder, and in 1788 it was overrun by Tippoo, and the rajahs were mostly driven for refuge to Cochin and Travancore, but in 1790 were reinstated by the English government, under whose superintendence the affairs of the province have much improved, the revenues have been augmented, and the trade increased. The province is under the immediate superintendence of the governor of Madras.

MALABAR LANGUAGE. [HINDUSTAN, p. 229.]

MA'LABATHRUM, a name which occurs frequently among the writings of the antients, and which was applied to a leaf imported from India, whence it was likewise called *φύλλον ἰνδικόν*, and also simply Folium. It was employed by them both as a medicine and as a perfume. From it there was prepared both an oil and a wine by maceration of the leaves in these menstrua. Many fabulous statements accompany the earliest accounts, as that of Dioscorides, by whom it is stated that by some they are thought to be the leaves of the Indian Nand; that they are moreover found floating on Indian marshes, and that they grow without roots (lib. i., c. 11), and that (lib. ii., c. 10) it is by feeding on them that the animal affording the onychia, or unguis odoratus of the antients, becomes aromatic. In the works of the Arabs *saduj* is given as the synonyme of Malabathrum; and *saduj*, both in Persian works and in India, is applied to tej-pat, or the leaf of the *tej*, which is a species of Cinnamomum, *C. albiflorum*, growing in the dense forests of the valleys of the Himalaya, which extend from Rungpore to the Deyra Doon in 30° N. lat. Dr. Hamilton found the same name applied to a very nearly allied species, the *C. Tamala*. Both species most probably yield the leaves which were so highly esteemed in antient times, and are still as extensively employed in eastern countries, and may be found in every Indian bazaar under the names of *tuj* or *tej-pat*, or by the Arabic name of *saduj-hindee*. They are analogous in all respects to bay-leaves produced by the Laurus nobilis, and are in fact the bay-leaves of India. The name Malabathrum no doubt is derived from *Tamala-putra*, or Tamala-leaf, as was first indicated by Garcias: 'Appellant autem Indi Folium Tamalapatra quam vocem Græci et Latini imitantes corrupte Malabathrum nuncuparunt.' These are brought from the interior of almost inaccessible forests, and necessarily stripped from the branches for the facility of carriage; hence most probably originated the fables with which their early accounts are accompanied.

MALACCA, a town in Southern Asia, situated on the western coast of the Malay Peninsula, in 2° 14′ N. lat. and 102° 12′ E. long., on the straits called by its name. It is on the northern banks of a small river. The roads along the shores are good and safe. South of the town there is a small island, between which and the continent is a harbour, where, during the south-west monsoon, vessels not drawing more than 16 feet water are secure. The bar at the mouth of the river has only water enough during high tide for boats. Many of the houses are tolerably well built, but the greatest part, which are inhabited by Asiatics, are composed of bamboo and mat huts. On the southern side of the river are the ruins of a fort, now converted into a public promenade.

Malacca was built in 1252, by Sri Iscander Shah, the king of the Malays, after his expulsion from Singapura, a town situated on or near the site of the emporium now called Singapore. It was first visited by the Portuguese in 1507, and taken by Alfonso Albuquerque in 1511. It was then a large commercial town, and the harbour contained 300 vessels. It continued in a flourishing condition till 1640, when it was taken from the Portuguese by the Dutch, upon which event its commerce began to decline, being partly transferred to Batavia. But its position on the great thoroughfare between the Gulf of Bengal on one side and the Indian Archipelago and China still gave it some importance; though the establishment of a British colony in the island of Pulo Penang, in 1786, diminished its commerce. It was taken possession of by the British in 1795, restored at the peace of Amiens, but soon afterwards taken again. In 1814 the Dutch recovered possession of it; but the British having founded the town of Singapore in 1819, which in a few years became a great commercial place, Malacca sunk to insignificance. The town and fort of Malacca, with its dependencies, were ceded to the English by the treaty between the Britannic and Netherland governments of March, 1824.

Besides the town, this colony consists of a tract of country about 40 miles long and 30 miles wide; its surface may be about 1000 square miles. The country along the sea-coast, to the distance of 12 or 15 miles, is low and nearly level; in many parts swampy, and mostly covered with wood. The soil is not distinguished by fertility; and though rice is raised, this article, as well as other grain, is annually imported from Bengal. Fruits succeed exceedingly well, as pine-apples, shaddocks, oranges, &c. Cocoa-nut palms are numerous. The cultivation of coffee has been introduced lately. Pepper is grown to a considerable amount, and 4000 piculs (1 picul = 133⅓ pounds) are annually exported. The amount of tin annually got from the mines is estimated at 4000 piculs. There is also gold.

The bulk of the population consists of Malays. There are some Hindus and Chinese, and also some descendants of the Portuguese and Dutch. In 1822 the population in the town of Malacca amounted to 12,000 souls, and in the whole colony to 22,000. After the British got possession of it, the number decreased by emigration to Singapore, but the population has recently begun to increase, and is said to be 30,000.

(Crawfurd's *Journal of an Embassy to the Courts of Siam and Cochin China*; Finlayson's *Journal of a Mission to Siam and Hué*; *Notices of the Indian Archipelago*, &c., collected by J. H. Moor, Singapore, 1837. [NANING.]

MALACCA, THE STRAITS OF, separate the Malay Peninsula from the island of Sumatra. They begin on the north between Diamond Point on Sumatra and the island of Pulo Penang near the shores of the continent, about 5° 20′ N. lat., and terminate on the south between the most southern cape of the Asiatic continent, the Tanjong Burus (1° 15′ N. lat.), and the islands of Carimon or Krimun (1° N. lat.). Its direction is from north-west to south-east, between 97° 30′ and 103° 40′ E. long. At its northern extremity it is nearly 180 miles wide, but southward it grows narrower, and opposite the town of Malacca, from which it takes its name, the strait is hardly 36 miles wide, and both shores are visible from the middle of the channel, though they are rather low. The strait preserves this width to its southern extremity. Being enclosed on the south-west and north-east by countries in which the mountain-ranges rise to a great elevation, this strait is not subject to the violence of the south-west and north-east monsoons, and the sea, especially at its southern extremity, is always as smooth as a pond. But when the Gulf of Bengal is agitated by the strong gales of the north-west monsoon, there is a heavy sea in the northern and more open portion of the strait, which at that time inundates many parts of the low shores which are immediately contiguous. The countries bordering on the strait have not the periodical seasons of rain and dry weather, but rain occurs the whole year round, and mitigates the heat of the atmosphere. Perhaps in no part of the globe is the temperature of the air less subject to changes than on these shores.

(Finlayson's *Journal of a Mission to Siam and Hué*; and Crawfurd's *Journal of an Embassy to the Courts of Siam and Cochin China*.)

MA'LACHI (מַלְאָכִי, 'my messenger'), the last of the twelve minor Hebrew prophets. So completely are we ignorant of the personal history of this prophet, that it has been doubted whether 'Malachi' is the name of a person, or only a title descriptive of the prophetic office. In the absence of any positive proof of the latter supposition, the former must be adopted as the more natural. Many of those who believe that 'Malachi' is an official title identify the prophet with Ezra. This was the opinion of Jerome.

Malachi evidently prophesied after the Babylonish captivity. He was later than Haggai and Zechariah, for he does not, like them, exhort the people to zeal in rebuilding the Temple, but he refers to it as already built (i. 7, 10; iii. 1, 10). In chap. i., ver. 8, he speaks of a political ruler of the people; now, no one appears to have held such an office later than Nehemiah, after whose time political power was in the hands of the priests. Moreover the state of things described and reproved in this prophecy agrees with the account which Nehemiah gives of the manners of the people after his second return from Persia into Judæa. (Compare *Mal.* ii. 8-11, with *Nehem.* xiii. 23-29; *Mal.* iii. 8, 10, and *Nehem.* xiii. 5, 12 x. 38, 39, with *Nehem.* xiii. 6-13; *Mal.* i. 8, 11, 13, ii. 8, with *Nehem.* xiii. 15, &c.) Hence Vitringa and others have concluded that Malachi prophesied during the latter part of Nehemiah's administration (about B.C. 432 or 420).

The object of this prophecy is to reprove the people and the priests for their irreligion. To the complaint of the people, that God dealt unkindly with them, the prophet replies by comparing their prosperity with the calamities that had befallen the Edomites (i. 2-5). He reproves the priests for their dislike to the service of God, their unholy sacrifices, and their perversions of the law, and the people for their intermarriages with the neighbouring heathen nations (i. 6, to ii. 16). Before the Captivity idolatry had been the great sin of the Jews, but now they seem to have been prone to infidelity, complaining that the wicked were favoured by God, and that the Messiah did not appear. The prophet therefore announces the approach first of the Messiah's precursor, and then of the Messiah himself, whom he styles 'the messenger of the covenant,' to purify the people of God, and to punish the ungodly (ii. 17, to iii. 6). He points to the withholding of tithes and offerings as the cause of the barrenness of the land, and promises a return of plenty upon the payment of these dues (iii. 7-12). He again answers the infidel complaints of the people by referring to a future recompense, and predicts the coming of Elijah to bring the people to repentance, denouncing a curse upon the land if they despised his ministry (iii. 13, to the end). This part of the prophecy is applied in the New Testament to John the Baptist. (Compare *Mal.* iii. 1, with *Matt.* xi. 10, *Mark*, i. 2, *Luke*, i. 76, vii. 27; and *Mal.* iv. 5, 6, with *Matt.* xi. 14, xvii. 10-13, *Mark*, ix. 11-13, *Luke*, i. 17.)

The prophecy of Malachi is almost entirely in prose. His style has the vigour which belongs to an indignant censor of abuses, but he is deficient in the poetical beauties of the earlier prophets. Bishop Lowth remarks that 'the book is written in a kind of middle style, which seems to indicate that the Hebrew poetry from the time of the Babylonish captivity was in a declinmg state, and being past its prime and vigour, was then fast verging towards the debility of age.' (*Prælec.*, xxi.) The canonical authority of this book is not disputed.

(Rosenmüller's *Scholia;* the Introductions of Eichhorn, De Wette, Jahn, and Horne.)

MALACO'LAPHUS. [WOODPECKERS.]

MALACO'LOGY. The science of molluscous or soft-bodied animals (Μαλακὸς and λόγος[*]) includes the knowledge of such animals, whether protected by shells or entirely naked, and their distribution into classes, subclasses, families, genera, and species. In this more extended and philosophical view of the subject, *conchology* may now be considered as merged; and the more modern classifications are based upon the anatomy of the soft parts and the habits of the animals, as well as upon the structure of the shells in those molluscous forms which have that protection. In the article CONCHOLOGY will be found a short statement of the reasons for treating the subject under the present title.

The shell-collector of former days looked upon his drawers, if they were rich in rare species or varieties, as containing an assemblage of gems; and indeed the enormous prices given for fine and scarce shells, joined with the surpassing beauty of the objects themselves, almost justified the view which the possessor took of his cabinet of treasures. They were to him really 'Les Delices des Yeux et de l'Esprit;[†] and the energetic zeal with which he collected and the sacrifices that he made to procure a fine and perfect *Many-ribbed Harp*, a *Gloria Maris*, or *Cedo Nulli*, among the cones; an *Aurora* or *Orange-Cowry*, a *Voluta aulica* or *Voluta Junonia*, &c., were only comparable to the extravagances of those visited by the tulip mania when it was at its height. But though they were the delight of his eyes, they were, in nine cases out of ten, little more to the owner of them: they were mere trinkets on which he looked dotingly without knowing, and scarcely wishing to know, the organization of the animal whose *skeleton* only was before him. This innocent trifling came at last to be viewed in its true light by some collectors worthy of better employment, who put off childish things and went deeper into the subject. Lister, Adanson, Linnæus, Poli, Cuvier, Lamarck, De Blainville, and others gave dignity to this department of zoology, and gradually raised the science to its proper rank; whilst the comparatively imperishable nature of the covering of the testaceous mollusks became, in the hands of such men as William Smith and his followers, among the most valuable records by which the stratification of the earth's crust could be demonstrated and its geological history deciphered. [GEOLOGY, vol. xi., p. 131.)

We must first examine what animals are included under the general name of *Mollusca*, or, if M. de Blainville's term be adopted as being the more comprehensive, *Malacozoa* or *Malacozoaria*.

The Μαλάκια of Aristotle, his Ὄστρεα or Ὀστρακόδερμα, and his Μαλακόστρακα, are distinguished by him from the fishes as not having, like the latter, blood; which must be understood as meaning that they were without red blood. The Μαλάκια are further described as having all the fleshy parts external and the solid or firm parts internal, and are thus distinguished from the Ὀστρακόδερμα, which are defined as having the fleshy parts internal and the solid parts external. The Μαλακόστρακα are described as having the solid parts of their bodies external, and the soft and fleshy parts internal, but as being protected externally by a *crust* instead of a *shell*, and having ambulatory feet.

Thus the Μαλάκια and Ὀστρακόδερμα of Aristotle, which were followed by Ælian and the Greek naturalists generally, correspond with the *Naked* and *Testaceous Mollusca* of the moderns.

Pliny and the antient Latin zoologists employ the same denominations as the Greeks, though they have translated them by the terms *Mollia* for the *Naked*, and *Testacea* for the *Shell-protected* Mollusks.

Upon the revival of letters, we find Belon, Rondelet, Gesner, and Aldrovandus adopting the denominations of the antients, and Jonston, in his general compilation, continuing the same under the general terms of *Exanguia* or *Exanguia aquatica;* and the more particular ones, as applicable to the animals immediately under consideration, of *Mollia* or *Mollusca* and *Testacea* or *Conchylia*.

Our countryman John Ray, who has justly been called the Precursor of Linnæus, and whose systematic views on the subject of zoology are well worthy of the attention of the student, appears to have been the first who applied the term *Vermes* or *Worms* to all invertebrate animals (with the exception of Insects and Crustaceans), whose blood or circulating fluid is white, and who employed the term *Vermes* (*Mollusca*) and *Vermes* (*Testacea*) to denote the divisions of Aristotle.

Lister, in his 'Synopsis Methodica Conchyliorum,' cannot be considered as having done much as a systematist; and though that zoologist gave the anatomy of many molluscous animals, as had been done by Fabius Columna before him, and Willis, Swammerdam, and others after him, little appears to have been effected for a principle of classification resting on their external organization or their form, and still less for one resting on their internal structure.

Linnæus, in his 'Natural Division' of Animals into three sections, depending on the structure of the heart and on the circulating fluid, makes his third section consist of those animals which have an unilocular heart without an auricle (inauritum), and a white and cold circulating fluid (sanie frigida, albida). This section he separates into two subdivisions: the first (Antennata) consisting of the *Insects* (Insecta); the second consisting of the *Worms* (Vermes).

The following is his definition of his 'Class' *Vermes*, *Cor* (Heart) uniloculare, inauritum, sanie frigida. *Spiracula* (Respiratory organs) obscura. *Maxillæ* (Jaws) multifariæ, variæ variis. *Penes* (Intromissive generative organs) varii Hermaphroditis Androgynis. *Sensus* (Organs of Sensation) Tentacula (Caput nullum, vix oculi, non aures, Nares). *Tegmenta* (Covering or Integument) calcarea aut nulla, nisi spinæ. *Fulcra* (Organs of support or motion) Nulli pedes aut pinnæ.

The class so defined—and the very definitions will show how very limited the knowledge of the structure of such animals was in the time of the writer—consists of the following orders in the *Systema Naturæ*:—1. *Intestina.* 2. *Mollusca.* 3. *Testacea.* 4. *Lithophyta.* 5. *Zoophyta.*

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[*] M. de Blainville, who first proposed the term *Malacozoologie*, or by abbreviation *Malacologie*, makes the etymology μαλακὸς, soft, ζῶον, animal, and λόγος.

[†] The French title of Knorr's celebrated work in German and French. The German title is 'Vergnügen der Augen und des Gemüths,' 4to., Nuremberg, 1757, 1764

The order *Mollusca* consists of the following genera arranged in the subdivisions here given:—

MOLLUSCA.

α. *Mouth above. Animal fixing itself by its base.*
Actinia. Ascidia.
β. *Mouth anterior. Body perforated with a small lateral foramen.*
Limax. Aplysia. Doris. Tethis or Tethys.
γ. *Mouth anterior. Body surrounded anteriorly by Tentacles.*
Holothuria. Terebella.
δ. *Mouth anterior. Body brachiated, or furnished with arms.*
Triton. Sepia. Clio. Lernæa. Scyllæa.
ε. *Mouth anterior. Body pedated.*
Aphrodita. Nereis.
ζ. *Mouth below, central.*
Medusa. Asteria or Asterias. Echinus.

In the above assemblage of animals we find a very heterogeneous arrangement; *Mollusca, Radiata,* and the genus *Lernæa* (which last the best authorities consider to be crustaceous), being there collected together.

The order *Testacea*, 'Testaceous simple mollusks, covered with a calcareous shell,' consists of the following subdivisions and genera:—

TESTACEA.

* *Multivalvia.*

Chiton (*Animal* Doris). Lepas (*Animal* Triton). Pholas (*Animal* Ascidia).

* * *Bivalvia:* CONCHÆ.

Mya (*Animal* Ascidia). Solen (*Animal* Ascidia). Tellina (*Animal* Tethys). Cardium (*Animal* Tethys). Mactra (*Animal* Tethys). Donax (*Animal* Tethys). Venus (*Animal* Tethys). Spondylus (*Animal* Tethys). Chama (*Animal* Tethys). Arca (*Animal* Tethys?). Ostrea (*Animal* Tethys). Anomia (*Animal* Corpus Ligula, *emarginata, ciliata, ciliis valvulæ superiori affixis.* Brachiis 2, *linearibus, corpore longioribus, conniventibus, porrectis, valvulæ alternis, utrinque ciliatis, ciliis affixis valvulis utrisque*). Mytilus (*Animal* Ascidia?). Pinna (*Animal* Limax).

* * * *Univalvia Spira regulari:* COCHLEÆ.

Argonauta (*Animal* Sepia). Nautilus (*Animal—Rumph. Mus.*, t. 17, f. D). Conus (*Animal* Limax). Cypræa (*Animal* Limax). Bulla (*Animal* Limax). Voluta (*Animal* Limax). Buccinum (*Animal* Limax). Strombus (*Animal* Limax). Murex (*Animal* Limax). Trochus (*Animal* Limax). Turbo (*Animal* Limax). Helix (*Animal* Limax). Nerita (*Animal* Limax). Haliotis (*Animal* Limax).

* * * * *Univalvia absque spira regulari.*

Patella (*Animal* Limax). Dentalium (*Animal* Terebella). Serpula (*Animal* Terebella). Teredo (*Animal* Terebella). Sabella (*Animal* Nereis).

This arrangement makes each of the generic characters reside in the shell, which is treated as the habitation of the 'animal.' Any one who examined this method soon found that it was impossible to affix any definite idea to many of the inhabiting animals; and but a vague one to most. To the bulk of the *Bivalves* or *Conchæ*, a *Tethys* is assigned as the animal; to the bulk of the *Univalves with a regular spire*, a *Limax* or Slug, which last is stated to be the animal of *Pinna* among the *Bivalves;* and yet the wonder is how Linnæus approached so nearly to a natural arrangement with the scanty materials—for scanty they were when compared with the information that we now possess—which formed the groundwork of his classification. Upon this system almost all scientific collections of *Shells* were arranged till within these few years; and so bigoted were many of the followers of this great man, who would have been the first to remodel his arrangement as new light poured in upon him, that every attempt at adopting the views of Cuvier, Lamarck, and others, and even those of Bruguière, founded upon the structure of the animals, was for a long time resisted, and almost resented as a presumptuous attempt at 'genus-making.'

Daubenton had read to the Academy of Sciences at Paris a memoir on the systematic distribution of *Shells*, in which, whilst he admitted that an acquaintance with these alone might suffice for arrangement, he remarked that a knowledge of the animals, or soft parts, was indispensable for forming a complete system of conchology and a natural distribution of these *exuviæ*. But though this indefatigable anatomist broached this opinion, he does not appear to have carried his plan into execution.

Guettard seems to have been the first who carried out the suggestion of Daubenton; for in 1756 he read a memoir inserted in the 'Transactions' of the same Academy, and therein established upon sound principles the necessity, in forming a classification of shells, of having recourse to the animals, or soft parts which they enclose, and a part of which the shells are. He did more; for he well characterised, upon the principle advocated by him, several genera, especially among the *Univalves*, as they were then called. And although he acknowledges that his information with regard to the *Bivalves* was not sufficient to enable him to carry out his views in the same manner with regard to them, he observes that they must be susceptible of being characterised with reference to the animals, or soft parts, as well as the Bivalves. Guettard further pointed out the division of shells into *Terrestrial, Fluviatile,* and *Marine,* and paid particular attention to the presence or absence of the *operculum*. There can be little doubt that these observations determined d'Argenville to add to his second edition of 'Conchyliologie' (1757) a number of figures of the animals, or soft parts, under the name of *Zoomorphoses;* these, it is true, are many, if not all of them, very bad.

The principles of Guettard were in the same year (1757) more extensively applied by Adanson in his 'Histoire Naturelle du Sénégal—*Coquillages*.' He distinguishes all the external parts of the animals and the shells. In the *Univalve Shells*, as they were then called, or, as Adanson denominates them, the *Limaçons*, he points out the whorls (spires), the apex (sommet), the aperture, the operculum, &c.; and in the Bivalves, under the name of *Conques*, he treats of the valves, which he terms battans, and notices their equality or inequality—whether they shut close or gape at any point—the hinge, and the number and form of the teeth composing it, with the cavities which they form—the ligament, considering it as to form and situation—the muscles, or rather muscular impressions with regard to their figure, size, and number; the nacre, &c. Out of the modifications of these parts of the bivalve shell he forms divisions—as five depending on the variations of the hinge; three depending upon the relative situations of the ligament externally, internally, &c.; three depending upon the modifications of muscular attachment, viz. *Conques* with one muscular attachment, *Conques* with two muscular attachments, and *Conques* with three muscular attachments; and three depending upon the presence or absence of the nacre and its modifications.

In the animals, or soft parts, of the *Limaçons*, he directs his attention to five principal parts.

1. The *tentacula*, or tentacles, which he names horns (cornes), and which he considers with regard to their number and shape as furnishing specific character, according as they are absent, or as there are two or four, or according to their conical or cylindrical form, the absence or presence of convexity (renflement) at their origin, and their situation at the root, or at the extremity of the head.

2. The *eyes*—their absence or presence; and in the latter case, their situation upon the head at the internal side of the root of the tentacles, behind the tentacles, towards their internal side, at the origin of the tentacles on their external side, above the root of the tentacles on their external side, at the middle of the tentacles on their external side, and at the summit of the tentacles.

3. The *mouth*, as provided with two jaws without a proboscis, or with a proboscis without jaws.

4. The *trachea*, or respiratory orifice, as formed by a simple hole situated on one of the sides of the animal, or by a long pipe which has its exit near the back.

5. The *foot*, according as it is divided by a transverse furrow at its anterior part, or not.

The *Conques* are regarded by Adanson with reference to four principal parts, viz.:

1. The mantle, which may be either divided all round into two lobes, or divided on one side only, or form a sac, open only at the two opposite extremities.

2. The trachea, or tube, which may be either single, and in the form of an aperture, double in the form of apertures, double in the form of separate and distinct pipes, or double in the form of united pipes.

3. The foot null, or not appearing externally, or appearing externally.

4. The byssus, or threads, which exist in some species, and do not exist in others.

The shells which he had observed at Senegal are figured and distributed generally in the following order, under two families.

Family 1.

LIMAÇONS.

§ I.

Limaçons Univalves.

Genera:—Cymbium. Bulinus (Physa of the moderns). Coretus (Planorbis of Guettard). Pedipes (Auricula of Lamarck). Cochlea (Bulimus of Bruguière). Lepas (Patella of modern authors and also embracing the Chitons). Haliotis. Yetus (Voluta of Lamarck, Cymba of Broderip). Terebra. Porcellana (Marginella and Oliva of authors). Cypræa. Peribolus (Young of Cypræa and small Marginellæ).

§ II.

Limaçons Operculés.

Strombus (Conus of the moderns). Purpura (including, with the true Purpuræ, Dolium, Cassidaria, Murex, Strombus of the moderns, some Mitræ, &c.). Buccinum. Cerithium. Vermetus. Trochus. Turbo. Natica. Nerita.

The *Conques* are also divided into two sections.

§ I.

Conques Bivalves.

Genera:—Ostreum (Ostrea of the moderns). Jataronus (Spondylus? of the moderns). Perna (including Mytilus, Modiola, Avicula, Pinna, and Cardita). Chama (including Venus, Cytherea, Mactra, Cardita, and some of Solen; but apparently none of the Chamæ of modern authors). Tellina (Donax of the moderns). Pectunculus (including Cardium, Arca, and some true Pectunculi of Lamarck). Solen.

§ II.

Conques Multivalves.

Pholas. Teredo.

Such is the system of Adanson; and although it presents errors, which would very probably have been avoided by so good an observer, if he had lived at a later period, when this branch of knowledge became better known, we must allow him the merit of being the first who practically applied the principle of classification based on the structure of the soft as well as the hard parts, or, in other words, on the organization of the animal and shell.

Geoffroy, a physician of Paris, applied the same principle to his little 'Treatise on the Terrestrial and Fluviatile Shells' in the neighbourhood of that city. His genera of Univalves amount to five only, viz. *Ancylus, Cochlea, Buccinum, Planorbis*, and *Nerita*. His genera of Bivalves consist of two, *Chama* and *Mytilus;* in the first of which he places *Cyclas*, and in the second an *Anodon* and a *Unio*.

Müller, the Dane, presented zoologists with a system founded on the same principle, which, whilst it was more complete than that of Guettard, inasmuch as it extended to all conchyliferous animals, was less natural than that of Adanson, and altogether inferior to it, as far as Adanson's went; but it was much more elaborate, and demands a great share of praise. The author of the *Zoologia Danica*, in his 'Vermium terrestrium et fluviatilium Historia,' adopts three primary divisions—*Univalves, Bivalves*, and *Multivalves*.

He divides the *Univalves* into three sections:—

1. Those testaceous univalves whose shell is pierced through and through; and in this section he places the *Echini* and *Dentalium*.

2. Those which have a very large aperture, consisting of *Akera* (*Bulla* of modern zoologists), *Argonauta, Bulla* (*Physa* of Draparnaud and others), *Buccinum* (*Limnæa* of the moderns), *Carychium, Vertigo, Turbo, Helix, Planorbis, Ancylus, Patella*, and *Haliotis*.

3. Operculated testaceous univalves, in which he places the genera *Tritonium* (*Buccinum* of Linnæus), *Trochus, Nerita, Valvata*, and *Serpula*.

The *Bivalves* are divided by the same author into two sections only: the 1st consisting of those which have a toothed hinge, including *Terebratula*, a new genus; the 2nd, of those which have a toothless hinge, including two new genera, *Anomia* and *Pecten*, which he separates from the oysters.

The *Multivalves* comprise the genera *Chiton, Lepas*, and *Pholas*.

There can be little doubt that it was to these authors (among whom we do not include Müller, whose works appeared subsequently, nor Geoffroy, whose treatise appeared nearly simultaneously) we owe the amended arrangement of Linnæus as it finally appeared in his last edition of the *Systema Naturæ* (the 12th, 1767), and as we have given it above. In the earlier editions the term *Mollusca* does not seem to have occurred to him. The naked mollusks are distributed among the order *Zoophytes*, of his class *Vermes*, and the testaceous mollusks formed his third order of that class, *Testacea*. Among the first we find *Tethys*, under which he arranged the *Holothuriæ;* and *Limax* and *Sepia*, which he placed near the *Hydræ*. The second were not yet divided into *Univalves* and *Bivalves*. The genera *Patella* and *Cochlea* seem to have embraced all the turbinated univalves; and *Cypræa, Haliotis*, and *Nautilus*, the simple univalves. All the *Bivalves* appear to be collected under the term *Concha;* and the *Ascidiæ*, under the name of *Microcosmus*, seem to have found a place under his *Testacea*.

It is in the tenth edition (1758) that we first trace considerable augmentations, which increased in the last that received the correction of the great Swedish naturalist's own hand, and which appeared in three volumes: the first part of the first volume being published in 1766; the second part of that volume, containing the *Insecta* and *Vermes*, in 1767; the second volume, containing the plants (*Regnum Vegetabile*), in 1767; and the third, containing the minerals (*Regnum Lapideum*), in 1768. Adanson's work was published at Paris in 1757, ten years before the second part of the second volume of the last edition of the *Systema Naturæ*. But Linnæus appears to have only *profited* by the labours of Guettard and Adanson to add *to the genera* of the orders *Mollusca* and *Testacea* of his *Vermes*, and to define them more closely. Geoffroy's publication appeared nearly at the same time with his own last edition. The object of Linnæus seems to have been to establish a nomenclature and form a system of conchology resting on the modifications of structure in the shell alone: in fact an arbitrary system which has now generally given way to systems founded upon more natural principles.

Pallas (*Miscellanea Zoologica*, 1766) seems to have been the first to point out the unsteady foundation on which the system of Linnæus rested. He shows that the subdivision of the testaceous mollusks, as adopted by Linnæus and his followers, resting on the shell only, without taking the animal into consideration, is far from natural; and, in that spirit of prophecy which is now fulfilled, he remarks that it cannot be preserved.

Bruguière, nevertheless, weighing the great influence which the system of Linnæus had exercised on zoology in general, and the powerful aid which it afforded to the student of that science, clung, in his *Dictionnaire des Vers*, to the method of the Swede in so many points that he may be said almost to have done little more than imitate him.

Bruguière admits the division of the two orders Molluscous Worms and Testaceous Worms. The first of these he subdivides into two sections, according to the presence or absence of *tentacula*, and consequently jumbles together a very heterogeneous mass of animals; for the same reason his second section is even more heterogeneous than the first. He however separates into a distinct order the *Echini* and *Star-fishes*.

In the second order, or that of *Testaceous Worms*, though the Linnæan principle is kept in view, the genera are more multiplied and their characters better defined; and as Bruguière is one of those authors who has greatly contributed to the advancement of this branch of zoology, we shall give an outline of his system of conchology.

He, like Linnæus, divides the *Testaceous Worms* into three sections, according to the number of the valves.

In the first (*Multivalves*) he places the *Chitons, Balanus*, and *Anatifa* (*Lepas* of Linnæus), *Teredo, Fistulana, Pholas, Char* (a new and imaginary genus), *Anomia*, and *Crania*. We here have for the first time a separation of the Pedunculated and Sessile types of the Cirripeds (*Campylosomata* and *Acamptosomata*) pointed out under the generic appellations of *Anatifa* and *Balanus*, and the new genera *Fistulana* and *Crania*.

The *Bivalves* (second section) are divided into the regular and irregular.

Among the *Regular Bivalves* are three new genera, viz. *Acardo*, *Placuna*, and *Perna*.

The *Irregular Bivalves* contain the new genera *Trigonia*, *Pecten* (previously separated from the oysters by Müller and Poli), *Tridacna*, *Cardita* (formed at the expense of *Chama*, Linn.), and *Terebratula*, containing a division of *Anomia*.

The *Univalves* are subdivided into the *Unilocular*, or those without any partitions, and the *Multilocular*, or those which are furnished with regular partitions or *septa*.

The *Unilocular Univalves without a regular spire* contain *Patella* and *Fissurella*, divided for the first time, and, notwithstanding the observations of Pallas, *Dentalium*, *Serpula*, *Siliquaria*, and *Aspergillum*, among others; *Fissurella*, *Siliquaria*, and *Aspergillum* being new.

The *Unilocular Univalves with a regular spire* present a less heterogeneous assemblage. We find among them *Voluta* reduced to a more uniform genus by withdrawing from it some of the widely different species which Linnæus had congregated under that name, and the following new genera: *Ovula* (or rather *Ovulum*), *Oliva*, *Purpura*, *Cassis*, *Terebra*, *Fusus*, *Cerithium*, *Bulimus*, *Planorbis*, and *Natica*.

The *Multilocular Univalves* not noticed by Linnæus, but pointed out by Breyn or Breynius of Danzig, in his *Dissertatio de Polythalamiis, nova Testaceorum Classe* (1732), comprise the genera *Camerina*, *Ammonites*, and *Orthoceras*, at the expense of the genus *Nautilus* of Linnæus.

Gmelin, whose edition of Linnæus appeared about the same time with the work of Bruguière, requires but little notice. Four or five new genera were added to the *Systema Naturæ*, which received in this edition a great number of species, too many of them added carelessly and in a manner to create confusion, instead of dissipating it.

In 1791 Poli published the first volume of his splendid work, *Testacea utriusque Siciliæ eorumque Historia et Anatome*. Of the care with which the details are wrought out, and the magnificence and accuracy with which they are illustrated, it is impossible to speak too highly. But while Poli avoids the errors of those who sought to establish a system of testaceous mollusks on the structure of the shell alone, he runs into the opposite extreme, and rests his arrangement on the soft parts of the animal only, without any reference to the hard part or shell. He divides the *Mollusca* into three orders:—1. *Mollusca brachiata* (*Sepiæ* &c. of Linnæus, and the *Tritons* and *Serpulæ* of the same author). 2. *Mollusca reptantia* (Gastropods of the more modern authors). 3. *Mollusca subsilientia* (Multivalves and Bivalves of the old school, and characterised as being provided with a long foot, as being fixed to rocks or free, and as always wanting a head and eyes).

Of these families the most natural are the Bivalves, and their arrangement is based upon the structure of important parts.

Little seems to have been done for the science from 1789 to 1798, a period which included the French revolution and its reign of terror; but in 1798 a new era commenced, and George Cuvier published his *Tableau Elémentaire de l'Histoire Naturelle des Animaux*. This great man, clearly perceiving that Guettard, Adanson, Geoffroy, Müller, and Poli took a right view of the principles of classification when they proposed the organization of the animal as its basis, adopted that method, and united, as Pallas had done, under the name of *Mollusca* both the *Vermes* (*Mollusca*) and *Vermes* (*Testacea*) of Linnæus. Considering the absence or presence of a shell as a contingency of secondary importance, he divided the Mollusca into three sections,—the *Cephalopodous Mollusca*, the *Gastropodous Mollusca*, and the *Acephalous Mollusca*. Finally he arranged this 'Second Grand Division of the Animal Kingdom' in six classes, and gave the following method in his last edition of the *Règne Animal* (1830).

MOLLUSCA.

Class I.

CEPHALOPODA.

1. *Sepia* of Linnæus, containing the following genera and subgenera: Octopus, Polypus, Eledone, Argonauta, Bellerophon, Loligo, Loligopsis, Onychoteuthis, Sepiola, Sepioteuthis, and the Cuttles properly so called, viz. Sepia of Lamarck.—2. *Nautilus* of Linnæus, containing Spirula, the Nautili properly so called (Nautilus pompilius, &c.), Lituus, Hortolus, and Orthoceras.—3. *Belemnites*, including Actinocomax?*.—4. *Ammonites*, including the Ammonites properly so called (Simplegades of De Montfort), Planites of De Haan, Ceratites, Orbulites, Globites, Goniatites, Pelagus, Scaphites, Baculites (Tiranites, Rhabdites, Icthyosarcolites), Hamites, Turrilites (the last with M. Audouin's doubt).—5. *Camerina* (Nummulites of Lamarck), with their infinity of genera. [FORAMINIFERA.]

Class II.

PTEROPODA.

1, *Clio*. 2, *Cymbulia*. 3, *Pneumodermon*. 4, *Limacina*. 5, *Hyalæa*. 6, *Cleodora*, including Creseis, Cuvieria, Psyche, and Eurybia, of M. Rang, and perhaps *Triptera* of Quoy and Gaimard. 7, *Pyrgo* (fossil).

Class III.

GASTEROPODA.

Order 1.

Pulmonifera.

§ 1.

Pulmonifera Terrestria.

1, *Limax*, including Limax properly so called. *Arion*. Vaginulus. Testacella and Parmacella. 2, *Helix*, including Helix properly so called. Vitrina (Helicolimax of Férussac). Bulimus. Pupa. Chondrus and Succinea. 3, *Clausilia*. 4, *Achatina* (including Polyphemus of De Montfort).

§ 2.

Pulmonifera Aquatica.

1, *Onchidium*. 2, *Planorbis*. 3, *Limnæus* or *Limnæa*. 4, *Physa*, near which Cuvier would place *Scarabus* of De Montfort. 5, *Auricula*, including Carychium of De Férussac. 7, *Melampus* (*Conovulus*, Lam.)

Order 2.

Nudibranchiata.

1, *Doris*. 2, *Onchidoris*. 3, *Plocamoceros*. 4, *Polycera*. 5, *Tritonia*. 6, *Thethys* or *Tethys*. 7, *Scyllæa*. 8, *Glaucus*. 9, *Laniogerus*. 10, *Eolidia*. 11, *Cavolina*. 12, *Flabellina*. 13, *Tergipes*. 14, *Busiris*. 15, *Placobranchus*.

Order 3.

Inferobranchiata.

1, *Phyllidia*. 2, *Diphyllidia*.

Order 4.

Tectibranchiata.

1, *Pleurobranchus*. 2, *Pleurobranchæa* (*Pleurobranchidium* of De Blainville). 3, *Aplysia*. 4, *Dolabella*. 5, *Notarchus*. 6, *Bursatella*. 7, *Akera*, including Bullæa, Bulla, and the Akeræ properly so called (Doridium of Meckel, and Lobaria of De Blainville). 8, *Gastropteron*. 9, *Umbrella*.

Order 5.

Heteropoda. (Lam.)

These were all comprised by Forskal under his genus Plerotrachea, and comprehend

1, *Carinaria*. 2, *Atlanta*. 3, *Firola*. 4, the *Timoriennes* of Quoy and Gaimard. 5, the *Monophores* of the same. *Phylliroe* of Péron is placed here, but with doubt.

Order 6.

Pectinibranchiata.

Family of Trochöids.

1, *Trochus* (including Tectus, Calcar, Rotella, Cantharidus, Infundibulum, Telescopium, Solarium, and Euomphalus). 2, *Turbo*, including, as genera and subgenera, Turbo properly so called (which comprises both Turbo and Meleagris of De Montfort), Delphinula, Pleurotomaria, Turritella, Scalaria; together with certain terrestrial and freshwater subgenera, viz.: Cyclostoma, Valvata, and Paludina; and the following: Littorina, Monodon, Phasianella, Ampullaria (including Lanistes of De Montfort), Helicina, Melania, Rissoa, Melanopsis, Pirena, Acteon (Tornatella, Lam.), Pyramidella, Janthina, Nerita, Natica, Peloronta, Velates, Neritina, and Clithon.

Family of Capulöids.

1, *Capulus* (Pileopsis of Lamarck). 2, *Hipponyx*. 3, *Crepidula*. 4, *Pileolus*. 5, *Navicella* (Cimber of De Montfort). 6, *Calyptræa*. 7, *Siphonaria*. 8, *Sigaretus*. 9, *Coriocella*. 10, *Cryptosoma*.

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* In the text Actinocomax is included in the section appropriated to the genus Belemnites, though it is spoken of as a genus. In the 'Table Méthodique' Actinocomax is printed as a genus, not a subgenus.

Family of Buccinoids.

1, *Conus*. 2, *Cypræa*. 3, *Ovula*, or rather *Ovulum*, including Volva (Radius?) and Calpurnus of De Montfort. 4, *Terebellum*. 5, *Voluta*, including Oliva, Volvaria, the true Volutæ (subdivided by Broderip[*] into Cymba—Cymbium of De Montf.—Melo, and Voluta), Marginella, Columbella, Mitra, and Cancellaria. 6, *Buccinum*, including Buccinum of Bruguière, Nassa, Eburna, Ancillaria, Dolium (the Tuns, and Partridge Tuns), Harpa, Purpura, Unicornus (Monoceros, Lam.), Ricinula (Sistrum of De Montf.), Concholepas, Cassis, Cassidaria (Morio of De Montf.), and Terebra. 7, *Cerithium* (including Potamides). 8, *Murex*, including Murex, Brug., which comprises the Murices properly so called (Murex, De Montf.), and Brontes, Typhis, Chicoreus, Aquillus, Lotorium, Triton, and Trophon of the same; Ranella (including Apollon of De Montf.); Fusus (including Fusus and Latirus of De Montf.); Struthiolaria; Pleurotoma; Clavatula; Pyrula (including Fulgur of De Montf.), and Fasciolaria. 9, *Strombus* (including Strombus, Lam., Pteroceras, Rostellaria, and Hippochrenes).

Order 7.

Tubulibranchiata.

1, *Vermetus*, including Vermilia. 2, *Magilus*. 3, *Siliquaria*.

Order 8.

Scutibranchiata.

1, *Haliotis*, including Padollus as a subgenus, and Stomatia. 2, *Fissurella*. 3, *Emarginula* (Palmarium of De Montfort). 4, *Parmophorus* (Scutus of De Montfort).

Order 8.

Cyclobranchiata.

1, *Patella*. 2, *Chiton*.

Class IV.

ACEPHALA.

Order 1.

Acephala Testacea (with four branchial *feuillets*, or leaflets).

Family of Ostraceans.

1, *Acardo*,[†] Brug., or *Ostracites*, La Peyrouse, including Radiolites, Sphærulites, Calceola, Hippurites, and Batolites. 2, *Ostrea*, Linn., including Ostrea, Brug., Gryphæa, Pecten, Lima, and Pedum. 3, *Hinnites*. 4, *Plagiostoma*. 5, *Pachytes*. 6, *Dianehora*. 7, *Podopsis*. 8, *Anomia*. 9, *Placuna*. 10, *Spondylus*, from which Lamarck has separated Plicatula. 11, *Malleus*. 12, *Vulsella*. 13, *Perna*, from which have been separated Crenatula, Gervillia, Inoceramus, Catillus, and Pulvinites. 14, *Etheria*. 15, *Avicula*, including Margarita. 16, *Pinna*. 17, *Arca*, Linn., including Arca, Lam., Cucullæa, Pectunculus, and Nucula. 18, *Trigonia*.

Family of Mytilaceans.

1, *Mytilus*, Linn., including Modiola and Lithodomus 2, *Anodon*, including Iridina, Dipsas, &c. 3, *Unio*, including Hyria and Castalia. 4, *Cardita*. 5, *Cypricardia*, and the *Coralliophaga* of M. de Blainville, *Venericardia*, and *Crassatella* (Paphia, Roiss.).

Family of Chamaceans.

1, *Chama*, Linn., including Tridacna, Hippopus, Chama (Brug.), Diceras, and Isocardia.

Family of Cardiaceans.

1, *Cardium*, including Hemicardium. 2, *Donax*. 3, *Cyclas*, including Cyrena, Cyprina, and Galathæa. 4, *Corbis*, Cuv., *Fimbria*, Megerle. 5, *Tellina*. 6, *Loripes*. 7, *Lucina*. 8, *Ungulina*. 9, *Venus*, including Astarte (Crassina, Lam.), Cytheræa, Capsa, and Petricola. 10, *Corbula*. 11, *Mactra*.

Family of the Enfermés.

1, *Mya*, including Lutraria, Anatina, Solemya, Glycymeris, Panopea, and Pandora. 2, *Byssomya*. 3, *Hiatella*. 4, *Solen*, including Sanguinolaria, Psammobia, and Psammothea. 5, *Pholas*. 6, *Teredo*. 7, *Fistulana*. 8, *Gastrochæna*. 9, *Teredina*. 10, *Clavagella*. 11, *Aspergillum*.

Order 2.

Acephala without shells.

1st Family (Simple).

1, *Biphora*, including Thalia, Salpa, and Dagysa. 2, *Ascidia*, including Cynthia, Phallusia, Clavellina, and Boltenia.

2. Family (Aggregate).

1, *Botryllus*. 2, *Pyrosoma*. 3, *Polyclinum*.

Class V.

BRACHIOPODA.

1, *Lingula*. 2, *Terebratula*, including Spirifer and Thecidea. 3, *Orbicula*, including Discina and Crania.

Class VI.

CIRRHOPODA.

(Lepas and Triton, Linn.)

1, *Anatifa*, including Pentalasmis, Pollicipes, Cineras, Otion, and Tetralasmis. 2, *Balanus*, including Acasta, Conia, Asema, Pyrgoma, Ochthosia, Creusia, Coronula, Tubicinella, and Diadema.

Such is the method finally proposed by Cuvier; and, while perusing it, the reader should remember that he had the advantage of reference to almost every author of note who had written on the subject, down to the year 1830. Not that this at all detracts from the excellent use which he has made of the materials at his command, and the grand philosophical views which he took of this intricate department of zoology.

We must now go back to 1798, when Lamarck began his publications on the Mollusca, by a paper in which he separated the great genus Sepia into three genera; and in 1799 he gave to the world his *Prodromus* of a new classification of shells, wherein he established several new genera. In this work he states his adhesion to the principles and views of Bruguière, whilst profiting by the observations of Cuvier as to the organization of the animals, but remarks that he has been compelled to restrict still *more the* characters of the genera, and consequently to *augment their* number. In 1801, when he published his *Animaux sans vertèbres*, he seems to have been convinced of the justice of the views of Cuvier; and no longer confining his attention to the shells, he followed very nearly the example of that great zoologist, and rested his system upon the organization of the soft parts, as well as on the form of the shell of the animal. The 1st vol. of the last edition, which received the corrections of Lamarck's own hand, was published in 1815, and the last vol. in 1822:[*] the following is the arrangement left by him.

Before we enter upon that part of the system which in strictness belongs to the subject before us, it will be necessary to give a succinct view of Lamarck's *Annelids*. These he divides into three orders:—

I. The Apod Annelids, containing the *Hirudinidæ* or Leeches, and the *Lumbricidæ* or Worms (Echiurées).

II. The Antennated Annelids, containing the *Aphroditidæ*, the *Nereididæ*, the *Eunicididæ*, and the *Amphinomidæ*.

III. The Sedentary Annelids, containing the *Dorsalidæ*, which include Arenicola and Siliquaria; the *Maldanidæ*, which include Clymene and Dentalium; the *Amphitritidæ*, which comprise Pectinaria, Sabellaria, Terebella, and Amphitrite, and the *Serpulidæ* (Spirorbis, Serpula, Vermilia, Galeolaria, and Magilus).

The *Annelids* immediately precede Lamarck's Class X.

CIRRHIPEDES.

Order 1.

Sessile Cirrhipedes.

§ 1. With a quadrivalve operculum.

Genera:—Tubicinella. Coronula. Balanus. Acasta.

§ 2. With a bivalve operculum.

Pyrgoma. Creusia.

Order 2.

Pedunculated Cirrhipedes.

§ 1. Body completely enveloped by its tunic. Shell composed of contiguous pieces, leaving a free issue to the animal when they are opened.

Anatifa. Pollicipes.

§ 2. Body completely enveloped by its tunic, which nevertheless has an anterior opening. Shell formed of separate pieces, which have no need to open themselves for the issue of the arms of the animal.

Cineras. Otion.

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[*] In the 'Règne Animal,' 'Sowerb.' is erroneously printed for 'Brod.'

[†] The species figured by Brug., 'Encyclop.,' pl. 173. ff. 1, 2, 3, appears to be nothing but a double epiphysis of the vertebræ of a Cetacean.

[*] There is another edition of Lamarck's 'Animaux sans vertèbres,' now (1839) in a course of publication, with valuable notes and additions by MM. Deshayes and Milne Edwards.

Class XI.

CONCHIFERA.

Order 1.

Conchifera Dimyaria.

Two muscles of attachment at least. Shell, internally, with two muscular impressions, which are separate and lateral.

(1) Shell regular, generally equivalve.

(A) Shell gaping, in general, at the lateral extremities, its valves being approximated.

(*) *Crassipede Conchifers.*—Mantle with its lobes united anteriorly, either entirely or partially; foot thick posterior: gape of the shell always remarkable, often considerable.

(1) Shell either contained in a tubular sheath, distinct from its valves, or entirely or partially incrusted in the wall of the sheath, or projecting externally.

Family Tubicolidæ†.

Aspergillum. Clavagella. Fistulana. Septaria. Teredina. Teredo.

(2) Shell without a tubular sheath.

(*a*) Ligament external.

(†) Shell either furnished with accessory pieces, foreign from its valves, or gaping very much anteriorly.

Family Pholadidæ.

Pholas. Gastrochæna.

(††) Shell without accessory pieces, and gaping at the lateral extremities only.

Family Solenidæ.

Solen. Panopæa. Glycymeris.

(*b*) Ligament internal.

Family Myidæ.

Mya. Anatina.

(**) *Tenuipede Conchifers.*—Mantle with its lobes not united, or hardly united anteriorly; foot small, compressed; gaping of the shell often considerable.

(†) Ligament internal.

Family Mactridæ.

(1) Ligament internal only.

(*a*) Shell gaping on its sides.

Lutraria. Mactra.

(*b*) Shell not gaping at its sides.

Crassatella. Erycina.

(2) Ligament visible externally, or double, one part being internal, the other external.

Ungulina. Solemya. Amphidesma.

Family Corbulidæ.

(Shell inequivalve. Ligament internal.)

Corbula. Pandora.

(††) Ligament external only.

Family Lithophagidæ.

Boring shells without accessory pieces, without any particular sheath, and more or less gaping at their anterior side. Ligament of the valves internal.

Saxicava. Petricola. Venerupis.

Family Nymphidæ.

Two cardinal teeth at most in the same valve. Shell often gaping a little at the lateral extremities. Ligament external; Nymphs, in general, gaping outwards.

(1) Solen-like Nymphidæ.

Sanguinolaria. Psammobia. Psammotæa.

(2) Tellen-like Nymphidæ.

(*a*) Lateral teeth, one or two.

Tellina. Tellinides. Corbis. Lucina. Donax.

(*b*) No lateral teeth.

Capsa. Crassina.

(B) Shell closed at the lateral extremities, when the valves are closed.

(***) *Lamellipede Conchifers.* Foot flattened, lamelliform, not posterior.

Family Conchidæ.

Three cardinal teeth at least in one valve, with as many or less in the other. Lateral teeth sometimes.

1. Fluviatile Conchidæ.

Shell with lateral teeth, and covered with a false epidermis.

Cyclas. Cyrena. Galathea.

2. Marine Conchidæ.

No lateral teeth in the greater number; rarely an epidermis, which covers the whole shell except the umbones.

Cyprina. Cytherea. Venus. Venericardia.

Family Cardiidæ.

Cardinal teeth irregular, either in their form or situation, and accompanied, in general, by one or two lateral teeth.

Cardium. Cardita. Cypricardia. Hiatella and Isocardia.

Family Arcidæ.

Cardinal teeth small, numerous, intrant, and disposed in each valve on a line which is either straight, or arched, or broken.

Cucullæa. Arca. Pectunculus. Nucula. Trigonia and Castalia.

Naiidæ.

Fluviatile shells, whose hinge is sometimes furnished with an irregular cardinal tooth which is simple or divided, and with a longitudinal tooth which is prolonged under the corselet; and sometimes is without any tooth at all, or is furnished along its length with irregular, granulous tubercles.

Muscular impression posterior and compound. Umbones with the epidermis peeled off, and frequently eroded.

Unio. Hyria. Anadonta (or rather Anodon) and Iridina.

(****) *Ambiguous Conchifers.*

Family Chamidæ.

Shell irregular, inequivalve. A single cardinal tooth which is oblique and subcrenate, inserted into a little pit in the opposite valve.

Muscular impressions two, distant, lateral. External ligament depressed.

Diceras. Chama. Etheria.

Order 2.

Conchifera Monomyaria.

Only one muscle of attachment, which seems to traverse their body.

Shell with an internal subcentral muscular impression.

(*) Ligament marginal, elongated on the border, sublinear.

(*a*) Shell transverse, equivalve, with an elongated muscular impression, bordering the upper limb.

Family Tridacnidæ.

Tridacna. Hippopus.

(*b*) Shell longitudinal or subtransverse, with a muscular impression contracted into an isolated space without bordering the limb.

(†) Ligament at the lateral border of the shell, and always entire.

Family Mytilidæ.

Hinge with a subinternal ligament, which is marginal, linear, very entire, occupying a great part of the anterior border. Shell rarely foliated.

Modiola. Mytilus. Pinna.

(††) Ligament at the lower border of the shell, or divided.

Family Malleïdæ.

Ligament marginal, sublinear, either interrupted by crenulations or serial teeth, or altogether simple. Shell subinequivalve, foliated

Crenatula. Perna. Malleus. Avicula. Meleagrina.

(**) Ligament not marginal, contracted into a short space under the umbones, and not forming a tendinous tube under the shell

(*a*) Ligament internal or demi-internal. Shell regular, compact, not foliated.*

Family Pectinidæ.

Pedum. Lima. Plagiostoma. Pecten. Plicatula. Spondylus. Podopsis.

(*b*) Ligament internal or demi-internal. Shell irregular, foliated, sometimes papyraceous.

Family Ostreidæ.

(1) Ligament demi-internal, shell foliated, but nevertheless often acquiring great thickness.

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† Lamarck does not use the termination 'idæ;' but it is now so generally employed in zoology to designate family names, that we have thought it advisable to adopt the form for the Lamarckian families.

* The term foliated is here applied as relating to the structure of the shell itself, rather than to the external excrescences.

Gryphæa. Ostrea. Vulsella.

(2) Ligament internal. Shell delicate, papyraceous.

Placuna. Anomia.

(***) Ligament either null or unknown, or represented by a tendinous chord which sustains the shell.

(*a*) Ligament and animal unknown. Shell very inequivalve.

Family Rudistidæ.

Sphærulites. Radiolites. Calceola. Birostrites. Discina. Crania.

(*b*) Shell adherent, either immediately or by a tendinous chord which sustains it, and serves as a ligament. Animal with two opposed arms, which are opposed, ciliated, and cirrhous.

Family Brachiopodidæ.

Conchifers having near the mouth two opposed, elongated, ciliated arms, rolled spirally when in repose. Mantle bilobated, the lobes separated anteriorly, enveloping or covering the body.

Shell bivalve, adhering to marine bodies, either immediately or by a tendinous chord.

Orbicula. Terebratula. Lingula.

Class XII.

MOLLUSCA.

Order 1.

Pteropoda.

No foot for creeping, nor arms for progress or seizing the prey. Two fins opposed and similar, proper for natation. Body free and floating.

Hyalæa. Clio. Cleodora. Limacina. Cymbulia. Pneumodermon.

Order 2.

Gasteropoda.

Animals with a straight body, never spiral nor enveloped in a shell which can contain the entire animal; having under the belly a foot or muscular disc united to the body nearly throughout its length, and serving for creeping.

Some naked, others protected by a dorsal shell, not imbedded; and others, on the other hand, containing a shell more or less hidden in their mantle.

1st Section.

Hydrobranchiata.

Branchiæ, whatever be their position, elevated either in a net-work, in laminæ, in a pectinated form, or in a ribbon-like shape. The animals of this section breathe water only.

(*a*) Branchiæ external, placed above the mantle, either on the back or on the sides, and being in no particular cavity.

Family Tritonidæ.

Glaucus. Eolis. Tritonia. Scyllæa. Tethys. Doris.

(*b*) Branchiæ placed under the border of the mantle, and disposed in a longitudinal series round the body, or on one side only; not being in any particular cavity.

Family Phyllididæ.

Phyllidia. Chitonellus. Chiton. Patella.

Family Semiphyllididæ.

Branchiæ placed under the border of the mantle, and disposed in a longitudinal series on the right side of the body only.

Pleurobranchus. Umbrella.

(*c*) Branchiæ placed in a particular cavity upon the back, situated anteriorly near the neck. Shell always external, and covering the soft parts.

Family Calyptræidæ.

Parmophorus. Emarginula. Fissurella. Pileopsis. Calyptræa. Crepidula. Ancylus?

(*d*) Branchiæ placed in a particular cavity towards the posterior part of the back, and covered either by the mantle or by an opercular escutcheon.

(†) No tentacula.

Family Bullidæ.

Akera. Bullæa. Bulla.

(††) With tentacula.

Family Laplysidæ.

Laplysia. Dolabella.

2nd Section.

Pneumobranchiata.

Branchiæ creeping, in the form of a vascular net-work, on the wall of a particular cavity, the aperture of which is a hole which the animal contracts or dilates at its pleasure. Animals of this section breathe nothing but air.

Family Limacidæ.

Onchidium. Parmacella. Limax. Testacella. Vitrina.

Order 3.

Trachelipoda.

Body spiral in its posterior part, this part being separated from the foot, and always enveloped in the shell. The foot free, flattened, attached to the lower base of the neck, or to the anterior part of the body, and serving for creeping. Shell spirivalve and sheathing (engainante).

Section I. (Phytiphagous.)

Trachelipods without a projecting siphon, and respiring in general by means of a hole. The greater part *phytiphagous* and furnished with jaws. Shell with the aperture entire, having at its base neither dorsal subascending notch nor canal.

* Trachelipods respiring air only. Shell spirivalve, unarmed (mutique), not distinctly nacreous.

Family Colimacidæ (terrestrial).

(*a*) Four tentacles.

Helix. Carocolla. Anostoma. Helicina. Pupa. Clausilia. Bulimus. Achatina. Succinea.

(*b*) Two tentacles.

Auricula. Cyclostoma.

Family Limnæidæ.

Amphibious. Living in the water, but coming to the surface to breathe. Shell with a sharp edge to the lip.

Planorbis. Physa. Lymnæa, or rather Limnæa.

(**) Trachelipods breathing water only. Branchiæ projecting in form of filaments, laminæ or tufts *in the* branchial cavity. Shell often nacreous, and often *also having* protuberant parts on the surface.

(*a*) Shell fluviatile, operculated, the left border *of which* does not resemble a demi-partition.

(†) Shell with disunited borders.

Family Melanidæ.

Melania. Melanopsis. Pirena.

(††) Shell with united borders.

Family Peristomidæ.

Valvata. Paludina. Ampullaria.

(*b*) Shell fluviatile or marine, whose left border or lip resembles a demi-partition.

Family Neritidæ.

Navicella. Neritina (fluviatile). Nerita. Natica (marine).

(*c*) Shell marine, whose left lip does not resemble a demi-partition.

(†) Shell floating at the surface of the water.

Family Janthinidæ.

Janthina.

(††) Shell not floating, having the aperture very wide: no columella.

Family Macrostomidæ.

Sigaretus. Stomatella. Stomatia. Haliotis.

(†††) Aperture without any particular width; plaits on the columella.

Family Plicacidæ.

Tornatella. Pyramidella.

(††††) No plaits on the columella.

(*a*) Borders of the aperture united circularly.

Family Scalaridæ.

Vermetus. Scalaria. Delphinula.

(*b*) Borders of the aperture disunited.

Family Turbinidæ.

Solarium. Rotella. Trochus. Monodonta, or rather Monodon. Turbo. Planaxis. Phasianella. Turritella.

Section II. (Zoophagous.)

Trachelipods with a projecting siphon, and which only breathe the water which arrives at the branchiæ by means of this siphon. These feed on animal substances only, are marine, have no jaws, and are furnished with a retractile proboscis.

Shell spirivalve, sheathing the soft parts, with an aperture which is either canaliculated, or notched, or turned up at its base.

(*a*) Shell with a canal more or less long at the base of its aperture, and the right border of whose lip does not change with age.

Family Canaliferidæ.

§ 1.

No constant *bourrelet* on the right lip of the species.

Cerithium. Pleurotoma. Turbinella. Cancellaria. Fasciolaria. Fusus. Pyrula.

§ 2.

A constant *bourrelet* on the right lip in all the species.

(*a*) No *bourrelet* on the spire.

Struthiolaria.

(*β*) *Bourrelets* on the spire.

Ranella. Murex. Triton.

(*b*) Shell with a canal more or less long at the base of its aperture, and the right border of whose lip changes its form with age, and has a sinus inferiorly.

Pteridæ (Ailées or Wing-shells).

Rostellaria. Pterocera, or rather Pteroceras. Strombus.

(*c*) Shell with a short canal, ascending posteriorly, or with an oblique notch at the base of its aperture, this demi-canal being directed towards the back.

Family Purpuridæ (Purpurifères).

§ 1.

An ascending canal, or recurved towards the back.

Cassidaria. Cassis.

§ 2.

An oblique notch directed backwards.

Ricinula. Purpura. Monoceros. Concholepas. Harpa. Dolium. Buccinum. Eburna. Terebra.

(*d*) No canal at the base of the aperture, but a subdorsal notch and plaits on the columella.

Family Columellidæ (Columellaires).

Columbella. Mitra. Voluta. Marginella. Volvaria.

(*e*) Shell without a canal, but having the base of its aperture notched or versant, and the whorls of the spire large, compressed, and enrolled in such a manner that the last whorl nearly entirely covers the others.

Family Convolutidæ (Enroulées).

Ovula, or rather Ovulum. Cypræa. Terebellum. Ancillaria. Oliva. Conus.

Order IV.

Cephalopoda.

Mantle in form of a sac, containing the lower part of the body. Head projecting from the sac, surrounded by arms, which are not articulated, but furnished with suckers (ventouses), and which environ the mouth. Two sessile eyes; two horny mandibles to the mouth; three hearts; sexes separate.

1st Division.

Polythalamous Cephalopods.

Shell multilocular, enveloped completely or partially, and which is enclosed in the posterior part of the animal, often with adherence.

* Shell multilocular, with simple chambers.

(1). Shell straight or nearly straight: no spiral.

Family Orthoceratidæ.

Belemnites. Orthoceras. Nodosaria. Hippurites. Conilites.

(2). Shell partially spiral: last whorl continued in a straight line.

Family Lituolitidæ.

Spirula. Spirolina. Lituola.

(3). Shell semi-discoid: spire eccentric.

Family Cristacidæ.

Renulina. Cristellaria. Orbiculina.

(4). Shell globulose, spheroidal, or oval, with enveloping whorls or partitions united *en tunique.*

Family Spherulidæ.

Miliola. Gyrogona.* Melonia.

(5). Shell discoid, with a central spire, and partitions radiating from the centre to the circumference.

Family Radiolididæ.

Rotalia. Lenticulina. Placentula.

(6). Shell discoid, with a central spire, and partitions which do not extend from the centre to the circumference.

Family Nautilidæ.

Discorbis. Siderolites. Polystomella. Vorticialis. Nummulites. Nautilus.

** Shell multilocular, with chambers pinked (decoupés) at the edges.

Family Ammonitidæ.

Ammonites. Orbulites. Ammonoceras. Turrilites. Baculites.

2nd Division.

Monothalamous Cephalopods.

Shell unilocular, entirely external, and enveloping the animal.

Genus, Argonauta.

3rd Division.

Sepiary Cephalopods.

No shell, either internal or external. A solid free cretaceous or horny body, contained in the interior of the greater part of the animals.

Genera:—Octopus. Loligopsis. Loligo. Sepia

Order V

Heteropoda.

Body free, elongated, swimming horizontally. Head distinct; two eyes. No arms surrounding the head; no feet under the belly or under the throat for creeping. One or more fins, without any regular order, and not disposed by pairs.

Genera:—Carinaria. Pterotrachea. Phylliroë.

Such was Lamarck's arrangement, as he finally left it, after various modifications in the course of his publications, from the commencement of them to the second edition of his 'Animaux sans vertèbres.' During that interval many authors had presented their views to the public, and we proceed to notice some of them.

In 1800, M. d'Audebard de Férussac (the father) produced a system of Conchology based on the consideration of the animal and its shell. He introduced some observations on the complete or incomplete state of what he calls the 'spiral cone' of the shell, and the point of attachment of the foot, under the neck or under the belly of the Gastropods. His views were limited to the terrestrial and fluviatile Mollusks, or 'Musculites,' as he calls them, and subdivides them into orders almost as numerous as his genera, among which we find *Helicolimax*, forming the passage between the *Limaces* and the *Helices.*

The work of M. Bosc, in the supplements to Buffon (Det., 1802), may be considered as rather of a retrograde character, for it still clung to the system of Linnæus as amended by Bruguière; and, notwithstanding the progress already made, we find him adhering to the terms *Molluscous Worms* and *Testaceous Worms*, as designating the *Naked* and *Testaceous Mollusca.* His divisions were nearly those of Bruguière, though he adopted the new subdivisions which Cuvier and Lamarck had established, and appears to have been conscious of the value of those innovations. Bosc was an observer, and had studied many of the *Mollusca* in a living state. He established many new facts and some new genera.

In 1803 appeared the *Prodromus* of the work of Draparnaud, which was not published till after his death in 1808, on the Terrestrial and Fluviatile Mollusca of France. This work is conceived and executed in a philosophical spirit, and with rational views of a natural system of classification. He abandoned the arbitrary method of Linnæus, and returned to the principle proposed by Réaumur (1711) in his 'Memoir on the Progressive Motions of Shells,' making his classification that of Cuvier.

The 'Natural History of Mollusca,' for Sonnini's edition of Buffon, was hardly commenced by Denys de Montfort, and almost entirely executed by M. de Roissy. The classification is carried out on the principles of Cuvier, but the author differs from Cuvier on some points, as, for instance, in thinking that the section of the Anodons ought not immediately to follow that of the Oysters, and that the aperture which Cuvier regarded as anterior in Biphora was really posterior—an opinion in which he is supported by MM. Bosc, Péron, De Blainville, Chamisso, and Kuhl. In this work the analogy of the Polythalamous or chambered shells is pointed out. M. de Roissy appears to have perceived the passage from the Univalve to the Bivalve Mollusks by means of the *Patellæ*, and he seems to have been the first who placed *Aspergillum* near to *Fistulana*, a position which it still holds.

M. Duméril, in 1806, published in his 'Zoologie Analytique' a classification of *Mollusca* nearly similar to that of Cuvier. M. Duméril divides the *Mollusca* into five orders: *Cephalopoda*, *Pteropoda*, *Gasteropoda*, *Acephala*, and *Brachiopoda*. The principal novelties in this publication were a division of the *Gasteropoda*, according to their organs of respiration, into three families—*Dermobranchiata*, *Siphonobranchiata*, and *Adelobranchiata*—which correspond nearly to the three divisions established on the structure of the shell; and a separation of the *Brachiopoda* as a distinct order.

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* A seed.

In 1808 Denys de Montfort published his *Univalves Cloisonnées*, and in 1810 the second volume of his *Conchyliologie Systematique*, containing the *Univalves non Cloisonnées*. His genera are very numerous, and not many of them are retained at present by zoologists, though they are for the most part neatly defined. His method is only carried out with regard to the Univalves; but his primary division rests upon the number of valves, and is separated into *Univalves*. *Multivalves*, and *Bivalves*, as in the systems of the older conchologists. He differs however in restricting the term *Multivalves* to shells made up of several united pieces, without any solution of continuity; whilst he applies the term *Dissivalves* to shells made up of many pieces, but not coherent nor adherent to each other, as *Teredo*, *Fistulana*, *Balanus*, &c.

Oken, in 1810, read to the society of Gottingen a paper upon the knowledge of Mollusca apart from their shells and upon a natural classification established upon this basis; and carried out this principle in his 'Manual of Nat. Hist.,' published at Jena in 1816. Our limits will not allow us to do more than call the reader's attention to this work, which he will find well worthy of perusal, though it does not contain any new principle of arrangement, and there is somewhat too much of change of name about his genera, of which there are but few really new; nor can we do more than hint at the work of M. Rafinesque (Palermo, 1814). About the year 1816 much light was thrown on the *Aggregated Mollusca* by Lesueur, Desmarest, and above all by the great Savigny, and in 1817 M. de Blainville first made known the principles of his system, which he afterwards carried out to its completion, and to which we shall call attention in the proper place. The systems of Goldfuss and Ranzani appeared in the same year, 1820, the first at Nuremberg and the second at Bologna; the first may be regarded as a compilation of the labours of those malacologists who had embraced the natural system; and the basis of the second, as far as the Cirrhipeds are concerned, rests on the structure of the shell and its operculum without regard to the animal, and, as far as relates to the acephalous mollusks, does little more than give new denominations to the four sections of that division.

M. de Férussac (the son) divided (1819) the Mollusca into two grand sections, the *Cephalous* and the *Acephalous*.

Cephalous Mollusca.

These are divided into three classes—Cephalopods, Pteropods, and Gastropods.

The first class, *Cephalopods*, contained the two orders, Decapods and Octopods, as in the arrangement of Dr. Leach. This class in the system of De Férussac embraces all the naked cephalopods and all the animals with multilocular shells; but was subsequently considerably modified in a joint work with M. d'Orbigny.

The second class, *Pteropods*, which originally consisted of the families Hyalæa, Limacinæ, the Clios, the Pneumoderms, and the Phyllirhoes, also underwent considerable changes in a subsequent and joint work with M. Rang.

The third class, *Gastropods*, are divided into the following orders and suborders:—1. Nudibranchians (Anthrobranchians and Polybranchians). 2. Inferobranchians (Phillidians and Semi-phillidians). 3. Tectibranchians. 4. Pulmonians without an operculum (Geophilians, Gehydrophylians, and Hygrophilians). 5. Operculated Pulmonians. 6. Pectinibranchians (Pomastomes, Hemipomastomes, Apomastomes, and Adeloderms). 7. Scutibranchians Ormiers, (Haliotis, &c.), Calyptracians, Heteropods. 8. Cyclobranchians (Chismobranchians and Polyplaxiphores).

Acephalous Mollusca.

These are divided into four classes—Cirripedes, Brachiopods, Lamellibranchians, and Tuniciers.

The first, *Cirripedes*, is divided into the orders—Sessile Cirripedes and Pedunculated Cirripedes.

The second, *Brachiopods*, contains the three families Lingulidæ, Terebratulidæ, and Cranidæ.

The third, *Lamellibranchians*, comprehends five orders—the Ostraceans, Mytilaceans, Benetiers (Tridacna and Hippopus), the Cardiaceans, and the Enfermés (Myidæ, Solenidæ, Pholidæ, and Tubicolidæ).

The fourth, *Tuniciers*, consists of the two orders Tethid Ascidians (Tethidæ and the Pyrosomes) and Thalid Ascidians (Biphora, &c.).

In England Dr. Leach had been active in introducing a natural system, as appears from his published papers, descriptions, and works. He had it in contemplation to publish a general history of English Mollusca; but the most distressing of maladies deprived zoology of one of its most zealous cultivators, and the work has never appeared.

Mr. Gray (John Edward) published in the *London Medical Repository* (1821), his system, which divides the Mollusca (taken in the largest sense of the word) into seven classes.

The first, *Antliobrachiophora* (Cephalopods) consists of three orders—Anosteophora, Sepiæphora, and Nautilophora.

The second, *Gasteropodophora*, is divided into three subclasses—*Pneumobranchia*, *Cryptobranchia*, and *Gymnobranchia*.

The first of these *subclasses* contains two orders—Adelopneumona and Phaneropneumona. The second embraces nine orders—the Ctenobranchia, which are divided into six sections by the application of a new principle, viz. the form of the operculum: the Trachelobranchia; the Monopleurobranchia; the Notobranchia; the Chismatobranchia; the Dicranobranchia; the Cyclobranchia; the Polyplacophora; and the Dipleurobranchia. The third *class* consists of two orders—Pygobranchia and Polybranchia.

Mr. Gray's third class, *Gasteropterophora*, corresponds with the Heteropoda of Lamarck, and is *similar to M.* de Blainville's order Nucleobranchiata.

The fourth class, *Stomatopterophora*, corresponding with the Pteropoda, contains two orders, Pterobranchia and Dactyliobranchia.

The fifth class, *Saccophora* (Tuniciers of Lamarck), consists of three orders—Holobranchia, Tomobranchia, and Diphyllobranchia.

The sixth, *Conchophora*, consists of orders depending on the number of muscular impressions, and denominated from the form of the foot, as Cladopoda, Leptopoda, Phyllopoda, Pogonopoda, and Micropoda.

The seventh, *Spirobrachiophora*, corresponds with the Brachiopoda.

M. de Blainville, who in 1814 had published his first sketch of a methodical arrangement of the *Malacozoa*, as he designates the animals on which we are treating, still further developed that method in 1817 in his 'Prodromus' of a general classification of the animal kingdom. The organ upon which that arrangement is based is the organ of respiration, and it was finally perfected in the method which appeared in his 'Manuel de Malacogie,' (1825). We here give an outline of it.

Type.

MALACOZOA.

Class I. Cephalophora.

Order 1.

Cryptodibranchiata.

Family 1. Octocera, containing the genus Octopus, which includes Eledone (Leach) and Ocythoë (Rafinesque).

Family 2. Decacera, including the genus Loligo (Sepiola and Cranchia, Leach. Onychoteuthis, Lichtenst., the Sagittated Calamaries, Pteroteuthis, Sepioteuthis) and the genera Sepia. Beloptera.

Order 2.

Cellulacea.

Family 1. Spherulacea, consisting of the genus Miliola (including Pollontes of De Montfort), Melonia (including Borelis of De Montfort), Saracenaria, and Textularia.

Family 2. Planulacea, comprising Renulina, including Frondicularia of Defrance; and Peneroplis, including Planularia of Defrance.

Family 3. Nummulacea, containing Nummulites, including Lycophris of De Montf.; Helicites, including Rotalites and Egeon of De Mont.; Siderolites, including Tinoporus and Siderolithes of De Montf.; Orbiculina, including

Ilotes, Helenis, and Archaias of the same; Placentula, including Eponides and Florilus of the same; and Verticialis, including Themeon, Sporilus, and Andromedes of the same.

Order 3.

Polythalamacea.

Family 1. Orthocerata. *Genera* * (with simple chambers or partitions), Belemnites, including Callirhöe, Hibolithes, Porodragus, Cetocis, Acamas, and Paclites of De Montf.; Conularia; Conilites, including Achelois, Amimonus, and Thalamus of the same; Orthoceras, including Nodosaria (Lam.), Reophax, and Molossus of De Montf. ** (with sinuous chambers), Baculites, including Tiranites of the same.

Family 2. Lituacea. *Genera* * (with simple chambers), Ichthyosarcolithes; Lituola; Spirula, including Hortolus and Lituites of De Montf., and Spirolina of Lam. ** (with sinuous chambers), Hamites and Ammonoceratita.

Family 3. Cristacea. *Genera*, Crepidulina, including Astacolus, Cancris, and Periples of De Montf.; Oreas; and Linthuris.

Family 4. Ammonacea. *Genera*, Discorbites; Scaphites; Ammonites; and Simplegas, including Ammonites, Planulites, and Amaltheus of De Montf.

Family 5. Nautilacea. *Genera*, Orbulites, including Aganides and Pelagus of De Montf.; Nautilus, including Angulithes, Oceanus, and Bisiphytes of the same; Polystomella, including Geophonus, Pelorus, Elphidium, Phonemus, Chrysolus, and Melonis of the same; Lenticulina, including Patrocles, Nonion, Macrodites, Robulus, Lampas, Pharamum, Antenor, Clisiphontes, Rhinocurus, Herion, and Spincterules of the same.

Family 6. Turbinacea. *Genera*, Cibicides; Rotalites, including Storilus, Cidarollus, and Cortalus of De Montf.

Family 7. Turriculacea. *Genus*, Turrilites.

Class II.

Paracephalophora.

Subclass I.

Paracephalophora Dioica (Aquatic, but capable of living for some time out of water).

§ 1.

Organs of respiration, and shell non-symmetrical, and almost constantly turned spirally from left to right.

Order 1.

Siphonobranchiata.

Family 1. Siphonostomata (Murex, Linn.). *Genera* * (no persistent bourrelet on the right lip), Pleurotoma, including Clavatula, Lam.; Rostellaria, including Hippochrenes of De Montf.; Fusus, including Latirus of De Montf.; Pyrula, including Fulgur of De Montf., and Melongena and Rapana of Schum.; Fasciolaria; Turbinella, including Polygonum of Schum.; Triton, including Lotorium, Aquillus, and Persona of De Montf., and Struthiolaria of Lam.; Ranella, including Buffo and Apollon of De Montf.; Murex, including Brontes, Chicoreus, Typhis, and Phos of the same.

Family 2. Entomostomata (Buccinum, Linn.). *Genera* * (Turriculated Entomostomes), Cerithium, including Vertagus of Schum.; Triphora or Tristoma of Deshayes; Nériné of Defrance, Potamides of Brongniart, Pyrazus of De Montf., and Pirena of Lam.; Melanopsis; Planaxis; Subula. ** (Turbinaceous Entomostomes, or those whose spire is moderately elongated and rarely subturriculated), Terebra; Eburna; Buccinum, including Alectrion and Cyclops of De Montf., and Nassa of Lam. *** (Ampullaceous Entomostomes, or those whose shell is in general globulose), Harpa; Dolium, including Perdix of De Montf.; Cassidaria, including Oniscia of Sowerby; Cassis; Ricinula, including Sistrum of De Montf.; Cancellaria; Purpura, including Monoceros of De Montf. **** (Patteloïd Entomostomes, or those whose shell is in its totality very wide, very flat, with a spire but little marked, and no columella), Concholepas.

Family 3. Angyostomata. *Genera* * (an operculum), Strombus, including Pteroceras of Lam.; Conus, including Rhombus, Cylinder, Rollus, and Hermes of De Montf. ** (no operculum), Terebellum, including Seraphs of De Montf.; Oliva; Ancillaria; Mitra,[†] including Turris of De Montf.; Imbricaria of Schum., and Concœlix of Swainson; Voluta, including Turbinellus of Oken and Cymbium of De Montf.; Marginella, including Volvaria of Lam.; Peribolus;[†] Cypræa; Ovula, including Calpurnus, Ultimus, and Radius of De Montf.

Order 2.

Asiphonobranchiata.

Family 1. Goniostomata (Trochus, Linn.). *Genera*, Solarium, including Maclurites of Lesueur and Euomphalus of Sowerby; Trochus, including Infundibulum, Phorus, Calcar, Tectus, Telescopium and Cantharidus of De Montf., and Rotella of Lam.

Family 2. Cricostomata (Turbo, Linn.). *Genera*, Turbo, including Clanculus and Meleagris of De Montf.; Labio of Oken, Monodonta of Lam., and Littorina of De Férussac; Pleurotomarium; Delphinula, including Trigonostoma; Turritella; Proto; Scalaria, including Aciona of Leach; Vermetus; Siliquaria; Magilus; Valvata; Cyclostoma, including Cyclophorus of De Montf.; and Paludina.

Family 3. Ellipsostomata. *Genera*, Melania; Rissoa, including Alvania of Risso; Phasianella; Ampullaria, including Lanistes of De Montf.; Helicina, including Ampullina and Olygira of Say; Pleurocerus, including Oxytrème of Rafinesque.

Family 4. Hemicyclostoma (Nerita, Linn.). *Genera*, Natica, including Polinices of De Montf.; Nerita. * (right lip dentated, Nerita, Lam.), Peloronta of Oken and Clithon of De Montf. ** (right lip not toothed), Neritina, Lam.; Velates, De Montf.; Pileolus, Sow.; Septaria.

Family 5. Oxystoma. *Genus*, Janthina.

Subclass II.

Paracephalophora Monoica.

§ 1.

Organs of respiration, and shell, where it exists, non-symmetrical.

Order 1.

Pulmobranchiata.

Family 1. Limnacea. *Genera*, Limnæa, including Radix of De Montf. and Omphiscola of Rafinesque; Physa; Planorbis.

Family 2. Auriculacea (Voluta, pars, Linn.). *Genera*, Pedipes, including Tornatella[‡] and Conovulus, Lam.; Auricula, including Scarabus of De Montf., Carychium of Müll., and Phytia of Gray; Pyramidella.[§]

Family 3. Limacinea (Helix, Linn., terrestrial). * (anterior border of the mantle elevated into a roll (bourrelet) and not a buckler; a shell). *Genera*, Succinea, including Amphibulimus, Lam.; Bulimus, including Bulimulus, Leach; Achatina, including Liguus and Polyphemus of De Montf.; Clausilia; Pupa, including Chondrus of Cuvier, Gibbus of De Montf., Vertigo of Müll., and Partula of De Féruss.; Tomogeres (Anostoma, Lam.); Helix * (circumference of the shell constantly carinated or subcarinated at all ages, Carocolla, Lam.), including Iberus, Caracolus, Acavus, and Zonites of De Montf., and Helicella of Lam. ** (anterior border of the mantle enlarged into a kind of buckler; shell null or nearly membranous), Helicolimax, including Helicarion of De Féruss.; Testacella; Parmacella; Limacella; Limax, including Arion of De Féruss.; Philomique and Eumèle of Rafin.; Onchidium, including Veronicella of De Blainv.

Order 2.

Chismobranchiata.

Coriocella; Sigaretus; Cryptostoma; Oxinöe; Stomatella;[‖] and Velutina.

Order 3.

Monopleurobranchiata.

Family 1. Subaplysiacea. *Genera*, Berthella; Pleurobranchus;[††] and Pleurobranchidium.

Family 2. Aplysiacea. *Genera*, Aplysia, including Acteon of Oken; Dolabella; Bursatella; Notarchus; and Elysia.

[†] Mr. Gray assured M. de Blainville that there was a small, horny operculum in this genus.

[†] Probably only the young of Cypræa, notwithstanding Adanson's observation, that he had seen both young and old ones. He, no doubt, saw them in various stages of growth, during which the young of Cypræa put on very different aspects. His figures represent the young of a Cypræa.

[‡] M. de Blainville, in his last corrections, says that the true Tornatellæ should be separated from Pedipes, because the type of the latter genus is operculated, as Mr. Gray pointed out to him.

[§] Operculated, according to Mr. Gray.

[‖] Should be united, the orbicular species at least, with Cryptostoma, Quoy and Gaimard. De Blainville.

[††] M. de Blainville thinks that Westernia and Gervisia of Quoy and Gaimard belong to this genus.

Family 3. Patelloïdea. *Genera*, Umbrella (Acardo of Megerle); Siphonaria; and Tylodina.

Family 4. Akera. *Genera*, Bulla, including Aplustre of Schum. and Atys and Scaphander of De Montf.; Bellerophus; Bullæa; Lobaria; Sormetus; Gasteroptera; and Atlas.

§ 2.

Order 1.

Aporobranchiata.

Family 1. Thecosomata. *Genera*, Hyalæa; Cleodora, including Vaginella of Daudin and Styliola of Lesueur; Cymbulia, including Argivora of Lesueur; and Pyrgo.

Family 2. Gymnosomata. *Genera*, Clio, including Cliodites, Quoy, and Gaim.; and Pneumoderma.

Family 3. Psilosomata. *Genus*, Phylliröe

Order 2.

Polybranchiata.

Family 1. Tetracerata. *Genera*, Glaucus; Laniogerus; Tergipes; Cavolina; Eolida; Dermatobranchus; and Placobranchus.

Family 2. Dicerata. *Genera*, Scyllæa; Tritonia; and Tethys.

Order 3.

Cyclobranchiata.

Genera, Doris, including Polycera of Cuv.; Onchidoris; and Peronia.

Order 4.

Inferobranchiata.

Genera, Phyllidia and Linguella.

Order 5.

Nucleobranchiata.

Family 1. Nectopoda. *Genera*, Pterotrachea, including Firola, Firolöides and Sagitella of Lesueur; and Carinaria.

Family 2. Pteropoda. *Genera*, Atlanta, Spiratella, and Argonauta.

Subclass III.

Paracephalophora Hermaphrodita (Patella, Linn.).

§ 1.

Organs of respiration and shell symmetrical.

Order 1.

Cirrhobranchiata.

Genus, Dentalium, including Entale of Defr.

Order 2.

Cervicobranchiata.

Family 1. Retifera. *Genus* Patella, including Helcion of De Montf.

Family 2. Branchifera. *Genera* Fissurella; Emarginula, including Rimula of Defrance; and Parmophorus.

§ 2.

Organs of respiration and shell non-symmetrical.

Order 3.

Scutibranchiata.

Family 1. Otidea. *Genera*, Haliotis, including Padollus of De Montf., and Stomatia of Lam.; and Ancylus.

Family 2. Calyptracea. *Genera*, Crepidula; Calyptræa; Capulus; Hipponyx; and Notrema.

Class III.

Acephalophora.

Order 1.

Palliobranchiata.

§ 1.

Shell symmetrical.

Genera, Lingula, Terebratula, including Pentamerus, Spirifer, and Productus, Sow., Strygocephalus, Defr., and Magas; Thecidea; Strophomena; Pachytes; Dianchora; and Podopsis.

§ 2.

Shell non-symmetrical, irregular, constantly adherent. *Genera*, Orbicula, including Discina, Lam.; and Crania.

Order 2.

Rudista.

Genera, Spherulites; Hippurites; Radiolites; Birostrites; including Iodamia of Defr.; and Calceola.

Order 3.

Lamellibranchiata.

Family 1. Ostracea. *Genera*, Anomia; Placuna; Harpax; Ostrea; and Gryphæa.

Family 2. Subostracea (Ostrea, Linn.). *Genera*, Ostrea; Spondylus; Plicatula; Hinnites; Pecten, including Amusium and Pandora of Megerle, and Neithea of Drouet, Pedum; and Lima.

Family 3. Margaritacea. *Genera*, Vulsella; Malleus; Perna; Crenatula; Inoceramus; Catillus; Pulvinites; Gervillia; and Avicula, including Margaritiphora of Megerle Margarita, Leach, Meleagrina, Lam.

Family 4. Mytilacea. *Genera*, Mytilus, including Modiola and Lithodomus (Lithophaga of Megerle); Pinna.

Family 5. Polyodonta, or Arcacea (Arca, Linn.). *Genera* Arca, including Trisis of Oken, and Cucullæa of Lam.; Pectunculus; and Nucula.

Family 6. Submytilacea. * (species with an epidermis and nacreous; freshwater). *Genera*, Anodonta, including Berpolis, Leach, Iridina, Lam., Dipsas of Leach, Alasmodonta of Say, and Cristaria of Schum.; Unio, including Hyria and Castalia of Lam. * * (species without an evident epidermis, not nacreous, and more or less pectinated; marine). Cardita, including Venericardia and Cypricardia of Lam.

Family 7. Chamacea. * (shell irregular). *Genera* Chama, including Chamostrea of De Roissy; Diceras, Etheria.[†] * * (shell regular). Tridacna, including Hippopus; Isocardia; Trigonia, including Opis of *Defr.*

Family 8. Conchacea. § 1. Regular *Conchacea* with lateral distant teeth. *Genera*, Cardium, *including* Hemicardium; Donax, including Capsa, Lam.; Tellina, *including* Tellinides, Lam.; Lucina, including Loripes of Poli, Amphidesma of Lam., Fimbria of Megerle, Corbis of Cuv.; Cyclas, including Cornea, Corbicula, and Pisum of Megerle, Cyrena and Galathæa of Lam.; Cyprina; Mactra; and Erycina. § 2. Regular Conchacea without lateral distant teeth. Crassatella; Venus, including Arthemis of Poli Venus, Cytheræa, and Crassina of Lam. (Astarte of Sowerby, Nicania, Leach), Triquetra of De Blainv., and Macoma of Leach. § 3. Irregular Conchacea; Venerupis, including Rupellaria of Fl. de Bell., and Petricola of Lam.; Coralliophaga; Clotho; and Ungulina.

Family 9. Pyloridea. § 1. Ligament internal. *Genera*, * Corbula; Sphæna; Osteodesma, including Rupicola of Fl. de Bell.; Thracia; Hemicyclostoma; and Anatina * * Mya, including Erodona of Daudin; Lutricola, including Ligula of Leach, and Lutraria of Lam. § 2. Ligament external and convex. Psammocola, including Psammobia and Psammotea of Lam.; Soletellina; Sanguinolaria; Solecurtus; Solen; Solemya; Glycimera, including Myoconcha ?; Panopæa; Saxicava; Byssomya; Rhomboides; Hiatella, including Biapholius of Leach; Gastrochæna; Clavagella; and Aspergillum.

Family 10. Adesmacea. *Genera*, Pholas, including Martesia of Leach; Teredina; Teredo; Fistulana; and Septaria.

Order 4.

Heterobranchiata.

Family 1. Ascidiacea (Ascidia, Linn.). Tribe 1. *Simple* Ascidians. *Genera*, Ascidia; Bipapillaria; Fodia. Tribe 2. Aggregated Ascidians, Pyura; Distoma, including Sigellina of Savign.; Botryllus, including Diazoma and Polyclina of Savign., and Polycyclus and Botryllus of Lam.; Synoicum, including Enocœlium, Didermum, and Aplidium of Savign., and Pulmonella of Lam.

Family 2. Salpacea. Tribe 1. Simple Salpians. *Genera*, Salpa, including the genera Monophore and Timorienne of Quoy and Gaimard. Tribe 2. Aggregated Salpians, Pyrosoma.

Sub-type.

MALENTOZOARIA.

Class I.

Nematopoda.

Family 1. Lepadicea. *Genera*, Lepas; Gymnolepas, including Otion and Cineras of Leach; Pentalepas, including Pentalasmis and Pollicipes of Leach; Polylepas, including Scalpellum of Leach; and Litholepas.

[†] M de Blainville, in his corrections, allows that Etheria will come better under the Submytilacea, according to the opinion of Mr. Sowerby.

Family 2. Balanidea. (Balanus, Brug.). * (operculum articulated, and more or less vertical). *Genera*, Balanus, including Acasta of Leach; Ochthosia; Conia, including Asemus of Ranzani; Creusia, including Pyrgoma of Savign.; and Chthalamus. * * (operculum not articulated, and more or less horizontal). Coronula, including Chelonobia of Leach, Cetopira and Diadema of Ranzani, and Tubicinella of Lam.

Class II.

Polyplaxiphora. (Chiton, Linn.)

Genera, Chiton, including Chitonellus of Lam., and Chitonellus of De Blainv.

Our limits will not allow us to do more than refer to the systems of Schumacher, Latreille, and Rang, though they will, the latter especially, which is in many respects a happy combination of the systems of Cuvier, Lamarck, and De Blainville, with some alterations, well repay the student for their perusal.

The organization of the animals above treated of will be found under the titles Cephalopoda, Conchifera, Gasteropoda, and other articles relating to them in this work.

MALACONO'TUS. [Shrikes.]

MALACOPTERY'GII, according to Cuvier, the second great division, or order, of osseous Fishes, the species of which are distinguished by all the rays of the fins being soft and cartilaginous; exhibiting minute articulations and often divided into small fibres at their extremities. It frequently happens however that the anterior ray of the dorsal or of the pectoral fins is hard and bony, a character observable in nearly all the species of the Siluridæ and in many belonging to other families.

The greater portion of the fishes of this order have the scales formed of simple laminæ and with smooth margins; in this respect differing from the species of the *Percidæ*, *Sciænidæ*, &c., in which the edges of the scales are pectinated or serrated. The *Pleuronectidæ*, or Flat-fishes, however, present the latter structure of scale; and yet, according to Cuvier, are placed in the Malacopterygii. M. Agassiz on this account removes this group to another section, and he also arranges the *Siluridæ* in another group, owing to the structure of their scales. [Siluridæ.]

The *Malacopterygii* are divided into three sections. First, the *Abdominales*, in which the ventral fins are situated in the abdomen, far behind the pectorals. In the second section (*Subbrachiales*) the ventral fins are situated immediately beneath the pectorals, and the pelvis is suspended to the bones of the shoulder. In the third section (*Apodes*) the ventrals are wanting.

The section *Abdominales* contains the following families. 1. *Cyprinidæ*, or fishes allied to the Carp; such as Barbel, Gudgeon, Tench, Bream, Roach, &c. 2. *Esocidæ*, of which the common Pike may be regarded as the type. 3. *Siluridæ*, a family of which there are no representatives in this country, at least not well authenticated. 4. *Salmonidæ*, or fishes of the Salmon tribe. 5. *Clupeidæ*, of which we have familiar examples in the Herring, Sprat, White-bait, Pilchard, Shad, &c.

The section *Subbrachiales* contains the families *Gadidæ* (Cod-fish, Haddock, Whiting, Ling, &c.); the *Pleuronectidæ*, or Flat-fishes, such as the Flounder, Halibut, Sole, &c.; the *Discoboli*, of which family the common Lump-fish will furnish an example; and finally the *Echeneididæ*, containing the species of Remora.

The third section, *Apodes*, contains the Eels, Lance-fishes, &c.

MALACORHYNCHUS. [Ducks, vol. ix., p. 179.]

MALACO'STRACA (Μαλακόστρακα), a term employed by Aristotle to designate the *Crustacea* generally, but confined by Dr. Leach in his arrangement to the second order of the class.

The *Malacostraca* of Leach are divided into three tribes.

1. *Brachyuri*, including the families Canceridæ and Oxyrhynchidæ.

2. *Macrouri*, including the families Paguridæ, Palinuridæ, Astacidæ, and Squillidæ.

3. *Gasteruri*, including the families Gnathidæ, Gammaridæ, Corophiidæ, Caprellidæ, and Apseudiidæ.

MALACO'TA, Schumacher's name for a genus of Cirripeds, *Otion* of Leach.

MALACOZO'A, or MALACOZO'ARIA. [Malacology, p. 322.]

MA'LAGA (the Μάλακα of Strabo, 156, *Casaub.*), the principal seaport of the province of Granada in Spain, is situated in 36° 45′ N. lat. and 4° 30′ W. long., in the bight of a bay on the coast of the Mediterranean. Inland from the city extends a spacious and fertile plain, called La Hoya, bounded by ranges of lofty mountains. The Guadalmedina, a mere brook in summer, but in winter a stream of considerable volume, enters the sea immediately to the west of the city.

Malaga is of great antiquity, and claims to have been founded eight or nine centuries B.C. by the Phœnicians, who gave it the name of 'Malcha,' or 'royal,' to intimate the estimation in which they held it. But of this high antiquity there is no evidence. W. Humboldt (*Prüfung der Untersuchungen über die Urbewohner Hispaniens*, &c. says that Malaca is a pure Basque word, and signifies the 'side of a mountain.' It was possessed successively by the Carthaginians; by the Romans, who called it 'Malaca,' and made it a municipium and confederate city; by the Goths, and by the Arabs. For the first three centuries of the Moslem domination in Spain, Malaga was subject to the caliphs of Cordoba; but on the disruption of that caliphat it fell into the hands of one petty sovereign after another, till it was annexed, early in the thirteenth century, to the kingdom of Granada. In 1487 Ferdinand and Isabella wrested it from the Moors, after an obstinate siege of three months, during which the citizens endured the severest horrors of famine.

From the earliest ages, under all the nations who have possessed it, Malaga has been renowned for its commerce. At the present day it is the only flourishing city in the province of Andalusia. Its imports are broad-cloths, cottons, laces, spices, hardware, and cutlery. Its exports are much more considerable, and amount on the yearly average to more than 4,000,000 dollars, or about 1,000,000*l.* sterling. They consist principally of wine and fruits; the former, which was once well known in England as 'mountain,' is now almost wholly consumed by the United States and Spanish America; the latter are chiefly fresh grapes and raisins, vast quantities of which reach the English market, together with some figs, almonds, oranges, and lemons. The other exports are brandy, oil, saffron, vermicelli, barilla, and soap, which is the only manufacture of Malaga worthy of mention.

Malaga at present contains about 62,000 inhabitants, but it was much more populous in the time of the Moors. Though the streets are narrow, tortuous, wretchedly paved, and not very clean, the city has a gay and cheerful aspect, as the exteriors of the houses are whitewashed or stained a yellow-ochre colour. Many of the roofs are flat, as in the East, and are surmounted by miradores, or square towers with open galleries, where the citizens enjoy the cool sea-breezes. The city is divided into six parishes, and has several colleges and public hospitals, an iron-foundry of very recent erection, and a tobacco-factory where 700 persons are daily employed in making cigars. There were also twenty-four convents, but these were suppressed in 1835. Malaga is an episcopal see, and possesses a cathedral, a light and handsome building in the Greco-Gothic style; it is nearly 400 feet long, 180 broad, 125 in height from the pavement to the roof, and is surmounted by a steeple 270 feet high. It contains few pictures of merit, but has some good specimens of the coloured wooden statuary in which the Spaniards excel. The alameda, or public promenade, is adorned with fountains and flowering shrubs, and flanked by private mansions of great splendour. The harbour of Malaga is spacious enough to accommodate a large fleet; it is protected on the east by a massy stone mole, five furlongs in length, terminated by a handsome lighthouse. Few remains of Roman architecture now exist in Malaga; those of Moorish buildings are numerous, and are interspersed through the city in gateways, towers, walls, houses, and fragments of mosques. But the grand boast of Malaga is the Moorish castle, built in 1279, and covering the slope of a hill immediately to the east of the city. It is of great extent, and is divided into the lower castle, or alcazaba, and the upper, or gibralfaro, so called by the Moors from a Roman pharos which is said to have stood on the crest of the hill. The whole displays in its ruinous condition the effects of the Christian artillery in the siege of 1487.

Malaga enjoys a serene and delightful climate, with a peculiarly dry and unclouded atmosphere. Provisions are

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abundant and cheap. The citizens are gay, courteous, and hospitable; and the females are renowned throughout Spain for their grace and beauty, sprightliness and humour. The lower orders of Malagueños are indolent, thievish, revengeful, and prone to commit assassination. Malaga gave birth in the twelfth century to Ibn Beithar, the naturalist, the Pliny of the Arabians.

(Ponz, *Viage de España*; Cruz, *Viage de España*; Laborde, *Itinéraire Descriptif de l'Espagne*; Carter's *Journey from Gibraltar to Malaga*; Townsend's *Spain*; Conde's *Aledris* and *Historia de los Arabes en España*. This account of Malaga is principally from personal observation.)

MALAGRIDA. [JESUITS.]

MA'LALA, JOHN (called also Malela, or Malalas, or Malelas), was the author of a chronicle in the Greek language, in 18 books, which extends from the creation of the world to the reign of Justinian. The time in which he lived is uncertain. He must have been alive after the reign of Justinian, since he mentions the number of years which that emperor reigned. Hody, in his Prolegomena to the Oxford edition of this writer, endeavours to show that he lived in the ninth century; but this opinion has been controverted by Jortin, Gibbon, Reiske, and L. Dindorf, who maintain that he lived shortly after the reign of Justinian.

Malala is a Syriac word, signifying 'orator,' or 'rhetorician.' He is also called John of Antioch; but he must not be confounded with the John of Antioch who also wrote a chronicle, extracts from which have been preserved in a work of Constantine Porphyrogennetus, 'On Virtues and Vices.'

The chronicle of Malala was printed for the first time at Oxford, 1691, under the superintendence of Chilmead, who died however before the work was published. Hody prefixed a dissertation to that edition on the life and writings of Malala; and Bentley an appendix, in the form of a letter to Mill, in which he corrected numerous passages. Bentley's letter to Mill was reprinted at the end of Bentley's 'Emendationes in Menandri et Philemonis Reliquias,' Camb., 1713. The chronicle was also published at Venice in 1733; but the best edition is by L. Dindorf (Bonn, 1831), which contains the notes of Chilmead and Hody, as well as Bentley's letter to Mill.

(Hody's *Prolegomena*; Dindorf's *Preface*.)

MÄLARN, LAKE OF. [SWEDEN.]

MALATIA (or more correctly Malatiyah), a town of Asia Minor, about 38° 25′ N. lat. and 38° 20′ E. long., is built in a fine plain, about 15 miles from the banks of the Euphrates. About six miles south-west of it is the town of Aspúzi, to which the inhabitants of Malatiyah retire for the seven summer months, returning for the five winter months to Malatiyah. These towns, which may be considered as one, contained in 1836, 3923 families, 2800 of which were Turkish and 1123 Armenian. The town was formerly more populous, but plague, cholera, and the depredations of the Kurds have greatly reduced it. Aspúzi is situated on the side of a mountain in a forest of fruit-trees. Malatiyah is in a plain, which at present is nearly reduced to an uncultivated state. The antient walls are in ruins, and in most parts have fallen down; the houses have a mean appearance, and the shops in the bazar are mere mud-stalls. There are two well built mosques and two caravanserais, all in the Persian style of architecture. Malatiyah derives its present importance only from its being situated on the great caravan-road which leads from Sivas to Diar-bekr and Mozul, and from being one of the places to which the Kurds resort for the purpose of trade. (Brant, in the *London Geographical Journal*, vol. vi.)

MALAY PENINSULA constitutes the most southern extremity of the continent of Asia, extending between the Gulf of Bengal and the Straits of Malacca on the west, and the Gulf of Siam and the Chinese Sea on the east. It is united to the continent at its northern extremity. Its most southern points form the northern shores of the Straits of Singapore. Kwi Point, in the Gulf of Siam, and the mouth of the Tanasserim river, which enters the Gulf of Bengal, may be considered as constituting its northern boundary; they are situated near 12° N. lat. Cape Burus, the most southern promontory of Asia, in 1° 15′ N. lat., and Cape Romania, in 1° 17′, constitute the two extremities of the Straits of Singapore. The peninsula lies between 98° and 104° E. long. It is 750 miles long, with a width varying between 60 and 180 miles. Its surface may cover an area of about 80,000 square miles, or about 4000 square miles less than that of Great Britain.

The peninsula is traversed by a mountain-range, which is a continuation of the Samroiyet (*i.e.* three hundred peaks) mountains, which between 12° and 14° N. lat. separate the valley of the Tanasserim river from the streams which fall into the Gulf of Siam. This chain, which in this part rises in numerous peaks to the elevation of 3000 feet, sinks lower south of Kwi Point, where it traverses the isthmus of Krah, the narrowest part of the peninsula, between 8° and 12° N. lat. It appears that the mountain-range on this long isthmus, though of moderate elevation, occupies together with its offsets the whole country from one sea to the other, except at its southern extremity, where an extensive tract of alluvial land, enclosing the bay of Chai-ya, occurs on the shores of the Gulf of Siam.

The isthmus of Krah lies due north and south. At its southern extremity, between 8° and 9° N. lat., the Malay Peninsula turns to the south-east, and preserves this direction to its most southern point. Between 6° 30′ and 8° N. lat. the mountains seem to be higher than on the isthmus, but this fact is not established, as no European has ever traversed this country. The tract between 5° and 6° 30′ N. lat. appears to be the highest part of the mountain-range, the peak of Titch Bangsa, opposite the town of Queda, rising, according to Crawfurd, to 6000 feet. The mountains in this part occupy the greatest part of the country, leaving only a low level tract, about seven or eight miles in width, along the Gulf of Bengal, which is swampy and mostly covered with jungle, but when cultivated yields rich crops of rice. On the eastern coast the level tracts are probably more extensive, but the offsets of the mountains in some parts approach near the sea-shore, as Cape Patani and Rocky Point.

South of 5° N. lat. is the widest part of the peninsula, which is about 180 miles in breadth. The interior or mountain-region of this part is little known, but it *is certain* that it is less elevated than the country farther *north*, and the summits of the hills are more rounded. *The level tract* along the Straits of Malacca widens considerably, *being* about 18 miles in breadth north of 4° lat., and more *than* 20 miles in breadth south of that parallel; but along the sea-shore a few isolated hills rise to a moderate height, as Rachado Point and others. The range forming the watershed between the rivers which fall into the Straits of Malacca and the Chinese Sea does not occupy the centre of the peninsula, but is nearer the western than the eastern shores. The level country along the Chinese Sea is also, so far as is known, much more extensive south of the town of Pahang, and contains a lake, that of Braugh, 30 miles in circumference. On the eastern boundary of the district of Malacca is an elevated summit, the Gunong Leadang of the natives, and Mount Ophir of the Portuguese, whose summit is estimated to be 4000 feet high. It is 24 miles from the Straits. Proceeding farther south the mountains subside into hills; but even along the Old Straits, which divide the island of Singapore from the continent, the country presents a rocky and elevated shore, and its surface is strongly undulating, though it can hardly be called hilly. Towards this extremity the level country along the Straits of Malacca and the Chinese Sea is of inconsiderable width.

The comparatively small width of this peninsula and the disposition of the mountain-range prevent the formation of considerable rivers. The largest which are known are the Muar river, which forms the southern boundary of the district of Malacca and falls into the strait of that name, and the Pahang river, which runs nearly north on the eastern side of the peninsula. Both rivers are navigable before they issue from the mountains, and are separated by a portage of not more than 300 yards. The Pahang river flows 200 miles under the name of Suruting, and falls into the lake of Braugh, from which it issues under the name of the Braugh river, but soon takes that of Pahang river. At its mouth, near Pahang, are four large islands, planted with cocoa-nut and palm trees. It is probable that there are other rivers, navigable at least for a considerable extent, but they are not known. The number of small rivers is very great, and there probably is no country better watered than this peninsula.

The climate differs on the eastern and western sides of the peninsula. The eastern resembles the coast of Coromandel and of Cochin China Proper, as the mountain-range interrupts the clouds brought by the south-west monsoon, during which period the dry season prevails. But the country is exposed to the full effects of the north-east monsoon and the wet season commences in the beginning of November and continues till March. The northern part of the western coast is exposed to the south-west monsoon, and in climate resembles Aracan, having its rainy season in our summer, and its dry season in our winter. The southern portion of the western coast differs in climate from all other countries in Southern Asia. It constitutes the eastern side of a large valley, running from north-west to south-east, in the centre of which the Straits of Malacca extend like a large river. On the north-east this valley is sheltered by the mountain-range which traverses the peninsula in its whole length, and on the south-west by that mountain-chain which extends along the south-western shores of the island of Sumatra. Thus this country, as well as the low eastern coast of Sumatra, is perfectly sheltered against both monsoons, the north-eastern and the south-western. In this country accordingly the regular succession of dry and wet seasons is unknown. Showers of rain fall in every month of the year, but more abundantly in our summer. They moderate the heat of the atmosphere, and maintain a vigorous vegetation. No gales are known to occur, and no winds except the sea and land breezes. The heat is not so insupportable as in other countries near the equator; and though during the day the sandy shores are heated to a great degree, the air is cooled sufficiently during the night. Though no meteorological observations on this country have been published, it is known that the range of the thermometer is comparatively very small; it seems to amount hardly to 10 or 12 degrees in the whole year.

The soil seems not to be distinguished by fertility, being in most places composed of a tough red clay, or of a black earth similar to peat; but in many places it yields rich crops of rice. Besides rice the inhabitants live on plantains and some other vegetables; also on fruits, in which this country, especially towards the south, surpasses all other countries. The cultivated fruits are chiefly pine-apples, mangosteens, durion, shaddocks, and oranges. As articles of commerce, pepper, cotton, and a little coffee are cultivated. The country is generally covered with high trees, even on part of the mountains, but the teak-tree does not occur. The variety of trees and plants is very great, but they have not been examined by botanists, except in a few places. Rattans are exported in great numbers.

Cattle are few in number, but buffaloes abound. No sheep are kept; hogs and fowls are plentiful. In the uncultivated tracts and woods tigers, leopards, and rhinoceroses are frequently met with, and sometimes elephants. Among the birds, that kind of swallow which makes the edible nests is the most remarkable. It occurs however chiefly on the islands which skirt the peninsula on the west, and perhaps also in some places on the western coast, where the rocks approach the sea-shore. Fish is extremely plentiful, and constitutes one of the most common articles of food.

The most important articles of commerce are from the mineral kingdom. Gold is found in all the rivers, and also got from mines. A sufficient quantity of this metal is collected to justify the name of Chersonesus Aurea, or the Golden Chersonese, which the antients gave to this country. Tin is still more abundant, and seems to occur in the whole range from the isthmus of Krah to the southern extremity, but not in the Samroiyet range, north of the isthmus. The quantity annually collected probably exceeds 40,000 peculs (1 pecul = 133⅓ pounds), and the greatest part goes to Pulo Penang, Malacca, and Singapore: part is exported from the harbours on the Gulf of Siam to China. Other metals are not noticed.

The bulk of the population consists of Siamese and of Malays. The former occupy the isthmus of Krah and the districts north of 6° 40′ N. lat., and the latter the remainder of the peninsula. The Malays of this country have not attained that degree of civilisation which is found among the inhabitants of Sumatra and Java. They show little industry in cultivating the ground, and still less in the mechanical arts. Their principal occupation is fishing. [MALAYS.] The language of these nations is different. In the interior there are two other nations: the Jakong, or Benua, inhabit some wooded plains towards the southern extremity of the peninsula; they are of a copper-colour, their hair is straight, and their features resemble those of the Malays. They have no fixed habitations, and live by the produce of the chace. Crawfurd thinks that they are Malays in the lowest state of civilisation, an opinion which is supported by their language, which contains but few words that cannot be traced in the Malay language. In the interior, between 6° and 8°, live the Samangs, who seem to belong to the race commonly called the Australian negroes, which is found from the Adaman Islands on the west, to Papua, or New Guinea, on the east, as well as on the continent of Australia. They resemble the African negroes in their features, and have woolly hair. In stature however they are much shorter, their average height, according to Light, in Marsden's 'History of Sumatra,' not exceeding 4 feet 8 inches. They have no fixed habitations, they live in the forests and mountains on the produce of the chase, and eat every kind of animal food, even reptiles. They are extremely timid, and have little intercourse with their neighbours. The whole of the Malay peninsula is thinly inhabited, and many extensive districts in the interior are unpeopled. The whole population perhaps does not exceed one million.

The northern part of the peninsula, as far south as the bay of Chai-ya, is immediately subject to the king of Siam. On that bay are two harbours, called Chai-ya and Bandon, and on the opposite western coast the harbour of Phunga, or Pongo, from which a commercial road traverses the peninsula to Chai-ya and Bandon. The produce of the island of Junk Seylon, or Salanga, and also European goods, are transported from Phunga across the isthmus to Bandon and Chai-ya, and thence shipped to Bangkok. From the island of Kos Sammi, or Pulo Carnam, the Chinese fetch cotton and edible nests; ten or fifteen junks arrive annually for that purpose.

That portion of the peninsula which lies between the bay of Chai-ya and Cajoe Patani is partly governed by Malay sovereigns, dependent on the king of Siam, and partly belongs immediately to Siam. The town of Ligar is said to have 5000 inhabitants, Malays, Chinese, and Siamese. A few Chinese junks arrive annually here for cotton, tin, pepper, and rattans. The same articles, and in addition to them sapan-wood, are exported from the towns of Talung and Sungara, which lie opposite the mountainous island of Tantalem. A road begins at Talung which crosses the peninsula to the small town of Trang, and is passable for elephants. Patani is the most southern of the small kingdoms subject to Siam. It is more fertile and productive than the other Malay states. Its capital was once much visited by vessels from Hindustan in their voyages to Siam, Cochinchina, and China, but at present it is rarely resorted to. It has some intercourse with Singapore; it exports much rice and salt, and a little tin.

The kingdoms of Calantan and Tringano on the eastern, and that of Queda on the western side of the peninsula are only nominally dependent on Siam, and their commercial produce, consisting of gold, tin, and pepper, is brought to Singapore. Tringano, situated at the mouth of the little river Tringano, seems to be a considerable place. From Queda a commercial road, passable for elephants, leads across the peninsula to Sungora; this road is much frequented. Another communication connects the mouth of the river Muda in Queda with the town of Patani. For a considerable distance the goods are conveyed in boats on the river, but still this road is not much frequented. The British colony of Pulo Penang, or Prince of Wales Island, is partly situated within the kingdom of Queda. [PENANG.] The town of Queda is a small place. Its commerce was formerly considerable, but has been nearly destroyed by the establishment on Prince of Wales Island. A few miles farther up is Alustar, a more populous place, and the favorite residence of the princes.

The southern extremity of the peninsula is divided between the kingdoms of Pahang and Johore on the eastern side, that of Rumbowe in the interior, and those of Salangore and Perak on the western coast, together with the British colony of Malacca. [MALACCA.] These kingdoms are independent, and under the protection of the British. None of the commercial places in these states are of importance; they send their produce, consisting of gold, tin, and pepper, to Malacca and Singapore. Perak contains the most productive tin mines in the peninsula, and in Salangore also some rich tin mines have been opened, not far from Cape Rachado. The islands lying in the Chinese Sea, as far as the Nantnas, are subject to Johore. Between the towns of Malacca and Pahang there is a communication, which is much favoured by the water-carriage on the river Suruting, a branch of the Pahang river, and also on the Pahang.

(Marsden's *History of Sumatra*; Crawfurd's *Embassy to Siam and Cochin China*; Finlayson's *Journal of a Mission* *to Siam and Hué*; and *Notices of the Indian Archipelago*, &c., collected by J. H. Moor, Singapore, 1837.)

MALAYS, THE, are a nation of Southern Asia, who occupy the shores of the Malay Peninsula, and, if language may be taken as a proof of the fact, seem to have spread over all the islands from Madagascar on the west to Easter Island on the east. Almost all the languages spoken in the islands of the Indian Archipelago and in the Pacific contain a great number of words and expressions which evidently are derived from the Malay language, and the physical character of the people confirms the inference drawn from this circumstance. The great body of this nation however inhabit the larger islands of the Indian Archipelago.

In person the Malays are short, squat, and robust. The medium height of the men may be five feet two inches, and that of the women four feet eleven inches, or about four inches less than the average stature of Europeans. Their lower limbs are rather large and heavy, but not ill-formed. Their arms are rather fleshy than muscular. The face is of a round form, the mouth is wide, and the teeth remarkably fine. The chin is rather of a square form; the angles of the lower jaw are very prominent. The cheekbones are high, and the cheek consequently rather hollow. The nose is short and small, never prominent, but never flat. The eyes are small, and always black. The complexion is generally brown, but varies a little in the different tribes: climate seems to have nothing to do with the colour. The fairest races are generally to the west, but some of them are on the equator. The hair is long, lank, harsh, and always black. Compared with Europeans and the nations of western Asia, the Malays must be considered an ill-looking people. In person and complexion they most resemble the inhabitants of Siam and Ava, but they differ considerably even from them, and are a very distinct people, with a striking likeness among themselves, and a marked dissimilarity from all other people.

Crawfurd, who has carefully examined the different languages of the Indian Archipelago, finds in them a great similarity in respect of pronunciation, grammatical structure, and idiom. Twenty consonants and five vowels are the greatest number which these languages generally admit, and only two diphthong sounds occur. The structure of these languages is very simple: the relations of nouns are marked by prepositions, the tenses of verbs by auxiliaries, the passive forms by the prefixing of particles, and the transitive forms by affixing particles. Many idiomatic phrases, though expressed by words differing in sound among different tribes, agree in the signification of the single words. These languages are rich in expressions for familiar objects, but poor in the expression of abstract ideas, particularly such as relate to the operations of the mind. For many moral ideas they have no expressions at all. Not less than five kinds of written character are known among the nations who inhabit the Indian Archipelago, the Arabic characters not included, which are in general use among the nations that speak the Malay language.

The Malays have made considerable progress in civilization; but more in the island of Java than on the other islands of the Indian Archipelago. They are well acquainted with agriculture and some of the mechanical arts. They have also made some progress in medicine and music. They are undoubtedly more civilized than any of the nations of southern Asia which inhabit the countries between China and Hindustan. The Malays have great mental activity, and eagerly apply themselves to commerce and navigation, but their navigation does not extend beyond the seas surrounding the Indian Archipelago. Being expert navigators in these seas, and being favoured by the great number of small inhabited islands, their daring spirit urges them to piracy. Various parts of the Indian Sea are thus made very dangerous for small vessels, but the Malay pirates rarely attack European ships. Most of the Malay tribes that inhabit the Indian Archipelago are Mohammedans, but they differ considerably from the Arabs in manners; their wives, for instance, are not secluded from society. They are very revengeful, and among the different ways of taking revenge is the extraordinary one of 'running a muck,' as it is called.

According to the traditional history of many of the Malay tribes, the country of Menangkabao, in the interior of Sumatra, is their original seat, and it is asserted that they first issued from it so late as 1160, and passed to the Malay Peninsula, where they built a town, called Singapura. Hence they are said to have spread over the lower parts of all the islands of the Archipelago. But when we consider how far the Malay tribes are scattered towards the east in the islands of the Pacific, this tradition seems very improbable. It may however refer to the introduction of the Mohammedan creed, as, according to Marsden, a Mohammedan is called in Sumatra a Malay, even when he belongs to one of the tribes which are not of Malay origin. In the larger islands the Malay population generally occupies only the lower tracts along the coast, and the original inhabitants have retired before them into the interior. On the smaller islands the original inhabitants have been extirpated by them.

(Marsden's *History of Sumatra*; and Crawfurd's *History of the Indian Archipelago*.)

MALCOLM I., king of Scots, was the son of King Donald IV., who died in the year 904. He succeeded to the throne when King Constantine III. abdicated, for the retirement of a monastery, in the year 944; and he appears to have reigned about ten years. The principal event of his reign was the cession of Cumbria by the English king to the king of Scots. In this it is said the English king resigned to Scotland what he found he could not easily retain, the border districts being, from the mixed character of the population, in a state of very frequent disturbance; and by the cession of these districts the English king hoped to secure the fealty and friendship of the king of Scots. Malcolm was slain by the men of Moray, in the north of Scotland, where he had marched to repress an insurrection in that quarter; but the precise time, place, or circumstance in which this event occurred, is not certain. He had two grandsons of the same name with himself; the one by his son King Duffus, the other by his other son King Kenneth III. The former was slain by his ambitious uncle Kenneth, and never mounted the throne.

MALCOLM II., king of Scots, was the son of King Kenneth III., and inheriting the ambitious spirit of his father, he set up a claim to the throne, in opposition to his cousin King Kenneth IV., and on the fall of the latter in a pitched battle between the partisans of the two princes, Malcolm succeeded in the year 1003. He reigned about thirty years, the greater part of which period was spent in warlike encounters with the Danes, who sought a settlement in the kingdom. It was in gratitude for a victory obtained over these pirates, that Malcolm founded and endowed a religious house at Mortlach, which afterwards became a bishopric, and at a still later period went to form, with other churches, the bishopric of Aberdeen; and on the same occasion he made many and various grants and oblations to the church and clergy. His piety was seemingly acknowledged and approved by the papal see. Malcolm is also said to have been a legislator, and there is a collection of laws which go by his name, but the authenticity of the *Leges Malcolmi* is disputed. Malcolm died in the year 1033; and there is still shown in the church-yard of Glammis, 'King Malcolm's grave-stone,' which is a rude mass, without any inscription, 16 feet high and 5 feet broad. He appears to have had no son, but only two daughters, both of whom were married. One of these was mother of King Duncan, who was killed near Elgin in 1039, by a stroke of 'treasonous malice.'

MALCOLM III., king of Scots, was the son of 'the gracious Duncan,' whose story has been immortalized in the pages of Shakspeare. On his father's death Malcolm fled into England; but after the fall of Macbeth, and that of his successor, he recovered his father's sceptre, and was declared king in the year 1057; and, as Chalmers reckons, in the thirty-third year of his own age. He is commonly known in history as *Malcolm Canmore*, or *Malcolm Great-head*, probably from the wisdom and prudence of his character. A contemporary bard gives him two epithets, the one implying that he had a handsome person, the other that he had a cheerful mind; and it appears that for a series of years his reign was undisturbed either by foreign or domestic enemies. The accession of William Rufus however proved the signal for hostilities between the two countries; and in an encounter with the English forces Malcolm was surprised by Earl Mowbray, and slain on the 30th of November, 1093, in about the seventieth year of his age.

MALCOLM IV., king of Scots, was the grandson of King David I., and on the death of that king, on the 24th of May, 1153, he succeeded to the throne, being then in the twelfth year of his age. The same year he was called on to repress the insurrection of Somerled, Lord of the Isles, a

Hebridean chief of such great influence, that when a peace with him was secured, the event was deemed of sufficient importance to form an epoch in the dating of Scottish charters. The standard of rebellion was afterwards raised in Galloway, and Malcolm was obliged to lead a great force against Fergus, the lord of that country, whom he at length subdued. Malcolm had also a struggle with the men of Moray, who affected independence; and in 1161 he compelled them to submit to his authority. The powerful Somerled also again rose, and prepared to make another attempt on the dominions of the Scottish king; but the latter by his vigour triumphed over all his adversaries. The period of his reign however was not of long duration; as he died of a lingering disease at Jedburgh, on the 9th of December, 1165, at the early age of twenty-four.

MALCOLM, SIR JOHN, G.C.B. and K.L.S., was born at Eskdale, in the county of Dumfries, in Scotland, in 1769. He was sent to India, when he was only thirteen, under the care of his maternal uncle Dr. Paisley, and was appointed a cadet on the Madras establishment. He returned to England in 1794, for the benefit of his health, but sailed again to India in the following year, and took an active part, as an inferior officer, in the war with the celebrated Tippoo. After the fall of Seringapatam he was appointed, jointly with Captain (afterwards Sir T.) Monro, secretary to the commissioners who were entrusted with the division of Mysore; and his prudence and abilities were already so highly estimated by the British government in India, that he was sent in the same year (1799) to Persia on affairs of the most important nature.

On his return from Persia, in 1801, he was appointed private secretary to the governor-general; but he was again sent to Persia in the following year, in consequence of the death of Hajed Kulleel Khan, the Persian ambassador, who was accidentally shot at Bombay. In February, 1803, he was nominated to the presidency of Mysore, and joined the army of General Wellesley in his campaign against the Mahrattas; but in 1805 he was recalled to Bengal, where he was occupied in the performance of the most active and responsible political duties, and particularly in concluding treaties of alliance with several of the Indian princes.

In consequence of the extensive projects of Bonaparte, who was said to be meditating an invasion of India, and who had entered into an alliance with Persia, Malcolm was again sent to Persia in 1807, but was unable to obtain any advantages in favour of the British government. On his return to India, in 1808, he proceeded to his government in Mysore; but owing to a change in the policy of the Persian court, he was again appointed minister plenipotentiary to Persia, where he arrived in 1809, and was received in the most flattering and distinguished manner. On his departure in 1810, in consequence of the nomination of Sir Gore Ouseley as his majesty's ambassador at the Persian court, the shah conferred upon him the order of the Sun and Lion, and appointed him a khan and sepahdar of the empire. Malcolm returned to England in 1812, and was knighted shortly after his arrival. In 1815 he published his 'History of Persia,' in 2 vols. 4to., which contained an account of the country from the earliest period to the time when the work was published. This work is extracted from native sources, and is the only account which we possess in the European languages of many portions of Persian history. D'Herbelot's narrative terminated with the reign of Shahrokh, in A.D. 1446. Malcolm's History is also valuable for the information it affords us respecting the religion, government, manners, and customs of the inhabitants of Persia in all periods of their history; and more particularly for his accurate account of the state of Persia in his own time, which he had obtained by personal observation and diligent inquiries in the country.

Malcolm returned to India in 1817, and was, immediately on his arrival, attached, as the governor-general's political agent, with the rank of brigadier-general, to the army under Sir T. Hislop, in the Deccan. He served under this general, as second in command, in his campaigns against the Mahrattas and Pindarries, and greatly distinguished himself in the decisive battle of Mehidpoor, in which Holkar was completely routed. Mr. Canning, then president of the Board of Control, after moving the thanks of parliament to Sir T. Hislop, added, 'and to Sir J. Malcolm, who was second in command on that occasion, but who is second to no one in valour and renown. The name of that gallant officer will be remembered in India as long as the British flag is hoisted in that country.'

After the conclusion of this war Sir J. Malcolm received the military and political command of Malwa and the adjoining provinces, where he remained four years. The central provinces of India were at that time almost in a state of anarchy; the plundering expeditions of the Mahrattas and Pindarries had reduced many fertile districts to complete deserts, and had thereby forced multitudes to adopt the same marauding mode of life; and the war, which had just been brought to a close, had thrown upon society thousands of soldiers who had been trained to every species of bloodshed and rapine. Too much praise cannot be attributed to the prudent and firm manner in which Sir J. Malcolm administered the government of these provinces: he was particularly successful in conciliating the affections of the natives, and reclaiming by mild and conciliatory means the remains of the Mahratta and Pindarry armies from their savage mode of life. When Bishop Heber visited this part of India, a few years afterwards, the inhabitants spoke of Sir J. Malcolm in the highest terms of admiration, and eagerly asked when they might expect his return. An interesting account of this part of India was published by Sir J. Malcolm in 1823, under the title of 'A Memoir of Central India, including Malwa and the adjoining Provinces; with the History and copious Illustrations of the past and present Condition of that Country.'

Sir J. Malcolm returned to England in 1821; and on his quitting Madras a general order was issued by the government, in which the following well-merited compliment to him occurs:—'His career has been unexampled; for no other servant of the Honourable Company has ever, during so long a period, been constantly employed in the conduct of such various and important military and political duties. His great talents were too well known to admit of their being confined to the range of service under his own presidency. The exercise of them under different situations has connected him with every presidency, and rendered him less the servant of any one of them than of the Indian empire at large.'

Sir J. Malcolm continued to remain in England till 1827, when he was appointed governor of Bombay; but he resigned this office at the end of three years, and again returned to England. He was elected, shortly afterwards, member of parliament for Launceston, and took an active part in the opposition to the Reform Bill. He died on the 31st of May, 1833, of an attack of paralysis. A monument has been erected to his memory in Westminster Abbey, and also an obelisk, 100 feet high, in his native town of Eskdale.

In addition to the works of Sir J. Malcolm, which have been mentioned above, he also wrote an account of the 'Political History of India,' from 1784 to 1823, in 2 vols. 8vo., 1826, and a 'Life of Lord Clive,' which was published after his death, in 1836.

(*Memoir of Sir John Malcolm,* in 'The United Service Journal,' 1833.)

MALDANIANS, or **MALDANIDÆ,** the second family of sedentary Annelids in Lamarck's system, including *Clymene* and *Dentalium,* which last is not an annelid, according to the latest and best authorities, but a mollusk. [DENTALIUM.] Savigny established the family.

MALDON, a corporate town of considerable antiquity, and a parliamentary borough, in the hundred of Dengie and county of Essex. The town, which is eight miles east from Chelmsford and thirty-four miles north-east from London, is on the right bank of the Chelmer, about a mile above its junction with the Blackwater river. It consists of two principal streets, at right angles to each other; and their cruciform figure has led some authors to suppose that the name of the town itself is derived from the Saxon *Mœldune,* signifying a crossed hill. The circumstance of the town not being now in a flourishing condition is said to be mainly owing to the construction of a canal, called the 'new navigation,' which commences at Collin's Reach, one of the channels into which the Blackwater river is divided by Northey Island; and after passing through the village of Heybridge, joins the Chelmer above Maldon, and is thence continued to Chelmsford, and thus the transit trade to this town has been in a great measure lost. The haven is convenient, and vessels of 200 tons come up to the town during spring-tides. The foreign trade, which in 1832 amounted to 3929 tons inwards and 2199 tons outwards, is declining; but the coasting trade, which in the same year amounted to 69,159 tons inwards and 44,111 tons outwards, appears to be on the increase. In 1823 the receipts of the custom-house were 17,010*l.*; in 1832 they had declined to 7032*l.* The chief part of the property of the corporation has been alienated. The town-council consists of four aldermen and twelve councillors. The charters are numerous, and date from the reign of Henry II. (7th of October, 1155). The parish church of All Saints is a very antient edifice, surmounted by a triangular tower of singular appearance. For a description of its interior, and of the other antiquities of Maldon, the reader is referred to the first volume of Morant's 'History of Essex,' folio, 1768, pp. 327-337. The livings are a vicarage and a curacy, producing a net income of 319*l.* and 165*l.* a year respectively; the latter is in the patronage of the dean and chapter of Westminster. The population of the borough, in 1831, was 3831. The grammar-school was founded by Alderman Breeder in 1608. It has been endowed by several benefactors with funds and landed property; and Dr. Plume, archdeacon of Rochester, and founder of the Plumian professorship of astronomy and experimental philosophy at Cambridge, bequeathed to its use his valuable library of books. The librarian receives a salary of 40*l.* a year. Dr. Plume also established a scholarship of 6*l.* per annum at Christ College, Cambridge, to which boys from the grammar-schools of Chelmsford, Brentwood, and Maldon are successively eligible. Maldon has returned two members to parliament since the reign of Edward III.

(Wright's *History of the County of Essex*, 4to., 1833; *Corporation Reports*, &c.)

MALE FERN, the rhizoma, incorrectly termed root, of the Nephrodium Filix Mas (Richard), Aspidium Filix Mas (Smith), has been celebrated from antient times as an anthelmintic. The rootstock of young plants should be collected in spring or summer, and a fresh supply obtained every year, as a change occurs in the part a few months after being collected. It should be quickly dried, and preserved in glass or earthenware vessels in a dry place. The interior should exhibit a greenish colour, and possess a disagreeable odour, with a bitter, harsh, astringent taste.

It consists of an oil, which may be extracted by sulphuric æther; resin, tannin, sugar, starch, and woody fibre. The oil, which is of two distinct kinds, one pure, and the other united with resin and an extractive, is the active principle. Formerly a powder of the whole substance was administered, but as the dose of this is bulky, Peschier has recommended pills of the æthereal extract, which are found to be very efficacious against that kind of tape-worm which is denominated the *Bothriocephalus latus*, or broad tape-worm. It is scarcely possessed of any power over the Tænia solium. The former infests the small intestines of the inhabitants of Poland, Russia, Switzerland, and some districts of France, in all which countries the male fern has a high reputation as a remedy; but it is not much valued as an anthelmintic in Britain, the broad tape-worm being nearly unknown in this island, though the Tænia solium abounds.

The common mode of administering it is to give a certain number of pills at night, and a like number in the morning, followed by some brisk cathartic, as the male fern only kills, but does not expel the worm. [ANTHELMINTICS.]

MALEBRANCHE, NICOLAS, one of the most illustrious disciples of Des Cartes, who both gave to his master's views a wider development and imparted to them clearness and vivacity, was born at Paris, 1638. Of a sickly and deformed habit of body, Malebranche passed his early youth in retirement and the close study of languages and biblical literature. His attention was first directed to the pursuit of philosophy by accidentally meeting with the work of Des Cartes 'De Homine.' The perusal of this work is said to have excited his susceptible disposition to such a degree that he was several times forced to lay it aside on account of the violent palpitation of his heart. Abandoning his previous literary pursuits, he devoted ten years to the examination of the Cartesian philosophy, and he acquired the reputation of surpassing all his contemporaries in a knowledge of its true spirit and tendency. As the result of his philosophical meditations, Malebranche published, in 1673, the first book of the 'Recherche de la Vérité,' which was quickly followed by the other five. This work thus complete was greatly altered in the several subsequent editions: the most correct and complete edition is that which appeared three years before the author's death, which took place at Paris, in 1715.

The philosophical writings of Malebranche are a model of a style at once elegant and perspicuous, in which neither the clearness of the thought is sacrificed to the graces of composition, nor the ornaments of language to simplicity. If the profound originality of his ideas gained Malebranche any admirers, the novelty and boldness of his assumptions exposed him to much opposition. Among the most famous of his opponents were Foucher, the Jesuit Du Fertre, and Arnaud, who, like Malebranche, was also a member of the Oratory, and at one time his friend and associate.

The object of the 'Recherche de la Vérité' is partly logical and partly metaphysical. On the one hand it investigates the sources of human error, which are reduced to three general heads—sensation, imagination, and the pure intellect (esprit pur). On the other, it attempts to establish some universal method for the investigation and discovery of truth. The source of error however lies not in any imperfection of the cognitive faculties, nor in any incomplete or wrong employment of them, but in the will, which forms its own opinion of the objects presented to it. When, for instance, we see a light or feel warmth, that which is in either case seen or felt is certainly light and warmth, and they are actually perceived, and so far error is impossible; but when, as the will is free to do, it is maintained that the light and warmth of which the subject is percipient exist in the object without, then error arises. Now as all sensuous perceptions are accompanied by pleasure or pain, which chiefly move the will, sensation is the principal source of error, and especially of those false systems of morality which make the highest good to consist in pleasure: for the senses present to the mind nothing but a delusive good, whereas the only true and real good—the *Deity*—is cognisable by the pure intellect alone.

But the most distinctive point in the system of Malebranche is the assumption by which he explained the possibility of knowledge. For as he followed Des Cartes in making extension to be the essence of matter, and thought of mind, it was necessary for him to account for the possibility of the interaction of two such distinct natures as thought and extension. The existence of ideas in the mind is, according to Malebranche, a fact not requiring to be proved; from this fact however he denies that it follows of necessity that objects corresponding to those ideas do actually exist; for, he observes, the imagination often presents ideas and combinations of ideas which do not exist. Indeed there is no greater hindrance to truth and knowledge than the erroneous belief that ideas refer to actually existing objects. Now all ideas may be classed under two heads: they are either internal, *i.e.* thoughts properly so called, which are therefore mere modifications of the thinking soul; or they are relative to certain external objects of which the soul cannot be cognisant without the mediation of ideas. Now the latter refer to material or spiritual things. External spiritual things may however be perceived both immediately and also mediately by ideas, but the material only mediately, both because they are extended and there is no community between them and the simple spiritual nature of the mind, and because the mind cannot pass out to distant objects. Here Malebranche refutes the hypothesis of material effluxes which pass from bodies and enter through the sensuous organs. Because, he says, these effluvial images must partake of the nature of body, and therefore being extended, they would impede each other in the passage to the senses, since from the same point and at the same time an incalculable number of objects may be perceived. Moreover this hypothesis does not account for the perception of the different distances of objects. Malebranche proceeds, in the next place, to refute the supposition that the mind arbitrarily produces the ideas which it has of outward objects. This is as absurd as to suppose that a painter can delineate an animal which he has never seen or heard described. Equally untenable is the explanation of cognition by innate ideas. For the number of ideas which the mind may entertain is potentially infinite, and it is absurd to suppose that an infinity of ideas have been originally implanted in the mind, of which however most individual minds are actively conscious of a very few at the utmost. Besides, with such a supposition, the choice and selection of ideas would be inexplicable. Again, the supposition that at each operation of thought the ideas are created and presented by God, is contradicted by the fact that the mind can at all times think of whatever object it pleases, and that consequently an infinite number of ideas must, however obscurely, be always present to the mind. Lastly, Malebranche examines the opinion that the soul, in order to the perception of outward objects, requires nothing but itself, by the contemplation and perfect development of its own powers. But this would be to make man equal to Deity, who alone is capable of being cognisant of all things in this manner and by the spontaneous exercise of his own energies. After repeating these theories as the only ones worthy of examination of all that have been advanced to account for the matter Malebranche concludes, that we see all things in and by God (nous voyons tout en Dieu). God, as the creator of all, necessarily possesses within himself ideas of all things, since otherwise the creation of them would have been impossible: by his omnipresence and as the source of spirituality he is intimately connected with all spirits, for God may be called the place of all spirits, as space is that of whatever is corporeal. The soul therefore sees in God the works of God as far as it pleases him to reveal them to humanity.

The mind, consequently, as well as matter, possesses no more than a passive activity, and the Deity is the original cause of all their operations. As then truth consists only in certain combinations of these ideas, which are furnished to the mind from without and by a foreign cause, the only method of truth is demonstration and the analytical investigation of the implicit consequences of explicit ideas.

The other works of Malebranche were partly controversial and partly religious. Of the latter we may mention the 'Entretiens d'un Philosophe Chrétien et d'un Philosophe Chinois sur la Nature de Dieu,' Paris, 1708; 'De la Nature et de la Grace,' Amsterdam, 1680. The following are of a mystical character, blending religion with metaphysics:—'Traité de la Morale,' Rott., 1684; and 'Entretiens sur la Metaphysique et sur la Religion,' Rott., 1688. A complete edition of his works was published at Paris, 1712, in 11 vols. 12mo.

MALEDIVA ISLANDS, commonly called the Maldives, lie in the Indian Ocean, and extend nearly on one meridian from 7° 6′ N. lat. to 40′ S. lat., or nearly 550 miles; but in no part is the breadth of the chain supposed to exceed 50 miles in a direct line, although the most western limit of the most northern group, or Atoll, is in 72° 48′ E. long., and the most eastern boundary of the chain in 73° 48′ E. long. The most northern Atoll is about 350 miles from Cape Comorin, the nearest point of Hindustan. The appellation is derived from the language of Malabar, in which the Sanscrit *dwipa*, 'an island,' is corrupted into *diva*, and from the name of the largest of these islands, which is called Mali.

The sovereign of these islands stiles himself Sultan of the Thirteen Atolls and Twelve Thousand Islands, but Captain Owen believes the actual number of these islands to be more than treble or fourfold this number. They are enclosed and protected from the sea, which during the south-west monsoon is violently agitated, by narrow strips of coral-reefs, which surround them like a wall. This protecting wall in many places scarcely reaches the surface of the water; in other places it forms a long sandy beach, perhaps less than six feet above the level of the sea, and is either circular or oblong. Each of these circular enclosures contains breaks, which constitute convenient passages for vessels or boats to enter. The number of these coral reefs is fourteen, thirteen of which are situated to the north of the equator. They lie on a long sand-bank, to the edge of which their outer sides extend, and beyond them there are no soundings. The channels which divide these Atolls, or Atollons (for so they are called), are in some places deep and safe. They are passed by the vessels which are bound to the island of Ceylon or the Bay of Bengal, the Malediva Islands lying across the direct route to these places. Two of these navigable channels are south of the equator: the Addon, or south channel, is between Pona Molubque Atoll (the South Atoll) and the island of Adon, and is about five miles long and five leagues wide; and the Equatcrial Channel is between the island of Adon and the Atoll Suadiva, which is ten leagues wide. North of the equator are first, the One and a Half Degree Channel, which is 17 leagues in breadth, and formed by the Sudiva Atoll and the Adoumatis Atoll; it is the widest and safest of all these channels, and frequently used by ships proceeding eastward in the westerly monsoon. Farther north is the Collomandous Channel, formed by the Adoumatis Atoll on the south, and the Collomandous Atoll on the north; it is only seven or eight miles wide, but it is safe. The most northern is the Cardiva Channel, which also seems to offer a safe passage, but it is not used at present, though it appears to have been much frequented two centuries ago.

Within the Atolls the sea is not agitated by storms, and there are always soundings in twenty or thirty fathoms water. The islands are generally situated along the enclosing coral-wall, the central part of the Atolls containing only few of them. The islands are all small; not many of them exceed a mile in length and breadth, and a few are less than half a mile. They are generally circular or lozenge-shaped. Many are mere narrow strips, 50 or 100 yards broad, forming a circle, which encloses a lower tract, filled up with broken coral rocks, and dry at spring tides. Within this ring there is sometimes a considerable depth of water, from one to ten fathoms, so that a perfect lagoon is formed. The highest part of the islands is from six to 14 feet above water. Their surface consists of sand, about three feet thick, the top part of which is mixed with vegetable matter, forming a black, light, sandy soil. Beneath the sand is a soft sand stone, resembling particles of beach-sand indurated. This sandstone is about two feet thick, below which depth it softens again to sand, and here fresh-water is found. All the inhabited islands have fresh water, and also some which are not inhabited.

All the islands are covered with a thick impenetrable jungle, among which there are many fine large trees, as the Indian banyan fig-tree, the candoo-tree, the bread-fruit-tree and others. The bamboo grows on some islands, but is scarce. On some of the islands are small plantations of Indian corn and sugar-cane. A little cotton is grown, from which a small quantity of cloth is made. Two kinds of millet are cultivated, but not extensively. The inhabitants live mostly on fish and the cocoa-nut palms, which are cultivated with care. They are of a very small species, none of the fruit being as large as a common tea-cup, and most of them much smaller; but the coir is fine, long, of a white texture, and very strong, and is exported to a considerable amount. A few cattle are only found on the Mali or Maldiva Atoll, but there are no sheep or goats, and no poultry, except the common fowl, which is abundant. A few cats are kept to keep the rats out of the houses, which are very numerous, and cause great damage to the cocoa-nut plantations. The 'flying fox,' as it is called in India, a large species of bat, is very common. Fish is very abundant, and salt-fish once constituted an article of export. Turtle are common. Cowries are collected and exported to a great amount.

The climate seems very pleasant all the year round, the range of the thermometer not being great; but we have no observations extending over a whole year. In December, January, and February, the thermometer ranges during the day from 80° to 84°; at night it falls to 78°. In this season there fall a few showers of rain. The easterly winds set in early in December, and seldom blow strong, but generally in pleasant light breezes. Towards the end of January they pass to the northward, and calms begin to be frequent. During the remainder of the year westerly and north-westerly winds are by far the most prevalent, and frequently stormy. The climate is not favourable to the health of Europeans.

The inhabitants are Mohammedans. It is not ascertained whether they belong to the Arab race or the inhabitants of the coast of Malabar. Two languages are in use among them; the common, which seems to be peculiar to the people, and the Arabic, as a learned language. They have also a peculiar alphabet, differing from the Arabic and from the Sanscrit. It is written from right to left, and the vowels are indicated by points, as in the Arabic. The whole population may amount to between 150,000 and 200,000. They are governed by a chief, called Sultan, who is proud of his dependence on the British at Ceylon, whither he sends an annual embassy, bearing presents of the products of the islands, and receiving others in return. He resides on the Mali or Maldiva Atoll, which contains the largest of the islands, called Mali; its circumference is about seven miles.

These islands were formerly annually visited by one or two vessels from Hindustan for cowries and other produce. At present, the inhabitants themselves bring their own goods in their boats to Bengal, which consist of cowries, coir, cocoa-nut oil, turtle-shell, and some smaller articles;

and they export from Bengal rice, which is not grown on the islands, sugar, silk stuffs, broad-cloth, hardware, and tobacco. They arrive at Calcutta in June or July with the south-western monsoon, and depart from that place in the middle of December with the north-east monsoon.

(Horsburgh, Owen, and Moresby, in the *London Geographical Journal*, vols. ii. and v.)

MALEIC ACID has already been described under the name of EQUISETIC ACID; the present appellation is given in consequence of its having been since procured by subjecting malic acid to heat. It is composed of—

One equivalent of Hydrogen	1
Four equivalents of Carbon	24
Three equivalents of Oxygen	24
	—
Equivalent	49
The crystals contain one equivalent of water	9
	—
Equivalent	58

MALENTOZOA'RIA, articulated Mollusca, the second subtype in the system of M. de Blainville. [MALACOLOGY, p. 324.]

MALESHERBES, CHRETIEN GUILLAUME DE LAMOIGNON, distinguished by his courage and misfortunes, the associate of Turgot and those illustrious statesmen who sought by moderate and beneficial reforms to prop the weakness of the old monarchy, was born at Paris, 16th Dec. 1721. His father was chancelier of Paris, and Malesherbes, after finishing the course of legal study, was first appointed deputy to the procureur-général. Shortly afterwards he was elected a counsellor of the parliament of Paris, and in 1750 president of the Cour des Aides. In this office, he on the one hand courageously resisted the extravagant expenditure of the court, and on the other put a stop to the frauds and peculations of the farmers-general of the revenue. When, in consequence of their opposition to the court, the parliaments were abolished by Louis XV., the Cour des Aides was also abrogated, and Malesherbes retired to his country-seat, and employed himself in benevolent plans for the education and improvement of his vassals. Upon the restoration of the constitutional courts of the parliaments by Louis XVI., Malesherbes resumed his duties as president of the Cour des Aides; and in the following year (1775) he was appointed minister of the king's household. Upon the retirement of Turgot, Malesherbes also tendered his resignation to the king, which was accepted. The interval between this date and the troubles which preceded the outbreak of the Revolution Malesherbes devoted to a tour of inspection through his native country, Switzerland, and Holland, acquainting himself with the state of industry and the arts, and carefully investigating the nature and efficiency of their public institutions. He was again invited by the king to aid him with his counsel in 1787; but finding that he had no power, and that his advice was not listened to, he again retired just before the meeting of the states-general. When Louis XVI. was brought to trial, Malesherbes claimed the honourable but dangerous post of his defender, and was associated with Tronchet and Desèze. The fearless intrepidity of Malesherbes entailed upon him the hatred and suspicions of the party in power, and, with several members of his family, he was cast into prison, condemned to death, and guillotined on the 22nd of April, 1794, meeting his fate with cheerfulness and resignation.

The works of Malesherbes, who was a member of the French Academy and of the Academy of Belles Lettres and Inscriptions, are mostly on subjects of natural history and rural economy. His 'Discours et Remonstrances,' printed in 1779, are still quoted as authorities on financial questions. His 'Mémoire sur la Liberté de la Presse' particularly deserves mention for the enlightened view which it takes upon this difficult question, the more especially as the tolerance and liberality which it advocates had been practised by himself when the surveillance of the press was entrusted to him. On this ground he incurred the censures of the ultra party, and La Harpe expressly ascribes the excesses of the Revolution to the facility of publication under Malesherbes' ministry of the press. After the Restoration a monument to the memory of Malesherbes was erected by Louis XVIII. in the hall of the Chamber of Justice, with the inscription, 'Strenue semper fidelis regi suo, in solio veritatem, præsidium in carcere attulit.'

MALESHERBIA'CEÆ, a natural order of polypetalous Exogens, with a tubular inflated inferior calyx, within the throat of which are inserted five petals, five or ten stamens, and a short rim or crown of the same nature as that of Passifloraceæ, but more rudimentary. The ovary is stipitate, superior, one-celled, with parietal or free placentation. The order is therefore nearly allied to Passifloraceæ, from which however it differs in habit. The species are in many cases remarkable for the beauty of their yellow or blue flowers, and have been cultivated in this country, their seeds having been brought from Chili. They are however seldom seen, and are of no known use. (Lindl., *Nat. Syst.*, ed. 2, 71.)

MALHERBE, FRANÇOIS DE, born in 1555, at Caen, in Normandy, of a noble family, studied first in his native town, and afterwards at Heidelberg and Basel. On his return to France, he accompanied Henri of Angoulême, son of Henri II., who went to Provence as governor in 1579, and remained attached to his household till that prince's death in 1585. During that period he married at Aix in Provence, and settled there. He afterwards served in the army during the wars of the League. In the year 1600 he wrote an ode on the arrival in France of Marie de Medicis, the wife of Henri IV. With this ode his poetical reputation began. In 1605, having come to Paris on private business, Henri IV. sent for him, praised his poetry, and provided him with the means of remaining at court. After the death of the king, his widow Marie de' Medicis gave him a pension in consequence of an ode which he addressed to her. In 1527 he had the misfortune to lose his only surviving son in a duel. He felt the loss severely, and took steps to bring the offenders to justice. He even wrote a letter to Louis XIII., in which he demanded satisfaction. This letter is published among his works. Malherbe having repaired to the camp before La Rochelle, where the court was then pressing the siege of that place, he fell ill, and died in a few days, in 1628, being 73 years of age.

Malherbe has been styled by competent judges the restorer of the French language and poetry. He had a delicate ear and a refined taste, and he was very careful in the choice of his expressions. The eulogium bestowed upon him by Boileau is well known:—

> 'Enfin Malherbe vint, et le premier en France
> Fit sentir dans les vers une juste cadence.'

Malherbe's poetry is more remarkable for gracefulness of expression than for power of thought. He was an elegant versifier rather than a real poet. (*Poésies de Malherbe, rangées par ordre chronologique, avec la Vie de l'Auteur*, Paris, 1776.)

MALIC ACID was discovered in 1785 by Scheele. It received its name from having been first obtained from the juice of apples, in which it exists in considerable quantity, and also, as has been since ascertained, in various other fruits, as cherries, raspberries, strawberries, in house-leek, and the berries of the sorbus or mountain-ash. Mr. Donovan, who procured it from the last-mentioned source, obtained it of so great purity that he supposed it to be a new and peculiar acid, which he called sorbic acid; but it has since been proved to be identical with the malic. A mucilaginous substance which accompanies the acid obtained from apples prevents its properties from being perfectly and readily developed.

Various processes have been proposed for procuring this acid, and they are generally complicated: the following is perhaps as good as any, and is proposed by Liebig:—add carbonate of lime, but not to perfect saturation, to the expressed juice of the sorbus; the solution is to be decomposed by nitrate of lead, which precipitates malate of lead: this, after washing with cold water, is to be heated with boiling dilute sulphuric acid, and the resulting mass with sulphuret of barium, by which there are formed sulphuret of lead and sulphate of barytes, while the clear liquor contains malic acid, to which ammonia is then added to convert it into bimalate of ammonia, which readily crystallizes; this salt is to be precipitated by acetate of lead, and the resulting malate of lead decomposed by hydrosulphuric acid; the clear liquor, separated from the sulphuret of lead, being evaporated by a gentle heat, yields crystals of malic acid, which are not however regular in their form. Malic acid is colourless, inodorous, very sour to the taste, and acts strongly on vegetable blues; in a moist air it is deliquescent; it is very soluble both in water and in alcohol. Nitric acid converts it into oxalic acid. Its saline compounds are called malates some of which exist in nature, as for example, supermalate of lime is found in the juice of the house-leek.

According to Liebig, malic and citric acids are isomeric bodies, both being composed of, when anhydrous,

Two equivalents of Hydrogen	2
Four equivalents of Carbon	24
Four equivalents of Oxygen	32
	—
Equivalent	58

The crystals contain one equivalent of water; whereas those of citric acid contain different proportions of it, according to the circumstances under which they are formed.

When malic acid is subjected to a heat of about 350° Fah., it is decomposed, and the results are two isomeric pyro-acids and water, which are the maleic or equisetic and the fumaric or pyromalic acids.

The malates are not an important class of salts: we shall mention the general properties of a few of them.

Malate of ammonia is a deliquescent salt, but the bimalate is crystallizable, unalterable in the air, and insoluble in alcohol. Malate of potash is a deliquescent mass; the supermalate forms crystals which are unalterable in the air and insoluble in alcohol. Malate of soda is a deliquescent mass, the supermalate crystallizes. Malate of lime is sparingly soluble in water, requiring 147 parts of it cold, and 65 when boiling: the hot solution deposits crystalline grains on cooling. It is stated to be more soluble in some saline solutions than in pure water: the supermalate occurs in houseleek and some varieties of *sedum;* it may be formed by adding acid to the neutral salt; by exposure to heat it dries as a transparent varnish, which distinguishes it from other salts of lime and vegetable acids. It is soluble in water, but insoluble in alcohol. Malate of magnesia yields crystals which are unalterable in the air and are soluble in twenty-eight parts of water; with excess of acid, a gummy deliquescent saline mass is formed. Malate of barytes, both neutral and acidulous, is soluble and gummy; an insoluble subsalt may also be formed. Malate of strontia is gummy and deliquescent, the supersalt is but slightly soluble, but more so in hot than in cold water; the hot solution deposits crystals on cooling. Of the metallic malates we shall state the properties of a few:—Zinc forms three different compounds with this acid: the neutral malate crystallizes in short four-sided prisms; it is soluble in 55 parts of cold water; by boiling water it is decomposed into a supersalt which dissolves, and a subsalt which is precipitated; bimalate of zinc crystallizes in large regular octohedrons; the submalate is an insoluble white powder. Malate of peroxide of iron is a reddish brown-coloured deliquescent mass, soluble both in water and alcohol. Malate of copper, whether neutral or acidulous, dries so as to form a green varnish which is unalterable in the air. The malate of silver is a gummy mass, but the supermalate is a crystallizable salt, which readily separates as such from solution in water. Malate of lead is nearly insoluble in cold water, but dissolves in boiling water, and the solution on cooling deposits brilliant white crystalline scales of this salt.

MALICIOUS INJURIES TO PROPERTY. At common law, mischief perpetrated with whatever motive against the property of another was not punishable criminally, unless the act amounted to felony, was accompanied with a breach of the peace, or affected the public convenience. In other cases the offender was liable only to an action for damages at the suit of the party injured. But the legislature has, at different times, interposed to repress, by penal enactments, injuries to private property of an aggravated nature, committed with the malicious intention of injuring the owner of such property. The different statutory provisions against mischievous acts done wilfully and maliciously were modified, as well as consolidated, by 7 and 8 Geo. IV., c. 30, which also contains a provision rendering it immaterial whether the malice of the offender be against the owner of the property or otherwise.

By the third section of that statute it is made felony punishable by transportation for life or not less than seven years, or by imprisonment not exceeding four years, with or without whipping in the case of a male, to cut, break or destroy, or damage with intent to destroy or to render useless, any goods or articles of silk, woollen, or linen, or of articles in which any of those materials are mixed, or any frame-work-knitted piece, stocking, hose, or lace, in any stage of manufacture; to cut, break or destroy, or render useless warps or shoots of silk, woollen, linen or cotton, or of any of those materials mixed with each other or with any other material; or looms, frames, machines, engines, racks, tackles, or implements prepared for or employed in manufacturing or preparing such goods; or to enter by force into any place with intent to commit any of those offences. By section 4, it is made felony punishable by transportation for seven years, or imprisonment not exceeding two years, with or without whipping in case of a male, to cut, break or destroy, or damage with intent to destroy or render useless, threshing-machines, or machines or engines prepared for or employed in manufactures, except those manufactures, &c. injuries to which are more severely punishable under the 3rd section.

By the 6th and 7th sections it is made felony punishable by transportation for seven years, or by imprisonment not exceeding two years, with or without whipping in the case of a male, to cause water to be conveyed into mines, or subterranean passages communicating therewith, or pull down, fill up, or obstruct air-ways, water-ways, drains, pits, levels, or shafts, with intent to destroy, damage, or hinder or delay the working of mines; or maliciously to pull down, or destroy, or damage with intent to destroy or render useless, steam-engines, or engines for making, draining, or working mines, or staiths, buildings, or erections used in conducting the business of mines or bridges, waggon-ways, or trunks for conveying minerals from mines, whether completed or unfinished. By sect. 12 it is made felony punishable by transportation for life or not less than seven years, or by imprisonment not exceeding four years, with or without whipping in the case of a male, to break down or cut down sea-banks or sea-walls, or the banks or walls of rivers, canals, or marshes, whereby lands are overflowed or damaged, or in danger of being so; to throw down, level, or destroy locks, sluices, floodgates, or works on navigable rivers or canals. And by the same section it is made felony punishable by transportation for seven years, or by imprisonment not exceeding two years, with or without whipping in the case of a male, to cut off, draw up, or remove piles, chalk, or other materials fixed in the ground and used for securing sea-banks or sea-walls, or the banks or walls of rivers, canals, or marshes, or to open or draw up flood-gates, or to do other injury or mischief to navigable rivers or canals, with intent or so as to obstruct or prevent the carrying on or completing or maintaining the navigation.

It is made felony, punishable by transportation for life, or not less than seven years, or by imprisonment not exceeding four, with or without whipping in the case of a male, by the 13th section, to pull down or destroy public bridges, or to do any injury with intent or so as to render them dangerous or impassable; and by the 18th section, to cut or destroy hop-binds growing on poles in any hop-plantation. But now (by 7 Wm. IV. and 1 Vict., c. 90, s. 2) the punishment of the latter offence is made transportation not exceeding 15 years and not less than 10 years, or imprisonment not exceeding three. By 7 & 8 Geo. IV., c. 39, s. 14, it is a misdemeanor punishable accordingly [MISDEMEANOR] to throw down, level, or destroy turnpike-gates, or walls, chains, rails, posts, bars, or fences belonging to turnpike-gates set up to prevent passengers passing by without paying toll, or houses, buildings, or weighing-machines for the collection, ascertainment, or security of toll. The 15th section makes it a misdemeanor punishable by transportation for seven years, or by imprisonment not exceeding two years, with or without whipping in the case of a male, to break down or destroy dams of fish-ponds, or of water being private property, or in which is a private right of fishing, with intent to take or destroy fish, or so as thereby to cause the loss or destruction of fish, or to put lime or noxious materials in ponds with intent to destroy fish, or to break down or destroy dams of mill-ponds. By section 16 it is made felony to kill, maim, or wound cattle; but the punishment is reduced by 7 Will. IV. and 1 Vict., c. 90, s. 2, to transportation not exceeding 15 years and not less than 10, or to imprisonment not exceeding three. The provisions of this statute (7 & 8 Geo IV., c. 39) relating to the destruction of trees, plants, &c. have been already noticed. [LARCENY.]

By section 17 it was made felony punishable by transportation for seven years, or by imprisonment not exceeding two, with or without whipping in the case of a male, to set fire to any crop of corn, grain, or pulse, whether standing or cut down, or to any part of a wood, coppice, or plantation, or to any heath, gorze, furze, or fern, and by 7 Wm. IV. and 1 Vict., c. 89, it is made felony punishable by transportation for life or not less than 15 years, or by imprisonment not exceeding three (sect. 10), to set fire to any stack of corn, grain, pulse, tares, straw, haulm, stubble, furze, heath, fern, hay, turf, peat, coals, charcoal, or any steer of wood, or (sect. 11) to set fire to any mine of coal or cannel coal.

The enactments in this statute with respect to the burning of houses, &c. [Arson] have been repealed; and now by 7 Wm. IV. and 1 Vict., c. 89, sect. 2, it is felony punishable by death to set fire to a dwelling-house, any person being therein, and by sect. 3 it is felony punishable by transportation for life, or not less than 15 years, or by imprisonment not exceeding three, to set fire to a church or chapel, or a chapel for the religious worship of dissenters, or to a house, stable, coach-house, outhouse, warehouse, office, shop, mill, malthouse, hop-oast, barn, or granary, or to a building used in carrying on trade or manufacture, whether in the possession of the offender or of any other person, with intent to injure or defraud any person.

For the protection of shipping against malicious mischief several statutory provisions have been made. By 1 and 2 Geo. IV., c. 75, sect. 11, it is felony punishable by transportation for seven years, or imprisonment for any number of years, to cut away, cast adrift, alter, deface, sink, or destroy, or do any act with intent to cut away, cast adrift, remove, alter, deface, sink, or destroy, or injure or conceal buoys, buoy-ropes, or marks belonging to ships or vessels, whether in distress or otherwise. By 7 Geo. IV., c. 30, sect. 10, it is made felony punishable by transportation for seven years, or by imprisonment not exceeding two, with or without whipping in the case of a male, to damage otherwise than by fire (which offence had been made capital by sect. 9) ships or vessels complete or unfinished, with intent to destroy them or to render them useless.

By 7 Wm. IV. and 1 Vict., c. 89, sect. 5, it is made felony punishable by death to exhibit false lights or signals with intent to bring any ship or vessel into danger, or to do any thing tending to the immediate loss or destruction of ships or vessels in distress. And by sect. 6 it is made felony punishable by transportation for life, or not less than 15 years, or by imprisonment not exceeding three years, to set fire to, cast away, or destroy ships or vessels, with intent to prejudice owners or part-owners of vessels or goods, or underwriters on ships, goods, or freight. And by the 4th sect. it is made felony punishable by death, to set fire to, cast away, or destroy any ship or vessel, either with intent to murder any person or whereby the life of any person shall be endangered.

Besides the criminal responsibility thus created in respect of the acts of spoliation above enumerated, the legislature has given summary relief to persons whose property has been subject to petty but wilful aggressions. The last enactment on this subject is 7 and 8 Geo. IV., c. 30, sect. 24, under which persons wilfully or maliciously committing damage, injury, or spoil, to or upon real or personal property, for which no remedy or punishment is specially provided by that act, are, on conviction before a justice of the peace, to forfeit and pay such sum of money as shall appear to him a reasonable compensation for the damage, injury, or spoil committed, not exceeding 5*l.*, to be paid, in the case of private property, to the party aggrieved, except where such party is examined in proof of the offence; and in such cases or in the case of property of a public nature, or wherein any public right is concerned, the money is to be applied towards the county-rate or borough-rate; and if such sums of money together with costs (if ordered) are not paid either immediately or within such period as the justice may appoint, the justice may commit the offender to the common gaol or house of correction, to be kept to hard labour for any term not exceeding two calendar months, unless such sum and costs be sooner paid. This enactment does not extend to any case where the party trespassing acted under a fair and reasonable supposition that he had a right to do the act complained of, or to any trespass, not being wilful and malicious, committed in hunting, fishing, or in the pursuit of game.

By the 28th section any person found committing any offence against this act, whether punishable upon indictment or upon summary conviction, may be immediately apprehended without a warrant, by any peace-officer, or the owner of the property injured, or his servant, or any person authorized by him, and forthwith taken before some neighbouring justice of the peace.

These summary proceedings before magistrates must be commenced within three calendar months from the commission of the offence.

The provisions of the law of France with respect to malicious injuries to property are to be found in the 3rd section of liv. iii. of the Code Pénal, entitled 'Destructions, Dégradations, Dommages.' Capital punishment is denounced only against those who set fire to buildings, ships, warehouses, wood-yards (chantiers), forests, underwoods, or crops growing or cut down, or to any combustible matter placed so as to communicate fire thereto. Minor offences in forests are provided for by titre 12 of the Code Forestier.

MALINES. [Mechlin.]

MALLEABILITY is that property of certain metals which admits of their being extended by the blows of a hammer or by pressure. In this quality gold exceeds all other metals: thus the gold-leaf sold in books is so extremely thin, that less than 5 grains cover about 270 square inches, and the thickness of each leaf does not exceed [illegible]th part of an inch. Metals which are malleable are also ductile, that is, they may be drawn into wire. [Metals.]

According to Dr. Thomson, malleability and ductility seem to depend upon a certain quantity of latent heat in the metals which possess these properties. During the hammering they become hot, sometimes even red hot, and after this many of them become brittle, owing to the forcing out of the latent heat which they contained. By annealing, which consists in heating them artificially and allowing them to cool slowly, the heat is restored, and they recover their malleability and ductility; and thus it is that iron which has been made hot by hammering loses its malleability, and cannot be again hammered till it has been annealed.

MALLEA'CEA, or MA'LLEIDÆ, a family of Monomyarian Conchifers according to the system of Lamarck, most of the genera of which are to be found in the family *Margaritacea* of De Blainville. They belong to the *Ostracea* of Cuvier, and the Oxygones of Latreille. Lamarck makes the family consist of five genera only:—*Crenatula*, *Perna*, *Malleus*, *Avicula*, and *Meleagrina*.

Animal, with the *mantle* non-adherent, entirely open in its whole circumference, without tube or particular opening, prolonged into irregular lobes, especially backwards; *foot* canaliculated, and almost always furnished with a byssus.

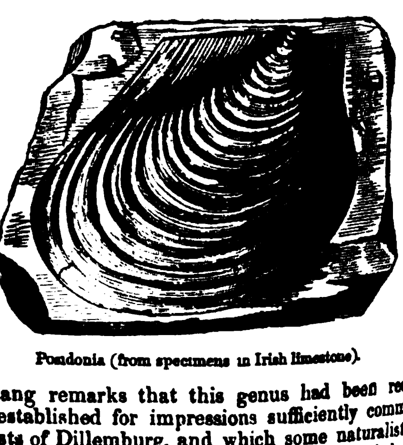
Shell black or horn colour, inequivalve, inequilateral, very irregular; *hinge* without teeth; marginal ligament sublinear, simple, or interrupted by crenulations; muscular *impression* subcentral, fixed generally by a byssus furnished by the animal.

M. Rang places the fossil genus *Posidonia* at the head of the family, so that the position of that genus is approximated to *Lima*, which is arranged as the last of the *Pectinidæ*.

Genera. Posidonia (Bronn).

Animal unknown.

Shell very delicate, nearly membranous, equivalve, inequilateral, oblique, rounded, not gaping? cardinal border straight, a little prolonged on each side, so as to be auriculated; *hinge* toothless; no pit for the ligaments; nor passage for a byssus.



Posidonia (from specimens in Irish limestone).

M. Rang remarks that this genus had been recently (1829) established for impressions sufficiently common in the schists of Dillemburg, and which some naturalists had been tempted to refer to rudimentary shells of Aplysia or Pleurobranchus. M. Rang agrees with M. Bronn in opinion, that these are the impressions of bivalve shells, and assigns to *Posidonia* the position above stated. M. Deshayes however, in the last edition of Lamarck (1836), does not mention the genus among the Malleacea.

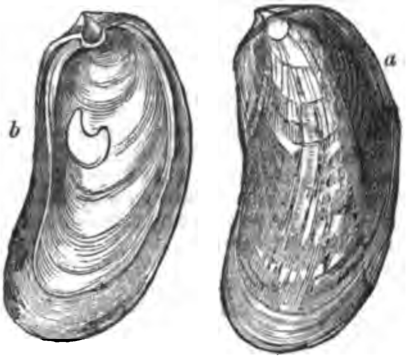
Vulsella. (Lam.)

Animal elongated, compressed; *mantle* very much prolonged backwards, and bordered with two rows of papillary tubercles which are very close set; *foot* small, canaliculated, without a byssus; mouth large, labial appendages very much developed and triangular; branchiæ narrow, very long, and united nearly throughout their extent.

Shell subcorneous, delicate, elongated, flattened, irregular, inequilateral, subequivalve, the umbones nearly anterior, distant, and a little recurved; *hinge* toothless, and offering simply on each valve a projecting callosity comprehending a pit for the insertion of the ligament; *muscular impression* subcentral.

Geographical Distribution of the Genus.—The seas of warm climates, where the species, none of which are furnished with a byssus, are found in *Alcyonia*, sponges, &c.

Example, *Vulsella lingulata.* *Locality.*—East Indian Ocean.



Vulsella lingulata.

a, Valves, closed; *b*, inside view of valve, showing the hinge and muscular impression.

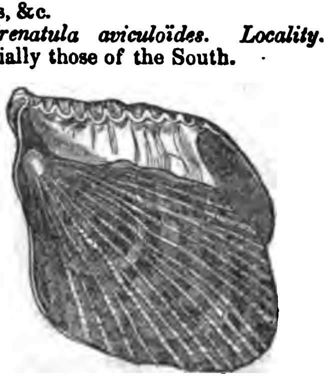
Crenatula. (Lam.)

Animal not known, but very probably bearing a close relation to that of Perna.

Shell foliated, flattened, subequivalve, inequilateral, irregular, a little gaping behind, but without any aperture for a byssus; *hinge* linear, marginal, marked with serial crenulations, which are callous and hollowed into rounded pits for the reception of the divisions of the ligament; muscular impression subcentral.

Geographical Distribution of the Genus.—The seas of warm climates, principally those of the East Indies and New Holland, as far as is yet known. The species, which are not numerous, are not fixed by their valves nor by a byssus, but, like the Vulsellæ, are found in submarine bodies, such as sponges, &c.

Example, *Crenatula aviculoïdes.* *Locality.*—Seas of America, especially those of the South.



Crenatula aviculoides.

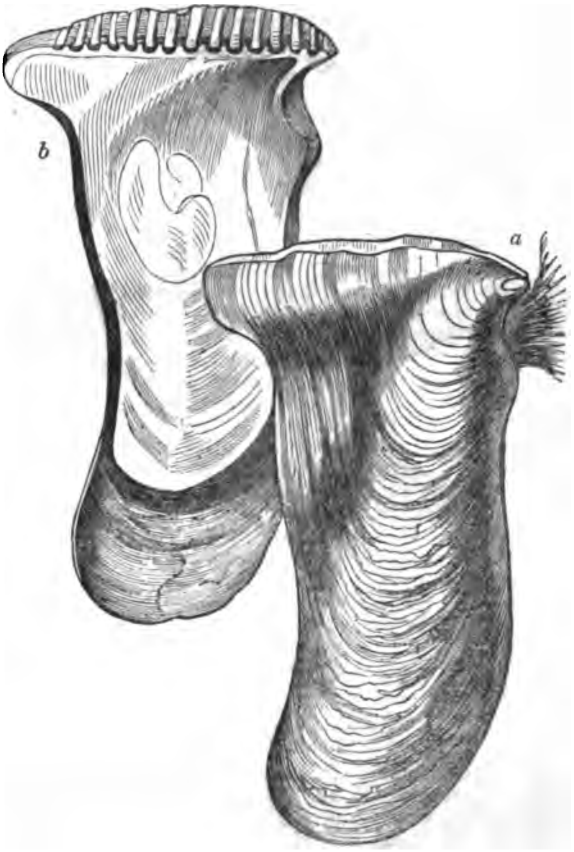
Perna. (Brug.)

Animal compressed; *mantle* very much prolonged backwards, and fringed at its lower border; *foot* very small, with a byssus.

Shell corneous or black, lamellar, very much flattened, subequivalve, inequilateral, very irregular, gaping in front for the passage of the byssus; *hinge* straight, marginal, having on each side a row of small parallel furrows, which are transverse, not intrant, and in which the divisions of the ligament are inserted; muscular impression subcentral.

Geographical Distribution of the Genus.—The seas of warm climates, more particularly those of the East Indies, though some species are found westward, as at the Antilles, Cape Verd, and the Azores. The species are moored to the rocks and mangrove trees by means of their byssus, and have been found at depths ranging from the surface to ten fathoms.

Example, *Perna Isognomum.* *Locality.*—East Indian Ocean.



Perna Isognomum.

a, Valves closed, showing the byssus; *b*, inside view of valve, showing hinge and muscular impression.

Malleus. (Lam.)

Animal considerably compressed; *mantle* prolonged backwards, and fringed with very small tentacular appendages; *foot* very distinct, canaliculated, and furnishing a byssus; buccal appendages spherico-triangular; *branchiæ* short and semicircular.

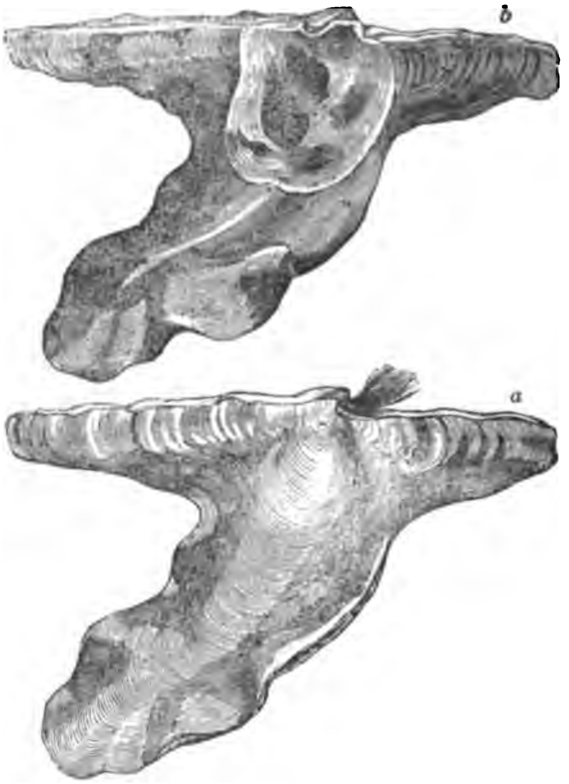
Shell foliated, black or corneous, subnacreous, subequivalve, inequilateral, very irregular, often auriculated, and presenting a hammer or T shape; umbones not distant; an oblique notch in front for the passage of a byssus; *hinge* linear, very long, toothless; with a conical oblique pit, partially external, for the reception of the ligament, which is triangular and subexternal; muscular impression of considerable size and subcentral.

Geographical Distribution of the Genus.—East and West Indies (Guadaloupe and Martinique) and Australasia. Found at depths ranging from the surface to seven fathoms. M. Rang speaks of the species from Guadaloupe and Martinique as having occurred at great depths. The species, which are not numerous, are moored by their byssus to submarine rocks, &c. They are very variable, and indeed M. Deshayes observes that he never saw any two individuals of a species alike. Age makes a considerable change in the shape of the shells, especially in the auricles.

M. de Blainville divides the genus into three sections:—1, consisting of species scarcely auriculated (*Malleus vulsellatus*); 2, consisting of uniauriculated species (*Malleus normalis*); and 3, consisting of biauriculated species (*Mal-*

leus vulgaris). M. Deshayes thinks that the greater part of the individuals occurring in collections under the name of *Malleus vulsellatus* may be the young of the variety of *Malleus vulgaris* with short ears, and he considers *Malleus vulsellatus* and *Malleus anatinus* as identical.

Example, *Malleus vulgaris*. *Locality.*—East Indian and South Seas.



Malleus vulgaris.

a, Valves closed, showing the byssus; *b*, inside view of valve, showing the hinge and muscular impression.

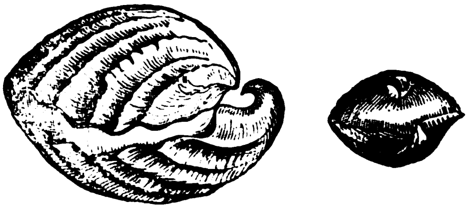
Gervillia (Fossil only).

(See the article, vol. xi.)

Inoceramus. (Parkinson.)—(Fossil only.)

See the article, vol. xii. Though some malacologists consider Inoceramus and Catillus to be identical, M. de Blainville, M. Rang, and M. Deshayes consider them as distinct species, and as belonging to this family. M. Deshayes gives the following description of *Inoceramus*.

Shell gryphoïd, inequivalve, irregular, subequilateral, with a lamellar shell, pointed anteriorly, and enlarged at its base; umbones opposed, pointed, and strongly recurved; *hinge* short, straight, narrow, and forming a right angle with the longitudinal axis, with a series of crenulations gradually smaller for the reception of a multiple ligament. Muscular impression unknown. The species are of moderate size.



Inoceramus sulcatus, nat. size; from the Folkstone blue marl. The smaller specimen shows the hinge of one valve, the other valve being a cast.

Localities.—Dr. Mantell records several species in the *Chalk*, two in the *Chalk-marl*, two in the Gault or Folkstone Marl, and one (from Martin) in the *Shanklin Sand* (Lower Green-sand). (*Organ. Remains of Sussex*, 'Geol. Trans.,' 1829.) N.B. Some of the species in the chalk—*Inocerami Brongniarti*, *Lamarckii*, and *Mytiloides*—are *Catilli*. Professor Phillips records three (one a *Catillus*) in the *White Chalk*, one in the *Red Chalk*, and one in the *Lias*. (*Geology of Yorkshire.*) Mr. Lonsdale notices two in the Lower Chalk (Oolitic District of Bath). Dr. Fitton records six named species and one undetermined from the *Upper Green-sand*, *Gault*, and *Lower Green-sand*. (*Strata between the Chalk and Oxford Oolite*, in *Geol. Trans.*, 1836.)

Example, *Inoceramus sulcatus*.

Catillus. (Brongn.)—(Fossil only.)

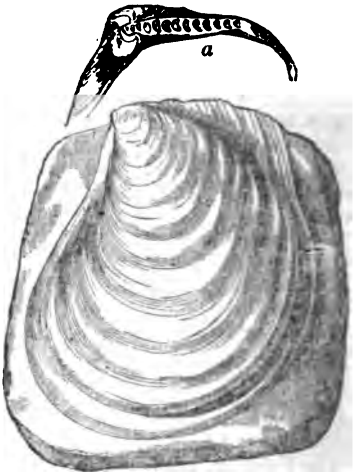
M. Deshayes thus defines Catillus, which is referred in this work from that title to MARGARITACEA; we however agree with the authors above quoted in thinking this the proper place for the genus.

Shell sometimes flattened, elongated, or suborbicular, sometimes convex, cordiform, subequivalve, inequilateral, with umbones more or less projecting. Hinge straight, a little oblique or perpendicular to the longitudinal axis, its border furnished with a row of small cavities which are very short and gradually increasing; structure of shell fibrous; muscular impression unknown.

M. Deshayes observes that among the genera proposed by Mr. Sowerby in his *Min. Con.* there is one to which he has given the name of *Pachymya;* this genus appears to M. Deshayes to possess all the external characters of *Catillus*, and he states that he has been led to remark the approximation of that genus to *Catillus* by studying a fine specimen in the collection of M. Duchastel. M. Deshayes proceeds to observe that M. Brongniart has established a genus under the name of *Mytiloïdes* for those *Catilli* which are very much elongated, and that consequently the genus *Mytiloïdes* cannot be retained. The genus *Catillus* then, as reformed by M. Deshayes, will consist of the genera *Pachymya*, *Mytiloïdes*, and *Catillus*. Some of the *Catilli* are of enormous size, and are mentioned as being of many feet in length. M. Deshayes thinks that the animals of *Inoceramus* and *Catillus* both wanted a byssus.

Localities.—The *White Chalk* in England and France.

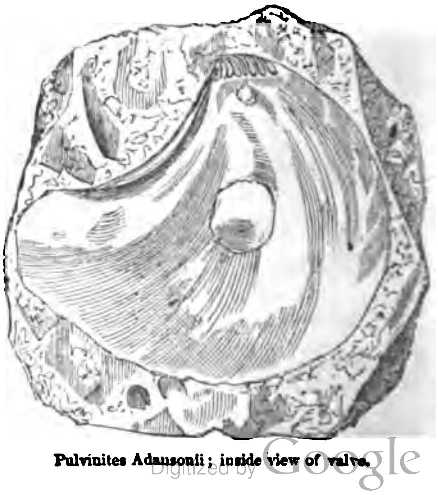
Example, *Catillus Cuvieri*.



Catillus Cuvieri.

a, The hinge.

Pulvinites. (Defrance.)—(Fossil only.)



Pulvinites Adansonii; inside view of valve.

Animal unknown.

Shell delicate, rounded, equivalve, subequilateral, with the umbones inclined a little forwards; *hinge* composed of eight or ten divergent teeth, forming so many pits.

The genus *Avicula*, which is placed by Lamarck among his *Malleacea*, but is arranged by M. de Blainville, with many of the genera above described, under his family *Margaritacea*, is separated by M. Rang into a family which immediately succeeds the Malleïdæ, under the name of *Aviculês*, containing the subgenera *Avicula* (properly so called) and *Meleagrina*. See the article AVICULA, vol. iii., to which we think it right to add the description of the animal by M. Deshayes.

Animal oval, flattened, having the lobes of the *mantle* separated throughout their length, thickened, and fringed on the edges; body very small, having on each side a pair of large branchiæ, nearly equal; mouth oval, rather large, with foliaceous lips, and with a pair of labial palps on each side, which are large and obliquely truncated; *foot* conical, vermiform, rather long, with a rather large byssus composed of stout filaments, united in some species, at its base.

M. Deshayes also concurs in merging the genus *Meleagrina* in that of *Avicula*, which, according to M. Deshayes's reformation of the genus, will contain also the fossil genus *Monotis* of Bronn.

FOSSIL MALLEIDÆ.

Those species which are fossil only are noticed above.

Vulsella.—M. Deshayes, in his Tables (Lyell), gives the number of recent species as five and one fossil (tertiary). In the last edition of Lamarck he makes the recent species six, with no addition to the fossil species. (Grignon, Lamarck, Paris, Deshayes.)

Perna.—The number of recent *Pernæ* given by M. Deshayes, in his Tables, amounts to ten recent and four fossil (tertiary). In the last edition of Lamarck, the same recent number is stated, but the fossil species amount to six. (Virginia, Alsace, and the neighbourhood of Hâvre, Italy, Hauteville, and Valognes, the Kimmeridge Clay, Germany and France, the Valmondois and Senlis.) Professor Phillips notes one (*Perna quadrata*, not mentioned by Lamarck or Deshayes) in the *Coralline Oolite* (Malton), and also in the *Bath Oolite*. He also notices a *Perna* in the Oxford Clay. (*Geology of Yorkshire.*) The genus is recorded in the *Inferior Oolite*, and in the *Coral Rag*, by Mr. Lonsdale (*Oolitic District of Bath*, in *Geol. Trans.*), and by Dr. Fitton, in the *Lower Green-sand* and the *Blackdown Sands*.

We here give a notice of the fossil *Aviculæ*.

M. Deshayes, in his Tables, states the number of recent *Aviculæ* (including *Meleagrinæ*) at thirty, and gives five as the number of fossil (tertiary). In the last edition of Lamarck he makes the number of recent *Aviculæ* twenty-one, and the number of fossil species six. (Paris, Grignon, Senlis, &c., Chaumont, Paris Basin, Maastricht, and Cypli, the Cornbrash in England and France, the Middle and Upper Oolite in England and France, and the Muschelkalk in Germany, Lorraine, and Toulon.) The *Meleagrinæ* are two in number, both recent. Dr. Mantell mentions species in the Chalk Marl. (*Organic Remains of Sussex.*) Professor Phillips records species in the Coralline Oolite and Calcareous Grit, in the Oxford Clay, Kelloways Rock, Bath Oolite, Inferior Oolite, and Marlstone. (*Geology of Yorkshire.*) Mr. Lonsdale notices species in the Lias, Inferior Oolite, Fuller's Earth, Bradford Clay, Cornbrash, and Kelloway Rock. (*Oolitic District of Bath.*) Professor Sedgwick and Mr. Murchison mention the genus among the Gosau Fossils. (*Geol. Trans.*) Dr. Fitton records species in the Upper Green-sand, the Gault, the Lower Green-sand, and the Portland Sand. ('Strata between the Chalk and Oxford Oolite,' *Geol. Trans.*) Mr. Murchison figures species from the Old Red-sandstone (middle and lower beds only), from the Upper Ludlow Rock, the Amestry limestone, the lower Ludlow rock, the Wenlock Limestone, and the Caradoc Sandstone.

MALLET, DAVID, was born about the year 1700, at Crief, in Perthshire, where his father, whose name was James Malloch, and who is said to have been one of the proscribed clan Macgregor, kept a small public-house. He is supposed to have been first sent to college at Aberdeen, but he afterwards studied at the university of Edinburgh; and he was attending the classes there and supporting himself by private teaching, after the custom of the Scotch students, when, on the recommendation of the professors, he was appointed tutor to the sons of the duke of Montrose, with whom he made the tour of Europe. He first became known as a writer by the publication of his ballad of 'Margaret's Ghost,' or, as it was originally entitled, 'William and Margaret,' which appeared anonymously in the 36th No. of Aaron Hill's 'Plain Dealer,' 14th July, 1724. There has been some controversy however as to Mallet's claim to more than the re-casting of this famous ballad. (See Percy's 'Reliques of antient English Poetry,' 1794, vol. iv., 332-336, where the ballad is given in the shape in which it was finally published by Mallet, in his collected works, 1759; 'The Hive,' a collection of songs, vol. i., 1724, where, at p. 169, it is given as it had appeared the same year in the 'Plain Dealer;' 'The Hive,' vol. iii., published in 1725, where, at p. 157, is given the other poem, which has occasioned the controversy as to the originality of Mallet's; and 'The Friends,' 1773, vol. i., where the attempt was first made to convict Mallet of plagiarism.) He now laid aside his paternal name, and took that of Mallet, which he probably imagined had more of an English sound, and was better suited to his ambition to be taken for a native of South Britain: the earliest known mention of him under his new name in print is said to occur in 1726. In 1728 he published his poem of the 'Excursion,' in 2 cantos; and in 1731 his tragedy of 'Eurydice' was performed at Drury-lane, but very indifferently received. A poem entitled 'Verbal Criticism,' which he soon after produced, was of some importance to his fortunes by introducing him to the acquaintance of Pope, and through him to that of his friend Bolingbroke. Through these connections he obtained the situation of private secretary to Frederic, prince of Wales, with a salary of 200*l.* In 1739 his tragedy of 'Mustapha' was acted at Drury-lane, with much applause, for the greater part of which however it was probably indebted to some satirical hits at the king and the minister Walpole. The next year, by command of the prince, he wrote, in conjunction with Thomson, the masque of 'Alfred,' which was performed in the gardens of Cliefden, in honour of the birthday of his royal highness's eldest daughter. It was afterwards entirely re-written by Mallet, and acted at Drury-lane, in 1751, with no great success. Of Mallet's remaining writings, the principal are, a 'Life of Bacon,' of very little merit, prefixed to an edition of Bacon's Works, in 1740; his poem of the 'Hermit, or Amyntor and Theodora,' 1747; and his tragedy of 'Elvira,' acted at Drury-lane in 1763. To this last a political meaning was at least ascribed by the public, and one that was not to the advantage of the play, for Mallet had now become a supporter of the unpopular administration of Lord Bute, who, soon after this, and, as it was said, by way of especial reward for this particular service, gave him a place in the Custom-house. Mallet was besides already in the receipt of a pension, which he had earned some years before from the duke of Newcastle's administration, by the assistance which he gave in directing the tide of the public rage against the unfortunate Admiral Byng. Two other transactions complete the history of his venal literary career: the first, his acceptance of a legacy of 1000*l.* left to him by Sarah, duchess of Marlborough, as the price of a Life of the great Duke, of which he never wrote a line; the second, his basely ungrateful attack upon his newly deceased patron Pope, at the instigation of his living patron Bolingbroke, in the affair of the latter's 'Idea of a Patriot King.' [BOLINGBROKE, VISCOUNT.] It is believed however that he was in the end rather a loser than a gainer by Bolingbroke's bequest to him of the property of his works, which was his pay for this exposure of himself; he refused the bookseller's offer of 3000*l.* for the works, and then published them on his own account.

Mallet was an avowed freethinker or infidel, and indeed he does not seem to have had much principle of any kind. He was vain not only of his literary talents, but of his person, which, although short, is described as having been rather handsome before he became somewhat corpulent, and which he was accustomed to set off with all the advantages of dress. He appears to have made a considerable figure in society, and even Johnson admits that his conversation was spirited and elegant. He was twice married; first to a lady by whom he had, besides other children, a daughter, who married an Italian gentleman named Cilesia, and wrote a play called 'Almida,' acted at Drury-lane in 1771; secondly, to a Miss Elstob, by whom he got a fortune of 10,000*l.* He died possessed of considerable property, 21st

April, 1765. A collected edition of his poetical works was published by himself, in 3 vols. 8vo., in 1759.

MALLET, PIERRE HENRI, born at Geneva in 1730, became professor of belles-lettres at Copenhagen, where he wrote several works on the history and antiquities of Scandinavia. He was made member of the academy of Upsala, and became also correspondent of the Académie des Inscriptions of Paris. He afterwards returned to Geneva, and was appointed professor of history in the academy of that city. He died at an advanced age. His principal works are:—1, 'Introduction à l'Histoire du Danemarc,' Copenhagen, 1755; 2, 'Edda, ou Monumens de la Mythologie et de la Poesie des Celtes,' translated into English by Bishop Percy under the title of 'Northern Antiquities and the Edda,' 2 vols. 8vo., London, 1770; 3, 'De la Forme du Gouvernement de la Suède,' 1756; 4, 'Histoire du Danemarc,' 3 vols. 4to., 1777; 5, 'Histoire de la Maison de Hesse;' 6, 'Histoire de la Maison de Brunswick.'

Mallet must not be confounded with Mallet du Pan, also a Genevese writer (born in 1750), who was well known for the various journals which he edited in Paris and London, and especially for his 'Mercure Britannique,' 1798-99, which, owing to the ability of the conductor and the energy of its language, was one of the most powerful organs of the Anti-Gallican press of that time.

MA'LLEUS. [MALLEACEA.]

MALLORCA, or MAJORCA, the largest of the Balearic Islands, is situated in the Mediterranean, off the eastern coast of Spain, to which kingdom it belongs. It lies between 39° 20′ and 40° 5′ N. lat., and between 2° 20′ and 3° 20′ E. long., about 110 miles from the coast of Catalonia and 120 from that of Valencia. It is nearly 60 miles long from east to west, and in some parts 40 broad from north to south: its circuit is 143 miles, and its area about 1410 square miles. The general surface of the country is hilly. On the north-west side a mountain-range crosses the island, the highest summit of which, the Puix de Torellas, is above 4500 feet high. Another range of lofty hills runs parallel to this, through the heart of the island, and high grounds in many parts border on the coast. The eastern and southern districts are the most level in character. Some of the plains are liable to be inundated by the periodical rains, on which account they are generally used as pasture-land. Near Campos on the south, and near Alcudia on the north of the island, are marshy tracts which generate malaria to a very pernicious extent. The general aspect of the country is extremely beautiful and picturesque. The roads in the interior are very rugged and stony, and are traversed only by mules, which form the ordinary mode of conveyance, and by carts of clumsy and primitive construction, similar to those of Spain.

The climate of Mallorca is delightful, the winters being mild, though occasionally stormy, and the heats of summer being tempered by the sea-breezes and the vicinity of the mountains. The extreme fertility of the soil is mentioned by Strabo. Firs, holm-oaks, and wild olives adorn the slopes, and often cover the summits of the higher mountains; lavender, rosemary, thyme, marjoram, saffron, and roses perfume the air; and the valleys and level tracts produce in abundance corn, wine, oil, and fruit. The date-palm and the plantain attain their full size, though seldom yielding fruit. The valley most famed for beauty and fertility is that of Soler, 11 or 12 miles in circumference, abounding in orchards of orange and lemon trees, and hemmed in by mountains luxuriantly clothed with wood. The island is poorly watered, for though there are said to be no less than 210 streams, only two deserve the name of rivers. The larger of these is the Rierra, which falls into the sea beneath the ramparts of Palma, the capital. It is almost dry in summer, but in the rainy season it is very full and impetuous, and on several occasions in past ages has carried away great part of the city, and drowned many thousands of the inhabitants.

Mallorca produces wheat, barley, and oats, wines of excellent quality, olive oil in large quantities, hops, vegetables; fruits, particularly melons, oranges, and citrons, all of superior flavour; honey, hemp, wool, and a little silk. Sheep, goats, horned cattle, and pigs are numerous; poultry and game are abundant. In 1820 the productions of this island were valued at 53,000,000 reales, or about 560,000*l.* With the exception of a few foxes and hawks, the island is free from beasts and birds of prey; nor are there many venomous reptiles.

The geology of Mallorca is but imperfectly known. Granite and porphyry are said to be found, but the generality of the rocks are of secondary or tertiary formation. There is slate, fine marble of various colours, with abundance of sandstone, freestone, and chalk. Seams of coal have been discovered, but have not been worked. Coral is found in the bay of Alcudia. Salt is procured by the evaporation of sea-water in the low grounds about Campos; and in the same district is a warm sulphureous spring, famed for its efficacy in removing cutaneous complaints.

The original colonists of Mallorca were, according to Strabo, Phœnicians. The island fell with Spain successively into the hands of the Carthaginians and Romans. After being taken by Metellus, surnamed Balearicus, B.C. 123, a colony of 3000 Romans from Spain was established in the island. In A.D. 426 it was seized by the Vandals. In A.D. 798 it was conquered by the Arabs; and after being several times taken by the Christians and retaken by the Mohammedans, it was finally wrested from the latter in 1229 by James, king of Aragon; and since the union of the crowns of Castille and Aragon, it has remained subject to Spain.

The population, though much decreased since the time of the Moors, is still about 140,000. Palma and Alcudia are the only cities.

Palma, the capital, which was one of the two principal towns in the time of Strabo, is on the south-east of the island, picturesquely situated on a slope in the bight of a deep bay, ten or twelve miles wide, and formed by the capes Blanco and Cala Figuera. The city, though walled and fortified, could not sustain a regular siege. Its population is about 33,000. The streets are in some parts narrow and mean, in others wide and regular; the houses are large and without external ornament, mostly in the Moorish style of architecture, and many are built of marble. Palma is the see of a bishop, who is a suffragan of Valencia. The cathedral, a large Gothic edifice of much simple beauty, was built in the beginning of the thirteenth century by James of Aragon, surnamed the Conqueror, who is interred within its walls. Attached to the cathedral is a spire, of such remarkable delicacy and airiness, that it has received the name of 'The Angel's Tower.' There are many other religious edifices in Palma, five parish churches and numerous convents (recently suppressed), together with several hospitals and two colleges. Ferdinand V. founded a university here in 1483. The other public buildings are:—the episcopal palace; the royal palace, a very antient edifice, the residence of the captain-general, or governor of the island, comprehending also an arsenal, a magazine, and a prison; the town-hall; and the house of contractation, or of mercantile assembly and judicature, a Gothic edifice of remarkable beauty, but now serving only as a memento of the decayed fortunes of the city. Palma, though in the thirteenth century one of the chief markets of Europe, has now comparatively but little commerce. Its port is small, and will only admit vessels of little draught. Within and without the city are to be seen numerous evidences of the superior size, population, and commercial importance of Palma in past ages.

Alcudia, the other city of Mallorca, is on the north-east coast, on a neck of land between the two bays of Alcudia and Pollenza. It stands on a rising ground, and is fortified with antient walls of great height. Some centuries ago it was a large and flourishing city, but is now in a wretched state of decay, with a population of only 1000 souls.

The other principal towns of Mallorca are:—Arta, with 8000 inhabitants; Manacor, with 7000 inhabitants; Pollenza (the Pollentia of Strabo), with 6000 inhabitants; Felanix, with 6000 inhabitants; Soler, Campos, Santani, San Marcial, Banalbufar, with 5000 inhabitants each; Andraig, with 4000 inhabitants; and Lluch Mayor, with 3500 inhabitants. There are other towns of smaller size, in all thirty-two in number. There are also numerous villages.

The manufactures of Mallorca are linen cloths (coarse and fine), silk stuffs, and woollen goods, as tapestry, blankets, sashes, and corded stuff. Of the leaves of the palm are made brooms and baskets. The exports are oils, vegetables, fruits (fresh and dried), wines, brandy, cheeses, and woollen goods. Most of these are taken by Spain; but some by Sardinia, Malta, England, Holland, France, and even America. The imports, which in value bear a very small proportion to the exports, are corn, salted provisions, sugar, coffee, spices, tobacco, rice, cutlery and other made goods, and articles of clothing.

In character the Mallorquines somewhat resemble the Catalans, but are less industrious and enterprising. They are much attached to their country, loyal to the government, and make excellent soldiers and sailors; they are bigoted and superstitious in religion, boastful, though mild and amiable in disposition, hospitable to strangers, and prepossessing in their manners. The women are elegant, and fond of dress and ornament. Castillian is spoken by the upper and middle classes, but the language of the lower orders is a mixed jargon of Castillian, Catalonian, and Arabic.

(Strabo, 167, *Casaub.*; Mariana, *Historia General de España*; Laborde, *Itinéraire Descriptif de l'Espagne*; Dameto and Mut, *History of the Balearic Kingdom*; St. Sauveur, *Travels through the Balearic and Pithiusian Islands.*)

MALLOW, the common name of the wild species of the genus Malva, the type of the natural order Malvaceæ. There are two common weeds of this genus, with flat, ribbed, mucilaginous fruits, enclosed in a valvate calyx, and not unlike a small round cheese, on which account they have in England the vulgar name of Cheeses, and in France of Fromageons. [MALVACEÆ.]

MALMAISON. [SEINE ET OISE.]

MALMESBURY. [WILTSHIRE.]

MALMESBURY, WILLIAM OF, one of the most valuable of our old historians, is said to have been born in Somersetshire, about 1095 or 1096: his father was a Norman, his mother an Englishwoman. When a boy he was placed in the monastery whence he derived his name, where, in due time, he became librarian, and, according to Leland, precentor, and ultimately refused the dignity of abbot. He is generally supposed to have died about 1143, though Sharpe, in his translation of Malmesbury's 'History of the Kings of England,' says it is probable that he survived this period some time, for his 'Modern History' terminates at the end of the year 1142; and it appears that he lived long enough after its publication to make many corrections, alterations, and insertions in that work, as well as in the other portions of his history. Some notion of his diligence may be afforded by the following list of his works:—1, 'De Gestis Regum' (the history of the kings of England). The first three books were probably written after 1120. After some delay he wrote the fourth and fifth books, which he dedicated to Robert, earl of Gloucester, at whose request he afterwards composed, 2, 'Historiæ Novellæ' (the modern history). This appears to have been begun after the death of Henry I. 3, 'De Gestis Pontificum' (the history of the prelates of England), containing, in four books, an account of the bishops and of the principal monasteries, from the conversion of the English by St. Austin to 1123, to which he added a fifth, *i.e.* 4, 'De Vita Aldhelmi,' completed in 1125. 5, 'De Vita Dunstani,' in two books, extant in the Bodleian Library, MS. Rawlinson, 263, written at the request of the monks of Glastonbury. 6, 'Vita S. Patricii,' in two books, quoted by Leland in his 'Collectanea,' tom. iii., p. 272, but of which no manuscript is at present known, any more than of, 7, 'Vita S. Benigni.' 8, 'Passio S. Indracti,' MS., Bodley, Digby, 112. 9, 'De Antiquitate Glastoniensis Ecclesiæ,' addressed to Henry, bishop of Winchester, and of course written after 1129. 10, 'Vita S. Wulstani, Episcopi Wigorniensis,' a translation from the Anglo-Saxon, the greater part of which is published by Wharton in his 'Anglia Sacra.' 11, 'Chronica,' in three books, supposed to be lost. 12, 'Miracula S. Elfgifæ,' in metre. 13, 'Itinerarium Joannis Abbatis Meldunensis versus Romam,' drawn up after 1140, a manuscript of which was formerly in the possession of Bale. 14, 'Expositio Threnorum Hieremiæ,' MS., Bodley, 868. 15, 'De Miraculis Divæ Mariæ libri quatuor,' noticed by Leland in his 'Collectanea,' tom. iv., p. 155. 16, 'De Serie Evangelistarum,' in verse. This also is mentioned by Leland (ibid., p. 157), but neither this nor the preceding work is at present known in our manuscript libraries. 17, 'De Miraculis B. Andreæ,' MS., Cotton, Nero E. i. 18, 'Abbreviatio Amalarii de Ecclesiasticis Officiis,' MS., Lambeth, 380. 19, 'Epitome Historiæ Aimonis Floriacensis,' MS., Bodley, Selden, Arch., B. 32. This work contains an extract from the 'Breviarium Alaricianum,' or Visigoth Code, made by the author with the object of giving a view of the Roman law. (Selden *Ad Fletam*, c. 7, § 2.) 20, 'De Dictis et Factis memorabilibus Philosophorum,' Harl. MS. 3969. Tanner ascribes one or two other pieces to him.

William of Malmesbury's greater historical works, 'De Gestis Regum,' 'Novellæ,' and 'De Gestis Pontificum,' were published by Sir Henry Savile among the 'Scriptores post Bedam,' fol. 1596, reprinted, fol., Francof., 1601. A translation of the 'De Gestis Regum,' into English, by the Rev. John Sharpe, was published in 4to., London, 1815. Gale printed Malmesbury's 'Antiquities of Glastonbury,' and Wharton, as already noticed, published his 'Life of St. Aldhelm.'

An excellent feature of Malmesbury's literary character is his love of truth. He repeatedly declares that for the remoter periods of his historical works he had observed the greatest caution in throwing all responsibility for the facts on the authors from whom he derived them; and as to his own times he declares that he has recorded nothing that he had not either personally witnessed or learned from the most credible authority.

(Leland, *De Script. Brit.*; Tanner, *Bibl. Brit. Hib.*, pp. 359-360; Nicolson's *English Histor. Lib.*, edit. 1776, pp. 47-84-88; J. A. Fabricii *Bibl. Lat. med. et inf ætatis*, 4to., Patav., 1754, tom. iii., p. 152; Sharpe's *Pref.* to his translation of William of Malmesbury *De Gestis Regum.*)

MALMÖ, a town in Sweden, in the province of Skane and the political division of Malmölän, is situated about 55° 40′ N. lat. and near 13° E. long. It is built on the widest part of the Sound, nearly opposite the town of Copenhagen, on level ground, and has a good and safe harbour, protected by the fortress of Malmöhuus. The town is well built, and has regular streets. In the middle is a fine square, 166 yards long and 144 wide. The inhabitants, about 9000 in number, carry on an active commerce in corn, as Malmö is the principal commercial town of the fertile and rich province in which it is situated. It may also be counted among the manufacturing towns of Sweden, as there are several manufactories in which cloth, stockings, hats, gloves, carpets, soap, leather, starch, and looking-glasses are made. Some of these manufactories are rather extensive. It has a grammar-school and other schools for the poorer classes of society. (Forsell's *Statistik von Schweden.*)

MALMSEY, a luscious and high-flavoured wine made in the island of Madeira from grapes of a peculiar kind, which are suffered to attain the last stage of ripeness before they are gathered. Malmsley wine has much body, and will retain its good qualities for an indefinite period of time; in fact, it is improved materially by keeping The quantity made is small, much smaller indeed than the demand, to supply which the wine dealers are said to give factitious sweetness to common kinds of wine, which are then sold under the name of Malmsey. When newly made, Malmsey Madeira is of the same golden hue as the ordinary wine of the island, but its colour is materially deepened by age Malmsey wine is also made in the island of Teneriffe, but the quality is greatly inferior to that of Madeira.

MALO, ST., a seaport in France, on the coast of the English Channel, capital of an arrondissement in the department of Ille et Vilaine. It is in 48° 38′ N. lat. and 2° 2′ W. long.; 194 miles from Paris in a direct line west by south, or 221 miles by the road through Dreux, Alençon, Mayenne, and Fougères.

A town called Aletum, in the neighbourhood of this place, existed in the time of the Romans, and is mentioned in the 'Notitia Imperii.' The inhabitants, being continually exposed to the attacks of pirates, retired, in the eighth or ninth century, to a neighbouring rocky peninsula, on which they founded a town called St. Malo, from the name of the then bishop of Aletum. The site of the old town is indicated by the name of a headland, called by the Bretons Guich Alet. Before the Revolution, St. Malo was the seat of a bishopric.

The town of St. Malo is on a rocky peninsula on the eastern side of the æstuary of the Rance, which opens into the roadstead of St. Malo. The peninsula is joined to the main by a causeway about 200 yards wide. A little distance to the south of St. Malo is the town of St. Servan, separated from St. Malo, to which in reality it forms a suburb, by the harbour, which is an inlet of the æstuary. St. Malo is surrounded by walls and bastions, and defended on the north-west side by a castle built by Anne, duchess of Bretagne, and in other parts by five forts. The more modern part of the town is regularly laid out, and the ramparts afford pleasant walks. The principal public buildings are the ex-cathedral, the former episcopal palace, the exchange, and the theatre. The harbour, situated between the town, the isthmus, and the mainland, is commodious and safe. Vessels are left dry at low water: the depth at high water is 45 feet. The entrance is difficult from its narrowness, and from its being, as well as the roadstead, beset with rocks and shoals. There are two ports or docks, one of them for the navy, at St. Servan.

The population of St. Malo in 1831 was 9701 for the town, or 9981 for the commune; that of St. Servan 7665 for the town, 9975 for the commune: together 17,366 for the towns, or 19,956 for the communes. In 1836 the population of the commune of St. Malo was 9744. The inhabitants manufacture cordage, fishing-nets, and other utensils for the fisheries. There are ship-building yards, and a government snuff manufactory. Trade is not so brisk as formerly, perhaps through the diminution of the English smuggling trade. Considerable business is however done in wine, brandy, snuff, salt provisions, hemp, and pitch; in linens, which are sent to Spain; and in the agricultural produce of the surrounding country. There are depôts of salt and of colonial produce. There is one yearly fair, which lasts eight days. Many vessels are fitted out for the Indies, and for the whale and cod fisheries; and the coasting trade is very active. The sailors of St. Malo are among the best in France. In war-time many privateers are fitted out, the activity of which has drawn upon the town several attacks by the English.

There are two churches in St. Malo, beside the ex-cathedral and those in St. Servan; a foundling and a general hospital, a high-school, a free school for navigation, a drawing-school, and an agricultural society. There is a naval arsenal.

Jacques Cartier, the discoverer of Canada; the seaman Duguay-Trouin; Maupertuis, and La Mettrie, a physician who died in exile for doubting the immortality of the soul, were natives of this town.

The arrondissement of St. Malo comprehends 60 communes, and is divided into nine cantons, or districts under a justice of the peace: its area is 367 square miles: the population in 1831 was 120,561; in 1836, 118,243. The cultivation of tobacco is extensively carried on, and would be much more so but for the government restrictions.

MALONE, EDMOND, was born at Dublin in 1741. His father was one of the judges of the Court of Common Pleas in Ireland; and the subject of this notice, having taken a degree in the university of Dublin, was called to the Irish bar in 1767. Mr. Malone was however devoted to literary pursuits; and an independent fortune having devolved upon him, he took up his residence in London, and became an intimate of the more eminent literary men of that day, including Burke and Johnson. He subsequently became distinguished, principally as an editor of Shakspere. His first publication, connected with this his favourite subject, was that of a Supplement to Steevens's edition of 1778, in 2 vols. This contains Shakspere's sonnets and other poems, with notes, and the various plays which, by general consent, have been rejected from his works—we mean 'Sir John Oldcastle,' 'Locrine,' &c. It also includes 'Pericles,' which has subsequently found a place in the variorum editions. Malone displayed in this work many qualities which in some degree fitted him to be an editor of Shakspere's undoubted works; and in 1790 he brought out an edition of his own. He had previously contributed some notes to Steevens's edition of 1785. There were essential differences of opinion between Steevens and Malone, which would have rendered their co-operation perhaps impossible. Steevens carried his disregard of the authority of the texts of the old editions to an extravagant length; Malone, on the contrary, had a proper deference for that authority. Steevens, especially, despised the text of the first folio; Malone, in a much greater degree, respected it: Steevens was coarse and even prurient in his editorial remarks; Malone was cautious and inoffensive: Steevens had the more acuteness; Malone the greater common sense. As it was, Malone published a rival edition, and Steevens quarrelled with him for ever. In Malone's edition, his History of the Stage was, for the time at which it was written, a remarkable performance; and his Essay on the Genuineness of the three Plays of Henry VI. displays great critical sagacity and discrimination. The same qualifications which he exercised as an editor of Shakspere were equally exhibited in the part which he took in the controversies as to the genuineness of the Rowley poems, and the Shaksperian papers published by the Irelands. He was amongst the first to proclaim his belief that the poems attributed to Rowley were the production of Chatterton; and the imposition of William Henry Ireland was very clearly pointed out by him in a letter addressed to Lord Charlemont. This tract contains many interesting researches into our earlier literature, and is worth referring to, amidst the mass of nonsense which this controversy called forth. Malone also published, in 1797, the posthumous edition of the works of Sir Joshua Reynolds, with a memoir, he being one of that eminent man's executors. The remainder of his life was spent in adding to his notes on Shakspere, and preparing for a new edition, which he did not live to complete. His death took place in 1812, when he was in his seventy-first year. His posthumous edition of Shakspere, very carefully edited, was published by his friend Mr. James Boswell, in 1821, in 21 vols. Of Malone it is not, perhaps, very high praise to say that he was without doubt the best of the commentators on Shakspere. He is, compared with his predecessors, more trustworthy in his assertions, more cautious in his opinions, and more careful to interpret what he found in the text than to substitute his own conjectures. But he belonged to an age when the merits of Shakspere were not properly appreciated; and he is, like the rest of his brethren, cold and captious. He was of a critical school which, to a great extent, is fortunately extinct.

MALOPE, a genus of Malvaceous plants, consisting of two species, one of which is commonly cultivated as a favourite hardy annual. This plant, Malope malacoides, is common in Barbary, where it is found among stones and rocks, which it ornaments with its large crimson flowers; it is also met with in Sardinia and other parts of the south of Europe. The genus differs from Malva in having its carpels distinct, and heaped irregularly over a central receptacle, instead of being placed in a whorl and consolidated. Three or perhaps four other species are known to botanists.

MALOUINES. [Falkland Islands.]

MALPAS. [Cheshire.]

MALPIGHI, MARCELLUS, was born near Bologna, in 1628. He studied medicine in that university, and in 1653 received his doctor's degree. His chief instructor in anatomy was Massari, at whose house he tells us that he and a few other select students were accustomed to meet in private, to dissect and discuss the important discoveries of the day. In 1656 he was appointed professor of medicine at Bologna, but soon after resigned on being invited to a similar office in the university of Pisa. Here he formed an intimate acquaintance with Borelli, the professor of mathematics in the same institution, to whom he often expresses his gratitude for the kindness and instruction which he received from him, though he doubtless repaid no small part of his obligations in the assistance which he gave to the valuable treatise 'De Motu Animalium.' Declining health obliged Malpighi to return to Bologna, but in 1666 he went to Messina, where he held the professorship of medicine for four years. He then again resided near Bologna till 1691, when he was summoned to Rome, and appointed chief physician and chamberlain to Innocent XII. In 1694 he died of apoplexy.

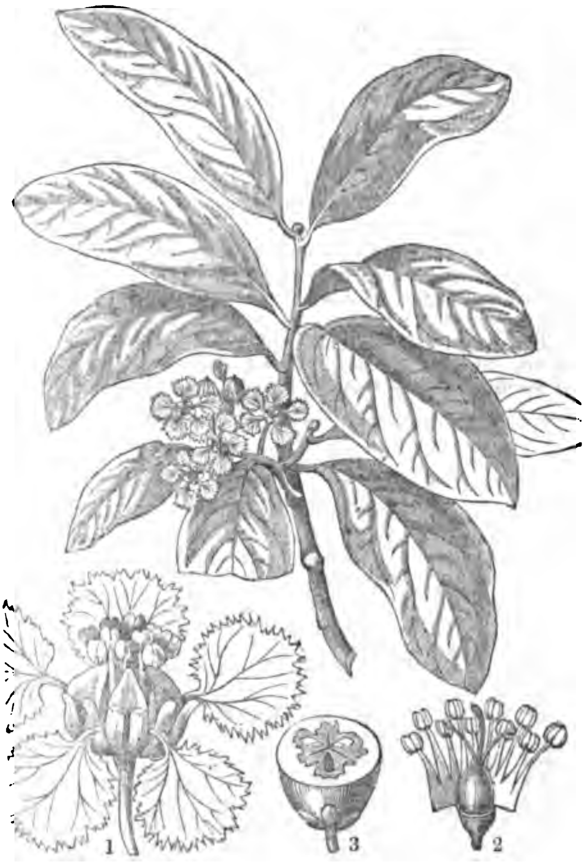
Malpighi is now chiefly remembered in connection with his discoveries in the anatomy of the skin and of the secreting glands. He first described clearly the structure of the tongue, showing that it is at once a muscular and a sensitive organ; and he pointed out the fine papillæ on its surface as the seat of sensation. Imagining that he could perceive a structure in the skin analogous to that of the surface of the tongue, he examined the former tissue in several animals, and at length succeeded in demonstrating that it is everywhere beset with delicate conical papillæ, the chief organs of the touch. In the coloured portion of the tongue of the ox he had first discovered the rete mucosum, or, as it is often called in his honour, rete Malpighii; and he afterwards showed a similar membrane on the skin of the negro. He proved, as Riolan had before done, that the colour of the skin depends on this substance, the cutis of white and of coloured races being always of the same rosy hue. [Skin.]

On the subject of the structure of secreting glands, Malpighi was long engaged in a discussion with Ruysch, maintaining that all glands consisted of ducts terminating in minute sacculi, on which blood-vessels ramified without having any open communication with them; while Ruysch held that the blood-vessels were continued directly and with open orifices into the ducts of the glands. The point was still debated when Müller's late work, 'De Glandularum Structurâ,' proved that Malpighi, though incorrect in some details, was perfectly correct in the general view which he had taken of this structure. [GLAND.]

Malpighi was the first who examined the circulation with the microscope. He published also some excellent observations on the chemical and other characters of the blood; and his works on the process of incubation, and on the structure and physiology of plants, though now almost forgotten, must have been very important additions to the knowledge of his day.

Several editions were published both of his separate treatises and of his complete works: the titles of the most important are, 'Anatomes Plantarum Idea'—'De Bombyce'—'De Formatione Pulli in Ovo'—'De Cerebro'—'De Linguâ'—'De externo Tactûs Organo'—'De Omento'—'De Structurâ Viscerum'—'De Pulmonibus'—'De Structurâ Glandularum Conglobatarum.' The 'Opera Posthuma' were edited by Petrus Regis of Montpellier; they consist chiefly of a history of his discoveries and controversies, with which he has interwoven his own biography. Several of Malpighi's best works were addressed to the Royal Society of London, of which he was elected an honorary member in 1688, and was afterwards a constant correspondent.

MALPIGHIA'CEÆ, a natural order of exogenous plants, with polypetalous flowers, trigynous pistils, usually monadelphous stamens, and alternate exstipulate leaves, inhabiting various parts of the tropics. They are usually shrubs or trees, and but seldom herbaceous plants. In addition to the more general characters already mentioned, they have in a majority of cases a pair of convex oval glands on the face of each sepal, and in many species the hairs are attached to the leaves, &c. by the middle; so that hairs of that description have acquired the name of *Malpighiaceous*. Many of them are beautiful objects, especially the Galphimias and climbing species of Hiræa and Banisteria; a few only are useful. The bark of Malpighia Moureila and crassifolia is a kind of febrifuge. The fruit of Malpighia glabra is the Barbadoes Cherry of the West Indies: it varies in size, from that of a large pea to a small cherry, is smooth, shining, and has three triangular stones; its flesh is juicy and sweet, but insipid. The fruit of Byrsonima coriacea, or Lotus-berry of the West Indies, is of much better quality; it is yellow, and contains a single stone. A few kinds produce timber of a bright yellow colour.



Malpighia macrophylla.

1, an entire flower, much magnified; 2, the stamens and pistils; 3, a transverse section of the ripe fruit.

The order is nearly related to the Aceraceæ, or Sycamores of colder climates, differing in little except the ternary division of the fruit, the symmetrical flowers with unguiculate petals, and the pendulous or suspended seeds.

MALPLAQUET. [MARLBOROUGH, DUKE OF.]

MALT is grain, usually barley, which has become sweet and more soluble in water from the conversion of its starch into sugar by artificial germination to a certain extent, after which the process is stopped by the application of heat.

For the following short sketch of the process, which is called *malting*, we are chiefly indebted to a valuable work on 'Vegetable Chemistry,' recently published by Dr. Thomson, of Glasgow.

The barley is steeped in cold water for a period which (as regulated by law) must not be less than 40 hours; but beyond that period the steeping may be continued as long as it is thought proper. Here it imbibes moisture, and increases in bulk; at the same time a quantity of carbonic acid is emitted, and a part of the substance of the barley is dissolved by the steep-water. The proportion of water imbibed depends partly upon the barley, and partly on the length of time that it is steeped. From the average of a good many trials, it appears that the medium increase of weight from steeping may be reckoned 0·47; that is to say, every 100 pounds of barley when taken out of the steep weigh 147 pounds. The average increase of bulk is about a fifth; that is to say, 100 bushels of grain, after being steeped, swell to the bulk of 120 bushels. The carbonic acid emitted while the barley is in the steep is inconsiderable; and it is probable, from the experiments of Saussure, that it owes its formation, at least in part, to the oxygen held in solution by the steep-water.

The steep-water gradually acquires a yellow colour, and the peculiar smell and taste of water in which straw has been steeped. The quantity of matter which it holds in solution varies from $\frac{1}{50}$th to $\frac{1}{100}$th of the weight of barley. It consists chiefly of an extractive matter of a yellow colour and disagreeable bitter taste, which deliquesces in a moist atmosphere, and always contains a portion of nitrate of soda. It holds in solution most of the carbonic acid disengaged. This extractive matter is obviously derived from the husk of the barley, and is that substance to which the barley owes its colour. Accordingly grain becomes much paler by steeping.

After the grain has remained a sufficient time in the steep, the water is drained off, and the barley thrown out of the cistern upon the malt-floor, where it is formed into a heap called the *couch*, about 16 inches deep. In this situation it is allowed to remain about 26 hours. It is then turned by means of wooden shovels, and diminished a little in depth. This turning is repeated twice a day or oftener, and the grain is spread thinner and thinner, till at last its depth does not exceed a few inches.

When placed in a couch, it begins gradually to absorb oxygen from the atmosphere, and to convert it into carbonic acid, at first very slowly, but afterwards more rapidly. The temperature, at first the same with that of the external air, begins slowly to increase; and in about 96 hours the grain is at an average about 10° hotter than the surrounding atmosphere. At this time the grain, which had become dry on the surface, becomes again so moist that it will wet the hand, and exhales at the same time an agreeable odour, not unlike that of apples. The appearance of this moisture is called *sweating*. A small portion of alcohol appears to be volatilized at this period. The great object of the maltman is to keep the temperature from becoming excessive, which is effected by frequent turning. The temperature which it is wished to preserve varies from 55° to 62°, according to the different modes of malting pursued.

At the time of the sweating, the roots of the grains begin to appear, at first like a small white prominence at the bottom of each seed, which soon divides itself into three rootlets, and increases in length with very great rapidity, unless checked by turning the malt. About a day after the sprouting of the roots, the rudiments of the future stem, called *acrospire* by the maltsters, may be seen to lengthen. It rises from the same extremity of the seed with the root, and advancing within the husk, at last issues from the opposite end; but the process of malting is stopped before it has made such progress.

As the acrospire shoots along the grain, the appearance of the kernel, or mealy part of the corn, undergoes a considerable change. The glutinous and mucilaginous matter is taken up and removed, the colour becomes white, and the texture so loose that it crumbles to powder between the fingers. The object of malting is to produce this change: when it is accomplished, which takes place when the acrospire has come near to the end of the seed, the process is stopped by drying the malt upon the kiln. The temperature at first does not exceed 90°; but it is raised very slowly up to 140° or higher, according to circumstances. The malt is then cleared, to separate the rootlets, which are considered injurious.

Barley, by being converted into malt, generally increases two or three per cent. in bulk; and loses, at an average, about 20 per cent. in weight, of which 12 are ascribed to kiln-drying, and consist of water, which the barley would have lost had it been exposed to the same temperature; so that the real loss does not exceed 8 per cent. From many trials, made with as much attention to all the circumstances as possible, Dr. Thomson considers the following to be the way of accounting for this loss:—

Carried off by the steep-water	1·5
Dissipated on the floor	3·0
Roots, separated by clearing	3·0
Waste	0·5
	8·0

The loss on the floor ought, in Dr. Thomson's opinion, to be entirely owing to the separation of carbon by the oxygen of the atmosphere; but were this the only cause, it would be much smaller than three per cent., according to the same authority. Two other causes concur to produce this loss:—1. Many of the roots are broken off during the turning of the malt; these wither and are lost, while others grow in their place. 2. A certain portion of the seeds lose the power of germinating, by bruises and other accidents, and these lose a much greater portion than three per cent. of their real weight. After numerous careful trials, Dr. Thomson is disposed to conclude that the quantity of carbon separated during the whole process of malting, by the formation of carbonic acid gas, does not exceed two per cent., and that the weight of the roots formed amounts often to four per cent. These two, in reality, include the whole loss of weight which barley sustains when malted. What is lost in the steep, being husk, need scarcely be reckoned.

In the opinion of Dr. Thomson, the roots appear, from the process, to be formed chiefly from the mucilaginous and glutinous parts of the kernel. The starch is not employed in their formation, but undergoes a change, intended, no doubt, to fit it for the future nourishment of the plumule. It acquires a sweetish taste, and the property of forming a transparent solution with hot water. In short, it approaches somewhat to the nature of sugar, and is probably the same with the sugar into which starch is converted by boiling it with diluted sulphuric acid.

The following are the results of Dr. Thomson's analysis of barley and the malt made from it:—

	Barley.	Malt.
Gluten	3	1
Sugar	4	16
Gum	5	14
Starch	88	69
	100	100

In brewing ale, porter, and table-beer, three different kinds of malt are employed, which are known as pale and amber malts, brown or blown malt, and roasted or black malt, sometimes called patent malt. The pale or amber malt yields the saccharine or fermentable extract; the brown malt is not fermentable, but is employed to impart flavour; and the roasted malt is employed, instead of burnt sugar, merely to give colouring matter to porter.

The analysis of malt above stated is that of pale malt whilst in the brown and roasted malts the sugar appears to be entirely converted into gum and colouring and extractive matters; and hence they are incapable of undergoing fermentation. The brown malt is subjected to a higher temperature in drying than the pale malt, and by a still further exposure to heat in revolving cylinders or roasters it is converted into black or patent malt.

Statistics.—Malt was first made to contribute to the public revenue in England in 1697. In Scotland the duty commenced in 1713, and in Ireland in 1785. The rate of duty, calculated on the imperial quarter, was in England 6⅔d. per bushel from 1697 to 1760; from the latter year to 1780 the duty was 9½-⅛d. per bushel; from 1780 to 1791 the duty was 1s. 4½d.; it was then for a short time raised to 1s. 7½d., but was lowered to 1s. 4½d. again in 1793, and so continued till 1802, when it was raised to 2s. 5d., and in the following year was further raised to 4s. 5¾d., and so continued till 1816, when it was reduced to 2s. 5d. In 1819 the duty was advanced to 3s. 7½d.; in 1822 it was reduced to 2s. 7d., and has continued at that rate until this time. In Scotland the duty from 1713 to 1726 was 6⅔d. per bushel; in 1726 it was reduced to one-half that rate until 1760; in 1780 it was again advanced to 8⅓d., and in [illegible] to 11d.. In 1804 a distinction was made in the duty, according as the malt was made from barley or from bere or bigg, and thenceforward the rates have been as follows:—

	From Barley. s.	d.	From Bere or Bigg. s.	d.
1804	3	9¼	3	1½
1816	1	8¾	1	8¾
1819	3	7½	3	7½
1820	3	7½	3	1
1821	3	7½	2	10
1822	2	7	2	0

There has not been any alteration since 1822.

In Ireland the duty first charged in 1785 was 7d. per bushel; in 1794 the rate was advanced to 9½d., and in the following year to 1s. 3d.; in 1798 to 1s. 5d., and in 1799 to 1s. 6½d. Further additions were made in 1803 to 1s. 9½d., in 1804 to 2s. 3½d., in 1806 to 2s. 6¾d., in 1813 to 3s. 3½d., and in 1815 to 4s. 5d. A reduction took place in 1816 to 2s. 4½d.; in 1826 the duty was again raised to 3s. 6¾d., and was again reduced in 1822 to 2s. 7d. The only alteration since was made in 1830, when the duty on malt from bigg was reduced to 2s. per bushel.

The quantity of Malt charged with duty in various years in the different divisions of the kingdom, and the amount of revenue received thereon, have been as follows:—

Years.	ENGLAND. Bushels.	SCOTLAND. Bushels.	IRELAND. Bushels.	Total. Bushels.	Duty. £
1703	26,754,505	..	..	26,754,505	[illegible]
1710	19,671,021	..	..	19,671,021	[illegible]
1720	25,625,844	..	..	25,625,844	[illegible]
1730	28,410,421	..	..	28,410,421	[illegible]
1740	22,074,674	..	..	22,074,674	[illegible]
1750	29,284,786	..	..	29,284,786	[illegible]
1760	27,810,971	..	..	27,810,971	[illegible]
1770	24,452,960	1,762,460	..	26,215,420	[illegible]
1780	30,805,100	2,215,487	..	33,020,587	[illegible]
1790	21,976,959	1,544,666	4,607,953	28,129,578	[illegible]
1800	14,049,749	876,598	681,340	15,607,687	[illegible]
1810	23,546,346	820,294	2,522,543	26,889,183	[illegible]
1820	23,884,242	1,182,208	1,793,671	26,860,121	[illegible]
1821	26,138,437	1,305,659	1,949,315	29,393,411	5,360,765
1822	26,688,512	1,403,177	1,756,391	29,848,080	[illegible]
1823	24,845,152	1,616,590	1,702,395	28,164,137	[illegible]
1824	27,615,383	2,788,608	2,107,752	32,511,743	[illegible]
1825	29,572,741	3,925,847	2,706,862	36,205,450	[illegible]
1826	27,335,971	2,726,555	2,406,252	32,468,778	[illegible]
1827	25,096,337	2,714,073	1,803,091	29,613,501	[illegible]
1828	30,517,819	3,867,159	2,409,228	36,794,206	[illegible]
1829	23,428,135	3,712,963	2,012,079	29,153,177	[illegible]
1830	26,900,902	4,101,946	1,959,606	32,962,454	[illegible]
1831	32,963,470	4,186,955	2.101,844	39,252,269	[illegible]
1832	31,669,771	3,714,334	2,006,350	37,390,455	[illegible]
1833	33,789,010	4,302,036	1,984,849	40,075,895	[illegible]
1834	34,449,646	4,491,292	2,204,658	41,145,596	[illegible]
1835	36,078,856	4,459,553	2,353,645	42,892,054	[illegible]
1836	37,196,997	4,903,187	2,287,535	44,387,719	[illegible]
1837	33,692,356	4,583,446	2,275,347	40,551,149	[illegible]
1838	33,823,985	4,419,141	2,262,440	40,505,566	[illegible]

It cannot fail to be observed, from these figures, that the increased consumption of malt in this country has borne a very inadequate proportion to the increase of the population. In the year 1730 the population of England and

Wales was 5,687,993, and it will be seen that the number of bushels of malt made for their use was within a very minute fraction of five bushels for each. In 1831 the numbers were 13,894,574, and the consumption of malt 32,963,470, being less than 2½ bushels for each. The reason for this comparative falling off is to be sought in our fiscal regulations. The rate of the duty was, in 1730, only one-fifth of the rate paid in 1831; and this alone would of course tend to check the consumption; but coincidently with this cause the importation of foreign-made malt has been prohibited; and as all the land in England fitted for the production of fine barley, such as is suited for the maltster, has long since been so applied, the consumption has been by that means starved, and the price enhanced so as to come in aggravation of the high duty. The importation of barley from foreign countries is allowed under very high duties, fluctuating with the price of home produce; but under no state of the market can any addition be thus made to the quantity of malt in this country, because barley which has undergone a voyage of any length is unsuited to the process of malting.

MALTA.—*General Description.*—The Maltese islands, in the Mediterranean, lie between 35° 49′ and 36° N. lat., and 14° 10′ and 14° 36′ E. long. from Greenwich. Malta is 58 miles from the nearest point of Sicily, and 179 from Cape Demas, the nearest point of the mainland of Africa. Its greatest length is 17½ miles, its greatest breadth is 9½ miles, and its circuit, as a boat would sail round it, 44 miles. It contains two principal ports on the south-east side of the island, which are separated by a tongue of land a mile and a half long, on which are built the castle of St. Elmo and a lighthouse, commanding the entrance to both ports. This tongue of land (formerly called Mount Sceberras) is 200 feet above the level of the sea, but lowers towards the point, and is almost flat at the part where it joins the mainland. On this advantageous position is built the modern city of Valletta, which is the seat of government, and the citadel of the island. It is defended on all sides by the most stupendous fortifications, which no power commanding less abundant resources than the Knights of St. John of Jerusalem, who drew large revenues and sometimes contributions from the richest countries of Europe, almost for this express purpose, could have constructed. Other works situate on the opposite side of the great harbour are of nearly equal strength; amongst which is the powerful castle of St. Angelo, that rakes the entrance of the harbour, with four tiers of guns, the heaviest of which is *à fleur d'eau*, corresponding to these, and completely forbidding every approach. Altogether the place is considered impregnable, which was proved by the fruitless endeavours of the British to expel the French garrison in 1798-1800.

When the British troops took possession of the place, after the capitulation of 1800, there were upwards of 800 pieces of ordnance mounted on the fortifications. The land-front of Valletta is defended by a strong line of works, which stretch across from one port to the other, having within them two very high cavaliers, which command the town and country, and look into the works on the opposite sides of each harbour. This front is strengthened by a dry ditch running its whole length, excavated in the rock to a depth varying from 90 to 140 feet. Outside the works of Valletta there is a suburb called Florian, and beyond this is another series of fortifications, consisting of an interior and exterior line and a horn and crown-work in front of them. The total number of embrasures in the defences of Valletta and its ports, including the three cities, is 947; but as the cavaliers and some of the parapets are *en barbette*, it may be calculated that the number of guns required to mount these works completely would be 1150. Many however are kept in store, and the embrasures at some points are considered useless.

The great harbour, which is to the eastward of Valletta, is about 3400 yards in length, with an entrance 450 yards wide, defended by a strong fort opposite the castle of St. Elmo, called Ricasoli, which crosses its fire, but is commanded by that castle. The harbour varies in width, from 700 to 450 yards, without including three coves or inlets, which are of themselves ports and capable of containing many ships of war. In one of these is situate the naval arsenal, consisting of a rope-walk, the offices of the naval departments and extensive storehouses, which would contain all that is necessary for the fitting out of a very large fleet. On the opposite side of the same cove are handsome residences for the superintendent and officers of the arsenal, and spacious stores for the victualling department. Here also are three immense arches of masonry, under which the galleys of the Order were built, and drawn up for repair and for protection from the weather. All these buildings were constructed by the Order, and they have been greatly improved by the British government. On a prominent point opposite Valletta, called Bighi, stands the new naval hospital, which was built by a vote of parliament in 1830, and is one of the many striking objects which surround this beautiful harbour. The entrance of the port has no bar or other impediment, and the water is so deep that the largest ships can sail in, close under the bastions of Valletta, direct to their anchorage. In the great harbour and its coves five and twenty sail of the line have been known to lie during the last war without inconvenience, besides three or four hundred merchantmen. The only wind which renders it dangerous for boats to ply, or creates any uneasiness for the shipping, is the north-east (commonly called *gregale*), and that only when it blows hard; but there is good holding ground, and accidents seldom happen.

The harbour to the westward, which is called Marsamuscetto (a word signifying, in Arabic, 'a place of shelter'), has at its entrance, opposite to and besides the castle of St. Elmo, a small but powerful fort called Fort Tigné. It is principally appropriated to vessels arriving from the Levant or countries infected with the plague, and it is therefore commonly called the Quarantine harbour. Here is also the lazzaretto, a suite of extensive buildings, built on an island in the centre of the harbour, with which have lately been united the spacious apartments of the square fort called Fort Manoel, on the same island; the whole forming the most complete quarantine establishment in the Mediterranean. In addition to its former accommodations a new plague-hospital is now nearly finished. Since the plague of 1813-14 no case of plague has occurred in the island, though many infected ships and crews have been received in this lazzaretto.

Besides the harbours already mentioned there are several bays which ships sometimes enter in stress of weather, such as Marsa Scirocco, St. Thomas's Bay, and Marsa Scala, to the south-eastward of Valletta, and St. Julian's, St. Paul's, and Melleha, to the north-westward, on the shores of which, as well as on all parts of the island where a landing could be effected, small towers are erected, which under former governments served to give alarm in case of the appearance of an enemy, but are now only used to prevent smuggling and maintain the quarantine laws.

The whole of the southern coast of the island is by nature inaccessible. The rocks rise perpendicularly from the sea to the height of several hundred feet. The island slopes from the southern to the northern side.

The small islands of Gozo, Comino, and Filfla belong to the group of the Maltese islands. The island of Gozo is about three miles and a half north-west of Malta. It is of an oval form, ten miles long by five and a half in breadth; it has no town or port on its coasts, and is only approachable by small craft. Its coasts are perpendicular on all sides, and it is studded with a few points of high land in the form of cones, one of which, being about 570 feet high, serves as a landmark to vessels coming from the westward. Between Malta and Gozo stands the little uninhabited island of Comino, in the channel between the two islands, which has a depth of water sufficient for the largest ships. This island is two miles long by one mile wide. Another small island called Filfla, one mile and three-quarters south of Malta, is about a mile long and half a mile wide; it is a high perpendicular rock, also without inhabitants.

The general appearance of Malta and Gozo at sea is that of flat lands, the highest part of which is less than 600 feet above the level of the sea, and not visible at a greater distance than 24 miles. From being entirely calcareous rock, without any trees of large size, and a part of the year without any verdure whatever, the aspect of these islands is dreary and barren.

Particular Description.—The scene on entering the port of Malta is one of the most striking and beautiful that can be conceived. This magnificent harbour is surrounded with bastions, over which appear handsome buildings and the towers of numerous churches, all built of stone, and presenting the cleanest and most brilliant appearance. On one side stands the city of Valletta majestically towering above the harbour, and on the other the three cities of Vittoriosa, Cospicua, and Senglea (commonly called the Borgo, Burmola, and Isola), which in fact form one continued town, covering the two spits of land which project from the eastern side of the harbour like pointing fingers, and forming the inlets or coves already mentioned. Valletta and these three cities compose the capital of Malta; Valletta being the seat of the civil government, the military head-quarters, and the residence of the Maltese gentry and the principal merchants. The cities on the opposite side are inhabited chiefly by those who depend upon the naval arsenal and departments, ship-builders (who have several private yards there), and the proprietors of small craft, and traders with the neighbouring coasts. Valletta has a population of 28,000 souls; that of the three cities on the opposite side of the harbour amounts to 20,000, who have hourly and constant communication by row-boats, which pass and repass the harbour and add to its lively appearance. The three cities have their respective fortifications, which have all a connection, and serve to defend each other. The Cottonera works, which surround the whole on the land side, enclose a large tract of ground; they were intended by the Grand-master Cottoner as a shelter for the population of the country in case of invasion; but they were never finished, and have no advanced works.

The eastern part of the island is separated from the western by a ridge of land which crosses the island to the westward of Valletta, and forms a natural fortification. The island is thus divided into two parts, of which the eastern contain all the casals, or villages. On this line are several old entrenchments, behind which the troops and inhabitants fell back, when they were unable to prevent a disembarkation on the western part of the island; and if no hopes remained of arresting the progress of the enemy there, they retired upon Valletta, or into the Cottonera. These works, the principal of which are at Nasciar, are now useless, although they still continue to bound the populous part of the island, through the force of habit and the situation of the parish churches. This concentration of the population was caused by their former insecurity. In the days of the Order, no inhabitant trusted himself to sleep on the coast unprotected by walls of defence; but at present the general safety is such, that the pleasant villages of St. Julian's and Sliema have sprung up on the coast to the westward of Valletta, where the inhabitants of the capital have built country-houses, and enjoy the summer breeze without any fear of being dragged from their beds into slavery. Although the western division of the island contains no towns, and scarcely any habitations, there is much land under cultivation, and the wild thyme and other odoriferous plants, which abound in these parts, produce the honey for which Malta has always been so famous. There are also considerable salt-works here, which are the property of the government. From Nasciar there is a fine and extensive prospect over this end of the island, which takes in Comino and Gozo.

In the eastern division are the antient capital and 22 casals or villages. Città Vecchia, or the old city, as it is commonly called, but the proper name of which is Città Notabile,* is situate on a rising ground in the interior of the island, about six miles from Valletta, and was, before the foundation of the latter city, the capital of the island. It is still the seat of the bishopric, and contains the cathedral, a handsome modern edifice, built on the site of the antient church. The city is walled, but is of no importance as a fortification. It contains many good and even magnificent buildings, but, with the exception of two large convents, the population is very trifling. A populous suburb, called the Rabbato, is inhabited by the dependents of many convents and ecclesiastical establishments in the neighbourhood, and by a large agricultural population. The catacombs cut in the calcareous rock are said to be very extensive, but are only partially open, the passages being walled up to prevent the curious from losing themselves; their origin and purpose are unknown, but they appear to be of great antiquity. The parish churches of the casals are large and magnificent: they are built of the stone of the island, and being isolated and well situated in the centre of the habitations, display their architecture to advantage. The attachment of the Maltese to their religion, and their fondness for its forms, induce them to make great sacrifices for the maintenance of their churches, which are richly decorated. There are many large towns on the Continent, and even in Italy, where the cathedrals are not more splendid than some of these village churches, which form a striking contrast to the poverty and simple mode of life of the village population.

There are no streams in Malta, and but few springs. The rain-water is collected in tanks, which are carefully excavated in the rock, and lined with a cement of pozzuolana; in ordinary seasons the tanks in the country are sufficient for agricultural purposes. The inhabitants of Valletta and the shipping are supplied with water by means of an aqueduct which conveys it from springs in the southern part of the island, and supplies all the lands in its passage. In seasons of great drought however the water is scanty. This magnificent work of the Grand-Master Wignacourt was built in 1616; it is eight miles and a half long, in some parts supported on arches, and on others running under ground.

Gozo contains six casals, and in the centre of the island, on a considerable eminence, about four miles distant from Migiarro, the principal landing-place, is a very old castle, the works of which are in a ruinous state. The inhabitants of the island, before the construction of towers on the coast, were obliged to retire every night within the precincts of these fortifications to protect themselves from the Barbary corsairs. At the foot of this castle is a populous town called the Rabbato. Gozo is more fertile than Malta. Its surface is more undulating, and its gardens are richer; it produces a great quantity of fruit and vegetables, and fresh cheese made from goats' milk, which are daily sent to Malta. The communication is kept up by 10 or 12 large boats with lattine sails. The *fungus melitensis* grows on a small rock lying off the western end of Gozo; it was once celebrated as a styptic, and was applied externally to stanch blood. Gozo contains a remarkable ruin called the *Giant's Tower*, from its being built of enormous stones, without cement. A large curious enclosure, with apartments contiguous, may be traced, but there is no style of architecture discoverable in these remains, nor any other indication of the æra to which they belong, except that they are cyclopean, and certainly of very great antiquity.

Agriculture.—The surface of Malta and Gozo is estimated at 114 square miles, or 72,960 acres, of which about two-thirds are cultivated, and the remaining third is bare rock. Notwithstanding what has been said of the sterile appearance of the island, a spot which nature seemed to condemn to barrenness has been rendered productive to an astonishing degree. It is a vulgar error to suppose that the soil of Malta has been brought from Sicily. There is much good native earth in the valleys, which has been converted into productive fields; but a great portion of the land has been brought to its present state of culture by the industrious native, who with great labour and expense cuts away the hard surface of the rock, and frequently finds a quantity of earth lying inert in the crevices and interstices beneath. This earth is carefully collected and placed in layers, seldom more than eighteen inches deep, on levels of loose broken-up rock; and such is the favourable nature of the climate, and the porous quality of the rock itself, which retains a certain degree of moisture, that the farmer who is not sparing of manure raises two crops a year, without ever being obliged to let his land lie fallow. The want of rain in summer is supplied by a heavy dew which falls at night. The produce of Malta is cotton (which is its staple), wheat, barley, pulse, potatoes, barilla, cummin-seed, and sulla. This last-named plant, which is what is called the French honeysuckle in England, grows to the height of four or five feet, and terminates in a large crimson blossom; it is a substantial and nourishing fodder for animals. Wheat and barley are sown in November, and cut in May and June. There are no oats. As there is no meadow-land, much barley is cut when green for draught animals; and the straw (which is very fine) is a good substitute for hay. The produce of corn is only sufficient for the subsistence of the population for about four months of the year. The fruits of Malta are generally good and in great variety, and the vegetables are excellent. The Malta orange is superior to all others, and melons, figs, and grapes are of a particularly fine flavour. No wine is made in Malta. The carrob grows in abundance: some of the carrob-trees are a hundred years old, and annually produce a plentiful crop.

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* The Maltese call their antient capital Medina—*the city*.

Animals.—There are no wild animals in the island, and, from the scarcity of pasture, very few cattle are bred. Meat is principally imported from Barbary. Horses are also imported, but some mules are reared, and the asses of Malta and Gozo have always been celebrated for their strength and beauty; they fetch large sums for exportation. Goats are likewise bred, which are prized for the quantity of milk they give. An animal once peculiar to Malta is the small dog with a long silken coat, mentioned by Pliny, which Buffon calls 'bichon;' but this race of dogs is now extinct. No venomous reptiles are known. As fish forms a large portion of the food of the inhabitants, the markets are well supplied with the common kinds. The dory, rock-cod, white and red mullet, and a species of whiting, commonly called *lupo*, are however generally to be had, and are excellent. The cray-fish, found on the rocks of the island of Gozo, are of enormous size and fine flavour.

Roads and Appearance of the Country.—The roads in Malta and Gozo, generally speaking, are good, and communicate with all parts of each island: those branching off from Valletta have received great attention from the present governor, Sir Henry Bouverie.

The inland modes of transport are by single-horse carts, and horses, mules, or asses of burden. The calesse of Malta is an uncouth-looking vehicle, slung upon a clumsy pair of wheels and shafts, and is made to carry four persons, but always drawn by one horse, by the side of which the driver runs. The glare of the hard naked roads, without hedges and without trees, is injurious to the eyes under a bright sun. The verdure being very partial either in extent or duration, the eye rests upon the innumerable stone dwarf walls, which are built up with the utmost care to prevent the precious earth from being washed away by the rains; and these are only relieved here and there by the fine rich dark tint of the carrob-tree, which is always green; and occasionally by the cactus, or Indian fig, which grows in considerable abundance.

Climate.—Although these islands cannot boast of rich landscape, they are blessed with the steadiest climate in Europe. If the shade of trees be wanting, the inhabitants are free from the damp and stagnant air which infects woody countries; and the barrenness of the rock is compensated by the absence of vegetable putrefaction. During the height of summer the heat is sometimes very oppressive; but the houses are spacious and well-built of stone, particularly in the capital. Valletta is superior in this respect to any town on the continent. For the greater part of the year the atmosphere is so clear that it gives brilliancy and life to every object. The summit of Mount Ætna may often be distinctly seen at sunrise or sunset, although it is 128 miles distant. The morning and evening sky is also most gorgeous and beautiful. But upon the subject of climate we shall rely upon Dr. Hennen (*Medical Topography of the Mediterranean*), who lived many years in Malta, and whose observations are confirmed by those who have long resided there. Much has been said, he remarks, on the climate of Malta: by some it has been represented as the hottest on earth; by others, as so dry as to be absolutely without fogs or dews; while others again consider it as more variable than the climate of England. Amid this great diversity of opinion however, it is almost universally admitted to be remarkably healthy. On reference to tables kept for the last six years, it appears that the heat indicated by the thermometer within doors has been—maximum 90°, minimum 46°, medium 63°. Every person accustomed to thermometrical observations is aware of the difference between sensible heat and that indicated by instruments. In Malta it is peculiarly striking, and greatly depends on the state of the winds; but it is in the night season that the heat is most oppressive, so much so as to justify the term 'implacable,' which is often applied to it. The sun in summer remains so long above the horizon, and the stone walls absorb such an enormous quantity of heat, that they never have a sufficient time allowed them to get cool; and during the short nights this heat radiates from them so copiously as to render the nights as hot as the days, and much more oppressive to the feelings of those who are accustomed to associate the idea of coolness with darkness. 'I have seen the thermometer (says Dr. Hennen) in a very sheltered part of my house steadily maintain during the night the same height to which it had risen in the day, while I marked it with feelings of increased oppression, and this for nearly three successive weeks of August and September, 1822.' No regular sea or land breezes are felt at Malta. As soon as the sun sinks beneath the horizon, the atmosphere becomes close and sultry, and whatever little breeze may have prevailed throughout the day dies away at once. Rain falls with tropical violence in the months of December, January, and part of February. The first indications of rain ordinarily appear about the end of August or the beginning of September. There are then three, four, or more days of brisk showers, with intermediate sunshine. October and the early part of November are delightful; the air is by that time sensibly cooled, and it is occasionally refreshed by showers. This season is denominated St. Martin's, or the little summer. December, January, and February are the rainy winter months, not however without the frequent recurrence of fine days. About March the sky gets settled. An occasional shower may fall in April and May; but during the months of June, July, and August scarcely a cloud is to be seen in the atmosphere. Unlike tropical climates, the rainy season of Malta is not peculiarly unhealthy, which may be in some measure attributed to the fact that the most copious rains fall principally during the night; and so absorbent is the soil in the country, and so well paved and drained are the streets in the city, that the rain is carried off from the surface almost as soon as it falls.

With regard to the winds, the only one which is deleterious is that called the *scirocco* of the Mediterranean; and all winds blowing between the south and east are of this character. In Malta they are most prevalent in the end of August and in all September; or if they blow in other less sultry months, their effects are not so oppressive. Persons who have felt them but slightly on their first arrival have been not the less sensible to them after some time, and feel a languor and disposition to perspire with the slightest exertion. Dr. Benza, speaking of the scirocco as felt in Sicily, gives a correct list of the sensations it causes: a general lassitude or torpor of the muscular system, attended by heaviness and oppression of the nervous system, inducing an inaptitude to any exercise, either corporal or mental; everything is damp and clammy to the touch, particularly one's clothes, which feel as if they had been dipped in water; the appetite is impaired, the thirst increased, the perspiration profuse; in short, one feels as if all the pores (as the common expression is) of one's frame were relaxed and open. All persons of weak constitution suffer considerably under the influence of this wind, and should avoid Malta in the month of September. But the winter of Malta is very delightful. The rain rarely continues for many days together; and although the air is sometimes penetrating, it is very common to enjoy clear weather and a cloudless sky. Frost and snow are unknown. Throughout the spring, northerly and westerly winds refresh the atmosphere; and it is not until the month of July that the inconveniences before described begin to be felt. Malta is eminently fitted for the residence of English invalids during the winter, *i.e.* from the beginning of October to the end of May. Englishmen may here find English society, reading-rooms newspapers, &c., and English medical advice. The houses are excellent; living is good and cheap; and the communication with England is speedy and regular. Malta has always been free from earthquakes. It may be remarked that hydrophobia is unknown in Malta; and that horses are never subject to the glanders, or to the disease called grease, so destructive to them in other countries; which may be owing to the dryness of the climate.

Character of the People.—The natives of Malta are a dark-skinned athletic race, and on that account, and from their Arabic dialect, have often been considered of African origin; but we look in vain for the Arab features. They are hardy and robust. The men are about the middle height, erect in stature, well formed, and active. The women are in general below the middle standard, but they are well made and graceful, have regular features and delicate limbs, and many of them are handsome; their complexion is usually dark. Deformity is exceedingly rare, and the general hale appearance of the population is an evidence of the salubrity of the climate. The Maltese marry very early: instances are not uncommon where girls have been mothers at fifteen. The women are very prolific; and where there are so few resources for the employment of families, there must be much poverty and wretchedness;

but the people are industrious, temperate, and frugal, and, being favoured by the climate, their wants are few. The great bulk of the people, who are not employed in field-labour, are stone-cutters. The Maltese are also excellent seamen, and are esteemed such in all the ports of the Mediterranean. In Valletta, since the connection with the English, all articles of household furniture are made in a superior manner, and much furniture is exported to the Levant. Workmen and artisans of all descriptions are numerous and expert in their respective trades. Their carvings in stone and many other works attest an eye and hand capable of great excellence in art. The elegance and beauty of their filagree work in gold and silver are well known. The higher orders enter into all the amusements common to persons of a similar rank in other parts of Europe; but gambling, drunkenness, and intrigue are almost unknown amongst them. They are fond of mixing in English society, and follow its usages: their manners, if not easy, are singularly exempt from vulgarity, and they have a great aptitude in catching those customs which are considered as the marks of good society. The men are generally good men of business, and the women good housewives. The grand-masters, as sovereign princes, granted to many Maltese the titles of marquis, count, or baron, in order to secure in their interests the antient families of the island, and also as a counterpoise to the importance of those who had in a similar manner been raised to nobility by the previous sovereigns. By the law of primogeniture their descendants still form a class of nobility, the property of a few individuals of which amounts to more than 1000*l.* a year, but an income of three or four hundred a year constitutes what is called a rich man. The younger branches sometimes study for one of the liberal professions, the candidates for which are numerous in Malta. All classes are much attached to the British government, and it would be difficult for any other power to seduce them from their allegiance.

Language.—The Italian language was introduced into these islands during the existence of the Sicilian government, and has ever since been in use, chiefly among the upper, but partly also among the middle classes of the inhabitants of the towns, in addition to their native tongue. The Italian has also been generally used in conducting the affairs of government, in legal proceedings generally, ecclesiastical matters, the transaction of commercial business, and for the purposes of education and literature. But up to the present time, the mother-tongue of the people, the Maltese, has continued in use throughout the country and at Gozo, and also among the poorer classes in the towns. It continues to be chiefly used by the upper classes in familiar conversation.

There has been much discussion on the language spoken by the Maltese, and as it is an unwritten language, the subject is one of some difficulty. But Mr. Schlienz, an oriental scholar, and a person who, by a residence of many years in Malta, is entitled to full confidence, has examined the arguments of those who attempt to trace it to the Phœnicians, the Carthaginians, and other antient nations, and comes to the conclusion 'that all its words, with the exception of very few, are purely Arabic, and conform in every respect to the rules, nay even to the anomalies, of the Arabic grammar.' A Maltese finds no difficulty in making himself understood anywhere on the Mediterranean coasts of Africa and Asia, a circumstance which is of no small importance in commercial intercourse, and which might be improved by a systematic cultivation of the Arabic language in Malta, to the great advantage of the Maltese people. The Arabic language was introduced into Malta by the Saracens, who had long had almost exclusive occupation of the island, when it was reduced by Count Roger the Norman.

The English language has made considerable progress in Malta; but it is still a foreign language to most of the natives. Many educated persons speak and write it, and still more read it, with facility. Among the inferior classes in the city, a slight smattering of English, for the purposes of trade, is very common.

Education.—The education of the Maltese has been until lately very limited, although a university, established in the time of the grand-master Pinto, offered to the natives the means of a learned and scientific education, and several erudite works have been written by Maltese authors. Since the Report of the Commissioners of Inquiry in 1838, the means of education have been more widely diffused; the government having, with a view to raise the population from their state of gross ignorance, undertaken the establishment of primary schools throughout the rural districts. Of these there are already twelve open (including Gozo), at which upwards of 1800 children of both sexes receive instruction. In Valletta and the three cities there are three schools, in which 600 children are educated. These schools are conducted upon the Lancasterian plan somewhat modified. The university has been also reorganized upon a more liberal scale, and has about 100 students. The Lyceum or high-school, attached to the university, is increasing in the number of scholars, which amount to 150. Education is therefore advancing in these islands, and will no doubt continue to do so, in proportion as the people become more aware of the advantages which they are likely to derive from it.

Religion.—The religion of the people is the Roman Catholic, to which they are universally and strongly attached, and they are punctually scrupulous in the observances of its ritual. Their religion was secured to them at the surrender of the island to the French republic, and again by the promises of the English generals who took possession of Malta, when the French were driven out of it. This promise has been scrupulously performed, and although the government has been Protestant for thirty-eight years, no religious dissension has been known to disturb the peace of society. The church festivals, which are very numerous, were always celebrated by public processions, which afforded an opportunity to the people of all classes to make holiday; and the women in particular, whom the customs and prejudices of former days kept in strict seclusion, except when they went to church, on these occasions found recreation in the public promenades, for which such festivals served as a pretext. The observances of religion were therefore connected with social life. But in proportion as Protestants and Catholics are becoming more mixed together in the forms of modern society, these festivals and ceremonies are less thought of, and in fact are gradually diminishing in importance. Both parties observe a moderation and deference for each other's opinions in religious matters; and Malta thus exhibits a striking and almost solitary instance of a highly religious people, ruled by a government of a different creed, by whose tolerance all live in the greatest harmony.

The Roman Catholic clergy are very numerous, amounting, between regulars and seculars, to about one thousand, some of whom are eminent for learning. The landed property of the church is about one-fourth of the rental of the island, out of which the bishop enjoys an income limited to 3000*l.* a year.

The Protestant places of worship are few and unassuming. The governor has his chapel in the palace of government; the naval departments have theirs in a building near the naval arsenal; there is a Sunday-evening service in the house of the Church Missionary Society; and the Wesleyan mission has a chapel, which has the external appearance of a private house. The number of Protestants in Malta is something under a thousand, not including the troops, whose religious service is performed by the military chaplain in their respective barracks. They have long desired to see a church erected for their use; this wish will speedily be realised, her majesty the queen-dowager having munificently signified her intention, on her late visit to Malta, to erect a church at her sole expense for the public worship of the church of England. The site for this building in the city of Valletta was cleared in January, 1839.

Population.—The increase of the population of Malta, after it came into the possession of the Knights of St. John, was very rapid. It seems to have been the policy of that government to stimulate it by all the means in its power. Property is still held by the present government, which is charged with the payment of annual sums, in dowries for the encouragement of marriages among the poorer people.

In 1530, when the Order took possession of the islands, the population amounted to	17,000
In 1632, according to Boisgelin . . .	51,750
In 1791, according to St. Priest . .	90,000
In 1798, according to Boisgelin . . .	114,000
In 1803, according to Colquhoun, 'Wealth of the British Empire' . .	94,000
In 1813, before the breaking out of the plague	102,000
In 1828, according to a census taken in that year	119,194
In 1838, according to the last census .	120,989

Detail of the Population, 31*st of December*, 1837.

	Males.	Females.
Malta.—Natives	45,487	49,491
British residents	915	553
Aliens	3,942	729
British troops	2,332	
Women and others accompanying them	16	361
Children of the troops	335	360
	53,027	51,494
Gozo.—Natives	8,124	8,331
British residents	8	5
	61,159	59,830
		61,159
	Total	120,989

Government.—Malta is a crown colony, and the local government is conducted by a governor, who, in legislative matters, is assisted by a council of six persons nominated by the crown. The principal administrative departments are the chief secretary's office, the quarantine department, the custom-house, the land-revenue department, and the audit-office. The courts of justice are numerous, and the procedure intricate and costly; the law administered by them is likewise in want of a thorough revision. The public revenue of the island amounts to about 100,000*l.* a year, of which about 70,000*l.* arises from custom duties (chiefly levied on grain and pulse) and quarantine dues; about 23,000*l.* from the rents of government lands and houses; and the remainder from several small duties. Out of this sum are defrayed not only the salaries of the regular government officers, but also the expenses of maintaining the roads, streets, and public buildings, and the cost of the university, elementary schools, and charitable institutions. Some reduction in the public burdens may be expected to be made in consequence of the recommendations of the recent commission of enquiry.

History of Malta.—The earliest notice of the Maltese Islands is in Diodorus of Sicily (v. 12). 'There are,' he says, 'over against that part of Sicily which lies to the south three islands at a distance in the sea, each of which has a town and safe ports for ships overtaken by tempests. The first, called Melite, is about 800 stadia from Syracuse, and has several excellent ports. The inhabitants are very rich, inasmuch as they exercise many trades, and in particular they manufacture cloths remarkable for their softness and fineness. Their houses are large and splendidly ornamented with projections and stucco (*γείσσοις καὶ κονιάμασι*). The island is a colony of the Phœnicians, who, trading to the western ocean, used it as a place of refuge, because it has excellent ports and lies in the midst of the sea. Next to this island is another named Gaulus (Gozo), with convenient harbours, which is also a colony of Phœnicians.'

Malta is said to have been subsequently occupied by the Greeks; but however this may be, the Carthaginians obtained entire possession of it, B.C. 402. In B.C. 242 the Carthaginians were compelled to cede it to the Romans, who erected the island into a municipium. It appears that the temple of Juno was rich enough to be an object of plunder to the rapacious Verres, when he was prætor of Sicily. (Cicero, *In Verrem*, iv. 46.) The linen cloth of Malta was considered an article of luxury at Rome.

The Vandals and the Goths, who had taken possession of Malta, were expelled by Belisarius, A.D. 533. About A.D. 870 the Arabs took possession of the island; and though it was recovered and held by the Eastern empire for about thirty-four years, it was retaken by the Arabs, and the Greek inhabitants were exterminated. In 1120 Count Roger, the Norman conqueror of Sicily, took possession of Malta, and expelled the Arabs.

Malta was thus attached to the island of Sicily, and it became subject to the different dynasties which successively governed that island, viz. the house of Hohenstauffen (A.D. 1189), Charles of Anjou (A.D. 1258), and the house of Aragon (A.D. 1282). During this period an officer of the Sicilian crown presided over the government of Malta, and the Sicilian laws and institutions were extended to the island. One of these institutions was a municipal council or body, similar to the municipal councils of Sicily, which originated in the reign of Frederic II. of the house of Hohenstauffen. This municipal council appears from its archives, which are still preserved at Malta, to have exercised considerable administrative, and even legislative powers, though its formation and constitution are quite obscure.

In 1516 Sicily, with the Maltese islands, passed to the emperor Charles V., as heir to the crown of Aragon. On the 4th March, 1530, Charles granted to the grand-master and religious fraternity of St. John, who had recently been expelled from Rhodes by the Turks, the ownership of all the castles, fortresses, and isles of Tripoli, Malta, and Gozo, with complete jurisdiction. The sovereignty of Malta was by this grant in effect surrendered to the Knights, though the form of tenure from the crown of Sicily was maintained by the reservation of the annual payment of a falcon by the Knights to the king of Sicily or his viceroy. At the time of the cession Malta contained only about 12,000 and Gozo about 5000 inhabitants, who were in a miserable condition. Malta was almost a shelterless rock, and the cultivation of the land had been nearly abandoned, owing to the wretched system of administration and the frequent predatory visits to which the people were exposed.

Under the Order Malta soon began to recover from its state of destitution. The first object was to protect the island against the incursions of its piratical enemies; and with this view the Knights commenced those works which remain to this day as a monument of their perseverance and military power. On the 18th May, 1565, the Turks, under Mustapha Pacha, to the number of 30,000 choice troops, landed on the island of Malta, where they encountered a desperate resistance from the Knights. Finally, the Turks were compelled to quit the island, with the loss, it is said, of 25,000 men: the loss on the other side was computed at about 7000. Upon the death of Sultan Solyman in 1566, shortly after the defeat of his troops, the grand-master La Vallette, who had successfully defended Malta against this formidable invasion, determined on the founding of a new city, in a favourable position for the protection of the island, and as a residence of the convent of the Order. He laid the first stone of the city of Valletta, which bore the name of its founder, on the 28th of March, 1566. The Knights, now secure in their possession of Malta, continued to cruise against the Ottomans, whom they greatly annoyed. But the discipline of the Order relaxed as the objects of their original institution gradually became of secondary importance; and Malta, which was safe against all attack, was a place of luxury and pleasure rather than of austerity.

The history of the island, between this time and its surrender to Bonaparte, requires no particular notice in this brief sketch. The outbreak of the French revolution was an event calculated to shake the declining power of an institution like that of the Knights of Malta, and the behaviour of the Order towards the new republic of France, their supposed partisans, their vessels, and their agent in Malta, certainly contributed to the downfal of the Order. The immediate surrender of the island however was perhaps owing in part to the pusillanimity of the Grand-master, as it certainly was in a great degree to the treachery of the French Knights, who, foreseeing the decline of the Order and the probability of Malta being placed under Russian influence, preferred its surrender to France, whether that country should be a monarchy or a republic.

On the 9th June, 1798, a French expedition, under the command of Admiral Brueys, consisting of 18 ships of the line, 18 frigates, and about 400 transports, having 40,000 men on board, arrived off the island. The French Knights had already been prepared for what was to take place: the Grand-master Ferdinand Hompesch, who had been elected in July, 1797, a weak and credulous man, took no means to deprive the French Knights of the principal military commands. Most of the towers along the coast fell under their orders by a rule of service. Although much time was lost in concerting measures of defence, nothing was done: in fact muskets were delivered to the troops unexamined; the ammunition was damaged and missent; troops were despatched to the coast without provisions; conflicting and impracticable orders were issued, and other similar apparent accidents happened. Baron Azopardi, in his 'Journal of the Taking of Malta,' states that the inhabitants ran in thousands to arms, but the military chiefs were satisfied with a semblance of preparation, and deluded the people with assurances of security. General Bonaparte, who was on board the ship of the line Orient, lost no time in making a demand in writing that the whole fleet should be allowed to enter the ports of Malta to water, to which an answer was returned, with expressions of regret, that only two, or at most four ships, could be allowed to enter the port at a time. 'The Grand-master refuses us water!' said Bonaparte; 'to-morrow at sunrise the army will disembark upon the coasts of the island wherever a landing can be effected:' and these words were inserted in the order of the day.

Accordingly, the next morning a body of French troops disembarked in St. George's Bay to the north-westward of Valletta, where one gun was fired from the tower for form's sake, and the batteries of St. Elmo and Fort Tigné opened a fire, which was ineffective from their position. Another corps landed in St. Paul's Bay unmolested, and a third in the harbour of Marsascirocco, to the south-east. Before night the French were in possession of the whole country, with the exception of five villages, or casals, without any opposition on the part of the knights who commanded the several posts; and the unsupported attempts of the Maltese battalions of Nasciar, Musta, Gargur, and Birchircara to defend their homes, only afforded to troops like the French a pretext for bloodshed and plunder. In the meantime the city of Valletta was in a state of tumult and despair. The Grand master, in a state of the greatest perplexity, was surrounded by various advisers, but wanted firmness to decide. At length, when it was reported to him that some French knights had been killed, and others wounded, by the Maltese soldiers, he felt his critical situation, and determined to solicit a suspension of arms. Two messengers were immediately sent on board the Orient to announce the readiness of the Grand-master to come to terms; they were bearers of a letter from the Danish consul to the French general, interceding for his favour, and another from the Grand-master himself to the commander Dolomieu, a knight of the Order, who had openly attached himself to the French, and was on board the Orient, soliciting his good offices. In the afternoon General Junot and others brought an answer to the palace, allowing the Grand-master twenty-four hours to send his delegates to conclude the capitulation.

Distrusting their government, the inhabitants claimed to take part in the deliberations; and to two knights and four influential citizens were confided the conditions upon which the fortress was to be surrendered. On the 12th of July the capitulation was signed on board the Orient by Bonaparte himself and these delegates. By its stipulations the Order of St. John of Jerusalem renounced, in favour of the French republic, the sovereignty of Malta, Gozo, and Cumino; the French republic pledged itself to use its influence with the congress of Rastadt to procure for the Grand-master during his life a principality equivalent, and in the meanwhile he was to be allowed a pension of 300,000 francs; the French knights were to be allowed to return to their country; to the French knights then in Malta pensions of 700 francs were to be paid, and 1000 francs to those of sixty years and upwards; it engaged to intercede with the Cisalpine, Ligurian, Roman, and Helvetic republics, to obtain similar pensions for the knights of those countries, and also with the other European powers, to secure to the knights of each the property of the Order. The knights were moreover permitted to retain their private property in Malta and Gozo; and the inhabitants were to continue in the free exercise of the Roman Catholic religion; to be secure in their property and privileges, and no extraordinary contribution was to be imposed upon them. This capitulation was more favourable than could have been expected. Hompesch was not asked to ratify its conditions.

In the afternoon of the same day the French ships of war and transports anchored in the ports of Valletta and Marsascirocco, and 15,000 troops took possession of Valletta, the three cities on the other side of the harbour, and their outworks. The French general had no sooner entered the gates than he eagerly made a personal inspection of the fortifications. 'It is well, General,' said Caffarelli, one of the officers of his suite, as he accompanied him, 'it is well that some one was within to open the gates for us. We should have had some difficulty in entering had the place been altogether empty.'

The French found in the port two line-of-battle ships, one frigate, and three galleys, besides two galliots, and some guard boats; and of ordnance 1500 pieces of artillery (about 600 of which were mounted on the works), together with 35,000 stand of small arms, 12,000 barrels of powder, and an immense number of shot and shell.

The Order of Malta was now extinct. Hompesch embarked privately in a merchant-ship in the night of the 17th of June, accompanied by twelve knights. On his arrival at Trieste he resigned his office of Grand-master of the Order of St. John. General Bonaparte sailed with the French expedition two days afterwards for Egypt, and General Vaubois was left with 4000 men to take care of Malta.*

As soon as the French were masters of Malta they established laws borrowed from the recent legislation of France, and formed an entirely new government and municipality, administered by a commission. Liberty and equality were proclaimed, titles and ranks were abolished; it was decreed under a heavy fine that the sons of the richest families should be sent to France for education in the new principles, at their own expense; all the establishments were reorganised, and the remaining knights, with few exceptions, were obliged to leave the place. The riches of the church of St. John, and of the other churches, and of the *auberges* of the *langues*, the plate of the hospitals, and of the Grand-master's palace, were melted down to be sent to France. (Baron Azopardi; and *Pièces Diverses rélatives aux Opérations Militaires et Politiques du Général Bonaparte*, Paris, an viii.)

Three months of subjection to such arbitrary measures and violent changes were sufficient to convince the Maltese that they had exchanged an enfeebled despotism for a harsh yoke. A total disregard of the articles of the capitulation was daily manifested, and even some alterations of the civil law which affected the tenure of property filled up the measure of hatred to their new rulers.

Besides the churches which had been pillaged in Valletta, those at Città Notabile, including the cathedral, did not escape plunder; but there still remained some rich silk damask in the churches and convents of the antient city. On the 2nd of September, 1798 (after the news of the battle of Aboukir had reached Malta), some persons being sent to Città Notabile to take down these decorations, the inhabitants assembled to prevent it. The French commandant of the small garrison of sixty-five men, in an endeavour to disperse them, imprudently drew his sword. In a moment he was attacked, and the people being joined by others from the neighbouring casals, the irritation increased, and the officer and the whole of the detachment were massacred, and their bodies burned. This was the signal for a general revolt. In twenty-four hours the insurrection spread throughout both islands. On the 3rd, General Vaubois having learned what had taken place, attempted to send a detachment of 200 men to keep possession of Città Notabile, but they were beaten back by the Maltese peasantry. On the same day the people of the villages near the fortifications of Cottonera entered the town of Burmola, and, being joined by the inhabitants, attacked the French guard and carried off the standard of the republic. Others in the meantime took possession of a magazine, and after a sharp contest bore away to the country eighty barrels of gunpowder.

The energy and daring which the Maltese thus early showed in their patriotic warfare surprised General Vaubois, who had been accustomed to consider them as wretched peasants. From this moment the gates of Valletta and the three cities were closed, and the garrison was kept in a close state of blockade for two years.

During this long period the Maltese gave proof of a patriotic ardour and long-suffering which few people would have equalled. Unanimous in their object, all their measures were taken with prudence and order. They collected arms and established a system which gave method to all their operations, and their levy of men was divided into bodies or battalions, and distributed in the towers on the coast and throughout the country, with almost as much order as regular troops.

The attempts made by the French general at conciliation were not listened to; his messengers were never allowed to go back; and he soon found to his surprise that the people had firmness enough to persevere in the enterprise they had undertaken, nothwithstanding they were at present single-handed.

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* The only detail we have of these transactions in English is by the Chevalier de Boisgelin ('Antient and Modern Malta,' London, 1805), who was a French knight of Malta; and he writes in the true spirit of an adherent to his Order. The present account of the surrender to the French, and what follows on the subsequent blockade by the British and Maltese, was written on the spot, and is confirmed or corrected by persons who were contemporary with the events.

With more than 6000 well-disciplined troops under his command (the soldiers and the crews of the vessels which escaped from Aboukir having been incorporated with them) he was unable to make a sortie in sufficient force to overawe his enemies; for the people of Valletta, encouraged by the movement of their countrymen, and borne down by forced contributions and the privations inseparable from a state of siege, were not to be left unwatched within the walls. The Maltese now made a warm appeal to the king of Sicily as their sovereign. They sought assistance from the British fleet, and sent out boats in all directions, some of which fell in with a vessel that communicated with Lord Nelson on his return from the battle of Aboukir; he sent the Portuguese squadron to their aid, his own ships being much disabled, and promised soon to follow. In fact on the 18th of September four Portuguese ships of the line and two frigates came off the island and commenced the blockade of Valletta, and supplied the Maltese with some arms and artillery. On the 25th of October Lord Nelson himself appeared with fourteen ships of war, and summoned the French to surrender, offering to send them all to France, and not consider them as prisoners of war; to which General Vaubois returned a laconic refusal. The English admiral's force not being in a state to keep the sea, he was obliged to go to refit, and he left the Portuguese admiral to maintain the blockade. So noble and encouraging was his reception of the Maltese deputies, that Nelson's name served as a word to animate their efforts throughout the rest of their long struggle.

All sorts of provisions still continued very scarce, and many of the inhabitants were reduced to the greatest misery. The king of Sicily, who had already supplied them with powder and shot, now permitted them to receive corn from his granaries upon credit. Yet their great support was the reliance they had on the presence of the British navy. Captain Alexander John Ball, who commanded the squadron afterwards appointed by Lord Nelson to continue the blockade of Valletta, was likewise ordered to supply as far as practicable the wants of the Maltese. This service could not have been entrusted to better hands. Captain Ball was a man whose dignified deportment and mild and affable manners were such as to acquire respect and esteem; his sympathy and consideration too for the Maltese was a sentiment of the heart, not a cold act of duty.

In the beginning of 1799 the Maltese elected him their chief and the president of their congress, which was immediately organised, and consisted of the bishop's delegate in ecclesiastical matters, a judge, and twenty-two representatives elected by the casals. The affairs, civil and military, of the Maltese now began to take the form of a regular administration under the direction of Captain Ball. The congress authorised a public loan to be opened, and the landed property of the church and of the late Order to be let for the purpose of paying the expenses of the war. The customs were also regulated, and the bays of St. Paul and Marsascirocco were made the authorised ports for trade. In April Captain Ball received, through the British minister at the court of Naples, an order from the king of the Two Sicilies to assume the command of Malta for his majesty, and the Neapolitan flag was now raised upon the Maltese batteries in conjunction with the English. A sum of money (about 3600*l.*) was about this time received for the first time, and was afterwards followed by others, which although supplied in the name of the king of Naples, were really furnished from the English subsidies. Very soon after this Lord Nelson authorised Captain Ball to assure the islanders that Malta would be protected by England, Russia, and Prussia until a general peace. All matters therefore seemed to be as well regulated as circumstances would admit, and the most ardent hopes were entertained that an end might speedily be put to the sufferings of the Maltese by the surrender of the French garrison, which was now strictly watched by land as well as by sea. But they had still much to contend against, and among other calamities disease, brought on by long suffering, and famine carried off many of the poorest classes, for whose relief no charitable fund existed; and it is stated that during the two years not less than 20,000 persons died of misery and famine. The expelled knights of the Order were not indifferent to what was going on in Malta; the bailiff de Neveu and some others attempted to land, offering their services to assist in recovering the island from the French, but they were rejected with indignity.

At the commencement of the siege the quantity of corn in the granaries of Valletta and the three cities was 36,000 quarters, which it was calculated would subsist the inhabitants and the garrison about 16 or 17 months. The city was so closely blockaded by sea, there seldom being less than three or four ships of the line, and as many smaller vessels cruising off the port, that only 15 small vessels with supplies, besides the frigate *Boudeuse*, got into the port during the first twelve months; and the situation of the besieged, before scarcely four months had elapsed, was such, that Ransijat, treasurer of the Order, who has given us a very detailed journal of the occurences within the city, says that the countenances of many bore marks of the cruel privations to which they were subjected. Famine stared them in the face, and many who were at first unwilling to leave their homes and properties, were afterwards glad to obtain the permission of General Vaubois to escape from the horrors of a siege and the insatiability of military rapacity. The population, which at the beginning of the blockade had been estimated at upwards of 40,000, by this means was reduced in September, 1799, to 13,000, and consequently the corn in the magazines was sufficient to last much longer than was at first calculated; yet in the subsequent month, General Vaubois managed to send despatches to France to inform his government that his supplies would not hold out beyond the following May. The inhabitants were not a little cast down by this anticipation, particularly as in July the garrison had been put upon half-pay, and the salaries of the authorities were suspended from the scarcity of money in the treasury. Still, trying as was their situation, the buoyant spirit of the French soldiers never deserted them: they made gardens in the fortifications, and raised fruit and vegetables to ameliorate their situation. At this time a pound of fresh pork sold for 6*s.*, salt meat 2*s.* 10*d.*, the commonest fish 2*s.* 2*d.*, a fowl 50*s.*, a pigeon 10*s.*, a pound of sugar 18*s.* 4*d.*, coffee 21*s.* 8*d.*, a good fat rat 1*s.* 7*d.*

The Maltese at first raised but few batteries, and those inconsiderable ones. When however they were joined by the English and Portuguese, who furnished them with mortars and cannon and a great quantity of ammunition, they erected others of much greater importance, in situations which kept the French garrison in constant apprehension, as we learn from Ransijat's 'Journal.' They were assisted likewise by the marines landed from the blockading squadron. In December, 1799, Brigadier-General Graham (now Lord Lynedoch), arrived with the 30th and 89th British regiments and some artillerymen; these were joined by the 35th and 48th regiments under Major-General Pigot, who took the command in June, 1800. Two Sicilian regiments also formed part of the besieging forces; and in official orders they were styled the allied troops at the blockade of Valletta.

In the beginning of September, the French troops being reduced to the last extremity, and the rigor of the blockade by sea and land depriving them of every hope of relief, General Vaubois made proposals to surrender the place into the hands of the English troops. This act was signed and concluded on the 5th of September, 1800, by General Vaubois and Admiral Villeneuve on the part of the French, and by General Pigot and Commodore Martin on the part of the English; and its principal conditions were, that the French troops should march out with the honours of war, as far as the sea-shore, where they should ground their arms, and then be embarked for Marseilles as prisoners of war, until exchanged. The next day four regiments of British troops took possession of the forts and batteries of Valletta, amidst the acclamations of the people; they hoisted the English ensign at St. Elmo, and the British squadron entered the port. Two days afterwards, everything being ready, the French troops sailed for France in English transports; and thus, after two years and two days, ended this protracted and memorable blockade.

At the peace of Amiens in 1802, the question of Malta was one of difficult arrangement. It was however eventually settled between Great Britain and the French republic, that the island should be restored to the Knights of St. John, and be an independent state as formerly, but that there should be neither an English nor a French langue, and that a Maltese langue should be established, which should enjoy all the influence and privileges of the other langues.

In strict conformity with this treaty, Malta was to have been evacuated by the British troops in three months after its ratification. But before the lapse of that period, circumstances had arisen which not only retarded the restoration of the island to the Knights of St. John, but rendered that measure inconsistent with the interests of Great Britain, and the security of her Indian possessions. Thus the treaty of Amiens remained unexecuted, and Malta remained in the hands of the English. On the 18th of the same month George III. issued a declaration of the motives which obliged him again to take up arms.

During the hostilities which followed, Malta was retained in military possession by Great Britain, without any formal declaration as to who was to be its future master. It became the head-quarters of the English army in the Mediterranean, and the rendezvous of the British fleet, which found there every advantage from a central situation, and the convenience the ports of the island afforded for fitting out and keeping in an effective state the squadrons which held the dominion of the seas from Gibraltar to the Dardanelles. It became the emporium of that commerce which was shut out from all the ports of the Continent by the operation of the Berlin and Milan decrees, and it was the only place in the Mediterranean whither the rich prizes taken from the enemy were carried for adjudication. This was a time of great prosperity to Malta; it however received a sudden interruption from the plague which broke out in 1813. From April of that year, when Valletta was so active in traffic and bustle, to September, 1814, there died 4668 persons in both islands. During the greater part of this period the capital was deserted, except by the mournful dead-cart; the grass grew in the streets, and everybody was shut up as in a prison.

On the 30th of May, 1814, a definitive treaty of peace, concluded at Paris between France and the allied powers, fixed definitively the lot of Malta, by a formal recognition of her union with Great Britain, with the concurrence of the king of Sicily, whose predecessors had for three centuries only exercised suzerainty over the island. Thus the Maltese people at length obtained the fulfilment of their wishes, and became subjects of a sovereign of their own choice. It is only under a great maritime power that they can be secure from aggression.

But the island did not recover its late excess of prosperity. The peace, which carried blessings to all the nations of Europe, opened the ports of the Continent to English commerce, which naturally neglected Malta and went thither direct. Malta besides was obliged to suffer a sort of penance inflicted upon her by the ports of France and Italy, whose health establishments kept her in quarantine for 12 years after the cessation of the plague. It was not until June, 1826, that she was admitted to communicate freely with these commercal states; and by this time her principal commercial establishments were broken up. The expenditure of a garrison and a small squadron, and a limited trade with Barbary and the Levant, were her only resources, and formed no approach to the florid state of prosperity she enjoyed soon after her first connection with Great Britain.

In the mean time her already excessive population was upon the increase, and her expenditure undiminished, and in 1832 the people began to petition his late majesty, William IV., for a consideration of their depressed condition, alleging certain grievances, which were then but cursorily considered or ineffectually remedied. In June, 1836, they made a more forcible appeal to the British government through the House of Commons, by a petition signed by 2388 Maltese, which was presented in that house by Mr. Ewart, on the 7th of June, 1836. The Maltese in this appeal prayed for a municipal body, a reform of the law, a moderate liberty of the press, an improvement of the system of education and elementary instruction, an independent board of health, a free port, a relief from the heavy excise duty on wine, a participation in the emoluments of office, a relief from the heavy duty on grain, and a popular council for the election of representatives to make known their wants and grievances. Commissioners of Inquiry were sent out in September, 1836, to examine and report upon the grievances set forth, and from their labours the most useful reforms are anticipated. Some indeed are already in operation: such as a complete freedom of the ports of Malta for all foreign merchandise, the duties remaining only on articles of consumption; the reform of the government departments, and the distribution of the higher offices more fairly among the Maltese, which were formerly held almost exclusively by Englishmen through patronage; a reconstruction of the university, and the introduction of elementary education amongst the lower orders; and though last, not least, the full liberty of printing and publishing, under laws to be enacted, by which the people will always be enabled to make known their complaints to the British government and the British people.

What promises however to be of the greatest benefit to Malta is the development of steam navigation in the Mediterranean within these few years past, not only from the passage of vessels from the coasts of France and Italy to the Levant, which all meet at Malta as the most advantageous point of rendezvous, and to provide themselves with coals, but from the increasing importance of the communication between England and India through the Mediterranean. Travellers of all nations are to be seen in the streets of Valletta, and there, where a few years ago every face was familiar, one now walks amongst strangers as in continental cities. This affluence of persons has led to the establishment of hotels of the best sort; and the improvements in the lazaret have stamped Malta as the most important quarantine station in the Mediterranean, and that which is now most resorted to by travellers of all countries.

MALTA, KNIGHTS OF, a celebrated military and religious order, known also by the names of Knights of St. John of Jerusalem, Knights Hospitallers, and Knights of Rhodes. The institution of the Order originated in an hospice which was founded at Jerusalem, by permission of the caliphs of Egypt, about the middle of the eleventh century, for receiving the pilgrims from Europe who visited the holy sepulchre. The hospice was annexed to a chapel dedicated to St. John the Almoner, and was at first kept by Benedictine monks. When Palestine was conquered by the Seljuk Turks, in 1065, who drove away the Arabian and Egyptian Saracens, the Christians found these new masters much worse than the former, and the hospice of St. John was plundered. Some time after, a Frenchman named Gérard, a pilgrim to the holy city, undertook the management of the hospice; and when the crusaders under Godefroy de Bouillon took Jerusalem in 1099, they found Gérard, who had been kept in prison by the Mussulmans during the siege as a suspected person. Gérard resumed his duties in the hospice, and several of the crusaders, through pious fervour, determined to join him and to devote the rest of their lives to the service of the poor pilgrims. Among the knights who took this determination were Raymond Dupuy and Dudon de Compt, both from Dauphiné, and Conon de Montaigne, from Auvergne. Godefroy de Bouillon made a donation of his own lordship of Montboire in Brabant to the hospice of St. John, and several other princes followed his example. The hospice thus became possessed of lands in almost every part of Europe, as well as in Palestine. The dress assumed by the new Hospitallers was black, with a white cross, having eight points or arms on the left breast. Pope Paschal II. sanctioned the new institution, the members of which bound themselves by solemn vows of chastity, individual poverty, and obedience, to which was afterwards added that of being always ready 'to fight against Mussulmans and all others who forsake the true religion.' Vertot, at the end of his 'History,' gives all the laws and regulations of the Order: 'Anciens et nouveaux Statuts de l'Ordre de St. Jean de Jerusalem.' The pope exempted them from paying tithes, and gave them the right of electing their own superior, who was styled grand-master. They were independent of every other ecclesiastical or lay jurisdiction. A splendid church was raised by Gérard near the old hospice, and dedicated to John the Baptist, with extensive buildings for the Hospitallers as well as the pilgrims, who were there entertained at free cost. Gérard and his successors established, in various maritime towns of Europe, hospices in imitation of that of Jerusalem, which served as resting-places for the pilgrims, who were there provided with the means of embarking for Palestine. These houses were called commanderies. Such were those of Messina, Tarentum, Seville in Spain, and St. Gilles in Provence.

Gérard dying in 1118, the Hospitallers elected as his successor brother Raymond Dupuy, who drew up a body of statutes or regulations of discipline for the Order. He first added to the duties of charity and hospitality that of taking up arms for the protection of the holy sanctuary. He divided the brethren into three classes, the military, the priests and chaplains, and the 'serving brothers,' who were neither soldiers nor priests. As the Order increased rapidly in numbers, the members were classed into seven nations, called 'languages,' namely, Provence, Auvergne, France, Italy, Aragon, Germany, and England. For nearly two centuries the Hospitallers, together with the Templars, were the firmest support of the Christians in the East; and when Acre, the last bulwark of Christendom, was taken by the Mussulmans in 1291, the remains of the Order withdrew to Cyprus, where the town of Limisso was assigned to the Hospitallers as their residence.

In the year 1310 the Hospitallers, having lost all hope of recovering Palestine, equipped a fleet, and, being joined by crusaders from Italy, landed, under their grand-master Foulques de Villaret, on the island of Rhodes, which was then possessed by Greek and Saracen pirates. The Hospitallers defeated the pirates, and took formal possession of Rhodes, as well as of Cos and other neighbouring islands. [RHODES.] From that time they became known by the name of Knights of Rhodes. The knights strongly fortified the town of Rhodes, from which they carried on by sea a deadly warfare against the Mussulmans, and especially against the Ottoman Turks, who about that time were establishing their power all over Asia Minor. The history of the Knights of Rhodes, during the fourteenth and fifteenth centuries, is closely connected with that of the Ottomans. Some of the Turkish sultans, among others Amurath, or Mourad II., were glad to purchase a temporary peace from the knights. Mahomed II., son of Murad, having taken Constantinople, sent a fleet with an army to conquer Rhodes in 1480; but the Turks were repulsed by the knights, under their grand-master Pierre d'Aubusson. In 1522, Sultan Solyman the Great sent another large armament against Rhodes, and he himself repaired thither to direct the siege. Villiers de l'Isle Adam, who was the grand master of the Order, defended the town with the utmost bravery; but there was a traitor among them, one D'Amaral, a Portuguese knight, who, through jealousy and disappointment at not being made grand-master, kept a correspondence with Solyman, and informed him of the state of the garrison and the weak points of the fortifications. D'Amaral was discovered and executed; but in December of that year the grand-master, having exhausted all his means of resistance, capitulated. Solyman behaved honourably: he allowed the knights, and all the inhabitants who chose to leave Rhodes, twelve days to embark with their moveables. Having expressed a wish to see the grand-master, he gave him words of consolation, and, touched by his venerable appearance, said to his vizier, that 'He could not help being grieved at driving that Christian in his old age out of his house.' On the 1st of January, 1523, the grand-master and the surviving knights left Rhodes and took refuge in Italy.

In 1530 Charles V. gave to the Order the islands of Malta and Gozo. [MALTA.]

After the surrender of Malta to the French, in 1798, the Order as a sovereign body became extinct, and its domains in various parts of Europe were confiscated. It still however exists as a religious order, a phantom of its former greatness. Ferrara in the Papal State is at present the residence of the grand-master and a few knights of the order of St. John of Jerusalem, who subsist upon some scanty remnant of their antient splendid revenues. Circumstances have so much altered in Europe, the Levant, and Africa, that the Knights of Malta as a sovereign military order would no longer be in harmony with the actual state of civilization. The objects of their institution have long ceased to exist. They were however for some centuries, together with Venice, the firmest bulwarks of Italy and western Europe against the barbarian power of the Ottomans.

(Vertot, *Histoire des Chevaliers Hospitaliers de St. Jean de Jérusalem.*)

MALTHA, a bituminous mineral, of which such different accounts are given by various authors, that it is impossible to determine to what substance the name properly belongs. In proof of the justness of this conclusion, we may merely observe that according to Phillips (*Mineralogy*, p. 368), it is blackish-brown; while according to Dr. Thomson (*Inorganic Chemistry*, vol. ii., p. 369), it is white.

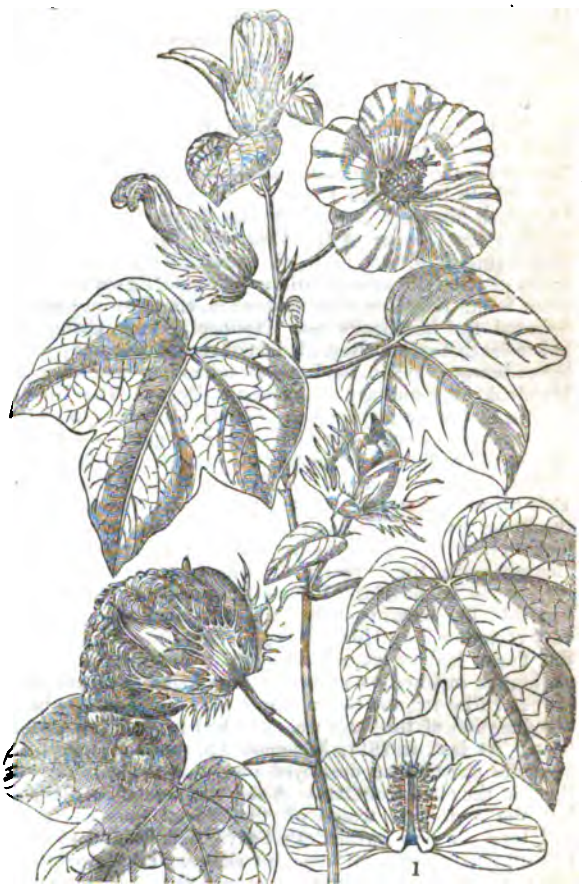
MALTHUS. [POPULATION.]

MALTON. [YORKSHIRE.]

MALU'RUS. [SYLVIADÆ.]

MALVA SYLVESTRIS (Wild Mallow), an indigenous, perennial, herbaceous plant, of very frequent occurrence, possessed in every part of mucilaginous properties, and which may be employed for the same ends as other demulcent herbs. The flowers only are officinal in Britain: when fresh, they are violet-coloured, but by drying become blue, and also lose a large quantity of their watery constituents, for 100 parts of recent flowers dry into 11. They have no odour, but a mucilaginous herbaceous taste. They yield their colouring principle both to water and alcohol. The alcoholic tincture furnishes one of the most delicate of re-agents for testing the presence of acids or alkalies. The compound decoction of the London Pharmacopœia is not a proper form of exhibition, an infusion with cold water being preferable. [DECOCTIONS; INFUSIONS.]

MALVA'CEÆ are a large natural order of exogenous plants, the distinguishing marks of which are polypetalous flowers, monadelphous stamens, unilocular anthers, and a valvate calyx. They also have alternate leaves, the hairiness of which, if present, is usually stellate; and conspicuous stipules. A large proportion of the order consists of herbaceous or annual plants, inhabiting all the milder parts of the world, but much the most plentiful in hot countries, where alone a comparatively small number of species become trees. In many cases they are remarkable for the large size and beautiful colours of their flowers, which are however fugitive, expanding for a single day only; the great number of them and the regularity of their succession during the flowering season make this of little importance. Among the very numerous species several are of essential service to man. As emollients they are well known in medical practice, the Marsh-mallow (Althæa officinalis) being one of the most useful among this kind of remedial substances, and a large proportion of the whole order being capable of supplying its place. The hairy covering of the seeds of the various species of Gossypium forms the raw cotton so important to our manufacturers. Malva tricuspidata is used by the negroes in the West Indies as a substitute for soap. The seeds of Hibiscus abelmoschus are warm and musky, and are employed in perfumery as a substitute for musk; those of Hibiscus esculentus form the ochra, so much used in hot countries as a mucilaginous in-



Gossypium tricuspidatum.

1, a section of a corolla, with adhering monadelphous stamens.

gredient in soups. A few species are acid, especially Hibiscus sabdariffa. Finally the tenacious fibres procured from the inner bark of many kinds of Malvaceous plants form a good description of cordage. Hibiscus elatus and tiliaceus, and several kinds of Sida, are principally used for this purpose.

The only modern systematical account of the genera and species of the order is to be found in the first volume of De Candolle's 'Prodromus;' but the genera have been since constructed upon principles so much more precise, and the number of species has been so very considerably increased, that this enumeration is of little use at present. There is a good account of Indian species in Wight and Arnott's 'Prodromus Floræ Peninsulæ Indiæ Orientalis;' of Brazilian species in Auguste de St. Hilaire's 'Flora Braziliæ Meridionalis;' and of Mexican kinds many are described in the various volumes of the 'Linnæa.' A few African species are also to be found in Guillemin and Perrottet's 'Flora Senegambiæ,' vol. i.

MALVERN, MALVERN HILLS. [Worcestershire.]

MALWA. [Hindustan, p. 212.]

MAMELUKES, or MEMLOOKS, a name derived from an Arabic word signifying slaves, was that of a military body which for a long time ruled Egypt. The Memlooks were first instituted in the early part of the thirteenth century by Malek Salech, grandson of Safadeen, which Safadeen was the brother of the famous Salah Edeen, the Koord, the founder of the Eyoob dynasty of the sultans of Egypt, which succeeded the Fatemides. Malek Salech purchased many thousands of slaves, with which the markets of Asia were then glutted in consequence of the devastating wars of Gengis Khan. He chose chiefly young natives of the Caucasian regions, whom he trained to military exercises, and embodied into a corps of 12,000 men called Memlooks. This corps, by its discipline and distinct organization, became formidable to its masters. In 1254 the Memlooks revolted and killed Tooran Shah, the last prince of the Eyoobite dynasty, and raised to the throne of Egypt El Moez Turkoman Memlook. El Moez was murdered in 1261 by another Memlook called Baybers, who founded the dynasty of the Baharites, which conquered Syria, took Damascus, and put an end to the domination of the Abbaside caliphs. In 1382 Doulet el Memlook el Borgéeh, a Circassian Memlook, overthrew the Baharite dynasty, and founded the dynasty of the Circassian Memlooks, which, after losing all the conquests of the Baharites in Asia by the hands of the Ottomans, continued to rule Egypt till 1517, when Selim I., sultan of the Ottomans, marched into Egypt, defeated the Memlooks near Heliopolis, took Cairo, and put to death Tomaun Bey, the last of the Circassian dynasty. Selim however maintained or was obliged to maintain the Memlooks as a military aristocracy in Egypt. The Beys of the Memlooks, twenty-four in number, continued to be the governors of as many districts, though subject to a Pacha, appointed by the Porte, who resided at Cairo. The beys were elected by their own body. [Egypt, *Modern History of*.] This aristocracy continued to rule almost independent of the Porte till Bonaparte's invasion, when the bulk of Memlook cavalry was destroyed in several brilliant but useless charges upon the French squares supported by artillery, at the battle of the Pyramids, in July, 1798. [Bonaparte.] The remains of this once splendid body with their beys retreated into Upper Egypt. After the English and the Turks had reconquered Egypt in 1801, the Porte was no longer inclined to allow the Memlooks to retain their former authority, and the captain Pacha treacherously murdered several of the beys whom he had invited to a conference. At last, in 1811, Mehemet Ali, pacha of Egypt, by a similar contrivance, destroyed nearly all the remainder of them in the citadel of Cairo. A few escaped into Dongola, but the victorious troops of the Pacha pursued them, and they are now extinct as a body. The Memlooks were recruited entirely from Caucasian slaves. The office of bey was not hereditary, but elective among them. Their morals were very depraved: they were rapacious and merciless, and their extinction has been rather an advantage than a loss to humanity.

MAMERS. [Sarthe.]

MAMMA'LIA, MAMMALS, a term employed by Linnæus to designate those animals which suckle their young, and which, in our opinion, is far preferable to the term *Mammiferes* generally used by the French zoologists. Mammals are vertebrated animals whose blood is red and warm, and whose system of circulation is double; whose fœtus, in most species,* is nourished in utero by means of a placenta; whose young, when born at the proper period, give signs of life at their birth, and are, in a state of nature, afterwards fed with milk secreted by the mammæ of the mother, till they are old enough to procure their food, or to have it supplied from other sources.

Linnæus, who makes the Mammalia the first class of the Animal Kingdom, gives the following definition:—*Heart* with two auricles and two ventricles; *blood* warm, red. *Lungs* respiring reciprocally. *Jaws* incumbent, covered: armed with teeth in most. *Penis* intrans viviparas, lactiferas. *Senses:* tongue, nostrils, eyes, ears, *papillæ* (touch). *Covering:* hairs, &c. *Support* (Fulcra): four feet, except in those which are entirely aquatic, in which the posterior feet are bound together (compedes) into the fin of the tail. *A tail* in most.

This class Linnæus divides into orders, principally resting on the basis of dentition. His name for the incisor teeth is *primores;* for the canine or cuspidate teeth, *laniarii;* and for the back or grinding teeth, *molares*.

The orders, which are six in number, are comprised in three sections, depending on the nature of the extremities. 1. The *Unguiculata*, containing the orders *Bruta*, *Glires*. *Primates*, and *Feræ*. 2. The *Ungulata*, comprising the *Belluæ* and *Pecora*. 3. The *Mutica*, consisting of the order *Cete* (Whales) only.

1. The *Primates* consist of the genera Homo, Simia. Lemur, and Vespertilio.

2. The *Bruta* comprise the genera Elephas, Trichechus, Bradypus, Myrmecophaga, Manis, and Dasypus.

3. Under the *Feræ* are arranged the genera Phoca, Canis, Felis, Viverra, Mustela, Ursus, Didelphis, Talpa, Sorex, and Erinaceus.

4. The *Glires* embrace the genera Hystrix, Lepus, Castor, Mus, Sciurus, and Noctilio.

5. The *Pecora* comprehend the genera Camelus, Moschus, Cervus, Capra, Ovis, Bos.

6. To the *Belluæ* belong the genera Equus, Hippopotamus, Sus, and Rhinoceros.

And 7. Under the order *Cete* are arranged the genera Monodon, Balæna, Physeter, and Delphinus.

For the history of the science relating to the arrangement of the *Mammalia* generally, the reader is referred to the article Mammalogy; and for the natural history and organization of the beings which form the class, to that article and the articles Man, Mammary Gland, Dentition, as well as the various titles referrible to the orders, families, and genera belonging to the class in this work.

MAMMA'LOGY, a hybrid word, the roots being derived from the Latin and the Greek. Accordingly M. Desmarest has proposed the term *Mastology*, and M. de Blainville that of *Mastozoology*, as being entirely of Greek origin, and therefore of more legitimate construction. Vicious however as the word is, the term *Mammalogy* is in such general use by the zoologists of England and France, that it seems to be less objectionable to retain it, with all its faults, than to attempt to supersede it by another word, which, though it may be more correct, would be comparatively very little known.

Mammalogy then is the science which has for its object the study and classification of animals with *mammæ*, or teats, that is to say, Man, and quadrupeds properly so *called*, including the quadrumanous animals and Whales.

The objects of this science are numerically much less than those which constitute the other classes of animated beings; their bulk, as compared with that of the others, is generally speaking of greater volume, and their structure is more readily laid open by the knife of the zootomist; whilst, with the exception of those passages by which nature gradually passes from one form to another, their differences are more strongly marked. Their habits too are better known, and consequently they afford materials for classification capable of a comparatively certain arrangement.

To a certain extent the knowledge of mammalia and their nominal distinctions, as regards their habits and economic uses, must have been of the earliest date. The Holy Scriptures abound with passages to confirm this statement, if indeed it needed confirmation. Antient monuments too, long anterior to the times of the Greeks and Romans, speak the same language. When we come down to the time of

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* A placenta does not exist in the Marsupials and the Monotremes.

Aristotle, we find that the science had not proceeded further than a knowledge of the external and internal structure of these animals, without any attempt at a systematic arrangement of them.* If we descend lower, we find the science in the same state, whether we consult the works of Pliny, or of the other antient writers who followed Aristotle.

Conrad Gesner, though he treated of the Mammalia alphabetically in his 'History of Quadrupeds' (1551), finally divided them into groups, such as Monkeys, Horses, Deer, Oxen, &c., as indeed he did with regard to the oviparous quadrupeds (Tortoises, Lizards, Frogs, &c.).

Aldrovandus, Jonston, and the rest of that class of mammalogists, seem to have followed Gesner as closely as the antient writers followed Aristotle.

The first great step in system was made by our countryman John Ray, in his 'Synopsis Methodica Animalium' (1693), wherein he separated the *Mammalia* into two great classes, the *Ungulated*, or Hoofed animals, and the *Unguiculated*, or animals with nails or claws.

The *Ungulated* class are divided into—1, the *Solipedes*, as the horse; 2, quadrupeds with a divided hoof properly so called, as the ox or sheep; and 3, quadrupeds which have the feet divided into more than two parts, as the elephant.

The animals with a divided hoof are again subdivided into two sections: 1, *those which do not ruminate*, as the the hog; 2, *Ruminants*, which last consist of four genera, Sheep, Goats, Stags or Deer, and Oxen.

Those of the Unguiculated Mammals which have the nails wide and resembling those of man, such as the Apes or Monkeys, are separated from those which have the nails sharp and narrow. These last he separates into those which have a bifid foot, as the *Camels*, and into those which have a multifid foot, which he names *Fissipedes*.

The *Fissipedes* are subdivided into—1, the *Analogous* group, which have more than two incisor teeth in each jaw, as the Lions or Great Cats, the Dogs, &c., or two incisors only, as the Beaver, the Hares, the Guinea Pigs, the Squirrels, the Marmots, &c.; 2, the *Anomalous* group, which have no teeth at all, as the *Tamandua*, and other Ant-eaters [ANT-EATER, vol. i.], or which have teeth differing in form, in number, and position from those of the other Mammals, as the Hedgehogs, Armadillos, Moles, Sloths, &c.

Our limits will not permit us to do more than allude to the authors, and they were not few, who entered upon this branch of the science after Ray. Of these Seba may be considered one of the principal, and his work is justly appreciated for the number, and, generally speaking, for the accuracy of the well-executed plates which illustrate his voluminous work. But there now arose one who was eminently distinguished from the crowd of zoological authors. Linnæus, an outline of whose system we have already given [MAMMALIA], fixed the science upon a basis which his penetrating genius immediately saw was the secure one. He may be said to have invented a language admirably adapted for the wants of that science; and it is in this department that the great Swedish naturalist shines preeminently as a zoologist. In vain was the splendid genius of Buffon arrayed against him and his pupils; in vain did Klein, who seemed to live for no other purpose than to attack the Swede, publish his 'Quadrupedum Dispositio brevisque Historia Naturalis' (1751), wherein he separated the Mammalia into two groups, the Ungulated and Unguiculated, each consisting of five families; in vain did Brisson (1756) publish his 'Animal Kingdom divided into eleven classes,' containing eighteen orders and forty-two genera, some of the latter well defined and still admitted; the philosophical system of Linnæus daily gained ground, and at length became almost the universal language of zoology.

About a year before the death of Linnæus (1777) Erxleben published his 'Systema Regni Animalis.' It contained several new genera, as for example *Papio*, *Cercopithecus*, *Cebus*, *Callithrix* (all at the expense of the great Linnæan genus *Simia*), *Lutra*, *Cavia*, *Glis*, *Spalax*, *Dipus*, *Antilope*, and *Hydrochœrus*, all of which are still retained; and indeed his work, which should be in the hands of the student, seems to have been intended as a further development of the Linnæan system, and of the principles contained therein.

The excellencies of the work last mentioned are strongly contrasted with the edition of the 'Systema Naturæ' which Gmelin gave to the world in 1788. It is not passing a severe judgment to characterise it as a jumble of all that had been previously contributed to this department of zoology, and a farrago of species heaped together, without care, and in many instances without inquiry. The student whose lot it may be to follow out the synonyms of the Mammalia will perceive in what a labyrinth he gets involved as soon as he sets to work upon the names and references which swell out the 'Systema Naturæ' from the neat proportions which graced it when it left the hand of Linnæus, to the undigested and overladen mass which Gmelin has made it.

Previously to this visitation, a work of a very different character had made its appearance. In 1780 Professor Storr published his 'Prodromus,' which gave a direction to those employed in classifying the Mammalia still in a great measure followed. He divided the class into three Phalanxes: the first consisting of those Mammals which have feet proper for walking; the second, of those whose feet are fin-shaped, but with distinct toes; and the third, of those which have true fins without any *apparent* toes. These phalanxes are separated into cohorts, orders, tribes, sections, and genera; and the system is well worthy the deep attention of the reader.

Boddaert (1785), in his 'Elenchus Animalium,' divided the Mammalia into two great groups, the *Terrestrial* and the *Aquatic*. In the first (*Terrestria*) he placed—I. The *Unguiculated Mammals* divided into two sections, *a*. The Quadrumania; *β*. The Unguiculata with long claws (Sloth, Bats, Armadillos, Pangolins, and other Ant-eaters). II. The *Carnivorous Mammals* (Feræ). III. The *Rodent Mammals* (Glires). IV. The *Ruminants*. V. *Ungulata* not ruminants (Hog, Horse, Tapir, Rhinoceros, and Elephant).

In the 2nd group (*Aquatilia*) were arranged the Hippopotamus, Beaver, Otter, Walrus, the Seals and Dugongs, and the Manatee. Not to detain the reader with the Anatomical System of M. Vicq-d'Azyr, which broke up the Mammalia into fifteen classes and thirty-eight genera, and is seldom referred to, we proceed to notice the system of Blumenbach, who separated the Mammalia into nine orders. I. *Bimana* (Man). II. *Quadrumana* (Apes, Monkeys, and Macaucos). III. *Chiroptera* (Bats). IV. *Digitata*, consisting of three sections, the Rodents (Glires), the Carnivorous (Feræ), and the Edentata (Bruta). V. *Solidungula* (Horse, &c.). VI. *Bisulca* (Ruminants). VII. *Multungula* (Hog, Tapir, Elephant, Rhinoceros, &c.). VIII. *Palmipeda*, consisting of three sections, viz. the Rodent Palmipedes (Glires, Beavers), the Carnivorous Palmipedes (Seals, Otters), and the Edentate Palmipedes (Bruta, Ornithorhynchus, Walruses, Dugongs). IX. The *Cetacea* (Whales).

In 1798 Cuvier published his Elementary Table of Animals, which was afterwards further developed in his *Anatomie Comparée* and the *Règne Animal*. The method of this great zoologist bears considerable resemblance in some of its parts to the 'Prodromus' of Storr, as Cuvier himself remarks: it is so generally adopted that we shall presently give it in detail.

M. Desmarest (1804—'Dictionnaire d'Histoire Naturelle'), principally taking Cuvier and Storr for his guides, divided the Mammalia into three great sections. I. The Unguiculated Mammalia. II. The Hoofed Mammalia (Mammifères à sabots). III. The Finned Mammalia (Mammifères à nageoires), containing the orders Amphibia, Seals, Walruses, Dugongs, &c., and Cetacea (Whales). Our limits will not permit us to enter at length into the classification of M. Desmarest, which should however be carefully perused by the student.

We now proceed to lay before the reader Cuvier's arrangement after it had received the benefit of the joint labours of M. Geoffroy and himself, and as it finally left his hands in his last edition of the 'Règne Animal.'

Class Mammifères.

Order I. *Bimana*. Man.

Order II. *Quadrumana*. Two families. 1. Apes and Monkeys (Simia, Linn.). 2. Macaucos (Lemur, Linn.).

Order III. *Carnassiers*. Family 1. Cheiroptera (Bats). 2. Insectivora (Hedgehogs. Tenrecs. Tupaia. Shrews Mygale. Chrysochloris. Talpa. Condylura. Scalops). 3. Carnivora. Tribe 1. Plantigrades. Bears (Ursus, Linn.). Raccoons (Procyon, Storr.). Panda (Ailurus, F. Cuv.). Benturongs (Ictides, Valenciennes). Coatis (Nasua, Storr) Kinkajous or Pottos? (Cercoleptes, Illiger). Badgers (Meles,

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* Aristotle's classification was a classification of organs, not a classification of animals.

Storr). Gluttons (Gulo, Storr). Ratels. Tribe 2. Digitigrades. Martins (Mustela, Linn.). Skunks (Mephitis, Cuv.). Otters (Lutra, Storr). Dogs (Canis, Linn.). Civets (Viverra). Genets (Genetta, Cuv.). Paradoxurus. Ichneumons (Herpestes, Illiger). Suricates (Ryzæna, Illiger). Crossarchus. Proteles. The last subdivision of the Digitigrades is composed of the Hyænas (Hyæna, Storr), and the Cats (Felis, Linn.), in which last the sanguinary development is at its height. Tribe 3. Amphibia. The Seals (Phoca, Linn.). The Walruses (Trichechus, Linn.).

Order IV. *Marsupialia.* Subdivision 1. Opossums (Didelphis, Linn., including Cheironectes, Illiger, and Thylacinus and Phascogale, Temminck). Dasyurus (Geoffroy). Perameles (Geoffroy). Subdivision 2. Phalangista (Cuv.), including the true Phalangers (Balantia, Illiger) and the flying Phalangers (Petaurus, Shaw; Phalangista, Illiger). Subdivision 3. The Potoroos, or Kangaroo Rats (Hypsiprymnus, Illiger). The Kanguroos (Macropus, Shaw; Halmaturus, Illiger). The Koalas (Lipurus, Goldfuss; Phascolarctos, Blainville). Phascolomys (Geoffroy).

Order V. *Rodentia.* The Squirrels (Sciurus, Linnæus, including Tamia? Illiger; Pteromys and Cheiromys, Cuvier). The Rats (Mus, Linnæus, including Arctomys, Gmelin; Spermophilus, F. Cuvier). The Souslik (Cynomys of Rafinesque); Myoxus, Gmelin; Echimys, Geoffroy (Loncheres, Illiger); Hydromys, Geoffroy; Capromys, Desmarest. The Rats properly so called, Mus, Cuv. The Jerbilles, Gerbillus, Desmarest; Meriones, Illiger; Meriones, F. Cuvier. The Hamsters, Cricetus, Cuv., and Arvicola, Lacépède. The Ondatras, Fisher, F. Cuv. The Field Rats and Mice, Arvicola, Cuv., Hypudæus, Illiger. The Lemmings, Georychus, Illiger; Otomys, F. Cuv. The Jerboas, Dipus, Gmelin; Helamys, F. Cuv.; Pedetes, Illiger; Spalax, Guldenstädt; Bathyergus, Illiger; Geomys, Rafinesque; Pseudostoma, Say; Axomys, Lichtenstein; Diplostoma, Rafinesque. The Beavers (Castor, Linnæus). Myopotamus, Commerson. The Porcupines (Hystrix, Linnæus, including the Ursons, Erétisons of F. Cuv., and the Coendous, Synetheres of F. Cuv.). The Hares (Lepus, Linnæus, including Lagomys, Cuvier). The Capybara, Hydrochœrus, Erxleben. The Guinea Pigs (Anœma, F. Cuv., Cavia, Illiger, including Keradon, F. Cuv.). The Agoutis (Chloromys, F. Cuv., Dasyprocta, Illiger). The Pacas (Cœlogenys, F. Cuv.); and the Chinchillas.

Order VI. *Edentata.* Tribe 1. Tardigrades. The Sloths* (Bradypus, Linnæus, including Acheus, F. Cuv.). Tribe 2. Ordinary Edentata. The Armadillos (Dasypus, Linnæus), and the subgenus Chlamyphorus, Harlan. The Aard-Vark (Orycteropus, Geoffroy). The Ant-Eaters (Myrmecophaga, Linnæus). The Pangolins (Manis, Linnæus). Tribe 3. The Monotremes. The Echidna, Cuv. (Tachyglossus, Illiger), and the Ornithorhynchus, Blumen. (Platypus, Shaw.).

Order VII. *Pachydermata.* Family 1. Proboscidians. Elephants (Elephas, Linnæus) and Mastodons† (Mastodon, Cuvier). Family 2. Ordinary Pachydermata. Hippopotamus (Linn.). The Hogs (Sus, Linnæus, including Phascochœres, F. Cuvier, and Dicotyles, Cuv.). Anoplotherium (Cuv., extinct). The Rhinoceroses (Rhinoceros, Linnæus). The Damans (Hyrax, Hermann). Palæotherium (Cuv., extinct). Lophiodon (Cuv., extinct). The Tapirs (Tapir, Linnæus). Family 3. Solipeda. The Horses, &c. (Equus, Linn.).

Order VIII. *Ruminantia* (Pecora, Linnæus). *No Horns.* The Camels (Camelus, Linnæus, including the Llamas, Auchenia, Illiger). The Musks (Moschus, Linnæus). * * *True Horns shed periodically.* The Stags or Deer (Cervus, Linnæus). * * * *Persistent Horns.* The Giraffe (Camelopardalis, Linnæus). * * * * *Hollow Horns.* The Antelopes (Antilope). The Goats (Capra, Linnæus). The Sheep (Ovis, Linnæus). The Oxen (Bos, Linnæus).

Order IX. *Cetacea.* Family 1. Herbivorous Cetacea. The Manatees (Manatus, Cuvier). The Dugongs (Halicore, Illiger). Rytina (Illiger). Family 2. Ordinary Cetacea. The Dolphins (Delphinus, Linn., including Delphinus, Cuvier, Delphinorhynchus, Blainville). The Porpoises (Phocæna, Cuv.). Delphinapterus, Lacépède, Hyperoodon, Lacépède. The Narwhals (Monodon, Linnæus). The Cachalots (Physeter, Linnæus). The Whalebone Whales (Balæna, Linnæus, including Balænoptera, Lacépède).

Illiger (1811), in his 'Prodromus Systematis Mammalium et Avium,' divided the Mammalia into fourteen orders, thirty-nine families, and one hundred and twenty-five genera, most of which last are characterised with great neatness. We have only room for a mere sketch of this system, which has considerable merit.

Order I. *Erecta* (Man).

Order II. *Pollicata.* Family 2. Quadrumana (Apes and Monkeys). Family 3. Prosimia (the Lemurs, &c.) Family 4. Macrotarsi (Tarsiers, Galago, &c.). Family 5. Leptodactyle (Cheiromys). Family 6. Marsupialia (except the Potoroos and Kangaroos).

Order III. *Salientia.* Family 7. Salientia (Hypsiprymnus and Halmaturus, Potoroos and Kangaroos).

Order IV. *Prensiculantia.* Fam. 8. Macropoda (Jerboas, &c.). Fam. 9. Agilia (Myoxus, the Squirrels, and Pteromys). Fam. 10. Murina (Marmots, Hamsters, Rats, &c.). Fam. 11. Cunicularia (Lemmings, Hypudæus, &c.). Fam. 12. Palmipeda (Hydromys and Beavers). Fam. 13. Aculeatea (Porcupines and Loncheres, or Echimys). Fam. 14. Duplicidentata (Hares, &c.). Fam. 15. Subangulata (Paca, Agoutis, Guinea Pigs, Capybara).

Order V. *Multungulata.* Fam. 16. Lamnunguia (Hyrax, &c.). Fam. 17. Proboscidea (Elephants). Fam. 18. Nasicornia (Rhinoceroses). Fam. 19. Obesa (Hippopotamus). Fam. 20. Nasuta (Tapirs). Fam. 21. Setigera (Hogs).

Order VI. *Solidungula.* Fam. 22. (Horse, &c.)

Order VII. *Bisulca.* Fam. 23. Tylopoda (Camels and Llamas). Fam. 24. Devexa (Giraffe). Fam. 25. Capreoli (Deer and Musks). Fam. 26. Cavicornia (Antelopes, Goats, and Oxen).

Order VIII. *Tardigrada.* Fam. 27. *Tardigrada* (Sloths, tridactylous and bidactylous, Sloth-Bear or *Prochilus*).

Order IX. *Effodientia.* Fam. 28. Cingulata (*Armadillos*). Fam. 29. Vermilinguia (Aard-Vark, Ant-Eaters and Pangolins).

Order X. *Reptantia.* Fam. 30. Reptantia (Monotremes and Pamphractus, which last is no mammal, but a tortoise).

Order XI. *Volitantia.* Fam. 31. Dermoptera (Galeopithecus). Fam. 32. Cheiroptera (Bats).

Order XII. *Falculata.* Fam. 33. Subterranea (Hedgehogs, Shrews, Moles, &c.). Fam. 34. Plantigrada (Kinkajou, Coatis, Raccoon, Glutton, Badgers, and Bears). Fam. 35. Sanguinaria (Fennec, Dogs, Hyænas, Cats, Civets, and Suricate). Fam. 36. Gracilia (Ichneumons, Skunks, Weasels, Otters).

Order XIII. *Pinnipedia.* Fam. 37. Pinnipedia (Seals and Walruses).

Order XIV. *Natantia.* Fam. 38. Sirenia (Manatee, Dugong, and Rytina). Fam. 39. Cete (Whalebone Whales, Narwhals, Cachalots, Dolphins, &c.).

M. de Blainville (1816) divided the *Mammifères* into two subclasses. 1. The *Monodelphes*, containing the six orders Quadrumana, Carnassiers, Edentata, Rodentia, Gravigrades, and Ongulogrades. 2. The *Didelphes.* All the orders of the *Monodelphes*, with the exception of the fourth and fifth, are subdivided into the *Normal* and *Anomalous*, and so is the subclass of Didelphes, the Normal forms being the *Carnassiers* and *Rongeurs*, and the Anomalous *Echidna* (for burrowing) and *Ornithorhynchus* (for swimming). M. de Blainville observes that it may be that the *Cetacea* should form a separate order or degree of organization; and that the *Echidnæ* and *Ornithorhynchi* may make a distinct subclass.

In 1825 Mr. Gray published his 'Outline of an Attempt at the Disposition of Mammalia into Tribes and Families, with a List of the Genera apparently appertaining to each Tribe.' For the details we must refer the reader to the 'Annals of Philosophy' (vol. xxvi.), confining ourselves to a mere sketch of the orders, families, and subfamilies.

§ 1. Teeth of the three distinct sorts, and forming a continuous series.

Order I. Primates (Linn.).

*

Anthropomorphous.

Family 1. *Hominidæ.* Subfamilies: 1. Hominina (Man). 2. Simiina (Apes). 3. Presbytina (Presbytes). 4. Cercopithecina (Cercopithecus, &c.). 5. Cynocephalina (Cynocephalus and Papio).

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* It is here that Cuvier mentions the extinct genera Megatherium and Megalonyx, noticing however the differences, and observing that the former, though it has a skull very like the sloths, wants the canines, and inclines, as to the rest of the skeleton, partly to the sloths, and partly to the ant-eaters.

† Extinct.

Fam. 2. *Sariguidæ.* Subfam. 1. Mycetina (Mycetes). 2. Atelina (Ateles, &c.). 3. Callithricina (Cebus). 4. Saguinina (Saguinus, &c.). 5. Harpalina* (Jacchus and Midas).

* * Quadrupedoid.

Fam. 3. *Lemuridæ.* Subfam. 1. Lemurina (Lemur). 2. Lichanotina (Indris, Lichanotus). 3. Loridina (Loris, Nycticebus). 4. Galagonina (Otolicnus, &c.). 5. Tarsina (Tarsius). 6. Cheiromina (Cheiromys).

Fam. 4. *Galeopithecidæ.* Galeopithecus.

Fam. 5. *Vespertilionidæ.* Subfam. 1. Rhinolophina (Megaderma, &c.). 2. Phyllostomina (Phyllostomus, &c.). 3. Pteropina (Pteropus, &c.). 4. Noctilionina (Noctilio, &c.). 5. Vespertilionina (Vespertilio, Barbastellus, &c.).

Order II. Feræ (Linn.).

* Cutting-teeth six above and below; grinders of three sorts.

Fam. 1. *Felidæ.* Subfam. 1. Hyænina (Hyæna and Proteles). 2. Felina (Felis, Lyncus, Prionodon). 3. Mustelina (Putorius, &c., and Lutra). 4. Viverrina (Viverra, &c.). 5. Canina (Canis, Fennecus, Lycaon).

Fam. 2. *Ursidæ.* Subfam. 1. Ursina (Ursus, &c.). 2. Procyonina (Procyon, &c.). 3. Gulonina (Gulo, &c.). 4. Myadina † (Myadus). 5. Taxina (Meles).

* * Cutting-teeth various (rarely six above and below); grinders of two sorts, false and tubercular.

Fam. 3. *Talpidæ.* Subfam. 1. Talpina (Talpa). 2. Chrysochlorina (Condylura, &c.). 3. Soricina (Sorex, Mygale). 4. Erinacina (Erinaceus). 5. Tenrecina (Tenrecus). 6 ? Tupaina (Tupaia).

Fam. 4. *Didelphidæ.* Subfam. 1. Macropina (Macropus, &c.). 2. Phalangistina (Acrobata, Petaurus, &c.). 3. Phascolomina (Phascolomys). 4. Didelphina (Didelphis, Cheironectes). 5. Dasyurina (Peracyon, Dasyurus, Phascogale). 6. Peramelina (Perameles and Isodon).

Fam. 5. *Phocidæ.* Subfam. 1. Stenorhyncina (Pelagios, Stenorhynchus). 2. Phocina (Phoca). 3. Enhydrina (Enhydra). 4. Otariina (Otaria, Platyrhynchus). 5. Stemmotopina (Stemmotopus and Macrorhinus).

§ 2. Teeth not of three sorts, or not forming a continuous series.

Order III. Cete (Linn.).

* Skin smooth without any hair or whiskers.

Fam. 1. *Balænidæ.* Subfam. 1. Balænina (Balæna, Balænoptera). 2. Physeterina (Physalus, Physeta, Catodon).

Fam. 2. *Delphinidæ.* Subfam. 1. Delphinina (Delphinus, Delphinorhynchus). 2. Phocænina (Phocæna, &c.).

* * Skin rather hairy, whiskers distinct; grinders flat-topped.

Fam. 3. *Trichecidæ.* Trichecus.

Fam. 4. *Manatidæ.* Manatus.

Fam. 5. *Halicoridæ.* Halicora, Stellerus.

Order IV. Glires (Linn.).

* Fur with scattered larger hairs or spines; tail spiny or scaly.

Fam. 1. *Muridæ.* Subfam. 1. Murina (Mus, &c.). 2. Hydromina (Hydromys). 3. Ondatrina (Ondatra). 4. Castorina (Castor, Osteopora). 5. Echymina (Echymys, &c.).

Fam. 2. *Histricidæ.* Hystrix, &c.

* * Fur nearly equally soft; tail none, or hairy.

Fam. 3. *Leporidæ.* Subfam. 1. Leporina (Lepus). 2. Lagomina (Lagomys). 3. Caviina (Cavia, Kerodon). 4. Hydrochærina (Hydrochærus). 5. Dasyporcina (Cælogenys, &c.).

Fam. 4. *Jerboidæ.* Subfam. 1. Pedestina (Pedestes). 2. Dipina (Dipus, Meriones (F. Cuv., not Illiger). 3. Gerbillina (Gerbillus). 4. Myoxina (Myoxus). 5. Sciurina (Sciuropterus, Sciurus, &c.).

Fam. 5. *Aspalacidæ.* Subfam. 1. Aspalacina (Oryctorus, &c.). 2. Lemmina (Arvicola, Lemmus, &c.). 3. Cricetina (Cricetus). 4. Pseudostomina (Pseudostoma, &c.). 5. Arctomina (Arctomys, Spermophilus).

Order V. Ungulata (Ray). Bruta, Pecora, Belluæ (Linn.).

* Two middle toes large, equal; bones of the metacarpus and metatarsus united.

Fam. 1. *Bovidæ.* (Horns persistent.) Subfam. 1. Bovina (Bos, Ovis, Capra, Antilocapra, Antilope, Catoblepas). 2. Camelopardina (Camelopardalis). (Horns none, or deciduous.) 3. Camelina (Camelus and Auchenia). 4. Moschina (Moschus and Memina). 5. Cervina (Cervus, Muntjaccus, &c.).

Fam. 2. *Equidæ.* Equus (Linn.). Asinus (Gray).

* * Toes three, four, or five to each foot, nearly equal; teeth nearly in one series.

Fam. 3. *Elephantidæ.* (Nose extended into a trunk.) Subfam. 1. Elephantina (Elephas, Mastodon). 2. Tapirina (Tapirus, Lophiodon, Palæotherium). (Nose not produced into a trunk.) 3. Rhinocerina (Rhinoceros, Hyrax, Lipura and Elasmotherium, Anoplotherium, &c.). 4. Suina (Sus, &c.). 5. Hippopotamina (Hippopotamus).

Fam. 4. *Dasypidæ.* (Body covered with scales and armour, revolute.) Subfam. 1. Manina (Manis, Dasypus, &c.). (Body hairy or spinous, not convolute.) 3. Orycteropina (Orycteropus). 4. Myrmecophagina (Myrmecophagus, &c.). 5. Ornithorhynchina (Echidna, Ornithorhynchus).

Fam. 5. *Bradypidæ.* Bradypus, Cholæpus, Megatherium, Megalonyx.

Mr. Gray then exhibits the manner in which the orders appear to be connected together, and the 'Typical' and 'Annectant Groups' of each order.

Mr. Swainson, who does not admit Man into the zoological circle for reasons stated in his 'Natural History and Classification of Quadrupeds' (1836), gives in the third part of his book an arrangement of 'The Class Mammalia, according to its natural affinities.' He makes the *Quadrumana*, the first order, consist of the following families:—1, Simiadæ. 2, Cebidæ. 3, Lemuridæ. 4, Vespertilionidæ, consisting of Mr. Gray's subfamilies Rhinolophina, Phyllostomina, Pteropina, Noctilionina, and Vespertilionina.

The second order, *Feræ*, includes the families—1, Felidæ. 2, Mustelidæ, consisting of the subfamilies Viverinæ (Viverrinæ), Mustelinæ, and Ursinæ. 2, Didelphidæ (Opossums). 3, Sorecidæ. 4, Phocidæ.

The third order, *Cetacea*, comprehends the families—1, Sirenia (Herbivorous Cetacea). 2, Cete, with the subfamilies? Delphinæ and Balæninæ.

The fourth order, *Ungulata*, embraces—tribe 1, Pachydermes. Tribe 2, Anoplotheres. Tribe 3, Edentates, including the Monotremes. Tribe 4, Ruminantes (comprehending the families—1, Bovidæ. 2, Antilopidæ. 3, Cervidæ. 4, Moschidæ. 5, Camelopardæ). Tribe 5, Solipedes.

The fifth order, *Glires*, consists of—division 1, Glires proper, with clavicles. Div. 2, Clavicles rudimentary or none.

Immediately following the genus Cavia and its subgenera we find the '*Marsupial* Rodentia. Situation uncertain;' and next to them the family 'Marsupidæ' (Herbivorous Marsupials), formed of the genera Halmaturus, Hypsiprymnus, and Phalangista, the latter with two subgenera, Petaurista and Petaurus.

We must refer the reader to Mr. Swainson's book for an explanation of the peculiar views of classification, affinity, and analogy developed in it.

The works of Buffon can hardly be said to present any principle of classification as applicable to the Mammalia. Pennant indeed gives what he calls a systematic index of the genera, species, and varieties, and divides the Quadrupeds into two grand divisions (the first without a name, and including—1, Horse; 2, Ox; 3, Sheep; 4, Goat; 5, Giraffe; 6, Antelope; 7, Deer; 8, Musk; 9, Camel; 10, Hog; 11, Rhinoceros; 12. Hippopotame; 13, Tapiir; 14, Elephant, as generic appellations; and the second grand division, with the name of Digitated Quadrupeds, including the genera (Section 1)—15, Ape; 16, Macauco; (Section 2)—17, Dog; 18, Hyæna; 19, Cat; 20, Bear; 21, Badger; 22, Opossum; 23, Weasel; 24, Otter; (Section 3)—25, Cavy; 26, Hare; 27, Beaver; 28, Porcupine; 29, Marmot; 30, Squirrel; 31, Jerboa; 32, Rat; 33, Shrew; 34, Mole; 35, Hedgehog; 36, Sloth; 37, Armadillo; 38, Manis: 39, Ant-Eater; 40, Walrus; 41, Seal; 42, Manati; 43, Bat); but this catalogue can hardly be called systematic. In his later editions he formed his catalogue into a more complete 'Method,' with four grand divisions:—1, Hoofed Quadrupeds; 2 Digitated; 3, Pinnated; 4, Winged; but his work will always be consulted more for the natural history of the 'Quadrupeds' there treated of, than for their arrangement.

* Hapalina ?

Mydaina ? Mydaus ?

We can only allude to the works of Pallas, Allamand, Schreber, Shaw, Marcgrave, Catesby, Hernandez, D'Azara, Sonnerat, Steller, Sparrman, Le Vaillant, Bruce, Barrow, Burchell, Humboldt, Peron, Lesueur, Fischer, Lesson, Rüppell, Smith, Bennett, Bell, Owen, Ogilby, Sykes, Darwin, and a host of others, who have enriched the subject by their writings or the observations which they have made in their travels.

MAMMARY GLAND is an organ of considerable interest from its occurring only in that important class of animals to which it gives its name [MAMMALIA], and whose greatest peculiarity is that, while young, their food is the milk secreted by the mammary gland of their mother.

The number of mammary glands varies in different animals. They are composed of ramified ducts which open on the surface of a nipple or teat by a very minute orifice. In some animals, as ruminants, there is but one orifice at the extremity of each nipple; in others, and in man, there are several. Each orifice leads into a fine canal, which however soon dilates, and ramifies with irregular and tortuous branches in the substance of the breast or udder. Each branch has either a simple closed extremity or terminates in a minute cellule, and numerous capillary blood-vessels ramify on their walls and secrete the milk into them. When the mouth of the young animal, by the action of sucking, produces a partial vacuum over the nipple, the weight of the surrounding medium presses lightly and equally upon the surface of the breast or udder, and propels the milk from the ducts in minute and gentle streams.

At the commencement of pregnancy, the mammary gland, which up to the period of puberty had been but little developed, enlarges; its increase of size keeps pace with the progress of gestation, and before its termination a thin serous milky fluid begins to be secreted. Directly after parturition, the quantity of milk increases, and it becomes more thick and rich, combining in itself all the best principles for the nourishment of the young animal. It continues to flow for a length of time proportioned to the age at which the young animal can seek its own food, and then gradually subsiding, the gland decreases to the same size which it had before pregnancy.

In women the mammary gland is subject to many and severe diseases; as abscess, cancer, and various tumours; but the consideration of these belongs to other general articles. In males of all species only a rudiment of this organ is found; yet there are not wanting instances in which milk has been secreted from the breasts of men and other male animals. (Blumenbach.)

MAMMEA, a genus of the natural family of Guttiferæ, so called from the American name *Mamey* of *M. Americana*, or the American Mammee-tree, which is the only species of this genus, and forms a handsome tree with a spreading elegant head, which is compared with that of a Magnolia. The flowers are odoriferous and employed as an aromatic addition to liqueurs called *Eau* and *Crème des Creoles* in some of the West India Islands. The fruit is large and has a double rind, of which the outer is thick and leathery; the inner one is thin and bitter, and contains the pulp closely adhering to it, which is of a yellow-apricot colour, whence it is sometimes called abricot de Saint Domingue. This pulp has a pleasant but peculiar taste with an aromatic smell; it may be eaten raw, or cut in slices with wine or sugar; or cooked, which deprives it of its gummy portion. It is also preserved in wine sweetened with sugar, or in brandy. (Labat.) The fruit is considered nourishing and pectoral, and much esteemed in America. Attempts have been made to cultivate it in stoves in this country. According to Sweet, it grows freely in sandy loam; and ripened cuttings, with the leaves not shortened, root in sand under a hand-glass in heat.

MAMMELLI'PORA. Bronn chooses this name instead of LYMNOREA, Lam., for a genus of fossil zoophyta, analogous to Alcyonium.

MAMMOTH, a term employed to designate the fossil elephants. The name has been erroneously applied sometimes to the Mastodon. [ELEPHANT, vol. ix., p. 352.]

MAMUN, ABUL ABBAS ABDALLAH, the seventh Abbaside caliph, was born at Bagdad, A.D. 786. He was entrusted, during the life of his father, the celebrated Harun al Rashid, with the government of Khorassan; but on the death of Al Rashid, in 808, and the succession of his brother Amin, Mamun was deprived of this government, and commanded to repair to Bagdad. But as such a step would doubtless have been followed by his death, Mamun disobeyed the orders of the caliph, and proclaimed war against him. The contest was carried on till 813; when Bagdad was taken by Thaher and Harthemah, the general of Mamun, and Amin put to death.

The early part of Mamun's reign was greatly disturbed by the pretensious of the descendants of Ali, the cousin of Mohammed. [ALI.] Mamun, in order to restore peace to his empire, named one of the princes of the house of Ali as his successor, and commanded that the black colour, which distinguished the Abbasides, should be discontinued at the court, and replaced by the green, which was worn by the descendants of the prophet. This step however occasioned a revolution in the government; the Abbasides rose against their caliph and proclaimed in his stead Ibrahim, the son of Mahadi. After the end of two years, Mamun obtained the caliphate again, and, taught by experience, restored the black colour of the Abbasides and named his brother as his successor. The partisans of the Alides again rebelled against Mamun, but were unable to obtain any advantages over him. In addition to these wars, Mamun was also engaged, during part of his reign, by the revolt of the son of Harthemah in Armenia, and by that of Thaher in Persia.

In 830 Mamun engaged in a war with Theophilus, the emperor of Constantinople; which is said to have arisen from the refusal of the emperor to allow Leon, a celebrated teacher at Constantinople, to repair to Bagdad, whither he had been invited by the caliph. The war was carried on, principally in Cilicia, during three successive campaigns; at the close of which Mamun died in the vicinity of Tarsus, 833, and was succeeded by his brother Motasem.

Although the reign of Mamun was disturbed by so many wars and intestine commotions, yet science and literature were more extensively cultivated than under any preceding caliph. Mamun was a munificent patron of literature; he founded colleges and libraries in the principal towns of his dominions; and invited to his court not only Greek and Syriac, but also Hindu philosophers and mathematicians. Many of the most celebrated Greek and Hindu works were translated into Arabic by his command; and among other works written during this time, we may mention an 'Elementary Treatise on Algebra,' by Mohammed ben Musa, which was published with a translation by the late Dr. Rosen. [ABBASIDES.]

MAN. The anatomy and physiology of man are treated of under their several and appropriate heads in this work. The present article is limited to the consideration of Man as an object of natural history. The subject may be divided into two parts: 1, The comparison of the human structure and economy with those of other animals; and 2, The comparison of the various modifications of the human structure and economy in different races of men.

Specific Characters of Man.—In every part of the human frame we find adaptations to the erect attitude, the most peculiar characteristic of mankind. Examining the skeleton, we find that the two condyles, or articulating surfaces of the occiput, by which the skull is connected with the spine, are so placed on each side, that a vertical line passing through the centre of gravity of the head would fall almost exactly between them and on the top of the spine. The condyles are not placed at the very centre of the base of the skull, but just behind it, so as to compensate in some measure for the greater specific gravity of the posterior part of the head, which is composed chiefly of thick heavy bone and brain, while the anterior is formed in part by the light bones of the face, and contains numerous cavities. Still however there is a slight preponderance in front of the condyles, which, when the head is not held up by some external force, tends to carry it forwards and downwards, as we may see in persons falling asleep in the erect posture. But the muscles attached to the back of the head are far larger and more numerous, as well as more conveniently arranged for the full exercise of their power, than those in front of the condyles, and the effort required of them to hold up the head is so slight, that it may be made throughout the day without producing fatigue.

The surfaces of these condyles moreover have a horizontal direction (when the head is held upright), and thus the weight of the skull falls vertically upon them and the top of the vertebral column. Comparing with these arrangements the position and direction of the occipital condyles in other mammalia, we find that in the latter they are placed much nearer the back of the head, and that their plane is more oblique. Thus, if a line be drawn in the median plane along the base of a human skull, the foramen magnum and occipital condyles will be found immediately behind the point at which that line is bisected; while in the chimpanzee (in which also the condyles are proportionally smaller) the same parts are placed in the middle of the posterior third of a line similarly drawn, and in other animals are still farther back. Hence there is in all animals a greater proportion of the weight of the head in front of the vertebral column than there is in man; and all the parts anterior to the condyles are proportionally shorter in man than in other mammalia, in which the jaws, the bony palate, the basilar part of the occipital bone, and the petrous portions of the temporal, are always long and large.

Besides being placed so far behind the centre of gravity of the head, the condyles of other mammalia are directed more obliquely downwards than those of man; so that, if the head were supported on the top of a vertical column, its weight (even if it fell entirely upon the condyles) would press on an inclined plane, and constantly tend to carry the head forwards and downwards. The degree of obliquity in the direction of the condyles varies in different animals. It may be nearly estimated by the angle formed by two lines, one of which is drawn in the plane of the occipital foramen, and the other from its posterior edge to the lower margin of the orbit. This angle is of 3° in man, and of 37° in the orang-outan; but in the horse it is 90°, the plane of the foramen being vertical. If therefore the natural posture of man were horizontal, he would in this respect be circumstanced like the horse, for the plane of his condyles, which is nearly horizontal in the upright position, would then be vertical; the head, instead of being nearly balanced on the top of the column, would hang at the end of the neck, and its whole weight would have to be supported by some external and constantly-acting power. But for this there is neither in the skeleton nor in the muscular system of man any adequate provision. In other mammalia the head is maintained in such a position by a strong and thick ligament (the ligamentum nuchæ), which passes from the spines of the cervical and dorsal vertebræ to the most prominent part of the occiput, but of which in man there is little or no trace. In the horizontal position therefore he would have the heaviest head, with the least power of supporting it.

The position of the face immediately beneath the brain, so that its front is nearly in the same plane as the forehead, is peculiarly characteristic of man; for the crania of the chimpanzee and orang, which approach nearest to that of man, are altogether posterior to and not above the face. This form, at the same time that it remarkably distinguishes the human from the brute features, is exactly adapted to the erect attitude. In that posture the plane of the orbits is nearly horizontal; the cavities of the nose are in the best direction for inhaling odours, proceeding from before or from below them; the jaws do not project in front of the forehead and chin. But suppose the posture changed, as painful an effort would be required to examine an object in front of the body as is now necessary to keep the eyes fixed on the zenith, and the heavens would be almost hidden from our view; the nose would be unable to perceive any other odours than those which proceeded from the earth or from the body itself; and the teeth and lips would be almost useless, for they would scarcely touch an object on the ground before the forehead and chin were in contact with it; while the view of that which they attempted to seize would be obscured by the nose and cheeks.

The vertebral column in man, though not absolutely straight, yet has its curves so arranged, that when the body is in the erect posture, a vertical line drawn from its summit would fall exactly on the centre of its base. It increases in size in the lumbar region, and is therefore somewhat pyramidal in form. The lumbar portion of the human vertebral column is also of considerable length, and is composed of five vertebræ; while in the chimpanzee and orang there are but four. The processes for the attachment of muscles upon it are long and strong; an arrangement well adapted to overcome the tendency which the weight of the viscera in front of the column has to draw it forwards and downwards. Thus the spinous processes of the cervical and dorsal vertebræ, which are in other mammalia large and strong for the attachment of the ligamentum nuchæ to support the head, are in man scarcely prominent, and his head is nearly balanced on the vertebral column; while those of the lumbar vertebræ, by which the weight of the thoracic and abdominal viscera is partly supported, are proportionally much larger in man than in other mammalia.

The base of the human vertebral column is placed on a sacrum of greater proportional breadth than that of any other animal, and remarkably arched forwards. The sacrum is again fixed between two widely-expanded haunch-bones, forming the lateral walls of a peculiarly broad pelvis. By its great width the pelvis forms an ample cavity for the support and defence of many of the viscera, and especially of the pregnant uterus: by the distant separation of the haunches and thighs the basis of support is rendered wider, and by its oblique direction the weight of the body is transmitted more directly from the sacrum to the upper part of the thigh-bones. The pelvis of every other species of the class is very different from the human; it is always longer and narrower, having a far smaller space between the iliac bones and the lowest ribs; the sacrum especially is lengthened and reduced in width; the alæ of the ilia are much less expanded; and the whole pelvis, instead of forming an angle with the vertebral column, is almost in the same line with it.

The lower extremities of man are remarkable for their length, which is proportionally greater than that of any other mammal, except those of the kangaroo tribe. Now it is evident that no greater obstacle to progression in the horizontal posture could exist than this length of what would then be the hind legs. Either man would be obliged to rest on his knees, with his thighs so bent towards the trunk, that an attempt to advance them would be painful, and with his legs and feet immovable and useless; or he must elevate his trunk upon the extremities of his toes, throwing his head downwards, and exerting himself forcibly at every attempt to bring forward the thighs by a rotatory motion at the hip-joint. In either case the only useful joint would be that at the hip, and the legs would be scarcely superior to wooden or other rigid supports.

The position of the human thigh-bone, in which it is most securely fixed in its deep acetabulum, is that which it has when supporting the body in the erect attitude. In the chimpanzee and orang-outan its analogous position is at an oblique angle to the long axis of the pelvis, with the body supported obliquely in front of it: in other animals, as the elephant, it forms nearly a right angle; and in others, as the horse, ox, &c., an acute angle with the axis of the pelvis and spinal column. The human femur is further distinguished by its great length, by the obliquity and length of its neck, and by its being directed somewhat obliquely inwards towards that of the opposite side, so as to approximate the knees and bring them more directly under the pelvis. It is by this great length of the thigh that the proportion in the length of the human thigh and arm is so different from that which obtains in the apes, among which, in the chimpanzee, the arms reach to the level of the knees, and in the orang-outan to the ancles; while in man they extend only to the middle of the thighs. In all other animals the thigh is still shorter.

In the human knee-joint we find the opposed extremities of the femur and tibia expanded so as to present a very broad articulating surface; and the internal condyle of the femur lengthened, so that the whole weight of the body, when erect, falls vertically on the top of the tibia, when the joint is in the firmest position in which it can be placed.

The weight of the body is next transmitted through the tibia to the upper convex surface of the astragalus, and thence to the other bones of the foot.

The human foot is, in proportion to the size of the whole body, larger, broader, and stronger than that of any other mammal. In the upright position it is at right angles with the leg, and is in contact with the ground at both ends. The sole of the foot is concave, so that the weight of the body falls on the summit of an arch, of which the astragalus (supported below by a very strong ligament), represents the key-stone, and of which the principal points of support are the large and arched os calcis, and the anterior extremities of the metatarsal bones. This strength and size of his foot enable man alone of all mammalia to stand upon one leg. The natural contact of the os calcis with the ground, and its arched form, are also peculiar to him. All the apes have the os calcis small, straight, and more or less raised from the ground, which, when standing, they touch only with the outer side of the rest of the foot; while in animals more remote from man the angle which the os calcis forms with the tibia is still more acute; and the foot being more elongated and narrow, the extremities of the toes only come in contact with the ground. The foot of the monkey is still further distinguished from that of man by the great length of four of its toes, and the separation of the most internal (which, instead of being the largest, is the smallest) from the rest, in such a manner that it can be opposed to them in action, like a thumb. Monkeys are hence four-handed, all their extremities being alike adapted for prehension, and for clinging to small bodies, as the branches of trees, &c.

Man's chest is large and expanded. It is flattened in front, and has greater dimensions transversely than in depth, a peculiarity in which only the most man-like monkeys partake. The sternum is short and broad, and there is a considerable distance between the lower ribs and the haunch-bones, in consequence of the small number of ribs and the length of the lumbar portion of the vertebral column. The viscera in this space, which in the horizontal position would be but insufficiently held up by the abdominal muscles, are in the erect attitude securely supported by the expanded pelvis.

In the upper or anterior extremity of man we find ample proofs of his naturally erect attitude, though some of them are only of a negative kind, as those drawn from the total unfitness of the arm and hand to be an organ of support; and others only presumptive, as those relating to the necessity of the upright posture for the full exercise of the hands. But the peculiarities of the upper extremity of man, in relation to his being the only two-handed animal, are sufficiently interesting to require a separate description.

The other parts of the human body concerned in locomotion are in exact adaptation with the peculiar construction of the skeleton. The superior power of the muscles, tending to draw the head and spine backwards, has been already referred to; the glutei, by which the pelvis is fixed on the thighs, and by which the principal outward motions of the legs are performed, are very large, forming the buttocks, which are peculiar to man; the extensors of the legs are more powerful than the flexors, an arrangement which is the reverse of that of other animals; the gastrocnemii, from which such powerful exertions are constantly required to raise the whole weight of the body by drawing up the heel, as in walking, jumping, &c., form a large mass, the calf, which, like the buttock, is found in no other animal; the flexor longus pollicis muscle is attached only to the great toe, on which the weight of the body is so often supported; while in the chimpanzee and orang, which, in so many other respects resemble the human form, it is affixed to the three middle toes; the serratus magnus, which, like a sling between the scapulæ, supports the front of the trunk of quadrupeds, is proportionally small in man.

In the preceding observations, at the same time that the peculiarities of the human skeleton have been pointed out, sufficient evidence has probably been adduced to prove that the erect attitude is that to which the structure of man, but of no other mammal, is best adapted. Yet some have argued the contrary from the histories and fables of some supposed wild men, who, it has been said, were found in woods, dumb, hairy, and crawling on all-fours, and who have been considered as specimens of man, unaltered by civilisation, in a state of original nature. (See the histories of Peter the Wild Boy and others in Blumenbach's *Beyträge zur Naturgeschichte*; Monboddo's *Antient Metaphysics*, &c.) It is sufficient to say that in the very few cases of the kind for which there is any authority, it has been clearly proved that they were merely idiotic or otherwise deficient children, who had been lost or exposed by their parents; and that the authors who state them to have been either quadruped or hairy are altogether unworthy of credit. But while this class of writers has seemed anxious to reduce man to the station of the apes, another has endeavoured to prove that there are some of the monkey tribe who are habitually biped. The allusions already made to the structure of their skeleton (which has been most fully illustrated by Mr. Owen in the 'Zool. Trans.' vol. i.) will have rendered this extremely improbable; and it is now perfectly certain, from repeated observation, that the gesture of even those orangs who are most man-like is never agile or easy unless they employ all their limbs to support them. The attempts of other animals, as dogs, bears, &c., who are taught to assume the erect posture, are even more constrained than those of the monkeys.

Man alone is two-handed. 'That,' says Cuvier (*Regne Animal*, i. 78), 'which constitutes the *hand*, properly so called, is the faculty of opposing the thumb to the other fingers to seize the most minute objects, a faculty which is carried to its highest degree of perfection in man, in whom the whole anterior extremity is free, and can be employed in prehension.' Hands thus defined occur only in man and in monkeys; the former is therefore made to constitute a separate order, 'Bimanous,' and the latter are included in a second order, as quadrumanous, or four-handed.

Although formed on the same general plan as the anterior extremity of all vertebrated animals, the structure of the human hand is so much more complicated than theirs, and adapted to so many more intricate offices, that Sir C. Bell (*Bridgewater Treatise*, p. 18) has said, 'We ought to define the hand as belonging exclusively to man.' Its perfection as an organ of prehension is due partly to its own construction, and partly to the form of the parts with which it is connected, for 'the whole frame must conform to the hand, and act with reference to it.' The erect attitude, for example, which has been proved to be that which is natural to man, is necessary to its full action, and to that wide range of motion which it receives from the arm, and which is the main object in the construction of all the parts by which the hand is connected with the trunk. And in like manner it could be proved that more remotely the peculiarities of the organs of sensation, of digestion, and of other functions are adapted to the hands.

By a powerful collar-bone, which keeps the shoulder and arm apart from the chest, man obtains, in common with all the animals which have much power in digging, flying, or climbing, as moles, bats, squirrels, &c., a powerful lateral and inward motion of the arm, and a wider range for action beyond the body. His scapula, or shoulder-bone, is strong and broad, and has a prominent spine and acromion, to which muscles are attached, while its glenoid cavity, being directed outwards, and maintained there by the clavicle, leaves all the outward motions of the arm perfectly free from hindrance. In the same degree the hemispherical head of the humerus loosely adapted to the shallow glenoid cavity, its long and light shaft, and its flattened tuberosities, all combine to produce a freedom of motion in the upper arm, which, were it used as an organ of support, could not exist without danger of injury, but which are essential to the wide range within which it is necessary that the hand should act. The only motions of the fore-arm upon the upper arm are those of flexion and extension; by the former the hand can be brought within, and by the latter carried beyond the range of motion of which the upper arm alone is capable. The bones of the fore-arm itself are so articulated that one may rotate on the other in any position of the arm; the bone, which in this rotation is fixed, being that by which the hinge-joint of the elbow is formed, while that which rolls over it is articulated by another hinge-joint with the wrist and hand. Thus then were the hand itself powerless, there would be in the other bones and joints of the upper extremity provisions for moving it through the greater part of a sphere whose radius is equal to the length of the arm, for bringing it to any point in that sphere, and for moving it in any direction at that point.

The perfection of the structure of the hand itself is chiefly due to the size and strength of the thumb, by which its superiority over the hands of monkeys (who enjoy a freedom of motion of the arm equal to that which man possesses) is also chiefly produced. From its size and strength the thumb of the human hand can be brought into exact and powerful opposition to the extremities of the fingers, which are all moreover separately moveable, and can each in its turn, or altogether, be employed in association with the thumb. The least consideration will show how numerous are the actions in which this easy and exact opposition of the tips of the thumb and of one or more fingers, if not necessary, is at least essential to dexterity. In those monkeys which approach most nearly to man the thumb is so short and weak, and the fingers so long and slender, that their tips can scarcely be brought in opposition, and can never be opposed in near contact with each other with any degree of force. Hence though admirably adapted for clinging round bodies of a certain size, as the small branches of trees, &c., they can neither seize very minute objects, nor support large ones; but the hand of man is adapted for all these and many other purposes.

It is a great peculiarity of man that his hands and feet are so different from each other; and in man alone their uses are totally different. In the monkeys all the extremities are alike formed to be organs of prehension; in the carnivora all are alike organs of prehension and support; in the hoofed animals all are organs of support alone; in man the anterior or upper extremities are entirely for prehension, the posterior, or lower, entirely for support. M. Bory de St. Vincent (art. 'Orang,' *Dict. Cl. d'Hist. Nat.*) indeed thinks that the absence of a prehensile power in the human foot is uncertain, and that the position of the great toe may be changed so as to convert the foot of man into a hand, like that of the monkey. He says there are peasants in the Landes of Aquitaine who are termed *resiniers*, from collecting the resin of the *Pinus maritima*, who acquire a power of opposing the great toe to the others, like a thumb; but it would surely be as incorrect to deduce from the instances of rarely acquired power in these peasants, or in those who are born without hands, and can write or work with their toes, that the human foot is naturally an organ of prehension, as it would to assume that the natural position of the bear is erect, because a few of his species have been taught to assume such a position for a short time. Besides, in those who have been born without hands, and have endeavoured to substitute their feet, the prehension of small bodies has been effected not by opposing the great toe to the others, but by flexing its phalanges firmly against its ball.

With one exception (in the fossil genus Anoplotherium) man is distinguished from all other animals by the equality in length of all his teeth, and by the equally close approximation of them all in each jaw. Even the most anthropomorphous apes (as the chimpanzee and orang-outan) have the canine teeth longer than the others, and an interval in the line of teeth in each side of each jaw, to receive the canine teeth of the opposite jaw. The vertical position of the human teeth, on which one of the most characteristic features of the human face, the prominent chin, depends, is also quite peculiar, and is intimately connected both with his erect attitude, and with the perfection of his hands, by which the divided food is conveyed to the mouth. The intermaxillary bones, in which the upper incisor teeth are developed, have often been described as absent in man alone; but in fact they are only united to the upper maxillary bones at a very early period of the life of the human fœtus. The extent of the palatine portions of these bones is indicated by the position of the foramina incisiva, which in man are united into one hole, which is much nearer to the incisor teeth than in any quadrumanous animal.

The smoothness of his skin and the entire deficiency of all natural arms either of attack or of defence are other peculiarities of the human race. The face and body of the most delicate female are indeed covered with hair, and therefore man must be regarded as a hairy animal; but there is sufficient difference between the fine colourless and downy hair with which the human body generally is beset, and the long silky or woolly hair with which even the smoothest apes are covered, to adopt this as an additional specific character of mankind. Some parts of the human body, on the other hand, are even more hairy than those of other animals, as the scalp, axillæ, &c. In his naturally unarmed condition, destitute of either projecting teeth or strong claws, covered neither with hard scales, nor with bristles, nor with a thick hide, and surpassed in speed by many of his more powerful antagonists, man's condition would seem most pitiable, and inferior to that of any other animal; for on all the rest of those to whom she has denied the weapons of attack, nature has bestowed the means either of defence, or of concealment, or of flight. But man, by his superior reason, has subdued all other animals. His intellect can scarcely suggest the mechanism which his hands cannot frame; and he has made for himself arms more powerful and destructive than any other creature wields; he has clothed himself in armour and built walls of defence with which he can defy the attacks of any but his fellow-men. Naturally unarmed, man has conquered the whole armed creation; some he has driven from their abodes, and almost exterminated; others he has forced to share his labour; and others he uses for his food, his clothing, or his pleasure.

The only other part of the human structure which it is now necessary to notice is the brain, whose size in proportion to the rest of the nervous system far surpasses that of any other animal. This may be at once seen by observing the proportion which the cranium, or rather the cavity containing the brain, and the face, bear to each other. In many cases also it may be estimated by what is called the facial angle of Camper, which is found by drawing a line from the most prominent part of the forehead to that of the upper jaw-bone, and observing the angle which it forms with another line drawn through the meatus auditorius externus to the base of the nose, or (the head being held in a vertical position) with a horizontal line. In man the facial angle is in the average of Europeans 80°; in some children it is a right angle, but in some negroes is not more than 70°. In the adult chimpanzee (which approaches in this respect nearest to man) the facial angle is only 35°, and in the orang or satyr 30°. (Owen,[*] in *Zool. Trans.*) In other animals it is still less, except when it is increased by the prominence of large frontal sinuses, or by the comparative shortness of the jaws. In regard to its structure the human brain exceeds all others in the development of its cerebral hemispheres, in the number and development of parts, in the depth and number of its convolutions, and in the quantity of its medullary matter in proportion to the cortical.

In the economy of the human body there are peculiarities not less marked than those in its structure. Perhaps the most characteristic is the ability which man enjoys of living on almost any part of the globe, and of thriving alike in either extreme of natural temperature. Thus the Greenlanders and Esquimaux have reached between 70° and 80° of north latitude, while the negro of Africa and the red man of America live under the equator. But even Europeans, accustomed to a temperate climate, can bear either of these extremes of cold and heat, as has been sufficiently proved by the numerous instances in which those who have gone on the Arctic expeditions have been obliged to winter in high northern latitudes; and on the other hand by the slight degree in which European settlers in the hottest parts of Africa are influenced by the temperature.

Man subsists with equal facility under various degrees of atmospheric pressure. The valleys, and the elevated table-lands of South America, some of which are 10,000 feet high, are both inhabited by man, the barometer standing in the one at 30, and in the other at only 20 inches. Condamine and Bouguer, with their attendants, lived for three weeks at a height of 14,600 French feet above the level of the sea, where the barometer stood at 15¾ inches, and the atmospheric pressure was therefore only a little more than half that to which they had been accustomed.

In adaptation with his ability to inhabit almost every climate, man can subsist on the most varied food. In the northern regions, where the earth is covered through the greater part of the year with snow, and vegetables of any kind can be procured only in the smallest quantity, the Esquimaux and Samoiedes subsist as well on animal food alone as the European does on the most carefully mixed diet;[†] and on the other hand the inhabitant of the torrid zone is not more inconvenienced by his daily subsistence on the cocoa-nut, banana, yam, rice, and other farinaceous and acid vegetables. In the temperate climates, where animal and vegetable food can be procured with equal facility, man is truly omnivorous; towards the poles animal food or fish becomes more exclusively his diet; and towards the equator his food is chiefly composed of vegetables: and there is no doubt that in each case that food which is most universally adopted is that which is best adapted for the health of the inhabitants.

Thus then, in his comparatively complete independence of the variations of external circumstances, man stands alone. It is singular that the animals who approach most nearly to him in structure should be amongst those who, in this respect of geographical distribution, differ most widely from him. The chimpanzee and orang-outan, for example, are confined to the islands of Borneo and Sumatra, the coasts of Guinea, and a few other parts of Africa; and even in their native countries they occur in but small numbers. The difficulty too of removing them to colder climates, and of preserving their lives there, even with all the advantages which human art can suggest, is immense, and after a few months they become diseased and die. Hence we may conclude that although he receives much aid in supporting the extremes of climate from the various means of defence with which his arts have supplied him, there is yet a strength and pliancy of frame in man which peculiarly fit him, and him alone, for universal distribution over the surface of the earth.

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[*] Mr. Owen has shown that the measurements which appeared to prove a greater proportionate development of the brain in these animals were made on the skulls of young individuals.

[†] The white men who trap the beaver and hunt the buffalo, in the regions of the Upper Missouri and the Columbia river, often live for many months on the flesh of animals only.

Man is further remarkable for his slow growth, and for the length of time during which he remains in a state of helpless infancy and of youth. The process of ossification and the closure of the sutures of the skull are completed later in him than in any other animal; he is unable to seek his own food for at least the three first years of his life, and does not attain to the adult period or to his full stature till he is from fifteen to twenty years old. The length of time to which his life may be prolonged is however proportionally greater than that of any animal, and is especially interesting when compared with that of those who in many respects resemble him. The greatest longevity to which the orangs attain is about thirty years, while in all nations of men instances occur of life being prolonged to upwards of 100 years.

However widely man may be distinguished from other animals in the peculiarities of his structure and economy already detailed, yet we must agree with Dr. Prichard (*Researches, &c.*, i. 175) that 'The sentiments, feelings, sympathies, internal consciousness, and mind, and the habitudes of life and action thence resulting, are the real and essential characteristics of humanity.' The difference in these respects between man and all other animals is indeed so great, that a comparison is scarcely possible. The highest moral endowments of animals are shown in their attachment to their offspring; but this ceases when the period of helplessness is past, and there is no evidence of attachment between individuals, except in the associated labours of some species, and the consentaneous actions of the male and female for the safety of the offspring. The arts of which animals are capable are limited and peculiar to each species; and there seems to be no evidence of a power of invention, or of construction for any purpose beyond that to which the original and instinctive powers are adapted. Among the monkeys the adults exercise authority over the young, and, it is said, maintain it even by chastisement; but there is no instance in which the stronger species has exercised authority over the weaker, or brought it into a state of servitude. Even when made the associates of man, and instructed by him, how little have animals learned: a few unmeaning tricks unwillingly performed, a few words uttered and constantly repeated, without choice or a conception of their meaning, and sullen passive submission, are in general the best results that can be found. There is not a proof in the whole history of animals that any species or individual has ever made an advance towards an improvement, or an alteration in its condition; whether solitary or living in herds, the habits of all remain the same; all of the same species appear endowed with the same faculties and dispositions, and each is in mental power the same throughout his life.

Contrast with these the progress of man. In his origin weak, naked, and defenceless, he has not only obtained dominion over all the animate creation, but the very elements are made to serve his purpose. Of the earth he has built his houses, and constructed weapons and the implements of art; he uses the wind to carry him in ships, and to prepare his food; and when the wind will not suit him, he employs fire and water to replace or to resist it. By artificial light he has prevented the inconveniences of darkness; he has stopped and made rivers, and has forced deserts, marshes, and forests alike to bear his food; he has marked out and measured the course of the celestial bodies, till he has discovered from them the size and form of the earth that he himself inhabits.

In intimate connection with his exalted mental endowments is man's peculiar possession of language. Other animals are naturally speechless, not from any material difference in the form of their organs (for man can teach some of them to imitate him), but from their inability to form those associations of ideas which are essential to the construction and utterance of words.

The peculiarities above described will probably be deemed sufficient to justify the separation of man as a distinct species from all others in the animal kingdom. In these respects indeed the difference between the lowest man and any animal is far greater than the change which any species can be proved or supposed to have undergone in any period of time, and under however varied circumstances; so that if degrees of difference of this kind could be measured, there would probably be as much justice as convenience in the classifications of those naturalists who have separated man from other animals to the greatest possible distance by constituting of the single species a separate genus and order.

We come now to the consideration of the variations to which the general characteristics of the human race are subject.

Varieties in form are of course chiefly referrible to differences in the structure and proportion of the parts of the skeleton, and we find the most marked characters of the different races in the varied forms of the skull. Dr. Prichard (*Researches*, i., 281) refers the varieties in the form of the skull to three principal divisions:—1st. The symmetrical or oval form, in which are included all those of the Indo-Atlantic, or Iranian nations, comprising the countries from the Himalaya mountains to the Indian Ocean, including the whole of Hindustan and the Deccan, as well as Persia and Arabia; and from the Ganges to the borders of the Atlantic, including the north of Africa and nearly the whole of Europe. In this variety the head is rounder than in the others, the forehead is more expanded, and the upper jaw-bones and zygomatic arches are so formed as to give the face an oval shape, while it is nearly on a plane with the forehead and cheek-bones, and does not project towards the lower part. The cheek-bones neither project outwards and laterally, nor forwards. The alveolar process of the upper jaw is well rounded and slightly curved vertically, so that the teeth are almost exactly perpendicular. 2nd. The narrow and elongated, or prognathous skull, which is found in the Negroes, the Papuas, Alfourous, New Zealanders, Australians, and other neighbouring oceanic nations, and of which the most marked specimens occur in the negroes of the Gold Coast. The chief character of these skulls is that they give the idea of lateral compression and elongation. The cheek-bones project forward and not outward. The upper jaw is lengthened and projects forwards, giving to the alveolar ridge and the teeth a similar projection, and thus diminishing the facial angle. 3rd. The broad and square-faced, or pyramidal skull, which is that of the Turanian, or northern Asiatic nations, Samoiedes, Yukagers, Koriacs, Tschuktschi, Kamtchadales, Tungusians, Chinese, Indo-Chinese, Tangutians and Japanese, part of the Tartar race, and of the Finnish nations of Europe, the Esquimaux, the aboriginal Americans, and the Hottentots. The Mongols afford a good specimen of this form, and the Esquimaux an exaggerated one. Its most striking character is the lateral or outward projection of the zygomata, so that lines drawn from each, touching the sides of the frontal bone, will meet only a little above the apex of the forehead. The cheek-bones project from under the middle of the orbit, and turn backwards in a large arch or segment of a circle. The orbits are large and deep; the upper part of the face remarkably plane and flat; and the nasal-bones, as well as the space between the eyebrows, nearly on the same plane with the cheek-bones.

The varieties of features dependent on the differences in the form of the frame-work just described will be at once evident. The first variety is distinguished by an evenness and regularity of features, an absence of any excessive prominence of one part in proportion to the other, a smooth and gently-rounded cheek, compressed and small lips, a full and prominent chin, and the whole face of a tolerably regular oval form. It is probable that among European nations the Greeks have displayed the greatest perfection in the form of the head, at least according to the European standard of perfection. Blumenbach has described a Greek skull in his collection, which, in the beauty of its form, agrees perfectly with the finest works of Grecian sculpture, and renders it probable that the latter were actual copies of nature, and not, as some have supposed, ideal compositions, intended to give the expression of exalted intellect or of dignity. The same author describes also the skull of a Georgian woman, equally remarkable for its elegance and symmetry, and says that its form agrees exactly with that of the head of a marble statue of a nymph in the Townley Collection.

The features corresponding with the narrow elongated skull are distinguished by the prominence of the jaws, from which they acquire a peculiarly ferocious and animal character. The compressed, narrow, and retreating forehead; the scarcely prominent nose, with its wide expanded nostrils; the thick protruding lips, and the retreating chin; the projecting cheeks, and the heavy jaws, combine to add to the characteristics which approximate, though they do not identify, the form of the negro with that of animals.

The features of the third variety differ scarcely less from the European than those of the negro, but in a different direction. Instead of the long and prominent face, we here find a face which is broadest transversely from one cheek-bone to the other; and which, as it gradually narrows, both above and below, acquires somewhat of a lozenge-shape. The nose is flat, the space between the eyes generally depressed, and the eyes themselves most frequently placed obliquely, with their internal angles descending towards the nose, rounded and open; the lips large, but not so prominent as those of the negro; the chin short, but not retreating under the lips.

But these varieties are not separated by very definite limits. There are numerous instances of negroes remarkable for the beauty and European character of their features; and daily observation shows Europeans who, in the narrowness of the skull, the lowness of the forehead, and the prominence of the jaws, closely approximate to the negro; while others in their features resemble the broad and flat-faced Tartars or Chinese. Within each of these varieties moreover are included numerous smaller divisions, which are certainly, though less prominently, distinct in their features. The varieties of national appearance between the Scotch, English, French, and Germans, for example, are in general distinguishable, though it would be difficult to define their differences. Similar subdivisions of character exist among all the varieties, and so fill up the intervals between the extreme specimens of each as to form a regular and nearly perfect series, of which the Esquimaux and negro might occupy the extremities, and the European the middle place, between the broad and high features of the one, and the narrow, elongated, and depressed skull and face of the other.

Differences in the shape of the pelvis (on which depend some important differences in the external form of the body) have been often supposed characteristic of different races of men. But from an extended series of observations by Professor Weber, it has been lately shown that every form of the pelvis which deviates from the ordinary type, in whatever race it may most frequently occur, finds its analogues in other races. He has arranged the various shapes of the human pelvis in four classes, the oval, the round, the square, and the cuneiform or oblong; and he shows that although the first is the most general form in Europeans, the second in the Americans, the third in the Mongolians, and the last in the Africans, yet that specimens of each kind may be found in all the different races.

The chest of the negro is somewhat more expanded than that of the European, the sternum more arched, the ribs larger and more roundly curved. In general also the negro's fore-arm, measured in proportion to his upper arm and to the height of the body, is longer than in the European. The knees of negroes often appear to Europeans misshapen, the bones of the leg bending out from beneath them, and the feet turned outwards in the manner commonly called splay-footed. The tibia and fibula also are rather more convex than in Europeans; the feet are flat, and the os calcis, instead of being arched, is nearly in a straight line with the rest of the tarsus; and the gastrocnemii muscles have the greater part of their mass high up in the legs, so that the calves seem to encroach upon the hams. The hands are generally narrow; the fingers long and very flexible.

It is from these modifications which the negro presents, and taking extreme cases of each peculiarity, that there has appeared some ground for supposing the negro to form a grade intermediate between the European and the monkey. But there is no character in which the difference between the lowest negro and the highest ape is not many times greater than that between the same negro and the highest European; and in all the important points of structure which we have already mentioned the differences which the negro presents are but slight. The length of the base of the skull, the somewhat more backward situation of the foramen magnum, the decrease of the facial angle, and the projection of the teeth, depend almost entirely on the prominence of the alveolar process of the upper jaw; and if a slight allowance be made for it, the negro in these points resembles the European. So also, in the prominence of his two ossa nasi, the position of the cranium over the greater part of the face, the equal length and approximation of all his teeth, the full development of the mastoid and styloid processes, which are nearly or quite wanting in all apes, and numerous other essential characteristics, there is no difference between the two races. At the same time therefore that it is allowed that the characters of form which the lowest class of negroes presents are more like those of the monkey than those of the European are, it is certain that the approximation is but slight, and that a vast space is still left between them. It is true that there coincides with this degradation of form a very low degree of intellectual development, but it is not lower than that of the Esquimaux and Hottentots and many of the third variety, who in some respects, as the breadth of the skull and face, are even more distantly removed from the monkeys than Europeans are.

Considerable differences occur in the general stature of the several races of mankind. In the temperate climates of Europe the general height varies from 4¾ to 6 feet; the instances in which individuals have fallen far short or have much exceeded this standard are too exceptional to be taken into a general account. [Dwarf; Giant.] Among the native inhabitants of America great varieties occur. The Peruvians, the natives of Tierra del Fuego and of Nootka Sound, the Esquimaux, and the Chaymas are all described as very diminutive; while the Payaguas, Caribees, Cherokees, and the natives of the regions immediately north of Canada are said to be generally much above the standard of Europeans. The height of the Patagonians also, though often exaggerated, is yet remarkable; the most authentic accounts agree that they commonly attain the height of six feet, and that they not unfrequently surpass it. The standard of height among the Africans appears about the same as that of Europeans. The Hottentots are below the general size, and the Bushmen still more so, for among them 4½ feet is said to be the average height of the men, and 4 feet that of the women. The Caffres on the contrary, the neighbouring tribe to the Hottentots, are distinguished for their height and strength. The people of the north of Asia and the Laplanders and Samoiedes in Europe are generally shorter than the inhabitants of the warmer climates, but the Chinese and Japanese, who in other respects much resemble them, are of about the same stature as the rest of the Europeans.

With these varieties in stature it is interesting to compare the amounts of physical power possessed by different nations. The result of all observation has been the exact contrary of popular belief, which ascribes a decrease of physical strength proportionate to the increase of intellectual power acquired by civilization. The Spaniards in their first intercourse with America found the natives in general much weaker than themselves; and the inability of the natives to sustain the severe labour of the mines led to the introduction of African slaves, one of whom was equal to three or four Indians. Hearne and others have found the same feebleness in the natives of various parts of the North American continent, and Pallas in the Buriats. But the most exact observations were made by Peron with the dynamometer upon 12 natives of Van Dieman's Land, 17 of New Holland, 56 of the Island of Timor, 17 Frenchmen belonging to the expedition, and 14 Englishmen in the colony of New South Wales. The mean results were as follows:—

	Strength of the Arms. Kilogrammes.	Strength of the Loins. Kilogrammes.
Van Dieman's Land	50·6	
New Holland	50·8	10·2
Timor	58·7	11·6
France	69·2	15·2
England	71·4	16·3

The substance on which the varieties of colour in the human race depend, is seated chiefly in the soft and most internal layers of the cuticle; the true skin (cutis, derma), is similar in all nations, and the outer hardened layers of the cuticle have only a light tinge of the colour of those beneath them, which constitute what is often called the rete mucosum. [Cuticle; Skin.] The human complexion depends in part on the condition of the cutis and its vessels, and in part on that of the cuticle. In white nations, according to the fulness or comparative emptiness of the blood-vessels of the skin, we find all the gradations of complexion, from the deep ruddiness of full health, to the blanched pallor of sickness; and in negroes, the same changes are indicated by a greater intensity of the blackness and by a dull leaden hue. These differences however chiefly characterise individuals; the national variations depend rather on the cuticle. A thick and opaque though colourless cuticle, obscuring the blood of the cutis, assists greatly in giving that deadness of hue and phlegmatic aspect which distinguishes some Europeans from others who with a thinner and more translucent epidermis are marked by a florid ruddy complexion. As the cuticle becomes darker in colour, it obscures more completely the colour of the blood in the subjacent tissue, and hence it is only in nations of light complexion that sudden blushing or paleness is at once perceptible.

With the varieties in the colour of the skin there generally coincide analogous differences in the hair and eyes. It is probable indeed that the colouring matter is the same in all; being combined in the cuticle with its peculiar cells and scales, in the hair with a horny substance, and in the choroid membrane and uvea with their minute roundish particles.

Dr. Prichard refers all the differences of complexion in man to three principal varieties:—1. The Melanocomous, or black-haired, which is the complexion generally prevalent, except in the northern parts of Europe and Asia. The coincident colour of the skin varies from a deep black, as in some Africans, to a much lighter or more dilute shade. In the copper-coloured nations of America and Africa the dusky hue is combined with red, while in the olive-coloured races of Asia it is mixed with a tinge of yellow. In intensity of colour there is every shade from the black of the Senegal negro to the light olive of the northern Hindus, and from the latter there may be traced every variety of shade among the Persians and other Asiatics, to the complexion of the swarthy Spaniards, and of black-haired Europeans in general. 2. The Leucous, or Albino variety, examples of which occur in all countries [ALBINO], but perhaps most frequently in hot climates. They are distinguished by the total absence of the colouring matter of the cuticle, hair, and eyes; hence their skin is of a milk-white or pinkish-hue, the hair silky-white or at most yellowish, the iris rosy and the pupil intensely red. 3. The Xanthous, or yellow-haired variety, which includes all those individuals who have light-brown, auburn, yellow, or red hair. Their general complexion is fair, acquiring on exposure to heat and light not a brown hue, but more or less of a red tint. The eyes are light coloured. This is the variety most prevalent in the temperately cold regions of Europe and Asia, whose climate seems peculiarly favourable to the constitution of body connected with it. This variety may spring up in any black-haired tribe; as it has in the Jews, who, though generally black haired, present many examples of the light fair complexion and reddish hair. Dr. Prichard also adduces (*Researches*, &c., i. 228) ample evidence that instances of this variety occur not only among the Greeks, Romans, Russians, Laplanders, Tartars, and other Melanocomous races of the least swarthy shade, but among the Egyptians, African negroes, and the islanders of the Pacific. The majority of these last cases have been confounded, under the term of white negroes, with the real Albinos; but they differ from them in the more ruddy hue of the skin, the colour of the iris, the blackness of the pupil, and the flaxen or red colour of the hair.

Other varieties besides those of colour occur in the skin and its appendages. The skin of many tribes of negroes is peculiarly sleek and oily, from the abundance of sebaceous and perspiratory secretion. From many also there is emitted a peculiarly strong odour, and Humboldt says that the Peruvians can by the sense of smell alone distinguish the European, the American Indian, and the negro. The cuticle of the dark tribes is thicker and coarser than that of white nations, and, from the greater difficulty of separating the latter into two layers, it has been imagined that there is no rete mucosum, or soft cuticle, in Europeans. The hair also varies almost as much in its texture as in its colour. Its chief varieties are observed in the copious, long, soft, and more or less curly hair of various colours in the European; the strong, straight, and scanty hair of the South Sea islanders; and the black, fine, wiry, crisp hair of the negro. A very general characteristic of the darker-coloured nations is either an entire want of beard, or a very scanty one developed later in life than in the white races. Mr. Lawrence (*Lectures*, 272) has adduced proofs of this in the Mongols, the Chinese, Japanese, Malays, South Sea Islanders, negroes, and the Indians of North and South America; but the fact has been somewhat obscured by the practice, which is generally prevalent among these nations, of extirpating the little hair which they have.

In the performance of the several functions of the economy, it has not yet appeared that any fixed difference exists in the several races of men, except in cases in which the variation is due to the difference of climate, and occurs alike in all races when subjected to the same influences. In physical endowments also, however great may be the distance between the degrees of intellectual and moral elevation possessed by civilised and uncivilised nations, yet there is sufficient evidence to prove that in all there may be traced the same mental endowments, similar natural prejudices and impressions, the same consciousness, sentiments, sympathies, propensities, in short a common physical nature, or a common mind. (See Prichard's *Researches*.)

This accordance in the physiological and psychical properties of all nations affords one of the strongest possible arguments in favour of the whole human race being but one species; for, as Dr. Prichard observes, 'the physiological characters of race are liable to few and unimportant variations;' and therefore when we find that in a number of individuals spread over the greater part of the globe no other differences occur, either in the average length of life, or the extreme length occasionally attained, in the periods of gestation, of infancy, of puberty, and of other changes in the economy, or in the habits, instincts, affections, and intellectual faculties, than may be fairly attributed to the differences of external circumstances, it may be at once concluded that they are all members of the same family, and the offspring of one common stock. This argument receives support from the fact that in many animals, of which from their forms alone it might be difficult to determine whether they belonged to the same or different species, a diversity occurs in their physiological characters. Thus the wolf and dog, though in many other respects closely resembling each other, differ in the period of gestation, the she-wolf carrying her young ninety days, and the bitch (of whatever variety) only sixty-two or sixty-three. In like manner the dog is strongly distinguished from the wolf in his inclination, which is everywhere observable, to associate with man; and the fox, from both the wolf and dog, in his solitary habits. Yet in form these three agree so nearly, that some naturalists have deemed them to be the same species. Similar differences may be observed in the ox kind, between the domesticated ox and the bison and buffalo, which, though nearly related to him in form, are totally opposite in disposition and habits. So also the most marked differences between the sheep (in all its varieties) and the goat are to be found in their instincts and consequent modes of life; and so on through numberless other instances, all tending to prove the permanence of physiological and psychical characters in each species, and their comparative independence of those influences by which modifications in form and colour are produced.

It is necessary however to show that the structural differences which seem to distinguish so clearly the several nations of mankind coincide with similar variations in other animals which are descended from a common stock. Such variations occur especially in animals which have been domesticated, and thus subjected to influences in many respects analogous to those under which man has fallen in the progress or decline of civilization. No one, for example, will be inclined to deny that the varieties of dogs (which there is reason to believe are all of one species) present far greater differences in form and colour, and in some parts of their habits and instincts, than any that are observed in man. And it is worthy of observation that in the most highly domesticated races, as the spaniel, the cranium is more fully developed, and recedes further from the form of the skull proper to the wolf, than in those which are less cultivated, as the mastiff. In this we can trace a series of varieties very analogous to those of the monkey, the negro, and the highly civilised European.

The races of swine present even more remarkable instances of variation, which have been particularly described by Blumenbach (*Beyträge zur Naturgesch.*). It is certain that these all descend from the wild boar; and it is equally certain that swine were unknown in America till carried there by the Spaniards. Yet in that country they have already degenerated into breeds very different from each other and from their original. Those taken to Cubagua became a race with toes half a span long, and those of Cuba became more than twice as large as their progenitors. In Normandy the swine are remarkable for the length of the bone of the hind leg. Swine with solid hoofs were known to the antients, and large breeds of them are found in Hungary and Sweden. In some also the hoof is divided into five clefts. In Guinea they have long ears couched upon the back; in China, a large pendant belly and very short legs; at Cape Verd and other places, very large curved tusks. Thus then in one species we find changes even greater than those which occur among men; and as to the most important, Blumenbach says that the whole difference between the cranium of the negro and that of a European is by no means greater than that which exists between the cranium of the wild boar and that of the domestic swine. An examination of the different breeds of sheep, horses, oxen, goats, cats, rabbits, and still more of domestic fowl, would in like manner show that all these species, even while under observation, are subject to greater variations than are found in the different races of men.

In respect of colour, a perfect analogy holds between the varieties of domestic animals and those of men. In all those enumerated above, examples occur of the melanocomous, leucous, and xanthous varieties springing up casually or existing constantly in particular breeds. Thus even in England the cattle of different counties may be recognised by their colour as well as their forms. Azara remarks of the horses and oxen of Paraguay (where both species have run wild and multiplied very rapidly) that while all those that are domesticated vary considerably in colour, those that are wild have all the same colour; the horses a chesnut or bay-brown, the oxen reddish-brown on the back and black on the rest of the body.

The analogy between the variations to which domesticated (and more rarely wild) animals are subject, and those which are observed in men, is a strong argument for the unity of the human species. Another which deserves much weight is drawn from the propagation of the several races. It is well known that among all other animals the hybrid productions of parents of different species are either quite barren or so little prolific that they soon become extinct, and that an intermediate race cannot be maintained even to the second generation without a return to the pure blood of one or other parent. On the other hand it is observed among domestic animals that the progeny of different varieties of the same species exceed in vigour, and are even more prolific than their parents; so that intermediate races are apt very soon to become more numerous than the originals from which they sprung. Exactly the same principle holds in the human race. All nations propagate together with equal facility, and Dr. Prichard has shown that the progeny of parents of different nations have in many instances exceeded those from whom they sprung in vigour and in the tendency to multiplication.

Lastly, a consideration of the diseases to which mankind are subject shows that the greater part of them are common to all, though modified in different climates, and though a few produced by local circumstances are peculiar to individual tribes.

From these facts therefore, by which it is shown that in all those characters in which external circumstances have least influence the whole human race agree, while in others more easily modified they present only those changes which are observed to an equal or even a greater extent in animals known to have descended from a common stock, it may fairly be concluded that mankind is composed of but one species. The characters of this species given by Blumenbach, and generally received, are: 'Erect, two-handed, unarmed, rational, endowed with speech; a prominent chin; four incisor teeth above and below; all the teeth equally approximated; the canine teeth of the same length as the others; the lower incisors erect.' The same author divides the species into five varieties, whose characters are as follows (Lawrence, *Lectures*, p. 477):—1. Caucasian variety: a white skin, either with a fair rosy tint, or inclining to brown; red cheeks; hair black, or of the various lighter colours, copious, soft, and generally curved or waving. Irides dark in those with brown skin; light in the fair or rosy complexioned. Large cranium with small face; the upper and anterior regions of the former particularly developed, and the latter falling perpendicularly under them. Face oval and straight, with distinct features; expanded forehead, narrow and rather aquiline nose, and small mouth; front teeth of both jaws perpendicular; lips, particularly the lower, gently turned out; chin full and rounded. Moral feelings and intellectual powers most energetic, and susceptible of the highest development and culture. This variety includes all the antient and modern Europeans except the Finns; the former and present inhabitants of Western Asia, as far as the River Oby, the Caspian Sea, and the Ganges (that is, the Assyrians, Medes, and Chaldæans; the Sarmatians, Scythians, and Parthians; the Philistines, Phœnicians, Jews, and the inhabitants of Syria generally; the Tartars, properly so called; the tribes actually occupying the chain of Caucasus; the Georgians, Circassians, Mingrelians, Armenians; the Turks, Persians, Arabians, Afghauns, and Hindus of high castes); and the northern Africans, the Egyptians, Abyssinians, and Guanches.

2. The Mongolian variety:—characterised by olive colour, which in many cases is very light, and black eyes; black, straight, strong, and thin hair; little or no beard; head of a square form, with small and low forehead; broad and flattened face, with the features running together; the glabella flat and very broad; nose small and flat; rounded cheeks, projecting externally; narrow and linear aperture of the eye-lids; eyes placed very obliquely; slight projection of the chin; large ears; thick lips; stature, particularly in the countries near the north pole, inferior to that of Europeans. It includes the tribes of Central and Northern Asia, as the Mongols, Calmucks, and Buriats; the Mantchoos, Da-urians, Tungooses, and Coreans; the Samoiedes, Yukagers, Koriacs, Tschuktschi, and Kamtchadales; the Chinese and Japanese, the inhabitants of Tibet and Bootan, of Tonquin, Cochin-China, Ava, Pegu, Cambodia, Laos, and Siam; the Finnish races of Northern Europe, as the Laplanders and the tribes of Esquimaux.

3. The Ethiopian variety:—skin and eyes black; hair black and woolly; skull compressed laterally and elongated towards the front; forehead low, narrow, and slanting; cheek-bones prominent; jaws narrow and projecting; upper front teeth oblique; chin receding. The eyes prominent; the nose broad, thick, flat, and confused with the extended jaw; the lips, and particularly the upper one, thick. All the natives of Africa, not included in the first variety, belong to this.

4. The American variety:—skin dark, and more or less of a red tint; black, straight, and strong hair; small beard; and a countenance and skull very similar to the Mongolian. The forehead low, the eyes deep, the face broad, particularly across the cheeks, but not so flattened as in the Mongols. Mouth large; and lips rather thick. This variety includes all the native Americans except the Esquimaux.

5. The Malay variety:—brown colour, from a light tawny to a deep brown. Hair black, more or less curled, and abundant; head rather narrow; bones of the face large and prominent: nose full, and broad towards the apex; mouth large. In this are included the inhabitants of Malacca, of Sumatra, Java, Borneo, Celebes, and the adjacent Asiatic Islands; of the Molucca, Ladrone, Philippine, Marian, and Caroline groups; of New Holland, Van Dieman's Land, New Guinea, New Zealand, and of all the islands of the South Sea.

Cuvier distinguishes only three principal divisions—the Caucasian, the Mongolian, and the Ethiopian; remaining doubtful as to the Malay and American varieties. Dr Prichard on the other hand (and his authority should have the greatest weight in everything relating to the subject) divides the species into seven principal varieties:—1, The Iranians, who in the form of their skulls and other physical characters resemble Europeans, in which are included, as before detailed, all the Caucasian variety. 2, The Turanian, who are nearly the same with the Mongolians of other writers. 3, The native Americans, except the Esquimaux and some others resembling them. 4, The Hottentots and Bushmen. 5, The Negroes. 6, The Papuas, or woolly-haired nations of Polynesia. 7, The Alfourou and Australian races.

MAN, ISLE OF, is situated between 54° 4′ and 54° 27′ N. lat., and 4° 17′ and 4° 43′ W. long.; 34 miles from St. Bees' Head in Cumberland; 16 from Burrow Head in Scotland; and 28 from Strongford, in Ireland. Its length, from north-north-east to south-south-west, is about 30 miles; its breadth varies from about 8 to 11 miles, but is much narrower at its extremities; and its circumference is about 75 miles. Its surface is about 220 square miles. The Calf of Man is a small island situated to the south-west of the island, nearly a mile from it, and from 3 to 5 miles in circumference. The Kitterlins, another small rocky island, is situated between the Isle and Calf of Man. The Isle of Man is the Mona of Cæsar, the Monapia of Pliny, Monæda of Ptolemy, Menavia of Orosius and Bede, and Eubonia of Nennius. Its derivation is probably from the British word ' mon,' which means isolated.

The island is intersected by a ridge of mountains, which runs from north-east to south-west nearly through its whole length, and chiefly occupies the central parts. Dr. Berger, who has fixed the heights of 89 of these hills, considers them to compose three chains, separated from each other by high table-lands, and crossed by three very narrow openings. Snafield, the highest point of them all, is 2004 feet above the level of the sea, and North Barrule rises to 1804 feet. The mountains, commons, and waste lands are supposed to cover 50,000 acres, leaving above 90,000 acres for cultivation. England, Scotland, Ireland, and Wales are visible from the summits of the mountains on a clear day. The Neb, Sulby, and other streams which flow from the mountains enter the sea at Peel, Laxey, Douglas, and Ramsey. The coast is in many places very precipitous.

Rocks of mica-slate and clay slate compose all the mountains. These slates form also the coast at Spanish Head, where some precipices exceed 300 feet in height. The summit of one of the cliffs contains a druidical monument. Mica-slate is found at Snafield, the rounded summit of which is covered with grass. The base of this mountain is rich in metals. The galena which is found here contains from 90 to 130 ounces of silver per ton. Copper pyrites has 5 ounces of silver per ton, and black-jack sells for 5*l.* per ton. Clay-slate forms the largest portion of the island and nearly all the Calf. In one of the varieties of this slate, found towards its junction with the grauwacke rocks, the surfaces of the seams shine with metallic lustre. A stratified grey stone, which is used in building, is the second variety of clay-slate. The third variety, at Spanish Head, is used for lintels, &c. The roofing-slate, drawing-slate, and one of a vermillion colour near Braddah, make up the other varieties of clay-slate found in the island. The secondary slate formation, resting on the primary, consists of grauwacke, grauwacke slate, and old red-sandstone, and forms the greater part of the rocky sea-coast of the island, but does not extend much inland. The cliffs of this formation on the coast at Spanish Head seldom exceed 200 feet, and present a bold and picturesque appearance. There is a belt along the west coast, about two miles in width, consisting of old red-sandstone, of which Peel Castle is built. Limestone extends several miles on each side of Castletown. The steps at the main entrance of St. Paul's, London, presented to the dean and chapter by Bishop Wilson, consist of the first variety of this rock. Castle Rushen was built of the second variety, which is of a bluish-grey colour. The third variety, of a light grey colour, consists chiefly of shells. The fourth variety is magnesian, rarely contains organic remains, and its colour is yellow or white grey. Near Poolvash veins of trap, from two to six feet broad, break through the dark grey limestone. Boulders occur, of which the most numerous are granite, which differs from that of the island. Boulders of sienite, porphyry, and quartz are scattered from north to south, and the blocks of clay-slate and mica-slate mixed with the quartz prove it to belong to the island. The other boulders not formed of quartz appear to have come from the north and north-west, and enormous masses of them are found high up on the sides of one of the most elevated mountains. Boulders of sienite form a druidical circle near Bishop's Court. Granite in situ, containing mica, felspar, and quartz, is found in blocks on the north side of South Barrule. The decomposition of the felspar forms a fine powder, which is sold for polishing iron.

The soil in the south part of the island is a light clay formed by the decomposition of the clay-slate. The mountainous district is adapted only for pasture, and judicious culture alone can render the hilly parts productive. The soil however in the level country, extending from Kirkmichael to the north-eastern extremity of the island, consists of sand, clay, and peat, and contains excellent marl. The soil in the neighbourhood of Castletown is well adapted for wheat, and the abundance of lime supplies the farmer with a cheap manure. The climate, although variable, damp, and windy, is temperate. The highest and lowest temperatures observed are about 77° and 26° Fahr. respectively: the mean annual temperature is about 49°. The annual fall of rain is about 37 inches.

The harvests are frequently late, owing to the climate. The agriculture of the country, in consequence of the attention paid to the herring-fishery, was left very much to the women, who were accustomed to perform all the hard work of a farm, and frequently without their aid the corn itself would have been unthrashed. The smallness of the farms, and the nature of the leases, very much impeded improvement. The breeds of cattle, although Bishop Wilson was not inattentive to their improvement, long continued very indifferent. When however Mr. Curwen formed an Agricultural Society at Workington, he did not neglect the interests of the island, but both by precept and example did everything in his power to improve its husbandry. Some excellent farmers from England and Scotland, who settled on the island, set the example of good farming. The annual value of the land among the hills varies from 5*s.* to 10*s.* per acre, and in some of the best cultivated districts amounts to 40*s.*, and near the towns is still higher. Many of the hedges present a very unsightly appearance, though more attention is paid to them than formerly. Wheat, and in some years potatoes, have been exported in very considerable quantities. The turnip husbandry has been much improved lately, and is steadily advancing. The largest part of the island is in the hands of yeomen, who farm their own estates, which are from 10 to 200 acres. Few properties are worth more than 1500*l.* a-year. There are about 8000 acres in wheat, which, at 2½ quarters per acre, produce 20,000 quarters; of barley 5000 acres, which, at 4 quarters per acre, produce 20,000 quarters; and 13,000 acres of oats, which at 3 quarters, produce 39,000 quarters. The Houghton sheep, peculiar to the island, are slow feeders and long in coming to maturity; their wool is much used for making stockings. A judicious system of turnip culture has recently been introduced into the Calf of Man, which will soon make this desolate spot productive. The best means for effecting durable improvements in the agriculture of the island are a judicious adaptation of stocks to the different soils. Thus the kyloes and galloways will suit inferior and mountain soils, while the short-horned may be introduced upon rich pastures. A judicious selection of such varieties of grain also as suit the soils and the climate would greatly increase the productiveness of the island.

The early history of the Isle of Man is obscure. It was governed by a succession of Norwegian kings, until Magnus, finding himself unable to preserve the Western Isles, sold them to Alexander III., king of Scotland, A.D. 1264. Soon after this Alexander reduced the Isle of Man, and appointed Regulus king, with whom he entered into a treaty, stipulating that the king of Man should furnish ten ships for Scotland, on condition that Alexander defended the isle from all foreign enemies. William de Montacute, with an English force, afterwards drove out the Scots, but his poverty prevented him from keeping it, and it thus became the property of the kings of England. In 1307 Edward II. bestowed this island first upon the earl of Cornwall, and then on Henry Beaumont. The Scots, under Robert Bruce, recovered and possessed it until 1340, when the earl of Shaftesbury wrested it from Scotland in the reign of Edward III., and sold it to the earl of Wiltshire, who was afterwards executed for high treason, and his estates confiscated. Henry IV. granted it to Henry Percy, earl of Northumberland, and in 1403, in consequence of Henry Percy being attainted of high treason, and the Isle of Man forfeited, the king of England gave it, with the patronage of the bishopric and of other ecclesiastical benefices, to William Stanley and his heirs, afterwards the earls of Derby, for his aid in putting down the rebellion of Henry Percy, on condition that he should give the kings of England two falcons on their coronation. Thomas earl of Derby relinquished the title of king of Man, and took that of lord. James I. made a new grant of the island to William, sixth earl of Derby, which the parliament confirmed. James earl of Derby, in consequence of his adherence to Charles I., was taken prisoner and executed at Bolton, in 1651. His wife defended Castle Rushen, to which she retired, until Christian, on whom she relied, and who had the command of the forces, capitulated to Birch and Duckinfield, who had invaded the island with ten vessels. The parliament granted the island to Lord Fairfax. King Charles II., on his accession to the throne, gave it to the earl of Derby, the son of the earl who had been beheaded. James earl of Derby dying without issue, the inheritance devolved upon James, second duke of Athol, who was descended from the youngest daughter of the seventh earl of Derby. As both public justice and the revenues of the kingdom were injured by the island affording undue protection to debtors, outlaws, and smugglers, the British government passed an act in 1726, empowering the earl of Derby to sell his royalty and revenue. Various causes however prevented the sale being completed until 1764, when the duke of Athol sold his sovereign rights for 70,000*l.*, with his civil patronage, and the two castles of Peel and Rushen. The duke however still retained the title of lord of Man, enjoyed all its ecclesiastical patronage, with mines, minerals, treasure trove, and other privileges. The duke, after repeated applications to government, obtained a perpetual grant of a fourth of the net customs revenue of the island, and enjoyed the honour of governor-general. By a subsequent arrangement with the duke on the part of the English government (6 George IV., c. 34) Great Britain now enjoys all the sovereign rights and privileges of the island. The customs of the ports are also vested in the crown, and a new code of revenue laws was likewise introduced that year (chap. 115), which established the privilege of licensing such a stipulated quantity of certain goods charged with specified duties as will serve for the consumption of the inhabitants of the island.

No part of the kingdom abounds so much in Danish remains. The various tumuli, barrows, weapons, coins, and Runic characters afford clear evidence of the connection which the Northmen had with this island. Some Druidical temples have been discovered. The venerable remains of Rushen Abbey, which belonged to the Cistercian order, and of another near Douglas, for female votaries, supposed to have been founded by St. Bridget, show the influence of the church during the middle ages. The tumulus at Tinwald, which is approached by turf steps on the east, presents the appearance of a truncated cone divided into three stages, which are raised about three feet above each other, and proportionally diminished both in circuit and width until they approach the summit, where the king of Man formerly sat on solemn occasions. The local laws of the island still continue to be read and promulgated here annually before the governor, two deemsters, keys, council, and various officers of state, and divine service concludes the solemnities of the day. The Tinwald Mount (which means either 'a fence for an assembly,' or 'a juridical hill') is situated near the intersection of the high road from Castletown to Ramsey with that from Douglas to Peel.

The whole island was formerly divided into 600 portions, called quarter-lands; but this number was increased, according to the authority of Feltham, in 1798, to 750. Possession for twenty-one years gives a good title to property. The right of pasturage for a certain number of cattle on the commons, and of quarrying stones and digging peat, belong to proprietors.

The principal towns in the island are Castletown, Douglas, Peel, and Ramsey. Castletown, situated in the south-west of the island, is a neat town, with spacious and regular streets. There is an open well-built square. The houses are situated on the opposite sides of a small creek, opening into a bay in the shape of a crescent, the extremities of which project into the sea. Castle Rushen, in Castletown, was built, according to tradition, in the year 960, by Guttred, a Danish prince, who is said to have been buried here. The stone glacis by which it is surrounded is supposed to have been built by Cardinal Wolsey. The stone-work of the keep and several interior portions of the buildings are nearly entire; but, in consequence of the damages done by repeated sieges, the other parts have been repaired. The prisoners must have been lowered into the keep by ropes, as there are no steps for descending. The first stone of a neat and beautiful chapel in this town was laid by Bishop Wilson in 1698. The college, which has 200 pupils, and is conducted with great ability and success by various masters, was built by the exertions of the late Bishop Ward, aided by 1000*l.* left by Bishop Barrow. There is also a neat chapel adjoining the college. The courts of chancery and common law are held in Castletown, and it is the residence of the governor. The House of Keys meet here. The number of houses in Castletown is calculated at 500, and the population in 1831 was 2077. When the last census was taken the number of prisoners in the gaol of Castle Rushen was 12 males and 3 females.

Douglas, in the parish of Kirkbraddan, formerly written Dufglass, and supposed by some to derive its name from the two rivers Doo and Glass, is situated on the south-east coast of the island. The bay extends three miles, from Clayhead to Douglas Promontory, in the form of a crescent, and is sheltered from all winds except the south-east. The beauty of the scenery, the magnificent appearance of Castle Mona, built by the duke of Athol, and the numerous gentlemen's seats and neat cottages which surround the town, give the place a very agreeable appearance. The pier, which is 520 feet long and 40 or 50 broad, was built by the government at the cost of 25,000*l.*

The old streets are generally very irregular, but some which have been lately finished, or are now in progress, are regularly built. The street which fronts the river forms a striking contrast with the older part of the town. St. George's Chapel is pleasantly situated on an eminence at the west end of the town. There is a Lancasterian school capable of containing 700 scholars, which is well attended. The population of Douglas was 6786 in 1831; according to a more recent census it contains 800 houses, occupied by 1500 families, and a population of 7000. This town, which a century ago consisted of little more than clay-built huts, has now the chief trade of the island. There is a linen manufactory and a paper and woollen manufactory at Douglas.

Peel, formerly called Holm Peel, is on the west coast of the island. The castle, which is built on a small rocky island, encloses an irregular space of more than two acres, and is separated from the town by a narrow channel, scarcely a foot deep at low water. A strong wall, built as a security for the harbour, connects the island and castle with the mainland. There is a pyramidal mound of earth in the centre of the castle, surrounded by a ditch five feet and a half broad. The churches of St. Patrick and St. Germain are situated near this mound. The former was probably built before the Norman conquest; the latter, which was erected about 1245, is the cathedral church of the island, but is now only used for a burying-place. Peel has only one church. The Methodists are almost the only dissenters. There is an endowed school for grammar and mathematics. No attention is now paid to the harbour, and the pier is altogether destroyed. This town, which flourished through smuggling, is now, since it has ceased, in a very decayed condition. The population in 1831 was only 1729.

Ramsey is situated on a spacious bay, where there is safe anchorage, on the north-eastern coast of the island. It is built in a straggling and irregular manner. In this town the courts of law for the north part of the island are held. The Methodists are the most numerous dissenters. Its population in 1831 was 1754.

The herring-fishery employs about 250 boats, of from 15 to 30 tons burthen, and from 2000 to 3000 fishermen. The value of one of the boats, nets, &c., is above 80*l.* Successful years at present yield 40,000 or 50,000 barrels of herrings, of which one-third are used on the island. The deep fishing, if properly followed out, would add very much to the wealth of the island, and would form an active body of permanent fishermen.

Duties levied on imported goods, charges on vessels and boats trading to the island, the harbour dues, taxes on dogs, carriages, and public-houses, are the taxes of the island. The two last are expended in repairing harbours, roads, and bridges. The customs average from 20,000*l.* to 25,000*l.* After paying salaries to the officers employed by government, a surplus is annually remitted to England of from 12,000*l.* to 15,000*l.*

Two steam-vessels ply between Liverpool and the island: there is one from Dublin to Whitehaven which calls at Douglas, and there is constant communication between Scotland and the island.

The established religion is that of the Church of England, but all denominations of Christians have the free exercise of their religion. The Methodists are supposed to be nearly one-tenth of the population. The value of thirteen out of seventeen livings in the diocese is 90*l.* per annum each. The episcopal see is supposed to have been fixed at Sodor in the ninth century, but the site of this place is not now known. The bishop of Sodor and Man, whose authority is wholly confined to this island, is a suffragan of the archbishop of York. He has no seat in the House of Lords. Several distinguished men have filled the see of Sodor and Man. Barrow, Wilson, and Hildesley have been rarely surpassed by any bishops of the Christian church. Barrow endowed schools, and formed a system of parochial instruction. Bishop Wilson, who filled the see for fifty-six years, secured the people of this island, by the Act of Settlement, a deliverance from their vassalage to the lord of the island, and manfully and successfully defended the interests of his clergy against the same noble family. He translated various works into Manks, and commenced the translation of the Scripture into that tongue, which was completed under Hildesley. The whole island felt for him the affection of a father, and the greatest pleasure of the people was to receive his benediction. Although offered a bishopric in England, he preferred his own little island and narrow income to rich preferment in his native country. His code for conducting the affairs of his diocese was so perfect, that it has been observed of it, that should all others perish, it would fully supply their loss. Many men have been distinguished by greater originality and vigour of mind, but few have equalled him in Christian charity and benevolence.

The bishop of Sodor and Man has an archdeacon and his assistant, two vicars-general, and an episcopal registrar, to assist him in managing the affairs of his diocese. Ecclesiastical courts for the proving of wills, granting administration, and carrying on suits against executors and administrators, are held by the bishop or his vicars-general for one half of the year, and by the archdeacon or his official for the other. There is an appeal from these courts in all spiritual affairs to the archbishop of York. The vicars-general hold a court every Friday. The clergy are assembled every year in convocation at the bishop's court, and a consistorial court is convened on the last Thursday of every month.

All the laws of the island are contained in one small volume. There are no barristers, and the services of the attorneys, who act both as attorneys and barristers, are in many cases rendered unnecessary by the clients pleading their own causes. Law is cheap, and litigation is common. The Manx agricultural population, who are generally yeomen, are frank, open, and kind; and most of them have all the necessaries, and some of them the comforts of life.

The House of Keys, which has both a legislative and judicial character, consists of 24 of the principal commoners of the island. They must have landed property, and have attained the age of twenty-one. They are now a self-elected body, but were formerly chosen by the people, and were the organ by which they acted. The two deemsters have equal jurisdiction, and are judges in civil and criminal cases. The Court of Chancery is held eight times in the year, where the governor acts as chancellor, with the assistance of the deemsters and other chief officers. The Court of Exchequer is generally held immediately after the former, and the governor, assisted by the deemster, is sole judge. This court takes cognizance of all matters connected with the revenues. The common-law courts are held at different places for the different sheadings into which the island is divided, called Glenfaba, Michael, Ayre, Garff, Middle, and Rushen. The courts at Peel are for the sheadings of Glenfaba, Michael, and Ayre; at Douglas, for Garff sheading; at Castletown for the sheadings of Middle and Rushen. All disputes about land and all personal actions for the recovery of damages are tried in this court before a jury. The deemsters administer the oath in the Manx language, deliver the charge, and receive the verdict. There is an appeal from the judgment of a court of common-law, first to the House of Keys, afterwards to the governor, and finally to the privy-council. There is a general gaol delivery twice in the year. The high bailiffs, who act as magistrates in the five towns of the island, were established in 1777, and can hear and determine all causes under forty shillings; they also maintain the peace and apprehend offenders.

Bishop Barrow formed a school, in 1666, in every parish in the island, and Bishop Wilson says, in 1747, 'We have petty schools, which are the foundation of catechising in every parish, and, though meanly endowed, may by care become special means of improvement.' The teaching of the Manx language, which is a dialect of the Erse or Celtic, has contributed to the general improvement of the natives, all of whom will probably in a short time be able to speak and read English. The present Archdeacon Philpots has taken much pains to promote the religious knowledge and intellectual improvement of the inhabitants.

Population.—Bede states that the island contained only 300 families, or about 1600 persons, in the eighth century. Holinshed, in 1584, says, 'There were formerly 1300 families in this island, but now scarcely half that number.' In 1667 it contained 2531 men between the ages of 16 and 60. In 1726 the population was 14,027; in 1757 it amounted to 19,144; in 1784, to 24,924; and in 1791, to 27,913. According to the census of 1831, the whole number in the island was 41,000. The increase during the ten years preceding 1831 amounted only to 919 persons; and the chief places where this took place were Douglas, Kirkpatrick, and Ramsey. The manufacturers in the Isle of Man are generally weavers and a few spinners.

(Townley's *Journal in the Isle of Man;* Feltham's *Tour through the Isle of Man;* Wood's *Account of the past and present State of the Isle of Man; Commissioners' Report for* 1793; *Population Returns; Education Returns;* M'Culloch's *Statistical Account of England; Communications from the Island.*)

MANAAR, Island. [CEYLON.]

MANAKINS, the name of a group of small birds remarkable for the rich tints of their plumage (*Pipra* of authors). Mr. Swainson makes them a subfamily of the *Ampelidæ*, under the name of *Piprinæ*. [PIPRA.]

MANATEE. [WHALES.]

MANCHA, LA, a province of Spain, bounded on the north by Toledo in New Castile, on the south by Andalucia, on the east by Cuenca and Murcia, and on the west by Extremadura. Its greatest length is 160 miles, and its greatest breadth 100. It contains about 7500 square miles. Its population, according to the census of 1788, amounted to 206,160 souls, of whom 749 were priests, 729 monks, and 610 nuns: within the last fifty years however it has somewhat increased, and may at present be estimated at more than 250,000.

The country for the most part consists of immense plains, elevated 2000 feet or more above the level of the sea, barren, sunburnt, and dusty, with scarcely a tree or house to relieve their dreary monotony, and affording only a scanty pasturage to vast numbers of mules and sheep. The towns and villages are mean and ruinous, indicative of the decay of the province. Cultivation is almost confined to corn, vines, and olives. In its great deficiency in natural beauty La Mancha bears a striking contrast to the fertile and picturesque regions to the south and east. Such is the centre of the province. Its frontiers are mountainous. On the south, forming the boundary between La Mancha and Andalucia, rises the lofty chain of the Sierra Morena; on the north are the mountains of Toledo, almost wholly in the province of that name; and on the south-east of La Mancha, but within its boundaries, is the Sierra de Alcaraz.

The province is divided into Upper and Lower La Mancha. The capital is Ciudad Real, situated in a fertile plain, and formerly a flourishing city; but its trade and manufactures of wool and leather are now almost extinct, and its population has dwindled down to 8000 or 9000. Its streets are straight and regular, and it contains a spacious square, in which bull-fights are occasionally held. The other towns of importance are Almagro, Manzanares, Val de Peñas, Almaden, Quintanar de la Orden, and Toboso—immortalised by Cervantes.

The climate of La Mancha is intensely hot in summer, and rendered severely cold in winter by keen winds, though snow and ice are rare, except on the mountains. The soil is poor; it is parched by a burning sun, and scarcely refreshed by rivers; for the Giguela, Zancara, Mundo, Guadarmena, Azuer, Jabalon, Las Fresnedas, and Guadalen, are mere rivulets. The Guadiana alone, which rises in the Sierra de Alcaraz, and intersects the greater part of the province, is of considerable volume. About four leagues from its source it loses itself in a marsh, and after running under ground for five leagues, re-appears at the small lakes called 'the Eyes of the Guadiana.' This remarkable phenomenon has given rise to the saying that there is in Spain a bridge five leagues in length. The population of La Mancha is principally agricultural. Wages for field labour are three reals, or sevenpence-farthing sterling per diem. The productions are corn, especially oats—olives, which grow in the neighbourhood of Ciudad Real, Almagro, and Malagon—and wines, which are excellent, and so cheap that a gallon costs no more than fourpence sterling. The wine of Val de Peñas is the most esteemed: it is a red wine, light and racy, but, unless drunk in the province, is much injured in flavour by the skins in which it is customary to transport wines in Spain. Its price on the spot is about 3*l.* 10*s.* per pipe. La Mancha also produces some saffron and honey, but scarcely any fruit. The mules of La Mancha are famed for their great size; mules and asses are used for all the purposes of husbandry, as there are ho horned cattle in this province. Beef is consequently not to be obtained, but mutton costs only about 2¼*d.* and bread 1¼*d.* per lb.

La Mancha is rich in mineral productions. There is a mine of silver, at present abandoned, together with several of antimony, near Almodóvar del Campo; and a mine of mercury, belonging to the crown, and very productive, at Almaden. [ALMADEN.] Ochre, rock-crystal, bole, calamine, and cinnabar are also found in La Mancha. There are likewise several springs of mineral waters, both hot and cold.

La Mancha formerly possessed some considerable manufactures, which have greatly decayed; but the spinning of wool still gives employment to several thousands of the population. Flannels, blond lace, leather gloves, hard soap, and gunpowder are also manufactured, but all on a small scale, and for the consumption of the province. Commerce is at a still lower ebb; and were it not for the productions of the soil with which La Mancha supplies the other provinces, it would be utterly dead. In exchange for these, La Mancha receives articles of luxury, and even many of the necessaries of life, especially in the way of clothing.

The Manchegos are grave, solemn, and punctilious, but courteous, peaceable, and good-humoured. The lower orders are hardy, industrious, frugal, and little addicted to pleasure. Everything indeed in La Mancha partakes of the melancholy character of the scenery; and were it not for the charm with which Cervantes has invested the province, and the similarity of manners and customs existing at the present day to those depicted in his immortal work, La Mancha would be to the traveller the most dreary and uninteresting part of Spain.

(Laborde's *Itinéraire Descriptif de l'Espagne;* Townsend's *Journey through Spain;* Inglis's *Spain in* 1830; Cruz, *Viage de España.*)

MANCHE, a department of France, deriving its name from La Manche (the Sleeve), or English Channel, on the coast of which it lies. It is bounded on the west, north, and north-east by the Channel; on the east by the department of Calvados; on the south-east by that of Orne; and on the south by those of Mayenne and Ille et Vilaine. Its form is irregular, but approximates to that of a rectangle, having its greatest length from north by west to south by east, from Cape de la Hogue to the neighbourhood of St. James, 92 miles; and it greatest breadth from Pontorson through Mortain to the border of the department of Orne, 39 miles. Its area is estimated at 2298 square miles, which is rather under the average area of the French departments, and about equal to the conjoint areas of the English counties of Kent and Surrey. The population of the department in 1831 was 591,284; in 1836 it was 594,382, showing an increase of only 3098, little more than a half per cent. in five years, and giving 258 inhabitants to a square mile. In amount and density of population the department exceeds the average of the French departments in the proportion of five to three; but is much exceeded by the English counties with which we have compared it. The chief town is St. Lô on the river Vire, in 49° 7′ N. lat. and 1° 6′ W. long.; 152 miles from Paris, in a direct line west by north, or 171 miles by the road through Mantes, Evreux, Caen, and Bayeux.

The coast-line forms two sides (the north and the west) of the rectangle to which the form of the department approximates, and part of the third side (the eastern); the northern part of the department is a peninsula, formerly known as the district of Le Cotantin, or Cotentin, from the town of Coutances. The coast-line forms on the south-western side of the department the bay of St. Michael, which is occupied by shoals, intersected by the channels of the rivers that empty themselves into the bay. From this bay the coast runs in a tolerably regular line north by west to the village of Carteret, receiving the Sienne, the Ay, and some other small streams. From the village and small sandy haven of Carteret the coast runs north to the rocky headlands of Cape Flamanville and the Nez (Ness or Nose) de Jobourg, between which is the small bay (Anse) of Vauville. Near the Nez de Jobourg is Cape la Hogue, the north-western point of the rectangle. Opposite to the western coast are the little island of Chaussey with its granite quarries, and the Channel Islands, which belong to England; Jersey is opposite the mouth of the Ay, and Aurigney or Alderney, the nearest to the French coast, is opposite Cape la Hogue, from which it is separated by the Raz de Blanchart, or, as the English term it, the Race of Alderney. The northern coast from Cape la Hogue to Pointe Barfleur, the north-eastern point of the rectangle, forms a shallow bay, at the bottom of which are the roadstead and town of Cherbourg. The roadstead is defended by a digue, or breakwater, having a small island at each end; that at the east end is called Pelée. Near Cherbourg the coast is high and abrupt. From Pointe Barfleur the coast runs southward in an irregular line to the æstuary of the Douve and the Vire, which is full of shoals. This eastern coast is skirted above highwater-mark by a marshy flat a mile and a half broad in some places, along the immediate margin of the sea by sandy-downs, and below highwater-mark by broad sands and rocks; it has opposite to it the small island of St. Marcouf.

The department has not any mountains, but a range of hills, some of them of considerable height, branching from the Armorican chain, extends through it from south to north. The principal streams flow from these heights eastward or westward into the sea, owing to the proximity of which all the watercourses are short.

The primitive rocks overspead the greater part of the department, but a part of the eastern coast and of the country about Valognes, Carentan, and St. Lô is occupied by later formations. Between Carentan and Valognes the elevated tract behind the low marshes that skirt the shore is composed of blue lias, which extends to a considerable distance inland. This lias closely resembles, in its fossil remains, that of the south of England; the white and blue strata are commonly much intermixed. The new red sandstone is abundant between Carentan and St. Lô; it is chiefly composed of red marl and red sandstone mixed with the usual blue and white strata; between Carentan and Isigny it is yellowish mixed with red and grey, and is tolerably compact. Red marl and red sandstone belonging to this formation are found near Valognes and along the coast intermingled with gravel beds composed of the rocks of this formation, intermixed with quartz rock, on which in several places the new red-sandstone is found to rest. This quartz rock has in some parts been denuded; it is found between Valognes and Cherbourg alternating with argillaceous slate. Argillaceous slate and grauwacké occupy the east of the department about St. Lô. Granite, resembling that of Dartmoor, is found at St. Vaast near Pointe Barfleur.

A bed of limestone, probably belonging to the supracretaceous rocks, is quarried between Carentan and Valognes; and another limestone of uncertain date is found in the immediate vicinity of the latter place. (*Geol. Transact.*, 2nd series, vol. i.)

The mineral treasures of the department are not great. There is one iron-work, having one furnace for making pig-iron, and one forge for wrought-iron. No coal is procured, but granite, slates, and stones for millstones and whetstones are quarried; kaolin and potters' earth are procured; and there are some mineral springs, and in the marshes considerable salterns.

The largest river is the Vire, which rises in the department of Orne, and enters this department on the east side near Tessy, from whence it flows northward, just within and in one part on the boundary of the department, past St. Lô into the English Channel. The whole length of the Vire is about 50 miles, for about eight of which it is navigable. The Douve rises near the west coast of the peninsula of Cotentin, across which it flows in a winding channel to the eastward, until it falls into the same inlet or æstuary as the Vire. Its whole length is about 34 miles, for above half of which it is navigable. The Merderet and the Sève, small feeders of the Douve, about 12 miles long, are navigable, the first for about four miles, the second for about three;

and the Taute, another small feeder of the same river, 20 or 22 miles long, is navigable for about 14 or 15 miles. The Sinope and the Saire run into the sea on the east coast; the Divette, at Cherbourg on the north coast, and the Ay on the west coast: these are all small. The Sienne rises in the department of Calvados and flows north-west across the department into the sea; its length is about 38 or 40 miles, of which only five are navigable. Its principal feeder is the Soulle, which flows by Coutances; the Airon and the Venne are smaller. In the south of the department are the Celune, or Selune (34 miles long, with five miles of navigation), which rises in the south-eastern side of the department, and flows across it into the sea opposite Mont St. Michel, receiving in its course the Deron, the Brevon, and the Oir; the Sée (28 to 30 miles long), which falls into the sea near the Celune; and the Couesnon [ILLE ET VILAINE], of which only a small portion, including a navigation of five miles, belongs to the department.

The Terette and the Madelaine, two streams to which the government returns assign a navigation of four and five miles respectively, are not marked, at least under those names, in Brué's map. The total amount of inland navigation is about 75 miles.

The number of Routes Royales, or government roads, is eight, of departmental roads 23; together 31. The aggregate length of the government roads was (1st Jan., 1837) 227 miles, of which 213 miles were in repair, 11 miles out of repair, and three miles unfinished. The aggregate length of the departmental roads was 360 miles, of which 201 were in repair and 159 out of repair. The principal road is that from Paris to Cherbourg, which enters the department on the east at the village of Anville on the Vire, between Isigny (Calvados) and Carentan, and runs through Carentan, Sainte-Mère-Eglise, and Valognes. The road from Paris to St. Lô branches off from the foregoing at Bayeux (Calvados) and entering the department on the east, at St. Quentin on the Elle, a small feeder of the Vire, runs to St. Lô. The road from Paris to Avranches branches off from the Cherbourg road at Caen and runs through Villedieu. Roads run from St. Lô northward to Carentan; westward to Coutances, where it joins a road from Carentan to Granville; and southward to Villedieu, where it joins the road from Paris to Avranches. Roads run from Granville to Villedieu and to Avranches; and from Avranches to Pontorson on the Coüesnon and so into Bretagne. A road from Caen (Calvados) to Rennes (Ille et Bretagne) crosses the south-eastern corner of the department through Mortain and St. Hilaire. The bye-roads and paths amount to nearly 14,000, with an aggregate length of nearly 10,000 miles.

The arable land of the department comprehends nearly two-thirds of the whole soil; the corn grown exceeds the consumption of the department and the average produce of the departments of France, especially in buckwheat and barley; more buckwheat is grown than of any other grain; the quantity of oats, rye, and maslin or mixed corn raised is small. Flax and hemp are raised in great quantity. Pulse is good; the fruit is of middling quality. The quantity of ground occupied for orchards is perhaps greater than in any other department; the apples are grown for making cider. The quantity of meadow-land is also very considerable, nearly one-sixth of the whole department; horses and horned cattle are very numerous, and the cattle are of one of the finest breeds in France. The proportion of cows is great, and a large quantity of butter is exported. The breed of sheep is not very good; it is considered that the long woolled Leicester breed might be introduced with great advantage. The rearing of swine, poultry, and bees is in some parts an object of great attention. There are no vineyards and but little woodland; the forest trees are chiefly oak, beech, and birch.

The department is divided into six arrondissements, as follows:—

		Area in square miles.	Population in 1831.	Population in 1836.	Communes.
Saint Lô	E.	436	99,250	100,717	120
Coutances	W.	512	136,847	135,980	137
Valognes	N. and Central	401	95,660	95,950	118
Cherbourg	N.	233	75,488	76,673	73
Avranches	S.W.	379	110,468	110,821	124
Mortain	S.E.	337	73,571	74,241	73
		2,298	591,284	594,382	645

There are 49 cantons, or districts, each under the jurisdiction of a justice of the peace.

In the arrondissement of St. Lô are, St. Lo (pop. in 1831, 8154 town, 8421 whole commune; in 1836, 9065 commune) [LÔ, ST.] and Tessy, on the Vire; Thorigny, or Torigny (pop. 2121 town, 2184 whole commune), and Cericy, in the country east of that river; Guilain, near the source of the Venne; Canisy and Marigny, near St. Lô; and Carentan, at the junction of the Taute and the Douve. Thorigny had formerly a fortress, built during the occupation of Normandie by the English, on the site of which was erected a magnificent mansion, of which only one wing remains. Carentan (pop. 2292 town, 2773 whole commune), situated in a marshy and unhealthy district, is surrounded by ruined walls and defended by a strong castle. Trade is carried on in corn, cider, hemp, flax, honey, butter, fish, cattle, and horses. There are some manufactures of lace and cotton.

In the arrondissement of Coutances are, Coutances (pop. in 1831, 8957; in 1836, 7663 for the commune) [COUTANCES] and Cerisy-la-Salle, on the Soulle; Hambie, or Hambye (pop. 3684), St. Denis, Gavray, and Cerences, on or near the Sienne; Brehal, in the country south-west of that river; Périers, near the Taute; Créance and Lessay, on or near the Ay, the mouth of which forms a small harbour; La Haye-du-Puits, on the Houillabec, a small feeder of the Douve; and Pretot, between La Haye-du-Puits and Carentan. Cerisy-la-Salle has a manufactory of calico, and near Créance and Lessay are considerable salterns. The sailors of Agou, a village of 1500 inhabitants, at the mouth of the Sienne, which forms a small harbour, are engaged in the Newfoundland cod-fishery.

In the arrondissement of Valognes are, Valognes (pop. in 1831, 6338 town, 6940 whole commune; in 1836, 6655 commune), Montebourg (pop. 2423 town, 2523 whole commune), Sainte-Mère-Eglise, and Le Homme, on *or near the Merderet*; Bricquebec (pop. 4255), St. Sauveur, and *Pont l'Abbé*, on or near the Douve; Barneville, on the haven of Carteret on the west coast; and Barfleur, Tatihou, Saint-Vaast (pop. 3502), Quettehou, and La Hougue, on the eastern coast. Valognes is pleasantly situated in a valley. It is said to have owed its origin to the destruction by fire of an antient city close by, which Malte Brun and others, misled probably by the modern name of the commune in which its ruins stand (Allaume), suppose to have been the Alaune of the antients, but which M. D'Anville considers, and with better reason, to have been Crociatonum, the chief town of the Veneli, or Unelli. There was antiently a strong castle at Valognes, which was taken by Bertrand du Guesclin (A.D. 1364) from Charles le Mauvais, king of Navarre. The town was several times taken and retaken during the wars of the English in France, under Henry V. and VI.; and was again the object of contest in the civil wars of the sixteenth century, and in the troubles of the minority of Louis XIV. The inhabitants manufacture porcelain, felt, cotton-yarn, and lace; there are dye-houses and tan-yards; and trade is carried on in linens, gloves, and paper. The manufacture of woollen-cloth, once flourishing, has gone to decay. There are a public library, a high-school, an agricultural society, and a poor-house or hospital, by the inmates of which lace is made.

In the arrondissement of Cherbourg are, Cherbourg (pop. in 1831, 18,377 town, 18,443 whole commune; in 1836, 19,315 whole commune) [CHERBOURG], on the sea, at the mouth of the Divette; Les Pieux, near the west coast; and St. Pierre-Eglise (pop. about 2300), near the north coast, between Cherbourg and Pointe Barfleur. At Saint-Pierre-Eglise is a large linen manufactory, and at the village of Tour-la-Ville (pop. 3624) near Cherbourg are slate quarries; there were formerly extensive glass-works here. At St. Vaast, near St. Pierre-Eglise, cotton-yarn and calico are manufactured.

In the department of Avranches are, Avranches (pop. in 1831, 7000 town, 7269 whole commune; in 1836, 7690 commune) [AVRANCHES] and Brecey, on the Sée; Villedieu (pop. 3074 town, 3095 whole commune), on the Sienne; La Lande, on the Airon; La Haye-Pesnel and Sartilly, in the country north of the Sée; Granville (pop. 7350) [GRANVILLE], Genest, and Pontorson, on or near the west coast; Ducey, on the Celune; and Saint-James (pop. 1790 town, 3104 commune), on the Brevon. Villedieu owes its origin to a grant of the territory in which it stands, made by Henry I. of England, duke of Normandie, to the Hospital of Jerusalem. The village, which rose on the possession of of the Hospitallers, called Theopolis, or God's town (in French, Ville Dieu), grew to a town. It is a busy place; there are copper-foundries, brass and earthenware manufactories, and a hair-cloth manufactory. Leather and lace are made; the latter chiefly by women. Pontorson is on the Couenon, or Couesnon, near the border of the department. The inhabitants trade in linen and lace. The latter, which is of excellent quality, is made in the hospital or poor-house, and affords employment and subsistence to a considerable number of poor. Saint-James is built on a hill, surrounded by valleys which present very picturesque and varied scenery. It is of uncertain origin; but the extent of the circuit of the walls, and the number of subterraneous vaults which yet remain, show it to have been formerly a place of greater importance. It was repeatedly taken and retaken in the wars with the English. There are several manufactures, and at the nine yearly fairs considerable business is done in linens, woollen stuffs, and thread.

In the arrondissement of Mortain are, Mortain (pop. in 1831, 1922 town, 2511 whole commune; in 1836, 2521 commune) and Juvigny, between the Sée and the Celune; Barenton (pop. 3106), near the Celune; St. Hilaire-du-Harcouet (pop. 2064 town, 2759 whole commune), on the Dcron; Le Teilleul, in the country south of the Celune; and St. Pois, in the country north of the Sée. Mortain is in one of the most hilly tracts in the department. The only manufacture is that of earthenware. At St. Hilaire-du-Harcouet there is a college or high-school.

The population, where not otherwise specified, is that of the commune, and from the census of 1831.

The manufactures of the department are woollen cloths, serges and other stuffs, linens, lace, cotton yarn and goods, haircloth, earthenware, glass, wax candles, ironmongers' and other hard wares, common cutlery, paper, leather, and soda from sea-weed. There are in the arrondissement of Valognes two establishments for the manufacture of sheet-zinc, zinc pipes, zinc nails for sheathing ships, &c. There are several ship-building yards and salterns on the coast. The coast and Newfoundland fisheries are actively pursued, and much trade is carried on with the Anglo-Norman Isles, Guernsey and Jersey.

The department forms the diocese of Coutances, the bishop of which is a suffragan of the archbishop of Rouen. It is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Caen; and in the fourteenth military division, the head-quarters of which are at Rouen. It sends eight members to the Chamber of Deputies.

In respect of education, this department is rather above the average of France. Of every hundred young men enrolled in the military census of 1828-29, forty-three could read and write, the average of France being thirty-nine. There are seven Collèges Communaux, or district high-schools, and two schools of navigation.

This department constituted in antient times the country of the two Celtic people, the Abrincatui and the Unelli or Veneli. Ingena, the capital of the former, from whom, in the fourth century, it took the name Abrincatui, is the modern Avranches; and Crociatonum, the chief town of the latter, was near the modern Valognes. Cerialtum was probably at the little haven of Gouril, near Cape la Hogue; and Alauna at Les Moutiers d'Alonne, near the haven of Carteret. Cosedia, which some have endeavoured to prove was the same as Constantia, the modern Coutances, was probably near the harbour of St. Germain. Fanum Martis was perhaps Mont Martin-sur-Mer, near the mouth of the Sienne; and Legedia was perhaps on the west coast, at the little haven of Lingreville, near Granville, which last place may be probably identified with the Roman Grannonum. Augustodurus, a Roman town mentioned in the Peutinger Table, was probably on the Vire, not far from Mont-Martin-en-Graignes. The æstuary of the Douve and Vire is probably the Argenus of Ptolemy, if that geographer speaks of a river, not a town; and the Tetus of the same writer was probably either the Sée or the Célune.

In the middle ages the department constituted the districts of Cotantin and Avranchin. They were among the tracts ceded by Charles le Simple to the Northmen, and formed part of the duchy of Normandie. It was the part of Normandie which the English retained the longest.

MANCHESTER is situated in the hundred of Salford and the county of Lancaster, 168 miles N.W. by N. of London, direct distance, or 187 miles by the present mail-coach road. The parish, which comprises several townships, had in 1773 a population of 13,786, and in 1831, 270,363, of which there were in the township of Manchester 142,026. From 1801 to the last census, in 1831, the population had more than doubled itself; nor has the increase come to a stand. In Pigot's 'Manchester and Salford Directory,' for 1829, were given 34,200 names of resident housekeepers; in that for 1839 above 44,000: in the former the number of streets was 2740; in the latter 3620. Under the Reform Act Manchester sends two members to parliament. In the first election (1832), contested by five candidates, there were given 9689 votes; in the election in 1835 four candidates received 9636 votes.

Under the Municipal Act the borough has a commission of the peace, is divided into fifteen wards, has a mayor (Thomas Potter, Esq., the first mayor), sixteen aldermen, and forty-eight councillors, whom the act empowers to hold a Court of Record for the trial of civil actions, provided the sum or damages sought to be recovered do not exceed twenty pounds. Under the same act the borough has also a commission of the peace and the right of holding quarter-sessions.

The town is not distinguished for architectural beauty; its chief streets are occupied with warehouses and shops, the more and the less opulent inhabitants residing, at a greater or less distance from the centre of the town, in dwellings separate from those in which they conduct their business, many of which are spacious and beautiful. There are however some objects of architectural interest in Manchester. Under the sanction of acts of parliament much has been done for the improvement of the town, both in convenience and appearance. Market-street, the chief mart for retail business, was not many years ago a mere lane: it is now a very handsome street. The improvement was completed in 1834, when the total outlay was 232,925*l.* The Manchester Improvement Committee have also judiciously applied the profits of the gas-works, which are in the hands of the Commissioners of Police, to the improvement of the township: 20,057*l.* were thus expended by them in the year 1835. Among the public buildings worthy of notice may be named the chaste portico of the Subscription Library, and the truly classic and handsome Royal Institution, both in Mosley-street, and the hall of the Museum in Peter-street. The Infirmary is a fine building, and has an advantage which is rare in Manchester, namely, that of being in a favourable situation. Several new churches have recently added to the appearance of the out-districts of the town, among which the churches at Pendleton and Hume deserve special mention: but even these are inferior to the beautiful church in the pointed style now (1839) being erected by Mr. Atkinson, architect, near Smedley-lane, Cheetham Hill.

Situation and Inland Communication.—Manchester stands on the south-east bank of the river Irwell, by which it has a communication with the Mersey, Liverpool, and the ocean. It is situated in a district which contains some of the best coal strata of England, a circumstance to which the place is in no small degree indebted for its prosperity. The weekly consumption of coal in the town and neighbourhood is estimated at 26,000 tons, the charge of which is for the factories about 8*s.* per ton, for private houses 12*s.* per ton. In 1836, 913,991 tons were brought into Manchester.

The climate of Manchester is not so genial as that of the more southern districts of the kingdom; but the unfavourable impression which prevails respecting it is much exaggerated. The following statements are made on the authority of Dr. Dalton (*Memoirs of the Manchester Philosophical Society*, second series, vol. iii., p. 483, et seq.). The mean height of the barometer at Manchester is 29·85. The mercury is higher in the summer months than in the winter. The general annual mean of temperature is nearly 49°. The mean annual fall of rain is 36·140 inches; while at Lancaster it is 39·714, at Dumfries 36·919, and at Kendal 53·944. The first six months of the year must be considered as dry months, and the last six months as wet months. April is the driest month in the year, and the sixth after, namely, October, is the wettest, or that in which the most rain falls, in a long continued series of years, in the immediate neighbourhood of Manchester.

Manchester has the credit of having given an impulse to our means of internal communication, and has reaped an ample reward. The achievements of Brindley were prompted by the desire which the duke of Bridgewater had of sending his coal from Worsley to Manchester at a small expense. [BRINDLEY.]

Manchester now possesses the means of water-communication with almost every part of the country. In the railroad enterprise Manchester has held a prominent station. It furnished its full share of the capital employed in the formation of the Manchester and Liverpool railway, the act for which was obtained in May, 1826; the road was completed by Midsummer, 1830, and formally opened on the 15th of September of the same year, in the presence of half a million of people assembled along the line. By the Report of the directors, dated January, 1839, declaring a dividend of 5*l.* per cent. for the half-year previous, it appears that the receipts within that period were as follows:—Coaching department, 79,277*l.*; merchandise, 54,215*l.*; coal, 3201*l.*: total, 136,693*l.* The expenses were 80,978*l.*, leaving a balance for distribution among the proprietors of 55,714*l.* The amount of expenditure in construction of the way and works is stated at the enormous sum of 1,376,073*l.* for a length of road only thirty miles. The Manchester and Bolton railroad was formally opened on the 26th of May, 1838. Its length is ten miles, and its cost 650,000*l.* A continuation of the line to Preston and Lancaster is in progress. A dividend of 1*l.* 10*s.* per share was declared on the 9th of January, 1839. The Grand Junction railway connects Manchester with Birmingham and London: there are 10,918 shares in this railway, and the outlay was 1,512,150*l.*; it was opened in September, 1837, and has paid on the first year 10*l.* per share, on the last six months 12*l.* The North Union connects Manchester with Wigan and Preston. There are also in course of formation lines to Leeds, direct to Birmingham, to Sheffield, &c.

History.—Manchester, as its name shows (Man, castra), was a Roman station, the Mancunium of the Antonine Itinerary. Aldport, the original of Manchester, is supposed by the learned Whitaker to have taken its rise in the reign of Titus, and during the continuance of the Romans in this island it was indebted to them for many of the germs of civilization, and especially for an improvement in the woollen manufacture, a branch of trade which is said to have been introduced from Gaul before their invasion. Of the roads which were planned by Agricola, Manchester had four; two running from east to west, and two from north to south: inferior stations, at places now known by the names of Singleton Brook, Prestwich, and Broughton, were connected with the Manchester camp. Under the Saxons Manchester became the abode of a Thane, who from his baronial hall dispensed a certain sort of justice, and furthered the improvement of the place. At an early period it had two churches, one of which, St. Michael's, is mentioned in Domesday Book. In 870 the Danes got possession of Manchester. After the Norman conquest William gave the place to William of Poictou. The third baron of Manchester was concerned in wresting Magna Charta from King John. In the year 1301 Thomas de Grelley granted the 'Great Charter of Manchester.' In 1307 the baron of Manchester was summoned to parliament, and appears to have been a favourite with Edward I., who made him Knight of the Bath. From the Grelleys the barony descended to the family of De la Warre, and John, the first of the line, was called to parliament in the ninth year of Edward II. He and his successors distinguished themselves in the battle of Cressy, during the Wars of the Roses, and most of all at the period of the Reformation, the baron of Manchester being one of those who apprised the pope that his continued resistance to Henry's wishes in regard to the divorce would lead to the extinction of his supremacy in England. At length the manorial rights vested in the family of 'Mossley of the Hough.'

The dissensions excited by the Reformation were strongly experienced in this town. Collyer, the warden of the collegiate church, refused to acknowledge the spiritual supremacy of Henry VIII., and many of the great families in the neighbourhood remained for a long time attached to the see of Rome. In the civil wars Manchester ranged itself on the side of the parliament (Puritanism having gained an ascendancy in it), and sustained a siege conducted by Lord Strange. On the cessation of the contest, Presbyterianism replaced Episcopacy; Heyrick, the warden of the collegiate church, being himself instrumental in bringing about the change. In 1646, when Lancashire was converted into an ecclesiastical province under the Presbyterian forms, Manchester, with some neighbouring places, was constituted the first classical division of the county. Under Cromwell the electors chose a representative in the person first of Mr. Charles Worsley, and then of Mr. R. Ratcliffe. The Act of Uniformity under Charles compelled about seventy ministers to quit their livings in Lancashire, and among others, the Rev. H. Newcombe, who became minister of what is now called Cross-street chapel, and may be considered the father of non-conformity in a town which has from the first been distinguished as possessing 'a greater dissenting population than most others in the kingdom.' A strong Jacobinical feeling soon grew up, and the Rebellion of 1745 had many friends and supporters in Manchester, even among the leading inhabitants and the clergy of the collegiate church. Prince Charles himself was entertained in the town at the residence of Mr. Dickinson, in Market-street, a house subsequently known as an inn, under the title of the 'Palace,' and which has recently been pulled down to give place to warehouses. It was not till 1783 that the town had a nightly watch, nor did it possess a Police Act before 1791. The political strife which characterises the last half century, and by which great changes have been effected in the constitution of the country, displayed itself at a very early period in Manchester, and was supported and extended by means of 'Reform Clubs' and 'Church and King Clubs.' In 1791 a 'Constitutional Club' was formed. The threat of a French invasion excited indignation and much warlike display. Immediately after the peace in 1815, the desire for 'Reform' began to manifest itself in Manchester in a very decided manner. By the Reform Act Manchester obtained, in common with many other towns in the kingdom, the elective franchise.

Manufactures.—Cotton is the chief article employed in the manufactures of Manchester. Of late the spinning and weaving of silk have been introduced, and it has manufactures of woollen, small wares, hats, umbrellas, and of machinery, which last has risen to great importance and perfection.

The commercial spirit dates back to a very early period. It is enough however to mention, that in the time of Henry VIII. and Edward VI. the town was distinguished for its manufactures. The more rapid expansion of trade began in the seventeenth century, and one who is known as a benefactor to the town, Humphrey Chetham, was among its most eminent tradesmen. The enormities of the duke of Alva in the Netherlands, and subsequently the revocation of the edict of Nantes, brought many enterprising and skilful foreigners into the district, and gave energy and effect to the native commercial impulse. At first the woollen was the only branch of trade, but since the middle of the last century the cotton business has nearly superseded the antient fabric. The natural advantages possessed by the town, together with the strength of character of the natives, was undoubtedly the original and the main cause of the growth of its trade and prosperity; but the series of brilliant inventions and discoveries applied, improved, or originated in the district of Manchester, which comprise the steam-engine, the spinning-jenny, the mule-jenny, the fly-frame, the tube-frame, the mule, &c., have proved most effective instruments in aiding the development. The early series of inventions which gave energy to the cotton manufacture were completed about 1780. Before their introduction—namely, until 1751—the importation of raw cotton into this country had gone on increasing slowly; the supply being in 1701, 1,985,868 lbs.; and in 1751, 2,976,610 lbs. But in 1780 it had increased to upwards of 6,700,000 lbs.; while in 1800 it reached 56,000,000 lbs. Equally striking is the official return of the export of cotton goods: in 1701 the value was 23,253*l.*; in 1800, 5,406,501*l.* Again, in 1838, the following, according to Burnd's 'Commercial Glance,' was the amount and value of manufactured cotton goods exported:—

	lbs.	£.
In manufactured goods .	120,784,629	11,746,475
In yarn . . .	113,753,387	6,043,138
In thread . . .	2,361,984	177,224
	236,900,000	17,966,837

The value of the cotton trade to the country has been estimated at 34,000,000*l.* annually; the capital employed at 20,000,000*l.*; the amount of wages annually paid, 17,000,000*l.* and that 1,500,000 people depend on it for their subsistence. Till within the last year or two, the progress has been steady and rapid; it is not however easy to affirm that it will continue as satisfactory; at the moment we write

(March, 1839), numerous mills in Manchester and the neighbourhood have ceased working, in part or altogether.

The processes of throwing and weaving silk were extensively carried on at Macclesfield several years before they reached Manchester. The silk-mill of Mr. Vernon Royle, erected in 1819-20, was the first brought into operation in the latter town. Since then the trade has rapidly increased. In 1819 there were in it about a thousand weavers of mixed silk and cotton, and fifty of pure silk goods; in 1836 there were in the county (Manchester being the principal locality) twenty-two throwing-mills employing about four thousand persons. Printing is another branch of the silk business, chiefly, if not exclusively, carried on at Manchester. Dyeing of silk is also extensively pursued, and in fact the town is becoming the centre of transactions in the silk trade.

Property in Manchester has greatly increased in value, and the habits of the manufacturers have undergone an entire change. It is curious to contrast the picture which Aikin gives with what is now seen in the stupendous warehouses and the mansions and palaces which are found in Manchester and its vicinity. 'An eminent manufacturer in that age (1695) used to be in his warehouse before six in the morning, accompanied by his children and apprentices. At seven they all came to breakfast, which consisted of one large dish of water-pottage, made of oat-meal, water, and a little salt, boiled thick, and poured into a dish. At the side was a pan or basin of milk, and the master and apprentices, each with a wooden-spoon in his hand, without loss of time, dipped into the same dish and thence into the milk-pan, and as soon as it was finished they all returned to their work.' 'When the Manchester trade began to extend, the shopmen used to keep gangs of pack-horses and accompany them to the principal towns with goods in packs, which they opened and sold to shopkeepers, lodging what was unsold in small stores at the inns.' In 1816 the annual value of property in the township of Manchester was 405,986*l.*; in 1835 it had reached 573,085*l.* In the township of Ardwick property had in 1836 nearly doubled in the short space of 87 years: in that of Chorlton-on-Medlock, a town has within a few years been actually created through the erection of factories; in 1801 its population was 675, in 1831 20,569; in 1815 the annual value of property was 84,844*l.*, and in 1835, 117,688*l.* Nor need there be any surprise felt at this when it is known that mills of the first character require an outlay of from 50,000*l.* to 100,000*l.* In the reign of William and Mary the taxable property in Manchester was rated at 4375*l.*; in the year 1828 the amount of assessed taxes charged was 25,420*l.* The circulation of the branch bank of England in Manchester, which in 1828 was 258,000*l.*, had risen to 1,520,000*l.* in 1837, though in the interval several joint-stock banks had been established. In 1794 the poors'-rate at five shillings in the pound produced 9270*l.*, in 1834 it realised on a rate of half-a-crown 44,896*l.* In 1790 it was mentioned as an extraordinary fact that Manchester paid in postages 11,000*l.*, being a larger amount than any other provincial town; in 1838 this sum had risen to 69,232*l.* In the single article of bricks the town paid to the excise in 1835 no less a sum than 45,770*l.* The value of land has undergone a proportional increase, as may be judged of by the following sales made of land in the central parts of the town: in 1834, 71 square yards in King Street were bought for 354*l.*; 50 yards at the corner of Todd Street for 280*l.*; 250 yards in Smithy Door for 2000*l.*; even 9*l.*, 10*l.*, 15*l.*, and yet higher sums have been given per square yard for land in situations eligible for those immense receptacles of goods, the larger warehouses. Land at the upper end of Market Street and Mosley Street, which 50 years ago was sold for 4*d.* per square yard annual rent, has been sold for 20*s.* a yard annual rent.

As to the intellectual and moral condition of the working classes, there has doubtless been great exaggeration, but it is equally true that in that condition there is much to deplore. The prevalence of the factory system has broken up the old domestic manufacture and thereby destroyed old domestic habits; it has also called from every district of the kingdom, and especially from Ireland (there are at least 50,000 Irish in Manchester), masses of people heterogeneous in their character, yet all more or less ignorant and uncultivated, and not likely therefore to coalesce speedily into a compact form of civilised existence. Most of them have been much bettered in their circumstances without having found an equal increase of morally improving influences. Children by the amount of their wages have become independent of their parents; girls have been sent into the mill before they have learnt the rudiments of domestic duty, and mothers, whose presence in their own houses is indispensable, work for twelve hours in the day amid a mass of people, young and old, with whom they have little or no connection, and from whom in consequence they can scarcely derive any improvement. It must also be said that the atmosphere of the factory is unnatural and consequently unhealthy, while the degree of heat tends to the premature development of the passions, and, as the least baneful consequence, to early, improper, and improvident marriages. The charges against the factories, of being the scenes of violence and cruelty to children, of extortion against the men, as destructive alike of life and morality, may be considered as gross extravagances or little better than falsehoods: but it is not the less true that neither their moral nor their physical atmosphere is favourable to the well-being of the work-people; that, with some honourable exceptions, the masters are disregardful of the comforts and improvement of those whom they employ, and think exclusively of the wealth they can extract from their establishments, and that thus there has arisen on the part of the workmen a feeling of jealousy, of dislike, of sullen discontent, which, added to other depraving influences, makes their moral tone hard, disposed to violence, and almost reckless, while their congregating together in masses gives them opportunities of communicating their feelings one to another and of concentrating their power. The system has not been sufficiently long in general operation to afford accurate means of judging of its effect on health and life; it has also been tried, in relation to these matters, under favourable circumstances, since there has been a continual influx of fresh population to the mills from rural districts or small towns, and therefore statistical tables cannot furnish any adequate means of forming an opinion; but in relation to children, the wonder is, that any one should have doubted of the injurious influence which it has upon their health and consequently on their character. As it is, the moral condition of the young, and of the homes whence they come, are in very many cases bad. When the mother is in the factory, the home must be in disorder. When parents subsist on the earnings of their children, as in many instances, the relations of domestic life are subverted; the weak labour, the strong are idle, idleness begets vice, vice is the parent of discontent, and this leads to the use of intoxicating drinks; the parent is moreover punished in the disobedience, if not insolence, which soon manifests itself on the part of the children, who are well aware how much the family depends on their earnings. Of 63,623 persons employed in mills, May, 1836, in the parish of Manchester, 35,283 were females; 37,930 were above the age of 18 years, and 16,965 were below the age of 15. The following table gives the average net weekly earnings of the different classes of operatives in the cotton factories of Manchester, Stockport, Duckinfield, Staley-bridge, Hyde, Tintwistle, Oldham, Bolton, &c., drawn from the Returns of 151 mills, employing 48,645 persons, in May, 1833:—

Denomination of process in which employed.	Class of Operatives.	Classification as respects age and sex.	Average weekly net earnings. s.	d.
Cleaning and spreading cotton	. . . . . .	Male and female adults, and some non-adults	3	8
Carding . . .	Carders or overlookers	Male adults	23	6
	Jack-frame tenters	Principally female adults .	8	0
	Bobbin-frame tenters	Do. do. .	7	5½
	Drawing tenters	Do. do. .	7	5¼
Mule spinning .	Overlookers .	Male adults	29	3
	Spinners . .	Male and female adults, but principally the former	25	8
	Piecers . .	Male and female adults and non-adults, but principally the latter	5	4¾
	Scavengers .	Male and female non-adults	2	10¼
Throstle spinning	Overlookers .	Male adults	22	4½
	Spinners . .	Female adults and non-adults	7	9
Weaving . .	Overlookers .	Male adults	26	3¼
	Warpers . .	Male and female adults .	12	3
	Weavers . .	Male and female adults, male and female non-adults, but chiefly females	10	10
	Dressers . .	Male adults	27	9¾
Reeling . .	Reelers . .	Female adults and non-adults	7	11¼
Roller-covering	Roller-coverers	Male and female adults .	12	1¼
Attending the steam-engine and making machines .	Engineers, firemen, mechanics, &c.	Male adults	20	6

If this table were combined with the relative numbers of each description of the hands, it would afford the absolute average of their earnings, but it is beyond a doubt that the average is not less than 10 shillings a week each person, young and old. It will be noticed that the lowest wages are given to the scavengers and piecers, who are generally young children. Out of a family of six persons there may be three, out of seven persons four employed at the factory, and when in a few years the children are become older, all may be so engaged. This will give for each of such families an average earning of 30*s.* or 40*s.* per week, when only three or four out of each family are employed, which would be amply sufficient to provide all the necessaries of life. The splendid gin-palaces, the numerous beer-houses in Manchester, make it but too obvious where the superfluous means of many go, and point out a source of demoralisation which is as frightful in its consequences as in its amount. But there are other signs which indicate anything but a want of means on the part of the great bulk of the population. The last Report of the Manchester and Salford District Provident Society shows that in 1837, though trade was not good, the amount received by its agents, who visit the houses of the work-people and take their savings in very small deposits, was 4735*l.*, while the Savings' Bank received within the year ending November, 1838, no less a sum than 109,123*l.* The following tables will furnish the reader with the means of judging how much of this came immediately from the operatives:—

Classification of Depositors, November 20, 1838.

	Male.	Female.	T
Tradesmen, shopkeepers, artificers, publicans, or their wives	9206	2568	11,774
Persons employed in factories, warehouses, or as porters, &c.	4789	845	5634
Domestic servants	930	5370	6300
Widows	——	997	997
Minors	2083	1856	3939
Weavers	1332	389	1721
Labourers	864	——	864
Farmers	473	85	551
Other descriptions not particularly specified	1382	2468	3850
			35,637
Friendly societies			77
Charitable societies			189
			35,903

CLASSIFICATION OF SINGLE DEPOSITS, 1838.

		1st Yr. 1818	2nd Yr. 1819	3rd Yr. 1820	4th Yr. 1821	5th Yr. 1822	6th Yr. 1823	7th Yr. 1824	8th Yr. 1825	9th Yr. 1826	10th Yr. 1827	11th Yr. 1828	12th Yr. 1829	13th Yr. 1830	14th Yr. 1831	15th Yr. 1832	16th Yr. 1833	17th Yr. 1834	18th Yr. 1835	19th Yr. 1836	20th Yr. 1837	21st Yr. 1838
£ s. d.	Not exceeding £ s. d.																					
Deposits of 0 1 0	0 5 0	357	403	245	348	422	606	762	991	521	757	1116	950	1132	1020	936	1011	936	970	1059	1016	1806
Above 0 5 0	0 10 6	94	131	72	162	196	464	597	806	390	748	1035	963	1371	1026	939	1022	1270	1492	1598	1256	2195
.. 0 10 6	1 1 0	192	231	185	350	459	763	876	1491	767	1158	1684	1722	3184	2004	1701	1713	2294	2330	3163	2354	3374
.. 1 1 0	5 0 0	263	545	461	763	1207	1681	1983	3573	1876	2850	3834	3706	4328	4109	3694	4361	5393	6229	6343	5241	7617
.. 5 0 0	10 0 0	81	154	146	318	452	637	774	1417	735	1173	1627	1307	1706	1577	1449	1533	1918	2231	2595	2066	2717
.. 10 0 0	20 0 0	55	107	119	190	258	399	512	820	560	731	1078	817	966	948	925	896	1063	1292	1478	1224	1595
.. 20 0 0	30 0 0	24	38	29	63	104	152	203	365	497	623	829	637	772	674	703	670	742	915	1008	910	1075
.. 30 0 0	40 0 0	11	13	14	31	37	73	120	138	10	5	8	8	19	23	25	12	10	26	15	24	226
.. 40 0 0	50 0 0	8	18	13	22	39	93	128	170	3	6	1	7	10	16	19	2	5	16	9	14	10
.. 50 0 0	100 0 0	14	21	15	40	59	89	146	65	10	14	17	24	19	28	31	15	18	16	10	15	20
Exceeding £100 .	. .	..	..	..	..	..	1	1	7	4	13	3	11	..	..	..	..	..	7	6	1	15
		1099	1711	1299	2287	3233	4949	6104	9933	5373	8078	11,232	10,152	12,507	11,427	10,422	11,235	13,649	16,174	17,724	14,124	20,453

The deposits stated as exceeding £30 since the eighth year, 1825, are not new deposits, but transferred by gift, decease, or otherwise, from old accounts to new ones.

Not merely the factory hands, but generally all classes of working men have been in the receipt of wages sufficient, if well laid out, to procure all the necessaries and many of the comforts of life. Yet for want of the proper moral training, and by reason of the demoralising influence of Irish and other uneducated labourers, the abodes of a large proportion are wretched. Of 4102 dwellings, of which the Manchester Statistical Society gave a Report in 1834, founded on personal inspection, 3100 were houses, 752 cellars, 250 rooms; of these there were comfortable 1551, well furnished 689, not comfortable 255,1.

In 1838 the Society issued another Report of 28,186 dwellings examined.

Persons occupying houses . . .	94,250
Do. do. rooms of houses .	9,351
Do. do. boarding with occupants of houses	9,671
	113,272
Persons occupying cellars . . .	14,274
Do. do. boarding with occupants of cellars	686
Total number of persons resident in the dwellings examined	128,232

Of the 28,186 dwellings, 14,042 are reported as ill-furnished and 8322 as not comfortable; thus only 72 per cent. of the houses of the working population of Manchester and Salford are comfortable. The Report adds, 'As in many (perhaps in the majority of cases) there are only *two* beds to a family of five or six persons of both sexes, the inconveniences and evils which must result are too obvious.'

The following is an extract from the Report for 1838 of the Manchester and Salford Town Mission, which, making allowance for the rhetoric of the style, affords a true picture of the condition of many: 'Those who only visit occasionally the dwellings of the poor can have no idea of the state of ignorance, superstition, demoralisation, and infidelity which exists. This is only to be discovered by those who visit them constantly and regularly, as our missionaries do. Scenes most disgusting and blasphemy at which the mind shudders are patiently borne and fearlessly met by the agency we employ. They (the town missionaries) have been stoned, threatened with death, surrounded with mobs, seriously bruised, and more than once they have narrowly escaped with their lives. And this in Manchester! Can it be supposed that the Christian public will suffer this state of things to exist without making a strenuous effort at once to meet the exigency of the case? Surely heathens at home should not be neglected.'

Schools and Scientific Institutions.—The education hitherto afforded to the working classes in Manchester has been very defective both in extent and quality. From the 'Report from the Select Committee on the Education of the Poorer Classes,' printed in 1838, much valuable information may be obtained. The Committee decided that daily education ought to be provided for one in eight of the population of a large town, and report that in Manchester only one in thirty-five is receiving an education likely to be useful. The numbers of children of the working classes stated to be at daily schools in the town are—at very indifferent day and dame schools 11,336; other better schools, 5680; total 17,100, on a population estimated at 200,000. The numbers attending Sunday-schools in Manchester are—under the Established Church 10,284, under Dissenters 19,032, Catholics 3812: respecting Sunday-schools the committee remark, 'They consider the instruction there given as of great advantage, by implanting feelings of religion and giving habits of order, but as imperfect without daily instruction also;' an opinion which will be thought not unfavourable by those who have personal experience of the workings, and therefore of the deficiencies, of these useful makeshifts, especially when they take into account the fact brought to light by Mr. J. Bentley by a personal examination, that in Manchester and Salford 1103 teachers and 11,479 scholars come too late to school, and this in the case of instruction where, the same authority informs us, the following is on the average all the time employed each Sabbath, that is, each week, namely, in reading about one hour and fifty minutes; in singing, fourteen minutes and twenty-one seconds; in praying, seventeen minutes and thirty-four seconds: total about two hours and a quarter. The educational clauses in the last Factory Act have been of but small advantage. Dr. Kay stated before the Education Committee of 1838, that one cause of failure was that no means were given in the Act for compelling the erection or provision of schools; and Mr. Ashworth stated from his own experience, 'If the manufacturer is desirous to make the most of the two hours, and give the children education, he may do some service in it, but a compulsory education affixed upon an employment is a stigma to the employment, and is very obnoxious to the employer, and, I think, generally people laugh at it; it is almost good for nothing.' In the Report of Mr. L. Horner on these very clauses (Feb., 1839), it is said—'Some parents appreciate the advantage (of the education), but most of them would much prefer their children working full time and earning a full rate of wages.' Under these circumstances it is easy to infer what good factory education confers. Indeed, Mr. Horner reports not more than eight mills in Manchester where 'the educational provisions have been best observed,' which 'best' he allows to be inferior to what primary education ought to be; and it embraces only 352 boys and 177 girls. The school of Messrs. M'Connel he considers worthy of special notice, and deserving of being held up an example. He adds, 'It is not at all an unusual thing to have certificates (of education) presented to us subscribed by the teacher with his or her *mark*. In the last quarter I had a school voucher presented to me with a *mark*, and when I called on the schoolmaster to read it before me, he could not; I have had to reject the school voucher of the fireman (to the steam-engine), the children having been schooled in the coal-hole—in one case I actually found them there; it occurred at factories where a a large capital must be embarked.'

Dr. Kay, before the Education Committee, gave in a table in which he calculated that in Manchester there was a total of uneducated and very ill-educated children of 26,265; that the actual cost of providing a worthless or indifferent education by existing methods was 16,021*l.* annually, and that not more than 19,500*l.* of annual outlay would be required for education, by an efficient method, of children now uneducated or very ill educated.

Meanwhile the diffusion of cheap literature and the operation of institutions for popular instruction are doing something to educate adults and youths, while the existence of a few good schools in Manchester for the children of the working classes will serve as models. In this way the 'Manchester Society for Promoting National Education' has rendered some service. It has at present three schools under its superintendence, with about 500 scholars.

Among the institutions in Manchester having an influence on the working classes there may be mentioned the Athenæum, the Mechanics' Institution in Cooper Street, the Mechanics' Institution in Miles-Platting, the Ancoats Lyceum, the Chorlton Lyceum, and the Parthenon. The Athenæum is designed for the benefit chiefly of clerks and other upper servants connected with the trade of the town. The experiment has been very successful. The number of subscriptions for the first quarter (1839) is upwards of 900. Lectures on various topics are given by men of eminence. There is a French class, an Italian class, an Amateur Musical Society, an Essay and Discussion Society; and concerts are occasionally given, which are very well attended. Connected with the Institution is a good library, a coffee-room, and a well-supplied news-room. Its expenditure is above 2000*l.* annually; James Heywood, Esq., is the president. The Mechanics' Institution, in Cooper Street, under the presidentship of Sir B. Heywood, Bart., has conferred great benefits on a class below those to whom reference has been made. The disbursements of the Institution during 1838 were 2177*l.* The original cost of the building was 6000*l.*, but as the institution had its resources mainly absorbed in defraying the annual charges, this sum has been increased by arrears of interest to 9570*l.*, and, deducting dividends paid, a balance is still due of 8195*l.*, to pay off which an effort is being made which gives promise of success. The number of subscribers on the 25th of December last was 1161, of whom 51 were under fourteen years of age, and 446 between fourteen and twenty-one. Sixty-five lectures were delivered during the last year, and were attended by 20,650 males, and 4800 females. Two concerts were also given. There are 5023 volumes in the library; the delivery of books to readers in the last year amounted to 42,451. The number of members in the respective classes were—grammar 128, German language 8, arithmetic 154, elocution and composition 28, mechanical drawing 64, landscape and figure drawing 46, music 24, writing 133, mathematics 18, French 25. Besides these there were the chemistry class, the mutual improvement society, and the natural history class. An exhibition of specimens of machinery, natural history, &c., on a very grand scale, to which 360 persons sent contributions, has been visited by nearly 100,000 persons, at the small charge of sixpence each. There is a reading-room, well furnished with literary and scientific periodicals. It is however to be regretted that the benefits of the establishment do not descend sufficiently low in the social scale, as the following classification of the numbers in 1837 will manifest:—

Principals, engaged as merchants, manufacturers, and mechanists	257
Mechanics, millwrights, and engineers	136
Overlookers, spinners, and other-mill hands	36
Building trades	104
Sundry trades, chiefly handicraft	132
Warehousemen	204
Clerks	150
Artists, architects, engravers, &c.	69
Professional men	7
Schoolmasters	10
Shopkeepers and their assistants	86
No profession	11
Ladies	17
Youths	173
	1392

The knowledge of this fact, combined with a wish to reach the operative classes, has led to the establishment of the Lyceums in Ancoats and in Chorlton-on-Medlock, as well as of the Parthenon; and if we may judge from the first Report of that at Ancoats, which has just been issued, it is reasonable to hope that these institutions will confer immediate benefit on those who are employed in the factories and on other hand-labourers. The subscription is only two shillings a quarter, for which lectures, a library and reading-room, a selection of newspapers, education in classes, and other means of improvement, are provided. The education of females is made a prominent object. The news and reading rooms were opened on the 11th of October, 1838. From the library the average number of deliveries is 120 each evening. There are now on the books 732 members, of whom 246 are below twenty-one years of age; the 715 ordinary members are thus classified:—

Principals, engaged as merchants, manufacturers, and mechanists	10
Professional men	4
Schoolmasters	6
Shopkeepers, master-tradesmen, and their assistants	87
Warehousemen and bookkeepers	132
Mechanics, millwrights, engineers, moulders, and smiths	137
Engravers and pattern-designers	7
Spinners, weavers, and other mill-hands	102
Other trades connected with the manufactures of the town, as dyers, calico-printers, fustian-cutters, &c.	22
Building trades	37
Sundry handicraft trades	85
No profession	7
School-boys	22
Females	57
	715

The Manchester Free Grammar-School was founded by Hugh Oldham, bishop of Exeter. The foundation deed, bearing date 20th August, 1515, states the cause which influenced the founder to be that 'the youth, particularly in the county of Lancaster, had for a long time been in want of instruction, as well on account of the poverty of their parents as for want of some person who should instruct them.' And one of the fundamental requirements is, 'The high-master for the time being shall always appoint one of his scholars to instruct and teach in the one end of the school all infants that shall come there to learn their A B C, primer, and sorts, till they begin grammar.' These quotations show that the school was designed to furnish elementary as well as grammatical learning to the poor and those in need of instruction. The income of this school is now above 5000*l.* a year; and though its operations have been extended under a decree of the court of Chancery, and though the masters receive handsome salaries, the outlay must still leave an annual surplus. The instruction given comprehends the mathematics, the English and French, as well as the Greek and Latin languages; but the school is far from effecting the good which its splendid resources might produce, and cannot be considered as administered in a manner conformable to the donor's intention.

Chetham's Hospital, or *The College*, was founded by charter 1665, Humphrey Chetham being the benefactor, who, having during his life fed and brought up fourteen boys of Manchester and Salford, and of Droylsden, ordered in his will that the number should be augmented by the addition of one from Droylsden, two from Crumpsall, four from Turton, and ten from Bolton, leaving the interest of 7000*l.* for their maintenance and instruction from six to fourteen years of age, at which period they were to be put out to some trade. The scholars are instructed in reading, writing, grammar, and arithmetic. They are clothed, fed, boarded, and lodged. The school is conducted in a convenient old building, which also contains *the College library*, a fine collection of not less than 25,000 volumes, which have been accumulated out of the benefactions of the same H. Chetham: among the books are many rare and most valuable works. The library is open to the use of the public; books are not allowed to be taken out, but a convenient reading-room is provided. At present the good which this library does is but small, the delivery of books to readers not amounting to an average of twenty per day, a circumstance which may be explained by the fact of the library being only open at hours during the day when most persons are engaged.

Among the scientific institutions of the town, the Literary and Philosophical Society stands first in point of time (founded 1781). It has numbered among its members most of the distinguished natives of the vicinity, and many other persons of high reputation: its utility has been fully proved by the publication of its Transactions. The Royal Manchester Institution for the promotion of Literature, Science, and the Arts, formed mainly under the auspices of G. W. Wood, Esq., M.P. for Kendal, has been of service in furthering the diffusion of knowledge: above 30,000*l.* were laid out in the erection of the building. The Manchester Museum, or Natural History Society, which has a handsome hall in Peter Street, ranks among the most useful and interesting institutions of the town, and offers to the public a collection of objects in nature with which few similar establishments can enter into comparison. The council is empowered to open the museum to ladies, strangers, resident non-subscribers, schools, and the working classes.

In its medical schools Manchester has a claim on public esteem, having been the first provincial town to provide a good elementary medical education; and in its numerous and well-conducted medical institutions it possesses very superior advantages. The Infirmary is a school in itself. During the year 1838 its expenditure was 8125*l.* 5*s.* 8*d.*; from June, 1837, to June, 1838, it treated no less than 20,760 patients; and since its foundation, 1752, it has extended its benefits to 629,348 cases. There were in the house and on the books, June 24th, 1838, 1317 invalids. Of the cases treated in 1838, 13,254 were cured; 3584 were cases of accident. Messrs. Jordan and Turner have the honour of having taken the lead in the foundation of the medical schools, the one situated in Marsden Street, the other in Pine Street, in which about 140 pupils are conducted by able professors through a complete course of medical instruction. Manchester has also the advantage of possessing an admirable botanical garden, zoological gardens (recently opened, and affording much promise), a school of design, an architectural society, concert hall, choral society, &c.

Charitable Institutions.—These are too numerous to allow of more than a bare mention of some which are the most useful. The School for the Deaf and Dumb was founded in the year 1825. A new and handsome building for it has just been opened, situated near the botanical gardens, on the Stretford road, a part of which will be appropriated to a blind asylum also, under the will of Mr. Kershaw of Oldham, who bequeathed 20,000*l.* to be applied to the maintenance of an asylum for the blind, so soon as the inhabitants should furnish a suitable building. The Jubilee, or Ladies' Female Charity School, founded in 1806, is conducted in the house in Ducie-road, and educates forty girls for the duties of domestic service. The Manchester and Salford District Provident Society is designed to meet, by a special effort, the special wants of the poor. Following the impulse which Boston (U.S.), under the auspices of Dr. Tuckerman of that city, had given, the society sends forth visitors into all parts of the town (most of them are gratuitous labourers) to visit the poor at their own homes, aid them with advice, encourage them by sympathy, and receive their little savings in order to deposit them in the savings' bank. For this purpose the town is divided into districts and sections, in all 919, of which however 236 only are supplied with visitors. Its mendicity department effects no little good. Three thousand cases were examined by its stipendiary visitors in 1838, whereof 1285 received tickets to the various medical societies, 741 were referred to the relief board of the society, and 942 were found to be cases in which the society could not interfere. Besides these, 413 cases were sent for inquiry only, of which number 248 were reported as unworthy, a powerful argument against indiscriminate alms-giving. Work was found for 14 persons, and 98 new cases of gross imposition were detected and exposed. The ministry to the poor, which commenced Jan. 1833, under the patronage of three Unitarian congregations, namely, Cross Street, Mosley Street, and Greengate (Salford), is designed for a *similar purpose* with the Provident Society. It employs a *paid agent*, the Rev. G. Buckland, whose duties are not sectarian, but purely benevolent. His visits to the poor average per month about 340, and he has 500 families under his superintendence. Of a similar character is the Town Mission, whose motto is, 'Not to Proselyte, but to Evangelise.' Its expenditure during the last year was 1513*l.*, and the following is the result of the first year's exertions:—'Seventeen thousand eight hundred and thirty-seven hours have been spent by our missionaries in promoting the above objects. They have held eleven hundred and eighty-one meetings. They have paid forty-three thousand three hundred and sixty-seven visits; have lent six hundred and twenty-five Testaments, and distributed in their districts sixty-three thousand one hundred and sixty-two religious tracts. It is estimated that the number of individuals now under their care are at least sixty thousand. The number of visits paid to the sick are four thousand four hundred and eighty-three.' At present it occupies forty-two districts under a superintending missionary and three assistants. These districts contain from five to eight hundred families; about one-fifth of whom reside in cellars, and more than two-thirds of the whole seldom or never think of going to any place of worship. In several of the districts there are not quite twenty families for each house that is licensed for the sale of strong drink; and many of the districts have no place of worship of any kind save those in which the missionaries hold their meetings. It is a fact, well ascertained, that in many districts there are *nearly as* many reputed brothels as there are houses for *the sale of* strong drink.

Places of Worship.—The collegiate church is a noble Gothic building. The warden and four fellows have the ecclesiastical patronage of the parish. Their corporate income cannot be accurately stated, as they refused to give answers to a return of the value of their property, ordered by the House of Commons, but the ecclesiastical commissioners report the gross yearly income to be 4650*l.* The new see of Manchester will be in the province of York. [LANCASHIRE, p. 296.] In 1795, Aikin tells us, the number of churches and chapels of the Establishment in Manchester and Salford, actually built or building, amounted to twelve, and about as many places of worship for different sects of dissenters. There are now twenty-five places of worship in connexion with the Establishment, and above sixty in connexion with the dissenters in Manchester and Salford, of which the Wesleyan Methodists have twelve, the Independents eight, the Unitarians five, and the Roman Catholics four. The members of the Establishment in Manchester and Salford amount to 53 per cent. of the whole population. There are three cemeteries in Manchester, each of which has an officiating minister, one in Rusholme Lane, another at Ardwick, and the third at Collyhurst.

Eminent Persons.—Hugh Oldham, bishop of Exeter; John Bradford, put to death by Mary for heresy; Doctor John Dee, the astrologer; John Byrom, author of Byrom's shorthand and of many small poems; Dr. Thomas Percival, an enlightened and benevolent physician; Dr. Henry, and the duke of Bridgewater, though not natives, are too much connected with the town to be passed without notice; and Dr. Dalton still survives to give lustre to a place on which he has conferred signal benefits. Crabtree, a native, ought also to be mentioned. [CRABTREE, WILLIAM.]

(*Communication from Manchester.* For further information see Whitaker's *History of Manchester;* Aikin's *Description of the Country from thirty to forty miles round Manchester;* Wheeler's *History, Antient and Modern, of Manchester; Reports,* &c.)

MANCHINEEL TREE. [HIPPOMANE MANÇANILLA.]

MANCI'PIUM, MANCIPA'TIO. The right apprehension of these terms is of some importance to those who study Roman authors. The following is the description of *Mancipatio* by Gaius (i. 119, &c.):—'Mancipatio is a kind of imaginary sale, and is a peculiar privilege of Roman citizens. It is effected in the following manner:—There must be present not fewer than five witnesses, Roman citizens, of full age, and also another person, of the same class and condition, to hold the brazen scales, who is called *libripens.* The person who receives *in mancipio,* taking hold of the thing, says, "I affirm that this man is my property, according to Quirital Law, and I have purchased him with this money (æs) and these brazen scales." He then strikes the scales with the piece of money, and gives it to him from whom he receives *in mancipio* as the price. In this manner both slaves and free persons are mancipated, as well as animals, which belong to the class of things *mancipii,* or *mancipi,* such as oxen, horses, mules, asses; lands also (prædia), as well in the city as in the country, which are of the class *mancipi,* such as are the Italic lands, are mancipated in the same way. The mancipatio of lands differs from that of other things in this respect only, that persons, whether free or slaves, cannot be mancipated unless they are present, it being necessary that he who receives *in mancipio* should take hold of that which is given him *in mancipio:* whence in fact comes the term *mancipatio,* signifying that the thing is taken (capitur) by the hand (manu); but it is the practice to mancipate lands which are at a distance.'

In this passage Gaius describes generally what 'mancipatio' is, and, by implication, what things admit of 'mancipatio,' or, in other words, what things are 'mancipi.' He was led to these remarks by that part of the subject-matter of his text which treats of the rights of persons, or *status;* and he prefaces his description of 'mancipatio' by stating that all children who are in the power of their parents, and the wife who is in that peculiar relation to her husband when she is said *in manu viri esse* [MARRIAGE], are things *mancipi,* and may be mancipated in the same way as slaves. [EMANCIPATION.]

All things, as subjects of ownership, were either 'res mancipi' or 'res nec mancipi:' and there is, observes Gaius (ii. 18, &c.), 'a great difference between things "mancipi" and things "nec mancipi." The latter can be alienated by bare tradition or delivery, if they are things corporeal, and therefore susceptible of delivery. Thus the property in a garment, gold, or silver, may be transferred by bare tradition. Lands in the provinces may be transferred in the same way.' Thus 'mancipatio' was the proper term for expressing the sale or transfer of things 'mancipi;' and 'traditio' for expressing the transfer of things 'nec mancipi.' (Ulpian, *Frag.*, tit. 19.)

It appears then that the ownership of property generally which belonged to that class of things called 'res mancipi' could only be transferred by the formalities already described: but that the ownership of things which were 'res nec mancipi,' and among them, lands in the provinces, could be transferred without the formalities required in the case of 'res mancipi.' The foundation of the distinction as to lands appears to be this. The real ownership (dominium) of provincial lands was either in the Roman people, in which case the lands were called Stipendiaria; or in the reigning Cæsar, in which case they were called Tributaria. There was therefore no ownership, properly so called, of lands in the provinces by individuals; at least no ownership in the sense in which lands in Italy were held. Lands in Italy held by individuals in full or Quiritarian ownership could be the subjects of usucapion, in jure cessio, mancipatio, and vindicatio: lands in the provinces could not, unless they acquired the Jus Italicum. Originally all the conquered lands even in Italy were Ager Publicus, the property of the state, and so long as they remained in that condition, nothing beyond the use (usus fructus) and occupation of them [POSSESSION] could be in private individuals. Much of the Ager Publicus in course of time was assigned to citizens in full ownership, and accordingly it would become 'mancipi' and subject to the same rule as to alienation as other lands held in Quiritarian ownership.

Mancipatio could only take place between Roman citizens and Latini Colonarii and Latini Juniani, and those Peregrini who enjoyed the Commercium, or privilege of buying and selling. As the effect of Mancipatio was to transfer Quiritarian ownership with its accessory rights of usucapion, in jure cessio, mancipatio, and vindicatio, the reason of the rule is obvious. The form of mancipatio was in some respects a disadvantage, inasmuch as without observing the formalities required by the law, the *legal* property in a thing 'mancipi' could not pass. The mancipatio was that form of transfer of which we find similar examples in the early history of most countries, and implied originally an actual seisin of the thing transferred. No writing being required, it was necessary that there should be some evidence of the transfer, and such evidence was secured by the mode of transfer which the law required. So far as relates to land, mancipatio in its origin may be presumed to have been equivalent to the feoffment with livery of seisin. [FEOFFMENT.]

There was another mode of alienating things 'mancipi,' by the form called *in jure cessio,* which, according to Ulpian, was applicable also to things 'nec mancipi.' The *in jure cessio* was a fictitious action before a competent magistrate at Rome, or a prætor, or before a praeses in a province. The purchaser claimed the thing as his, and the seller either acknowledged his claim or made no defence, upon which the magistrate gave judgment for the purchaser. This form was in effect and was called 'legis actio.' (Gaius, ii. 24.) Its great resemblance to the fictitious suit formerly in use in our own system, called a Fine, might lead to the conjecture that the notion of a Fine was taken by the early practitioners in our courts from the Roman Law; and that this hypothesis is exceedingly probable will be the more apparent, the further any person examines into the connection between the early English and the Roman Law. The *in jure cessio* has apparently a closer resemblance to a Fine than the *transactio* of the Roman Law, to which some writers would refer as the origin of the Fine.

Mancipatio, as Gaius observes (ii. 26), was more in use than the *in jure cessio,* inasmuch as it was easier to transact the business with the assistance of a few friends than to go before a praetor, or a praeses.

Easements (*jura prædiorum,* otherwise called *servitutes*) could be transferred in the case of lands in the city only by the *cessio in jure;* but in the case of lands in the country, also by *mancipatio.* But this observation applies only to Italic lands; in the provinces, rights of this kind, such as right of road, of conveying water, &c., were matter of contract.

Some difficulty has arisen from the use of the word *nexum,* or *nexus,* in connection with *mancipium.* 'Nexum' properly signifies that which is bound or obligated, and hence it may signify the engagement or contract. Thus in the laws of the Twelve Tables, in the words, 'quum nexum faciet mancipiumque,' 'nexum' may signify the contract. Cicero (*Topica,* 5) defines 'Abalienatio' to be 'ejus rei quæ mancipi est, aut traditio alteri nexu, aut in jure cessio, inter quos ea jure civili fieri possunt;' from which it follows that as there are only two ways of transferring the ownership of things 'mancipi,' and as the *in jure cessio* is here mentioned as one, the *nexus* must represent the other, that is, the *mancipatio.* The 'nexus' then in this case must be equivalent to the 'mancipatio,' or, as a more general term, must contain the mancipatio; for the mancipatio does not contain the nexum. This would be consistent with Varro (*De Ling. Lat.*, 5) quoting Manilius, who says that everything is 'nexum' which is transacted by the piece of money and scales (per æs et libram), which includes mancipium: but he adds that M. Scævola considered 'nexum' to be everything transacted per æs et libram, so as to be thereby bound, *except* things which were transferred by mancipatio. Thus the definition of Scævola would exclude 'mancipatio' from the 'nexum,' but would include a testamentary disposition, inasmuch as that also was made per æs et libram (Gaius, ii. 103), and it would also include that form of marriage called *coemptio*. But if Scævola is right, and this can hardly be doubted, Cicero is wrong in the use of 'nexum,' in the passage quoted. In the 'Orator' (i. 39) he mentions both 'nexa' and 'mancipia' in his enumeration of the various subjects brought before the Centumviri. Assuming Scævola's definition to be correct, Cicero may have properly distinguished 'nexum' from 'mancipium' in the passage in the 'Orator;' and have used *nexu* with some inaccuracy in the passage from the 'Topica.'

MANCO CAPAC. [Peru.]

MANDAL. [Christiansand.]

MANDA'MUS is a writ by which the court of king's bench, in the name of the reigning king or queen, commands the party to whom it is addressed to do some act in the performance of which the prosecutor, or person who applies for or sues out the writ, has a legal interest; that is, not merely such an interest as would be recognised in a court of equity or in a court of ecclesiastical jurisdiction, but an interest cognizable in a court of common law; the right must also be one for the enforcing of which the prosecutor has no other specific legal remedy. Thus, a copyholder can transfer or alien his customary tenement or estate [Copyhold] in no other manner than by surrendering it into the hands of the lord of the manor to the use of the purchaser or surrenderee. The courts of common law formerly took no notice of the right of the surrenderee to call upon the lord for a grant or admittance, and the court of king's bench therefore left the party to seek his remedy in a court of equity, and would not interfere by granting a mandamus. But the obligation on the part of the lord to admit the surrenderee is not merely an equitable liability, because this mode of transferring property of this nature is founded upon antient custom, and rights dependent upon custom are matters of common-law cognizance. Of late years the court of king's bench appears to have taken this view of the subject, and has awarded writs of mandamus in all cases where the lord has refused to admit the party to whose use a surrender of the copyhold has been made. Again, the duty of parishioners to assemble in vestry for parochial objects, whether those objects be of a temporal or spiritual nature, is a common-law duty, and a mandamus will be granted to compel the parishioners to meet. But when they are met, the power of the court to interfere further by mandamus depends upon the nature of the act which the parishioners have to do. If the provisions of a statute are to be carried into execution, the act to be done, whatever its nature, is considered a temporal matter, because the construction of statutes belongs preeminently to the courts of common law. But if the object for which the vestry are assembled be one purely of ecclesiastical cognizance, as the setting up of bells, the purchase of books or vestments necessary for divine service, or the making provision for the repairs of the fabric of the church (delinquencies in which matters are punishable by interdict [Interdict] and ecclesiastical censures), the court of king's bench, being without judicial knowledge on such subjects, has no jurisdiction. It is probable indeed that ecclesiastical censures would formerly have been pronounced with less severity against the original delinquents than against those who should have attempted to bring such cases before a lay tribunal. Again, the court can by mandamus compel the visitor of an eleemosynary foundation to hear an appeal, but it has no further authority than 'to put the visitorial power in motion.' It cannot compel him to do any specific act as visitor.

The term 'mandamus' (we command) is found in a great variety of writs, and those usually distinguished by this name by the old law writers are totally different from the modern writ of mandamus, which appears to be nothing more than the antient 'writ of restitution' enlarged to embrace a great variety of objects, that writ being adapted merely to the purpose of restoring a party to an office from which he has been unjustly removed.

The writ of mandamus is now granted not only to restore a man to an office from which he has been wrongfully amoved, but also to admit to an office to which the party has been duly elected or appointed. It lies for a mayor, recorder, alderman, town-councillor, common-councilman, burgess, and town-clerk,—for a prebendary, master of a free-school, parish-clerk, sexton, and scavenger,—to hold a court-baron, court-leet, or a borough court of record,—to justices, to do an act within the scope of their authority, and which will not subject them to an action,—to restore a graduate in a university to degrees from which he has been suspended,—to a corporation, to pay poors-rates where they have not sufficient destrainable property,—to parish officers, to receive a deserted infant,—to permit inspection of documents of a public nature in which the party is interested,—to appoint overseers of the poor,—to swear in churchwardens,—to proceed to the election of a corporate officer,—to grant probate or letters of administration,—to affix the common seal to an answer agreed to by the majority of the members of a corporation aggregate,—and to allow a poor-rate, in which case the rule for a mandamus is absolute in the first instance.

The mandamus is said to be a prerogative writ; by which is meant,—either that the power to award it is not delegated by the crown to the ordinary judges between party and party, that is, the justices of the common pleas, but is reserved for that court in which the king is supposed to be personally present,—or that it is a writ of grace and favour, granted according to discretion, and not a writ of right, that is, not such a writ as the party applying for it has a right to call upon the court to issue under the clause of Magna Charta, by which the king binds himself not to refuse or delay justice or right.

In order to obtain a mandamus the applicant lays before the court the affidavit of himself or of others presenting the facts upon which his right and interest in the thing to be done, and his claim or title to the remedy, are founded. Upon this application the court, if it see a probable cause for interference, grants a rule calling upon the party against whom the writ is prayed, to show cause why such writ should not be awarded. At the appointed time the party so called upon either does not appear, in which case the rule is made absolute, and the mandamus is awarded as prayed, or he appears and resists the rule, either by insisting upon the insufficiency of the facts disclosed by the affidavits upon which the rule was obtained, or by producing other affidavits which give a different aspect to the transaction. If the resistance be effectual the rule is discharged; if not, the mandamus is awarded.

The writ, in the first instance, issues in an alternative form, requiring the party to do the act, or to show why he has not done it. The party may therefore make a return to the writ, saying that he has not done the act required for such and such reasons. Where the reasons returned are insufficient in law, the court quashes the return, and awards a peremptory mandamus requiring the party absolutely, and without allowing him any alternative, to do the act. Where the answer is apparently sufficient, the mandamus is at an end; and if the statements are untrue, the remedy is by action on the case for a false return, though in order to avoid expense and delay the party is allowed in some cases, by the statute 9 Anne, c. 20, and now in all cases, by 1 Will. IV., c. 21, to engraft an action upon the mandamus itself by traversing the return, *i.e.* by putting in a plea contradicting the allegations contained in such return. (Comyns's *Digest*; Selwyn's *Nisi Prius*; 1 Vict., c. 75.)

MANDARIN DUCK. [Duck, vol. ix., p. 185.]

MANDARINS is the general name of the officers of state in China. They are chosen from the men of letters or scholars from every part of the empire, who, having obtained their degrees and passed their examination, have their names inscribed in a register kept by a court or board established for this purpose. When an office in the administration is vacant, the court presents to the emperor a list of those who stand foremost on the register, from among whom the monarch appoints one to fill up the vacancy. Sometimes when there are several candidates equally qualified they draw lots for the vacant office. In Duhalde's time there were 13,600 mandarins all over the empire, independent of the military mandarins, or superior officers of the army. The civil mandarins are divided into nine classes, the highest of which, called 'Colaos,' are ministers of state, counsellors of the emperor, or presidents of the supreme courts. The governors of provinces rank in the second class. The secretaries of the emperor belong to the third class; the governors of cities to the fourth class, and so on. Each order has its distinctive mark of dignity; the highest orders wear a peacock's feather at the back of their caps. All is gradation and strict subordination among them.

MANDAVEE. [Cutch, vol. viii., p. 242.]

MANDELSLO. [OLEARIUS.]

MANDEVILLE, SIR JOHN DE, was born at St. Albans, about the year 1300. He was descended from a family of distinction, and appears to have received a better education than was usual in those times. He studied mathematics, theology, and medicine, and for some years pursued the last as a profession. In 1327 he left England, passed through France, and proceeded to Palestine, where he joined the army of the infidels. He afterwards served in Egypt under the sultan, and in Southern China under the khan of Cathay. He resided for three years at the city of Peking, then called Cambalu, and appears to have travelled over a large part of Asia. After an absence of about thirty-three years, he returned to England, and wrote a narrative of his travels, which he dedicated to Edward III. He died on the 17th of November, 1372, at Liège, where he was buried.

His work contained details more ample and minute than any which had previously appeared concerning Palestine, Egypt, and parts of India and China, and must for some centuries have been an extremely interesting work. To render it more amusing, he seems to have borrowed unscrupulously from previous writers; he inserted parts of such chronicles as were then in existence, and introduced romantic tales of knight-errantry, miraculous legends, monsters, giants, and devils. Probably some of the most absurd parts of the work have been added or improved upon by the contemporary copyists.

His reputation as a traveller was very high in his own age. Besides a Latin version of his work, translations of it appeared in all the principal languages of Europe—in Italian, French, Spanish, and German. A MS. of Sir John Mandeville's travels, which belongs to the age of the author, is in the Cottonian Collection in the British Museum (Titus, C. xvi.). The first English edition was printed by Winkyn de Worde, at Westminster, 8vo., 1499: 'A lytell Treatise or Booke, named John Mandevyll, Knyht, born in Englande, in the towne of Saynt Abone, and speaketh of the wayes of the Holy Lande toward Jherusalem, and of Marvyles of Ynde and other dyverse Countries.' The best English edition is that of London, 1725, 8vo.: 'The Voiage and Travaile of Sir John Mandeville,' &c. Perhaps the first printed edition was that of Pietro de Cornero, Milan, 1480, 4to.: 'Tractato delle piu maravigliose Cosse e piu notabili che si trovano in le parte del monde vedute . . del Cavaler Johanne da Mandavilla.'

(*Biog. Univ.*; Watt's *Biblioth. Brit.*; *Manuel du Libraire.*)

MANDEVILLE, BERNARD DE, was born at Dort, in Holland, somewhere about the year 1670. He was brought up to the profession of medicine, and completed his studies and took the degree of Doctor of Medicine in Holland. He afterwards came over to England, to practise his profession in London. He does not appear to have had much success as a physician; but his writings assisted him in procuring the means of subsistence, while they also gained for him considerable notoriety. His first work was 'The Virgin Unmasked, or Female Dialogues betwixt an elderly maiden Lady and her Niece on several diverting Discourses on Love, Marriage, Memoirs, and Morals, &c.,' and was published in 1709. This is a work on a coarse subject, written in a coarse style. In 1714 Mandeville published a short poem, called 'The Grumbling Hive, or Knaves turned Honest,' to which he afterwards added long explanatory notes, and then published the whole under the new title of 'The Fable of the Bees.' This work, which is of an altogether superior character to the 'Virgin Unmasked,' and which, however erroneous may be its views of morals and of society, is written in a proper style, and bears all the marks of an honest and sincere inquiry on an important subject, exposed its author to much obloquy, and, besides meeting with many answers and attacks, was denounced as injurious to morality in a presentment of the Middlesex grand-jury, in 1723. It would appear that some of the hostility against this work, and against Mandeville generally, is to be traced to another publication, recommending the public licensing of stews, the matter and manner of which are certainly exceptionable, though it must at the same time be stated that Mandeville earnestly and with seeming sincerity recommends his plan as a means of diminishing immorality, and that he endeavoured, so far as lay in his power, by affixing a high price and in other ways, to prevent the work from having a general circulation. Mandeville wrote also at this time in a paper called the 'London Journal,' which shared with the 'Fable of the Bees' the censure of the Middlesex grand-jury. He subsequently published a second part of the 'Fable of the Bees,' and several other works, among which are two, entitled 'Free Thoughts on Religion, the Church, and National Happiness,' and 'An Enquiry into the Origin of Honour and the Usefulness of Christianity in War.' We are told by Sir John Hawkins, in his 'Life of Dr. Johnson,' that Mandeville was partly supported by a pension from some Dutch merchants, and that he was much patronised by the first earl of Macclesfield, at whose table he was a a frequent guest. He died on the 21st of January, 1733, in his sixty-third year.

The 'Fable of the Bees, or Private Vices Public Benefits,' may be viewed in two ways, as a satire on men and as a theory of society and national prosperity. So far as it is a satire, it is sufficiently just and pleasant; but viewed in its more ambitious character of a theory of society, it is altogether worthless. It is Mandeville's object to show that national greatness depends on the prevalence of fraud and luxury; and for this purpose he supposes a 'vast hive of bees,' possessing in all respects institutions similar to those of men; he details the various frauds, similar to those among men, practised by bees one upon another in various professions; he shows how the wealth accumulated by means of these frauds is turned, through luxurious habits, to the good of others, who again practise their frauds upon the wealthy; and, having already assumed that wealth cannot be gotten without fraud and cannot exist without luxury, he assumes further that wealth is the only cause and criterion of national greatness. His hive of bees having thus become wealthy and great, he afterwards supposes a mutual jealousy of frauds to arise, and fraud to be by common consent dismissed; and he again assumes that wealth and luxury immediately disappear, and that the greatness of the society is gone. It is needless to point out inconsistencies and errors, such for instance as the absence of all distinction between luxury and vice, when the whole theory rests upon obviously false assumption; and the long dissertations appended to the fable, however amusing and full of valuable remarks, contain no attempts to establish by proof the fundamental points of the theory.

In an 'Enquiry into the Origin of Moral Distinctions,' contained in the 'Fable of the Bees,' Mandeville contends that virtue and vice, and the feelings of moral approbation and disapprobation, have been created in men by their several governments, for the purpose of maintaining society and preserving their own power. Incredible as it seems that such a proposition as this should be seriously put forth, it is yet more so that it should come from one whose object always was, however strange the way in which he set about it, to promote good morals; for there is nothing in Mandeville's writings to warrant the belief that he sought to encourage vice.

MANDINGOES, a negro nation inhabiting the country on the banks of the rivers Senegal and Gambia, and that which extends farther eastward along the upper course of the Joliba or Quorra. This country occupies the northern declivity of the mountain-region which extends between the Gulf of Guinea and the great desert of the Sahara, and which goes under the name of Kong. [KONG.] The Mandingoes constitute a considerable portion of the population of most of the small kingdoms which occupy that extensive tract: in some of them they form a great majority; in others they live mingled with the Foolahs, Yaloffs, Saravulli, Yariba, and others. Their language seems to be more widely spread than any other that is spoken in that part of Africa, as Mungo Park, on his return from the interior, first heard the Mandingo language spoken to the west of Taffara and Iabbi on the Joliba, and found that it was understood as far west as Pisania on the Gambia, and even to Ianjan-Bure or MacCarthy's Island (13° 33′ N. lat. and 14° 45′ W. long.).

The Mandingoes are distinguished among the negro tribes by their stature and some other characteristic features. They are generally above the middle size, well shaped, strong, and capable of enduring great labour. Their features are regular, their nose rather prominent, with the nostrils rather flattened; their lips are not so thick as in other negro tribes, but their hair is woolly. Their colour is a good clear black, inclining to yellow Golberry thinks that the Mandingoes and the Foolahs, in the features of their face, more resemble the Hindus, or blacks of India, than the other negro tribes of Africa.

The Mandingoes in their writing use the Arabic characters, and are Mohammedans; but Golberry thinks that they have retained many of the usages of fetichism as practised on the coast of Guinea by the negroes. As their language is so widely spread over the western countries of Africa, Mr. R. Maxwell Macbrair, who is agent of the Wesleyan Missionary Society, has done good service in lately publishing a grammar and vocabulary of this tongue. The Gospel of St. Matthew has also been recently printed in Mandingo by the British and Foreign Bible Society from a translation by Mr. Macbrair.

The Mandingoes generally live on the produce of small spots of ground which they cultivate, and by the chace; but a considerable number apply themselves to commerce, and evince great shrewdness and activity in trade. Their habitations are mere hovels, but they make good coarse cloth of cotton, and dye it with indigo, a plant which is indigenous in their country: they have also attained some skill in tanning leather, and in smelting and working iron.

(Mungo Park's *Travels in the Interior of Africa;* Golberry's *Travels in Africa;* Washington's *Account of a Mandingo of Nyáni-Maru,* in *Lond. Geogr. Jour.*, vol. viii.)

MANDOLINE, a musical instrument of the lute kind, but smaller, having four strings, which are tuned as those of the violin. The mandoline is still met with occasionally in Italy, but has fallen into disuse in most other parts of Europe.

MANDORE, a musical instrument of four strings, of the lute kind, no longer in use under such name.

MANDRAKE. [Atropa.]

MANDRILL. [Baboon, vol. iii., p. 231.]

MANDSHOO, a nation of Asia who originally inhabited the mountainous country which extends along the northern boundary-line of Corea as far north as the river Songari, an affluent of the Amur. The Mandshoo belong to a widely-spread race, which is generally known under the name of Tungooses. This race is found to the east of a line drawn from the most north-western angle of Corea to the Yalo Pass of the Khing-kan range (49° N. lat.), and thence through Nertskink to the northern extremity of the lake of Baikal, terminating on the shores of the Arctic Sea at the Bay of Katanga. From this line they spread eastward to a line drawn from Okhotzk to the mouth of the the river Lena. This race differs considerably from the Mongols, who inhabit the country farther west, in the form of their body, being tall and of a slender make. The languages of all the tribes of this race have a great similarity in words and construction; and it appears that there is a relationship between them and the language of the Mongols and Turks, as well as some languages of Eastern Europe, especially that of the Finlanders.

The Mandshoo, the most southern of the Tungoose tribes, have risen into great importance during the last two centuries by the conquest of China, and by seating their royal family on the imperial throne of Peking. They began their incursions into the northern provinces of the Celestial Empire about 1610. Their progress at first was slow, but it afterwards became so rapid, that in 1662 they proclaimed the son of their valiant chief Taytsong emperor of China, under the name of Kanghi, and he completed the conquest of the empire with singular success His family still occupies the throne of China. As the Mandshoo are a comparatively small tribe, and have to govern and to keep in subjection the immense population of China, the court of Peking has shown great political sagacity in adopting every means for incorporating the other Tungoose tribes into their own. All individuals belonging to these tribes are in China considered as native Mandshoos, and admitted to the privileges of the conquering nation. A great number of Tungoose families established in Siberia, on the eastern shores of the lake of Baikal, have accordingly abandoned that country, and emigrated to Mandshooria and China, where they serve as soldiers and attain military honours. The civil employments are reserved for the native Chinese, as they alone are acquainted with the manners, institutions, and laws of the country.

(Du Halde's *History of China;* Klaproth's *Asia Polyglotta;* Ritter's *Erdkunde von Asien*, vol. ii.)

MANDSHOORIA now constitutes a government of the Chinese empire under the name of Kirin-oola, or Ghirin-oola. It is the most eastern projection of the high lands of Central Asia, and lies between 42° and 58° N. lat., and between 120° and 142° E. long. Its surface is estimated at 650,000 or 750,000 square miles, which is more than triple the area of France. On the north it borders on Siberia, from which it is separated by a mountain-range, the Yablonoi Khrebet of the Russians, or the Khing-khan Tugwick of the Chinese. On the west it is divided from the Russian province of Da-uria by the river Kerlon, an affluent of the Amur, and from Mongolia by the river Khailar and the mountain-range called Khing-khan-oola. On the south it joins the Chinese provinces of Pe-cheli and Leao-tong, the latter of which formerly belonged to Mandshooria, and has only been detached from it since the present imperial dynasty ascended the throne of Peking. On the east is Corea, from which it is divided by the Tsi-yung-shan and Shan Alin, a high range; and farther north the Sea of Japan and the Gulf of Tartary, which separate the large island of Tarakai from Mandshooria.

A very small portion of the country has been visited by Europeans. The Jesuits who were sent by the emperor to survey the country visited the mountainous tract contiguous to the Tsi-yung-shan as far as Ninguta; and some Russian embassies traversed the country along the eastern declivity of the Khing-khan-oola. The rémainder is almost entirely unknown.

Mandshooria may be considered as an immense valley enclosed by high and steep mountains, except at its south-western corner, where a broken and rather hilly tract divides it from the province of Leao-tong. The mountain-chain of the Khing-khan-oola, which forms the western boundary, seems to be the highest. Towards its southern extremity, between 42° and 43° N. lat., is the peak of Pecha, which is thought to rise to more than 15,000 feet. There are other elevated and snow-capped summits farther north. The Yalo Pass, the only one traversed by Europeans, is near 49° N. lat., and even in April is *covered with* deep snow. The mountain-region of the Yablonoi Khrebet does not attain the snow-line; and its mean elevation *probably* does not exceed 2500 or 3000 feet above the sea-level. Along the Gulf of Tartary the coast is formed by an exceedingly steep mountain-range, rising to 4000 or 5000 feet, and coming close up to the sea, so that only a few level spots of inconsiderable extent intervene between the range and the water. On the eastern declivity of this range there is a tribe which seems to belong to the same race as the inhabitants of Japan: they are called Ainos or Kechen, and live on the produce of their fishing. This mountain-range seems to allow no passage, as the Ainos have no intercourse with the Mandshoo, who inhabit the country west of the range. At its southern extremity (43° N. lat.) this maritime range is probably connected with the Shan Alin and its continuation the Tsi-yung-shan, which appears to run in a south-south-west direction, until it terminates on the Hoang Hai, or Yellow Sea, in a long promontory, the most southern extremity of which is called the Regent's Sword. The huge mountain-mass of the Shan Alin rises above the snow-line.

The interior of Mandshooria contains, towards its southern extremity, an extensive and nearly level plain, called Corchin. It lies on both sides of the Siren-Muren, or Leao-Ho, and seems to stretch northward to the banks of the rivers Nonni-oola and Songari. It greatly resembles the desert of the Gobi, which is only separated from it by the Khing-khan range, being mostly covered with sand, and having no water, or only salt lakes; but the *grassy spots* are more common and more extensive here than in the Gobi, and afford better pasture to the numerous cattle of the Mongols, who occupy this part of Mandshooria, which is also called the Eastern Gobi. In some parts the surface is covered with salt incrustations. The remainder of Mandshooria is supposed to consist of a succession of valleys and mountain-ranges of various elevation. The mountains however are not bare, but covered with forests nearly to the top. The valleys are said to be fertile, and wide along the principal rivers south of the Amur river, and so far it appears that agriculture extends. But that large part of the country which extends from the last-mentioned river to the Yablonoi Khrebet is too cold for agriculture, and its inhabitants live on the produce of their herds and of the chase.

Though the climate of Mandshooria is not equal in severity to that of the Gobi, it must be very cold, as we may infer from its geographical position and its elevation.

The principal river is the Amur, which has numerous tributaries. [Amur.] Through the southern districts runs the Sira-Muren or Leao-Ho, which flows about 500 miles; it rises in the Khing-khan range north of the Peak of Pecha, and runs for nearly 400 miles east, and the remainder of its course south-west, until it falls into the Gulf of Leao-tong. It seems to be navigated nearly up to the place where it turns to the south-west.

Agriculture is common south of the river Amur. Wheat, rye, barley, and buckwheat are cultivated extensively, as well as hemp and cotton. The forests, which cover the greatest part of the surface, are partly composed of oak and lime-trees, and partly of different kinds of pines, fir, and birch. On the mountains towards Corea the rhubarb and the ginseng grow in abundance; both are collected by the natives, and constitute, with corn, the principal articles of export. All domestic animals common to the countries of central Europe are kept in considerable numbers; there are also reindeer in the districts north of the Amur, and camels in many places south of it. Wild animals are numerous, especially those that yield furs, in the forests which clothe the eastern declivity of the Khing-khan, where sables, ermines, bears, wolves, and foxes are found. Among the wild animals peculiar to this and the neighbouring countries are the argali and the dshiggetai. Fish abound in the rivers, especially the sturgeon and salmon. Pearls are said to be found in some of the streams. The mineral riches of Mandshooria are not known.

The population is very vaguely estimated at two millions, but it is probably much underrated. All the people, with the exception of the Mongols, who inhabit Cortchin, belong to the race of the Tungooses. [Mandshoo.] The most widely spread tribe is the Proper Tungooses, who seem to occupy the whole or nearly the whole country north of the Amur, and also the greatest part of that between the Nonni-oola and Songari rivers. They lead in general a nomadic life, subsisting on their herds of cattle or reindeer. The Taguri or Da-ures live on the river Nonni, and are agriculturists. Among them are settled the Yakutes, about 6000 families, which emigrated in 1787 from Siberia. The Mandshoo occupy the south-eastern part of the country: though not the most numerous of the tribes, they are the most important, their sovereign family having ascended the throne of China. [Mandshoo.] They are agriculturists, but pass a great part of their life in hunting. Many Chinese families have settled among them, and have improved their modes of cultivation.

The governor of the province resides at Ghirin-oola, a place of some importance. Ninguta, on the Hurka Pira, an affluent of the Songari river, is the antient residence of the chiefs of the Mandshoo, and is held in great veneration by the court of Peking and the whole nation. Other towns of some importance are Naun-koten, on the Nonni, and Sakhalien, on the Amur.

(Du Halde's *History of China;* Broughton's *Voyage of Discovery in the Northern Portion of the Pacific Ocean;* La Pérouse's *Voyage round the World;* Ritter's *Erdkunde von Asien*, vol. i.)

MANES, the name given by the Romans to souls separated from the body. According to Apuleius (*De Deo Socrat.*) they were originally called lemures, and were divided into two kinds, lares and larvæ; the former being the souls of such persons as had lived virtuous lives, and the latter of such as had been wicked; but that afterwards the name of manes was applied to both. Augustine (*De Civ. Dei*, ix. 11) gives a somewhat different account: he says that the souls of good men became lares, those of evil men lemures or larvæ, and those respecting whom it was uncertain whether their virtues or vices most predominated, manes. According to these accounts, and to a passage in Virgil (*Æn.*, ix. 258-9), the lares were considered by the Romans as the manes of their ancestors.

The etymology of manes is uncertain; it is generally derived, by antient grammarians, from an old word, *manus*, signifying 'good,' probably in the same sense as the Furies were called Eumenides by the Greeks. Some considered the manes as the good and bad genii which accompanied a man through his life; but this notion appears to have been introduced by the later Platonists.

The stones in the Roman burial-places and their funeral urns were generally inscribed with the letters D. M. S., that is, *Dis Manibus Sacrum*, 'Sacred to the Manes Gods.' There are many specimens of such funeral inscriptions in the Townley Gallery, British Museum. The term 'gods,' applied to the manes, would appear to imply a kind of deification of departed souls. If such is the fact, it would be a curious matter of inquiry to ascertain when the manes were first honoured with the title of 'dei' or 'gods.' The things which were left or belonged to the Dii Manes were Religiosae; those consecrated to the Dii Superi were called Sacrae. (Gaius, ii. 4.)

It was the duty of the Pontifex Maximus to see that the manes were propitiated by proper ceremonies (Liv., i. 20); and with this object it was usual to pour libations of wine on the funeral piles, and also sometimes to slaughter animals, especially such as the deceased had been fond of. (Plin., *Ep.*, iv. 2.)

MA'NETHO (Μάνεθως, Μανετῶ, Μαναίθων, or Μανεθῶν), a celebrated Egyptian writer, a native of Diospolis, who is said to have lived in the time of Ptolemy Philadelphus at Mende or Heliopolis, and to have been a man of great learning and wisdom. (Ælian, *De Animal.*, x. 16.) He belonged to the priest caste, and was himself a priest, and interpreter or recorder of religious usages and of the religious and probably also historical writings (ἱερογραμματεύς). It appears probable however that there were more than one individual of this name; and it is therefore doubtful whether all the works which were attributed by antient writers to Manetho were in reality written by the Manetho who lived in the reign of Ptolemy Philadelphus.

The only work of Manetho which has come down to us complete is a poem, in six books, in hexameter verse, on the influence of the stars (ἀποτελεσματικά), which was first published by Gronovius, Leyden, 1698, and has also been edited by Axtius and Rigler, Cologne, 1832. It is probable however, for many reasons, as Heyne has shown in his 'Opuscula Academica' (vol. i., p. 95), that parts at least of this poem could not have been written till a much later date. We also possess considerable fragments of a work of Manetho on the history of the antient kings of Egypt, which there is every reason for supposing was written by the Manetho who lived under Ptolemy Philadelphus. It was in three books or parts, and comprised the period from the earliest times to the death of the last Persian Darius. Considerable fragments are preserved in the treatise of Josephus against Apion; and still greater portions in the 'Chronicles' of George Syncellus, a monk of the ninth century. The 'Chronicles' of Syncellus were principally compiled from the 'Chronicles' of Julius Africanus and Eusebius, bishop of Cæsarea, both of whom made great use of Manetho's 'History.' The work of Africanus is lost, and we only possess a Latin version of that of Eusebius, which was translated out of the Armenian version of the Greek text preserved at Constantinople. Manetho derived his history of the kings of Egypt, whom he divides into 30 classes, called dynasties, from the sacred records in the temple at Heliopolis.

In addition to these works, Manetho is also said to have written:—1, Ἱερὰ βίβλος on the Egyptian religion; 2, Βίβλος τῆς Σώθεως, the subject of which is doubtful; 3, Περὶ ἀρχαισμοῦ καὶ εὐσεβείας, on the antient rites and ceremonies of the Egyptians; 4, Φυσικῶν ἐπιτομή (Laert. *Proœm.*, s. 10), probably the same work as that called by Suidas φυσιολογικά.

It is no easy matter to ascertain the real value of Manetho's 'History' in the form in which it has come down to us. The reader may judge of the use that has been made of it for Egyptian chronology by referring to Rask's *Alte Aegyptische Zeitrechnung* (Altona, 1830), to the works of Champollion, Wilkinson's *Topography of Thebes*, and the other authorities which will be indicated by a reference to these works.

(Fabricii *Bibliotheca Græca*, ed. Harles, vol. iv., p. 128-139; the *Preface* of Axtius and Rigler; and *Egyptian Antiquities*, in the 'Library of Entertaining Knowledge,' vol. i., p. 26, 27.)

MANETTIA CORDIFO'LIA is a Brazilian twining plant, whose roots possess considerable emetic energy. The bark is administered in Brazil in powder, in doses of ½ to 1½ drachms, and is considered a most valuable remedy in dropsy and dysentery. (Lindley's *Flora Medica*, No. 862, p. 432.)

MANFELOUT. [Egypt.]

MANFRE'DI, natural son of the emperor Frederic II. and of a Lombard lady, was appointed by his father, at his death, A.D. 1250, regent of the kingdom of the two Sicilies, until the arrival of his brother Conrad, the legitimate son and heir of Frederic. Pope Innocent IV. excommunicated Manfred, and declared that the dynasty of Suabia had forfeited the crown of Sicily in consequence of Frederic having revolted against the see of Rome, whose feudatory he was. Upon this, most of the towns of Apulia revolted against the authority of Manfred. Conrad however came with an army from Germany, and soon reduced the rebels, but he died in the midst of his successes, in 1254, leaving an only son in Germany, Corradino, then a child two years old. Manfred became again regent of the kingdom in the name of his nephew, and as such had to carry on the war against the pope and his own revolted subjects, among whom the powerful baronial house of San Severino stood foremost. The city of Naples opened its gates to the pope and swore allegiance to him; but Manfred found refuge among his father's faithful Saracens at Lucera. Upon the death of Innocent, which took place soon after, Manfred recovered possession of Naples, and cleared the kingdom of the invaders. A report being spread that Corradino had died in Germany, the barons, prelates, and towns of the kingdom invited Manfred to ascend the throne, and he was crowned at Palermo in 1258. On his return to Apulia, he found messengers from Margaret, Corradino's mother, who informed him that his nephew was still alive, and they claimed his inheritance in his name. Manfred refused to resign the crown, but declared in the presence of the envoys that as he had no male issue, the crown should at his death devolve on his nephew or his nephew's heirs. No one presumed to gainsay Manfred's words: he was brave, high spirited, and handsome, and the idol of the people. He had just delivered the country from the invaders, and his illegitimate birth was no longer remembered. Margaret herself tacitly assented to his retaining the crown upon such conditions: her son was but a boy, and had a fair prospect of succeeding his uncle in due time. To crown Manfred's good fortune, Pope Alexander IV. made peace with him. Manfred was now looked upon as the hereditary protector of the Guibelines of North Italy, and he sent troops to the assistance of those of Tuscany, who defeated the Guelphs at Monteaperto, and occupied Florence. In 1261 Alexander IV. died, and was succeeded by Urban IV., an inveterate enemy of the Guibelines and of the House of Suabia. The new pope began by excommunicating Manfred, treating him as a usurper, and offering the crown of Sicily for sale among the princes of Europe. He offered it to Richard, earl of Cornwall, brother to Henry III. of England, who laughed at the proposal, and said 'it was like making him a present of the moon.' Urban then offered the crown of Sicily to Henry himself for his second son Edmund, but the English king had neither troops nor money to enforce such a claim. At last the pope addressed himself to Charles, count of Anjou, brother of Louis IX. of France, who accepted the offer in 1264: the conditions were, that he should receive the crown of Sicily as a fief of the see of Rome, pay a yearly fee of a thousand ounces of gold and a white horse, surrender to the pope the right of nominating to all the sees of the kingdom, and grant an appeal to Rome on all ecclesiastical affairs. After concluding this bargain, Urban died, but his successor Clement IV. followed up his policy. Charles, having collected an army of his Provençal vassals and of French adventurers, came to Rome, where he was solemnly crowned by Clement in 1265. In January, 1266, he marched from Rome, and entered the dominions of Manfred, who met him under the walls of Benevento. A desperate battle took place in the month of February. Manfred's faithful Saracens fought bravely, but being unsupported by the Apulian troops, who refused to advance, they were thrown into disorder, and Manfred, seeing himself betrayed, spurred his horse into the thickest of the enemy's ranks, and fell under a heap of the slain. His body was buried by Charles's soldiers, without any honours, under a heap of stones on the banks of the river Calore, but the papal legate ordered it to be disinterred, because, being excommunicated, it could not remain within ground belonging to the holy see. The body was dragged as far as the frontiers of Abruzzo, where it was allowed to rest on the banks of the river Verde, an affluent of the Tronto, near Ascoli. Dante, in pathetic and at the same time indignant strains, alludes to this disgraceful act of fanaticism ('Purgatorio,' canto iii.).

Manfred was fond of letters, was himself a poet, and is praised by the Neapolitan chroniclers for his great and noble qualities. The Guelph writers, on the contrary, have accused him of horrid crimes; among others, of poisoning and incest. This tradition has preserved the remembrance of him as a dark and mysterious character. Manfred was the founder of the town of Manfredonia.

MANFREDO'NIA. [CAPITANATA.]

MANGABEY, a name for two species of monkeys belonging to the group of *Guenons.* [GUENONS.]

MANGALORE. [HINDUSTAN, p. 207.]

MANGANESE, a metal of which the black oxide, or binoxide, was first described by Scheele in 1774, and was afterwards determined by him and Gahn to contain a peculiar metal, which has so powerful an affinity for oxygen, that this circumstance alone would prevent its occurrence in nature in its metallic state. The natural compounds of manganese, and especially its oxides, are numerous, and are found abundantly in many parts of the earth. Like oxide of iron, it frequently occurs in minerals in such small quantity as to show that it exists in them rather in mixture than combination.

Manganese may be procured by mixing any of its oxides with oil, and heating it strongly in a well covered crucible. Its properties are, that it has a greyish-white colour and resembles white cast-iron in appearance; it is hard, brittle, and has a fasciculated crystalline structure; its specific gravity, according to Berthier, is 7·05; it is inodorous and tasteless, but when breathed upon emits a smell of hydrogen gas. By exposure to the air manganese readily tarnishes by oxidizement, and even in a very short time attracts sufficient oxygen to lose its metallic lustre, and falls to a reddish-brown powder; hence the necessity for preserving it immersed in naphtha. Even at common temperatures it slowly decomposes water; and at a red heat the decomposition is rapidly effected, and in both cases hydrogen gas is evolved and oxide of manganese formed. It requires an extremely high temperature for its fusion, and it is fixed in the fire.

The ores of manganese are chiefly oxides: they are the following:—

Haussmannite.—Occurs crystallized in octohedrons and massive. Primary form a square prism. Cleavage parallel to the base of the primary form. Fracture uneven. Hardness rather greater than that of phosphate of lime. Colour brownish-black. Powder reddish-brown. Lustre imperfect metallic. Opaque. Specific gravity 4·722.

Before the blow-pipe with borax fuses into an amethystine-coloured glass. It is found at Ilmenau in Thuringia, at Framont, and in Pennsylvania, &c.

Dr. Turner's analysis gives very nearly—

Manganese	70·98
Oxygen	27·33
Silica	0·34
Barytes	0·11
Water	0·43
	99·19

The equivalent of manganese being 28, this ore is essentially a compound of 3 equivalents of metal 84 + 4 equivalents of oxygen 32 = 116. It contains less oxygen than any other oxide except the protoxide, which does not occur in nature except in combination.

Braunite.—Occurs crystallized and massive. Primary form a square prism. Cleavage distinct, parallel to the faces of an octohedron. Fracture uneven. Hardness 6·0 to 6·5. Brittle. Colour brownish-black. Streak the same. Lustre imperfect metallic. Opaque. Specific gravity 4·818. The massive varieties are divergingly fibrous.

Before the blow-pipe melts and effervesces slightly with borax.

It is found at Elgenberg, Wursindel, Piedmont, and in Cornwall.

According to Dr. Turner, it consists very nearly of—

Manganese	67·76
Oxygen	29·03
Barytes	2·26
Water	0·95
	100·

It is essentially an anhydrous sesquioxide of manganese, consisting of 1 equivalent of metal 28 + 1½ equivalent of oxygen 12 = 40.

Manganite.—Occurs crystallized and massive. Primary form a right rhombic prism. Cleavage parallel to the lateral faces. Fracture uneven. Hardness 4·0 to 4·25. Scratches glass slightly. Colour iron and steel, and blackish-grey. Streak reddish-brown. Lustre metallic. Opaque. Specific gravity 4·328. Massive varieties amorphous. Structure crystalline, granular, large fibrous.

Before the blow-pipe, with borax, fuses into a transparent amethystine glass; heated in a tube, water is expelled. It occurs at Hartshill near Coventry, in Devonshire, Ilfeld in the Harz, &c.

Dr. Turner's analysis gives very nearly—

Manganese . . .	62·93
Oxygen . . .	26·97
Water	10·10
	100·

It is therefore hydrated sesquioxide of manganese.

Varvicite.—Occurs massive and in pseudo-crystals. Composed of thin plates and fibres. Hardness 2·5. Colour grey. Powder black. Lustre metallic. Opaque. Specific gravity 4·531. When strongly heated yields oxygen gas and water.

It occurs massive at Hartshill in the county of Warwick, and the pseudo-crystals at Ilfeld.

Analysis according to Phillips—

Manganese . . .	63·1
Oxygen	31·5
Water	5·4
	100·

It is a compound of 4 equivalents of metal 112 + 7 equivalents of oxygen 56 and 1 equivalent of water 9.

Pyrolusite.—Occurs crystallized and massive. Primary form a right rhombic prism. Cleavage parallel to the lateral planes and short diagonal; indistinct. Fracture uneven. Hardness 2·0 to 2·5. Colour blackish-grey and black. Streak black. Lustre imperfect metallic. Opaque. Specific gravity 4·94.

Massive varieties amorphous, reniform, and botryoidal. Structure granular, fibrous.

It is the most abundant ore of manganese, occurring in large quantity in Devonshire, Warwickshire, Thuringia, Brazil, and many other places.

Dr. Turner's analysis gives very nearly—

Manganese . . .	61·86
Oxygen . . .	35·36
Silica	0·56
Barytes . . .	0·66
Water	1·56
	100·

It is a compound of 1 equivalent of metal 28 + 2 equivalents of oxygen 16 = 44, and is the per- or bin-oxide.

Hydrated Binoxide of Manganese has long been known by the name of *black wad.*—It occurs of various shades of brown, and is massive, botryoidal, amorphous, and sometimes pulverulent. It is frequently soft enough to soil the fingers. It occurs largely in Devonshire, and is also met with in Cornwall, the Harz, Piedmont, and many other places.

Analysis of a specimen from the Harz by Klaproth:—

Peroxide of Manganese .	68
Oxide of Iron . . .	6·5
Water	17·5
Silica and Barytes . .	9·
Carbon	1
	102·

Psilomelane is an ore of manganese which contains a considerable quantity of barytes. It occurs reniform, botryoidal, and stalactitic. Structure granular, compact, and indistinctly fibrous. Fracture conchoidal, even. Hardness 5·0 to 6·0. Colour dark-grey and greyish-black. Streak brownish-black. Lustre imperfect metallic. Opaque. Specific gravity 4·0 to 4·15. It occurs in Devonshire, Cornwall, in the Harz, and most manganese mines.

Dr. Turner's analysis gives—

Red oxide of Manganese	69·795
Oxygen . . .	7·364
Barytes . . .	16·365
Water . . .	6·216
Silica	0·260
	100·

Sulphur is also found in combination with manganese. The compound is called

Kobellite, Manganese Blende, &c.—It occurs crystallized and massive. Primary form a cube. Cleavage parallel to its faces. Fracture uneven, conchoidal. Hardness 3·5 to 4·0. Colour brownish-black; when fresh fractured, steel-grey. Streak dark-green. Lustre imperfect metallic. Opaque. Specific gravity 4·014.

Fuses with difficulty and only the edges with the blow-pipe; gives sulphuretted hydrogen when dissolved in an acid.

It is found at Nagyag in Transylvania, and in Mexico.

Analysis by Arfwedson—

Manganese . . .	62·
Sulphur . . .	37·6
	99·6

Manganese occurs also in combination with some metals and oxides.

Arseniuret of Manganese.—Occurs massive. Fracture in one direction granular and shining, in the other dull. Structure foliated. Hard. Brittle. Specific gravity 5·55. Found in Saxony. Colour whitish-grey. Blackens by exposure to the air.

Dr. Kane found it to consist of—

Manganese . . .	45·5
Arsenic with a trace of Iron	51·8
	97·3

Cupreous Manganese.—Occurs massive, reniform, and botryoidal. Structure compact. Fracture imperfect conchoidal. Hardness about 1·5. Colour bluish-black. Streak the same. Lustre resinous. Opaque. Specific gravity about 3·2.

Occurs in Bohemia and Chili.

Analysis by Kersten—

Oxide of manganese .	74·10
Oxide of copper . .	4·80
Water	20·10
Sulphate of lime . .	1·05
Silica	0·30
	100·35

Carbonic acid and silica also occur in combination with oxide of manganese, and the latter also with oxide of manganese and iron.

Carbonate of Manganese: Kohlerite.—Occurs crystallized and massive. Primary form a rhomboid. Cleavage parallel to the primary planes. Fracture uneven, conchoidal. Hardness 3·5. Colour rose-red, brownish. Streak white. Transluscent. Lustre vitreous, pearly. Specific gravity 3·3 to 3·6. Massive varieties globular, botryoidal. Structure compact, fibrous, granular. Colour yellowish-white. Opaque.

Found at Hartshill in Warwickshire, Nagyag, Freyberg, &c.

Analysis of the carbonate from Nagyag by Berthier—

Carbonic acid . . .	38·6
Protoxide of manganese .	56·0
Lime	5·4
	100·

Silicate of Manganese.—Occurs crystallized and massive. Primary form an oblique rhombic prism. Cleavage parallel to the lateral faces of the primary crystal. Fracture uneven and conchoidal. Scratches glass. Colour rose-red. Translucent on the edges. Lustre between pearly and resinous. Specific gravity 3·538 to 3·685.

It occurs in Sweden, the Harz, Devonshire, Cornwall, &c.

Analysis by Berzelius—

Silica	48·
Oxide of manganese .	49·04
Lime and magnesia .	3·34
	100·38

Leonhard has described some silicates of manganese under the names of *allagite, photizite, rhodonite,* &c., which contain admixtures of various other substances.

Silicate of Manganese and Iron: Knebelite.—The locality of this is not known. It occurs massive. Externally cellular and uneven. Fracture imperfect conchoidal. Lustre glistening. Colour grey; spotted dirty-white, red, brown, and green. It is opaque, hard, and brittle. Specific gravity 3·714.

Analysis by Döbereiner—

Silica	32·5
Protoxide of manganese	35
Protoxide of iron	32
	99·5

Phosphate of Manganese and Iron: Ullmannite.—Occurs massive. Fracture conchoidal. Hardness 5·0 to 5·5. Colour reddish-brown, or blackish. Lustre resinous. Opaque. Specific gravity 3·439 to 3·775.

Occurs at Limoges in France.

Analysis by Berzelius—

Phosphoric acid	32·8
Oxide of manganese	32·6
Oxide of iron	31·9
Phosphate of lime	3·2
	100·5

Two other varieties have been described under the name of *Heteposite* and *Huraulite*.

Having now noticed the more important manganese ores, we proceed to mention the action of other elementary bodies upon this metal, and first the artificial compounds of—

Oxygen and Manganese.—It has been already mentioned that this metal falls to powder by oxidation, even by exposure to the air, and the oxide thus formed appears to be the red oxide of manganese: the native compound has been already described under the name of haussmannite. The protoxide of manganese exists in nature only in combination, forming the carbonate of manganese, also mentioned.

Protoxide of Manganese may be artificially procured in two or three ways:—1st. When the peroxide of manganese is strongly heated in an iron retort for the purpose of obtaining oxygen gas, green protoxide of manganese will sometimes remain, though it is in general the red oxide which is thus obtained; 2nd. The protoxide may be obtained by passing hydrogen gas over any higher oxide, but the red is to be preferred as containing the least oxygen; 3rd, by mixing chloride of manganese with twice its weight of carbonate of soda, and heating the mixture in a platina crucible, and afterwards dissolving out the chloride of sodium formed with water.

The properties of protoxide of manganese are:—It is of a light green colour. It undergoes no change by exposure to the air. It is insoluble in water. When heated to 600° it acquires oxygen, and is converted into red oxide; and sometimes, by exposure to a strong heat, it undergoes combustion as well as oxidation. It combines readily with acids, and dissolves in them, even when dilute and cold, without effervescence; and the solutions are colourless. It is this oxide which is the base of all the common salts of manganese; indeed it is questionable whether any other oxide acts as a base. When this oxide is precipitated from solution by an alkali, it forms a white hydrate, which speedily loses water and acquires oxygen by exposure to the air, and becomes deutoxide. It is composed of—

One equivalent of oxygen	8
One „ manganese	28
Equivalent	36

Red Oxide of Manganese: Haussmannite, already described.—It is artificially obtained by submitting either the protoxide, sesquioxide, or peroxide of manganese to heat in a platina crucible; the first acquires and the two last lose oxygen by this process; in fact, whatever oxide or salt of manganese is strongly heated, it is decomposed and converted into this, and remains permanently such unless some additional deoxidizing agent be employed. It suffers no change by exposure to the air, is insoluble in water, and has a reddish colour. The nitric, sulphuric, and hydrochloric acids all decompose it, the two first separating it into protoxide and binoxide; and they dissolve the first and leave the second insoluble. With hydrochloric acid it yields a chloride and chlorine.

It is composed of—

Four equivalents of oxygen	32	or 10·66,	1⅓ eq.
Three equivalents of manganese	84	28	1 eq.
Equivalent	116	38·66	

Sesquioxide, Deutoxide of Manganese.—The native has been described under the name of manganite. It may be artificially procured in the mode just alluded to, by decomposing a protosalt with an alkali, and exposing the precipitate to the air, or by cautiously heating the peroxide or carbonate of manganese: in the former case oxygen is expelled, and in the latter carbonic acid is expelled and oxygen absorbed; it may further be obtained by decomposing the nitrate with heat. Its properties are:—It is brown, except when obtained from the nitrate, and then it is nearly black. It is insoluble in water, suffers no change by exposure to the air, is decomposed by dilute nitric and sulphuric acids, being separated by them into protoxide, which they dissolve, and peroxide, which remains insoluble. It is said to be soluble in strong sulphuric acid without decomposition; with hydrochloric acid it yields chlorine and chloride of manganese.

It is composed of—

One and a half equivalent of oxygen	12
One equivalent of manganese	28
Equivalent	40

Varvicite.—This has not been obtained by artificial means.

Binoxide or Peroxide of Manganese: Pyrolusite.—This may be formed artificially by decomposing either the red oxide, sesquioxide, or varvicite by means of dilute sulphuric acid, they being all separated into protoxide, which dissolves, and binoxide, which remains insoluble. It may also be prepared by adding chloride of lime to a solution of chloride of manganese, in which case it is thrown down in the state of a black powder.

Its properties are:—It is black, or brownish-black, unalterable in the air, insoluble in water, decomposed by heat into red oxide and oxygen gas, insoluble in alkalis, unacted upon by nitric acid or dilute sulphuric; but by the last acid, when concentrated, resolved into protoxide and oxygen gas; and is thus sometimes used for preparing the protosulphate and oxygen. With hydrochloric acid it gives protochloride and chlorine.

It is composed of—

Two equivalents of oxygen	16
One equivalent of manganese	28
Equivalent	44

Of the five oxides of manganese it will appear that three are resolvable, by the action of dilute sulphuric acid, into definite compounds of the protoxide and binoxide, thus:—

		Oxygen.		Metal.		Protoxide.		Binoxide.
One equiv. of sesquioxide	=	3	+	2	=	1	+	1
„ „ red oxide	=	4	+	3	=	2	+	1
„ „ varvicite	=	7	+	4	=	1	+	3

And in point of fact some chemists consider them to be rather compounds of other oxides than as constituting peculiar oxides. There are two acids of manganese which are entirely artificial compounds, namely, the manganic acid and per-, or, more properly, the hyper-manganic acid.

Manganic Acid has not hitherto been obtained in a separate state; but manganate of potash is easily prepared by heating in a silver crucible one part of powdered binoxide of manganese and two parts of potash. When the mixture has been kept at a dull red heat for an hour, it may be poured out, and when cold put into a bottle and excluded from the air.

The manganate of potash thus obtained is of a green colour. During the operation of the heat one portion of the binoxide yields oxygen to the other, which is by this converted into manganic acid, and this, united with the potash, forms the salt in question, which has long been known by the name of *mineral chameleon*, on account of the change of colour which the solution undergoes: on the first addition of cold water a green solution is obtained; this soon becomes blue, purple, and red, and ultimately brown; hydrated binoxide of manganese separates, and the solution is rendered colourless. These changes are produced more quickly by employing hot instead of cold water; they are owing to the conversion of the manganate into red hypermanganate of potash, the varied tints being derived from a mixture of these two salts.

By keeping a strong solution of the green manganate of potash to subside, and allowing the clear liquor, when poured off, to evaporate in vacuo over sulphuric acid, the salt is obtained in crystals, which are anhydrous and permanent in their dry state, but must be kept from the contact of organic matter, which speedily deoxidizes the acid.

Manganic acid is composed of—

Three equivalents of oxygen	24
One equivalent of manganese	28
Equivalent	52

Hypermanganic Acid.—This may be prepared by several processes. Mix together four parts of finely-powdered binoxide of manganese, three and a half of chlorate of potash, and five of hydrate dissolved in a small quantity of water. Evaporate the mixture to dryness, and heat it to dull redness in a platina crucible. The mass is to be added to a large quantity of boiling water; and when separated from the residual oxide of manganese, is to be quickly evaporated and allowed to crystallize; the crystals are to be washed with a very little boiling water, and are of a very deep colour.

Hypermanganic acid may be obtained in a separate state by decomposing the barytic salt with dilute sulphuric acid. It has a fine red colour, and is rapidly decomposed by organic matter, as paper or linen. It bleaches coloured matter; the aqueous solution begins to decompose when heated to 86°, and is totally decomposed at 212°; oxygen is given out, and binoxide of manganese is precipitated. Its salts are more permanent than the acid, and when heated they yield oxygen gas, deflagrate when thrown on burning charcoal, and detonate violently with phosphorus. A very minute portion of hypermanganate of potash imparts a very rich purple to a large quantity of water.

Hypermanganic acid is composed of—

Three and a half equivs. of oxygen	32
One equivalent of manganese	28
Equivalent	60

Chlorine and Manganese form two compounds. The *protochloride* may be prepared by dissolving any pure oxide in hydrochloric acid, and evaporating the solution to dryness out of the contact of air. It is a pink-coloured lamellated mass, which attracts moisture readily from the air, and is very soluble in water, forming a solution which is nearly or quite colourless.

It is composed of—

One equivalent of chlorine	36
One equivalent of manganese	28
Equivalent	64

Perchloride of Manganese is prepared by the mutual decomposition of hydrochloric and hypermanganic acids. It is a greenish-coloured vapour, which, by cooling to 4°, condenses into a greenish-brown-coloured fluid. When it comes into contact with moisture it resolves again into hydrochloric and hypermanganic acids.

It is composed of—

Three and a half equivs. of chlorine	126
One equivalent of manganese	28
Equivalent	154

Sulphur and Manganese may be combined by heating a mixture of sulphur and the binoxide. Sulphurous acid gas is evolved, and a greenish powder is left which gives out hydrosulphuric acid when dissolved in acids. It may also be prepared by the addition of a hydrosulphate to a sulphate of manganese. It is then precipitated in combination with water, which modifies the colour.

It is composed of—

One equivalent of sulphur	16
One equivalent of manganese	28
Equivalent	44

According to Berzelius manganese combines with several other metals, as gold, silver, copper, tin, and iron; with the last-mentioned combination takes place readily, and the iron is rendered harder, whiter, and more brittle by it; and it is stated that iron which contains manganese is best adapted for making steel. A small quantity of iron causes manganese to obey the magnet, and renders it less oxidable.

The salts of manganese are compounds of very little importance. As that which is most readily obtained in a pure state, and as offering a type of the soluble salts of this metal, we will mention the

Sulphate of Manganese.—This salt may be obtained by dissolving the protoxide or carbonate in dilute sulphuric acid; a solution is obtained which is nearly colourless, or sometimes of a slight pink colour, owing to the presence of a little hypermanganic acid. By evaporation colourless rhombic crystals are obtained, which have a bitter taste, effloresce in a dry atmosphere, and are soluble in about two and a half times their weight of water.

This salt is decomposed by the alkalis ammonia, potash, and soda, which precipitate colourless hydrated protoxide; and by the carbonates, which throw down white protocarbonate of manganese, and all these precipitates readily acquire oxygen and a brown colour, and are converted into deutoxide. Ferrocyanide of potassium gives a white precipitate, and hydrosulphuret of ammonia an orange one. Manganese is not precipitated in the metallic state by any other metal.

Oxide of manganese tinges glass of an amethystine colour.

The oxides of manganese, and especially the binoxide, as containing most oxygen, are largely employed in the preparation of chlorine [Chlorine] for the manufacture of bleaching-powder, or chloride of lime. It is employed in glass-making to correct the yellow colour which oxide of iron is apt to impart to the glass; it is used also in making the black enamel of pottery. Sulphate of manganese has also been used within a few years to give a brown colour in calico-printing.

MANGE, an eruptive disease to which many domestic animals, and particularly dogs, are subject. It usually occurs as the result of dirt and confinement, bad or deficient food, or some other circumstances producing a generally unhealthy condition. It has many analogies to the itch in man [Itch]; and the fluid discharged from the eruption of the mange in horses and dogs has sometimes been known to produce the itch in the human skin. Both appear to depend in general on the presence of a minute species of Acarus which burrows beneath the skin, and thus excites the irritation and itching by which these diseases are peculiarly characterised.

MANGEL WURZEL. [Beet.]

MANGI'FERA, a genus of trees of the natural family of *Terebinthaceæ*, tribe *Anacardiæ*, so called from the Malayan name (*manga*) of the fruit, and *fero*, I bear. Three or four species of this genus are enumerated: as *M. fœtida* of Loureiro, a native of Cochin China and the Moluccas; *M. laxiflora*, indigenous in Mauritius; and *M. sylvatica*, of Roxburgh, a native of the hilly districts bordering on Silhet, where it grows to a great size, and is called *lukshmee-am*. It bears a fruit which ripens in February and March, and is eaten by the natives, though not so palatable as even a bad mango. It is also dried and kept by them for medicinal purposes. *M. oppositifolia*, Roxb., a native of Rangoon, is proposed by Messrs. Wight and Arnott to be formed into a distinct genus.

The Mango tree however, *Mangifera Indica*, is alone of any consequence, and this as forming one of the most grateful fruits of the tropical parts of Asia; it extends also as far north as 30°, and has been successfully introduced into the West Indies. The trees grow to a great size, with an erect trunk, and dark-coloured cracked bark. The wood is of a whitish or a dull grey colour, porous, yet pretty durable if kept dry. The leaves are alternate, petioled, lanceolar, entire, often a little waved at the margins, firm, smooth, shining, and having, when bruised, a pleasant resinous smell. The flowers are yellow-coloured and small, but produced in great numbers, on large terminal erect panicles. Many perfect male flowers are often found intermixed with the hermaphrodite ones. Calyx five-leaved. Petals five, lanceolate, twice the length of the calyx, furnished in the inside with a lobed glandular scale or crust. Stamen a single fertile one, with three or four filament-like bodies, which represent the abortive stamens. Ovary with its base immersed in the torus, obliquely oval, one-celled, with a single ovule attached to the side of the cell. Style one, from the upper edge of the ovary, curved downwards. Drupe oblong, or somewhat kidney-formed, also a little compressed like a kidney, fleshy, with a smooth rind, yellow or reddish when ripe, size various, but in general about as large as a goose's egg. Nut conformable to the drupe, but more compressed, woody, one-celled, two-valved, covered on the outside with many fibrous filaments, particularly in the worst sorts. The kernels are large. Embryo between erect and transverse. Cotyledons thick, fleshy. Radicle opposite to hilum.

The Mango is so well known as one of the most highly esteemed fruits of the East, that one is surprised to find it sometimes described as like nothing so much as a mixture of tow and turpentine. The latter is a secretion abounding in the family to which the Mango belongs, and may be secreted in larger quantities in neglected varieties, where also the filaments of the nut will likewise abound. But in well-cultivated varieties the fruit is sweet and rich-flavoured, juicy, and nearly as free of fibres as a melon. The kernels contain much nourishment, but are never used for food except in famines, when they are cooked in the steam of water, and used as an article of diet.

The tree is generally raised from seeds, which should be sown soon after they are gathered, but this is a very uncertain way of getting the finer varieties. Propagating by layers, and grafting by approach, are the only modes of certainly continuing fine sorts, as well as of improving them. These have the advantages also of bearing when small in size, that is, only a few feet in height, and therefore well suited to culture in the hothouses of Europe. Sweet states 'that the Mango ripens in this country when the plants are of a good size. Sandy loam, or a mixture of loam and peat, is most suitable to it, and the pits should be well drained, as the plants are apt to get sodden with too much water. Fresh seeds from the West Indies vegetate freely. The plant may also be increased from cuttings, which root best in sand under a hand-glass.' It would be advisable also to imitate its native climate as much as possible, that is, after winter, giving it dry heat with watering for some months, and then removing it into an orchideous house in the season of ripening its fruit.

MANGOSTEEN. [Garcinia.]

MANGOUSTES. [Ichneumon.]

MANGROVE. [Rhizophora.]

MANHEIM, or MANNHEIM, the capital of the circle of the Lower Rhine, in the grand-duchy of Baden, is situated in 49° 29′ N. lat. and 8° 28′ E. long., in a very fertile plain, at the junction of the Neckar with the Rhine. Over both rivers there are bridges of boats: that over the Rhine, which belongs to Baden and Bavaria in common, rests on 43 pontoons; that over the Neckar, which rests on 28 pontoons, is 200 paces in length. Manheim is a new city built with great regularity: it consists of broad, straight, parallel streets, of which 11 run in one direction, and are crossed by 11 others at right angles. The houses are handsome, of equal height, all of two stories, except those at the corners, which have three stories. The principal street, 1200 paces long and 60 feet wide, leads from the Neckar Gate to the palace of the grand-duke, which is a very magnificent building, and one of the finest of the kind in Germany; it is feet in length, occupying the whole side next the Rhine, and consists of two great quadrangles. The front next the Rhine is built of a red stone intermixed with a whiter kind, and the general effect resembles that of Hampton Court. In the bombardment by the French in 1795 part of the left wing was destroyed. The right wing contains a gallery of pictures, a cabinet of natural history, a collection of plaster casts of the most celebrated antiques, and a library of 60,000 volumes. There are besides several fine apartments, a large hall called the Rittersaal (Knights' Hall), and a handsome chapel. Among the other public buildings the most worthy of notice are the observatory, the merchants' hall, resting on 72 arches, and 160 paces in length, and adorned with a lofty tower; the new arsenal, which is 92 feet high, 200 paces long, and 118 paces deep; and the splendid church, formerly belonging to the Jesuits, the theatre, the Lutheran, Calvinist, and Catholic churches, three hospitals, &c. Of the ten squares, the handsomest are the Parade, in which there is a marble fountain (but without water), with five statues cast by Crepello, and the great market-place, in which there is a celebrated group called the 'Mercury Group,' by Vandebranden. Manheim has likewise a gymnasium, a botanic garden, a mercantile school, an academy of painting and sculpture, and other establishments for education. The fortifications having been entirely demolished by the French, and the site subsequently converted into gardens, the inhabitants enjoy the benefit of beautiful public promenades, besides the fine park of the palace, which is nearly 200 acres in extent. The situation of Manheim in a fine country and near two large rivers would seem to give it great advantages as a place of trade, and several of its princes have turned their attention to this subject; but the same local circumstances have rendered it an important military station, and exposed it to sieges, bombardments, and the passage of hostile troops. There is however a considerable carrying and transit trade. There are manufactories of tobacco, shawls, linen, and playing cards, and bleaching-grounds and tanneries. In the environs there are numerous gardens, and hops are extensively cultivated.

Manheim was only a village till 1606, when the elector palatine, Frederick IV., laid the foundation of a fortress and a town; he assigned to each of the villagers an allotment of ground, and promised the free exercise of their religion to emigrants driven by religious persecution from Franconia and the Netherlands, numbers of whom resorted thither. In the Thirty Years' War it was taken by Tilly, Duke Bernhard of Weimar, the French, and the Bavarians. In 1688 it was taken by the French general Melac, and desolated like the rest of the palatinate. In 1699 the elector Frederick William collected the scattered inhabitants, encouraged new settlers, and had the city fortified on Coehorn's system. His successor Charles Philip removed hither from Heidelberg in 1720, with his court and all the public officers, on account of the religious disputes with the Protestants. The first stone of the splendid palace was laid in 1720, and the building was completed in 1731. The next elector, Charles Theodore, founded many of the still existing literary and scientific institutions; but on the death of Maximilian Joseph, elector of Bavaria, in 1788, without issue, he succeeded him, and removed his court to Munich, which was a great loss to Manheim. It was taken, as already observed, by the French in 1795, by the archduke Charles in 1799, afterwards re-occupied by the French, and assigned to Baden by the treaty of Luneville in 1801. It has recovered in a great degree its former prosperity during the peace that has continued since the fall of Napoleon, and the population is now about 23,000 inhabitants.

(Sophie de la Roche, *Briefe über Manheim*; Helmina von Chezy, *Heidelberg, Manheim*, &c.; Hassel, *Geographie*; Stein, *Lexicon*; Cannabich, *Geographie*, &c.)

MANHEIM GOLD, a species of brass, which, according to Wiegleb, consists of three parts of copper and one part of zinc.

MA'NIA. [Insanity; Lunacy.]

MANICHÆANS, an heretical Christian sect, who derived their name from Mani, as he is called by the Persians and Arabians, or Manes or Manichæus, according to the Greek and Roman writers. The particulars of the life and death of this individual are variously reported by the Greek and Oriental writers; but it appears from all accounts that he was a native of Persia, or at least brought up in that country; that he was well acquainted with the doctrines of the Magi; that he attempted to amalgamate the Persian religion with Christianity; and that after meeting with considerable success, he was eventually put to death by Varanes I., king of Persia. It is difficult to determine the exact time at which the doctrines of Mani were first promulgated in the Roman empire; but they do not appear to have been known before the end of the third century or the beginning of the fourth.

The Manichæans believed, like the Magi, in two eternal principles, from which all things proceed, namely, light and darkness, which are respectively subject to the dominion of two beings, one the god of good, and the other the god of evil. They also believed that the first parents of the human race were created by the god of darkness with corrupt and mortal bodies, but that their souls formed part of that eternal light which was subject to the god of light. They maintained that it was the great object of the government of the god of light to deliver the captive souls of men from their corporeal prisons, and that with this view he created two sublime beings, Christ and the Holy Ghost, and sent Christ into the world, clothed with the shadowy form of a human body, and not with the real substance, to teach mortals how to deliver the rational soul from the corrupt body, and to overcome the power of malignant matter. Referring to the promise of Christ shortly before his crucifixion, which is recorded by John (xvi. 7-15), that he would send to his disciples the Comforter, 'who would lead them into all truth,' the Manichæans maintained that this promise was fulfilled in the person of Mani, who was sent by the god of light to declare to all men the doctrine of salvation, without concealing any of its truths under the veil of metaphor, or under any other covering. Mani also taught that those souls which obeyed the laws delivered by Christ, as explained by himself the Comforter, and struggled against the lusts and appetites of a corrupt nature, would, on their death, be delivered from their sinful bodies, and, after being purified by the sun and moon, would ascend to the regions of light; but that those souls which neglected to struggle against their corrupt natures would pass after death into the bodies of animals or other beings, until they had expiated their guilt. Their belief in the evil of matter led them to deny the doctrine of the resurrection.

Mani entirely rejected the authority of the Old Testament, which he said was the word of the god of darkness, whom the Jews had worshipped in the place of the god of light. He asserted that the books of the New Testament had been grossly interpolated; and that they were not all written by the persons whose names they bear. The doctrines of the sect were contained in four works, said to have been written by Mani himself, which were entitled respectively 'Mysteries,' 'Chapters,' 'Gospel,' and 'Treasury;' but we know little or nothing of their contents.

Bower, in the second volume of his 'History of the Popes,' has attempted to prove that the Manichæans were addicted to immoral practices; but this opinion has been ably controverted by Beausobre and Lardner, who have shown that they were, on the contrary, exceedingly rigorous and austere in their mode of life.

The disciples of Mani were divided into two classes, one of which was called the *Elect*, and the other *Hearers*. The former were bound to abstain from animal food, wine, and all sensual enjoyments; the latter were considered as imperfect and feeble Christians, and were not obliged to submit to such a severe mode of life. The ecclesiastical constitution of the Manichæans consisted of 12 apostles and a president, who represented Christ; of 72 bishops, who also represented the 72 disciples of Christ; and of presbyters and deacons, as in the Catholic church.

The Manichæans never appear to have been very numerous, but they were spread over almost all parts of the Christian world. Numerous treatises were written against them, the most important of which were by Eusebius of Cæsarea, Eusebius of Emesa, Serapion of Thumis, Athanasius of Alexandria, George and Apollinarius of Laodicea, and Titus of Bostra. Much valuable information concerning this sect may be found in the writings of Augustine, who was for nine years a zealous supporter of the Manichæan doctrines.

The Paulicians are generally considered to be a branch of the Manichæan sect, and are supposed to have appeared first in the seventh century in Armenia, and to have derived their name from Paul, a zealous preacher of the doctrines of Mani.

In the sixth century the Manichæan doctrines are said to have spread very widely in Persia. They continued to have supporters, under their new name of Paulicianism, till a very late period in ecclesiastical history. About the middle of the eighth century the emperor Constantine, surnamed Copronymus, transplanted from Armenia a great number of Paulicians to Thrace; where they continued to exist even after the capture of Constantinople by the Turks. In the eleventh and twelfth centuries the doctrines of the Paulicians were introduced into Italy and France, and met with considerable success.

(Neander's *Kirchengeschichte*; Mosheim's *Ecclesiastical History*; Lardner's *Credibility of the Gospel History*, Works, vol. iii., ed. of 1831; Gibbon's *Decline and Fall*, c. 54; Hyde, *De Religione Veterum Persarum*; D'Herbelot's *Bibliothèque Orientale*, art. 'Mani.')

MANICHORD, a keyed musical instrument, of the spinnet kind, similar in all respects to the clavichord. [CLAVICHORD.]

MANI'LIUS, MARCUS or CAIUS (whose name is sometimes written Mallius or Manlius), a Latin poet, who wrote a work on astronomy, called 'Astronomicon,' in five books. We possess no particulars respecting his life, but the opinion of Bentley seems the most probable, that he was born in Asia, and lived in the time of Augustus Cæsar.

Some writers suppose Manilius to be the same person as the Manilius or Manlius of Antioch, the astrologer, mentioned by Pliny (*H. N.*, xxxv. 17), and others the same as Manlius the mathematician, also mentioned by Pliny (xxxvi. 15, s. 6); but the only reason for these opinions consists in the similarity of the names.

The 'Astronomicon' does not appear to be complete. The five books which are extant treat principally of the fixed stars; but the poet promises in many parts of his work to give an account of the planets. The 'Astronomicon' contains several passages which are not unworthy to be compared with some of the best writings of the Augustan age; but the subject gave the author little opportunity for the exercise of his poetical powers. It appears from many parts of the work that Manilius was a staunch adherent of the Stoic philosophy.

A MS. of the 'Astronomicon' was first discovered by Poggio in 1416. The best editions are by Bentley, Lond., 1739, and Stoeber, Argent., 1767. It has been translated into English verse by Creech, Lond., 1700.

MANILLA. [PHILIPPINE ISLANDS.]

MANIPULATION, in chemistry, embraces every part of the subject which is of a mechanical nature, such as the operations of weighing, measuring, the application of heat and electricity, the various modes of effecting solution, precipitation, distillation, and sublimation, and in fact every step in chemical research includes manipulation. It will be impossible therefore to treat of the whole of this subject under one head, and the most important parts of it will be found under their respective letters. [CALCINATION; DISTILLATION; FILTER, &c.] This subject is admirably treated in Faraday's 'Chemical Manipulation.'

MANIS. [PANGOLINS.]

MA'NLII, the name of one of the most illustrious patrician *gentes* of antient Rome. Those most worthy of notice are:—

1. Marcus Manlius Capitolinus, who was consul B.C. 390 (Liv., v. 31), and was the means of preserving the capitol when it was nearly taken by the Gauls (Liv., v. 47), from which he obtained the surname of Capitolinus. He afterwards became a warm supporter of the popular party against his own order, and particularly distinguished himself by the liberality with which he assisted those who were in debt. He publicly sold one of his most valuable estates, and declared that as long as he had a single pound he would not allow any Roman to be carried into bondage for debt. In consequence of his opposition to the patrician order he was accused of aiming at the kingly power. The circumstances attending his trial and death are involved in much obscurity. It would appear that he was accused before the centuries and was acquitted; and that afterwards, seeing that the patrician party were determined on his destruction, he seized upon the capitol, and prepared to defend it by arms. In consequence of this Camillus, his personal enemy, was appointed dictator, and the curiæ (*i.e.* the patrician assembly) condemned him to death. According to Livy, who implies that Manlius did not take up arms, he was thrown down from the Tarpeian rock by the tribunes; but Niebuhr supposes, from a fragment of Dion (xxxi.) compared with the narrative of Zonaras (vii. 24), that he was treacherously pushed down from the rock by a slave, who had been hired for that purpose by the patrician party. (*Roman History*, vol. ii., p. 610, 611, Engl. transl.; Liv., vi. 11, 14, 20.) The house which had belonged to Manlius was razed; and the Manlian gens resolved that none of its patrician members should again bear the name of Marcus. Manlius was put to death B.C. 381.

2. Titus Manlius Capitolinus Torquatus, son of L. Manlius, surnamed Imperiosus, who was dictator B.C. 361. When his father Lucius was accused by the tribune Pomponius on account of his cruelty towards the soldiers under his command, and also for keeping his son Titus among his slaves in the country, Titus is said to have obtained admittance to the house of Pomponius shortly before the trial, and to have compelled him, under fear of death, to swear that he would drop the prosecution against his father. This instance of filial affection is said to have operated so strongly in his favour, that he was appointed in the same year (B.C. 359) one of the military tribunes. (Liv., vii. 4, 5; Cicero, *De Off.*, iii. 31.)

In the following year Manlius distinguished himself by slaying in single combat a Gaul of gigantic size on the banks of the Anio. In consequence of his taking a chain (*torques*) from the dead body of his enemy, he received his surname of Torquatus. (Liv., vii. 10.)

Manlius filled the office of dictator twice, and in both instances before he had been appointed consul: once, in order to conduct the war against the Cærites, B.C. 351; and the second time, in order to preside at the Comitia for the election of consuls, B.C. 346. (Liv., vii. 19-26.)

Manlius was consul at least three times. (Cic., *De Off.*, iii. 31.) In his third consulship he defeated the Latins, who had formed a powerful confederacy against the Romans. In the same campaign he put his own son to death for having engaged in single combat with one of the enemy, contrary to his orders. (Liv., viii. 5-12.)

3. Titus Manlius Torquatus was consul B.C. 235, and obtained a triumph on account of his conquests in Sardinia. (Vell., ii. 38; Eutrop., iii. 3.) In his second consulship, B.C. 224, he conquered the Gauls. (Polyb., ii. 31.) He opposed the ransom of the prisoners, who had been taken at the battle of Cannæ. (Liv., xxii. 60.) In 215 he defeated the Carthaginians in Sardinia (Liv., xxiii. 34, 40, 41); and in 212 was an unsuccessful candidate for the office of Pontifex Maximus. (Liv., xxv. 5.) In 211 he was again elected consul, but declined the honour on account of the weakness of his eyes. (Liv., xxvi. 22.) In 208 he was appointed dictator in order to hold the Comitia. (Liv., xxvii. 33.) The temple of Janus was closed during the first consulship of Manlius. (Liv., i. 19; Vell., ii. 38.)

4. Cneius Manlius Vulso was consul B.C. 189, and appointed to the command of the war against the Gauls in Galatia, whom he entirely subdued. An account of this war is given by Livy (xxxviii. 12-17), and Polybius (xxii. 16-22). After remaining in Asia the following year as proconsul, he led his army home through Thrace, where he was attacked by the inhabitants in a narrow defile and plundered of part of his booty. He obtained a triumph, B.C. 186, though not without some difficulty. (Liv., xxxix. 6.)

MANNA, the concrete juice of the *Ornus Europæa*, a species of ash which is a native of the South of Europe, growing abundantly in Sicily, Calabria, Apulia, &c. The juice exudes spontaneously in warm dry weather, and concretes upon the bark of the tree; the finest manna is however procured by making longitudinal incisions of about three inches long. The manna flows at first in the form of a thick juice, which gradually concretes. The finest kind is called Calabrian or flake manna; it is in pieces of a pale yellowish white colour, is light, rather dry, and brittle, and it bears frequently the impression of the branch on which it concretes. It has a slight peculiar odour, and a sweetish taste, mixed with a slight degree of bitterness, and altogether leaves a disagreeable impression. Its texture is generally granular; but the finer pieces when broken are often hollow, and when examined by the microscope exhibit specular crystals. Manna is perfectly soluble both in water and in alcohol; the crystals deposited by cooling a hot spirituous solution constitute a peculiar variety of sugar, which has been called *mannite;* it differs however from common sugar in not being fermentable. According to Bucholz, 100 parts of flake manna contain about 60 of mannite, mixed with uncrystallizable sugar, purgative principle, gum, &c.

Mannite is composed of

	Prout.	Liebeg.
Hydrogen . .	6·8	7·62
Carbon . .	38·7	40·02
Oxygen . .	54·5	52·35
	100·	99·99

Manna is employed as a gentle laxative, for children or persons of weak habits. It is however seldom exhibited alone, but as an adjunct to other more active medicines, as senna, rhubarb, &c. [ORNUS.]

MANNA, KINDS OF. Besides the genuine manna above described, other sweetish secretions are exuded by some other plants which are usually considered to be kinds of manna. These appear to be all produced in warm and dry parts of the world. The kind which is most abundant is by the Arabs called *toorunjbeen*, which is often translated 'Persian manna,' and is produced by a thorny plant, called by botanists *Alhagi Maurorum*. The genus Alhagi (a name compounded of *haj* and the article *al*) of botanists contains two species, *A. maurorum* and *A. desertorum*, found in India, Egypt, Arabia, the north of Persia, and Syria. Both species are also called *oooshturkhar*, or camel's thorn. *A. maurorum* is alone remarkable for yielding a kind of manna, which by some authors has been supposed to be the Manna of the Wilderness; hence the plant itself was called *Manna hebraica* by Mr. Don. The climate of Persia and Bokhara seems alone suited for the secretion of this manna, which in the latter country is employed as a substitute for sugar, and is imported into India from Caubul and Khorassan. A second kind, which, though less abundant, is more esteemed than the former, is called *sheer khisht*, and is mentioned by Garcias under this name, and described as produced in the country of the Uzbecs. A Caubul merchant reported to Dr. Royle that it was produced by a tree called *gundeleh*, which was about twelve feet high, had a jointed stem, and grew in Candahar. A third kind of manna is called *guzunjbeen*, the produce of a species of Tamarisk, called *guz*, which is considered by Ehrenberg to be only a variety of *Tamariscus gallica* growing on Mount Sinai, but which has been called *T. mannifera:* by some authors this is supposed to be the Manna of the Wilderness. It is said to be produced also in Laristan and in Irak Ajemi. A fourth kind of manna is produced on *Calotropis procera*, called *ashur*, and its sweet exudation or sugar *shukur-al-ashur*, under which name it is described by Avicenna; Zuccarum al-husar in the Latin translation, ch. 758. A fifth kind, called *bed-khisht*, is described in Persian works as being produced on a species of willow in Persian Khorassan. Besides these comparatively little known kinds of manna, a sweetish exudation is produced on the larch (Larix europea), which forms the Manna brigantiaca, or Briançon Manna of some Pharmacopœias.

MANNINGTREE. [ESSEX.]

MANNITE. [MANNA.]

MANO'METER (from two Greek words, *μανός, thin* or rare, and *μέτρον*, a measure) is the name given to instruments which measure the rarity of the atmosphere or other gas. As however the rarity of a gas is proportional to its elastic force, so long as its temperature and chemical composition remain unchanged, such instruments as measure the elastic force of gases are also, with this restriction, properly termed manometers, and accordingly it is to the latter instruments that the term is most frequently applied, both in this country and upon the Continent.

The 'statical barometer' of Robert Boyle was a manometer of the simplest kind, consisting of an exhausted glass globe suspended from one extremity of a delicate balance, and counterpoised by a metallic weight at the other extremity, the adjustment being made when the atmosphere was in its mean state of density. Any subsequent variation in the specific gravity of the air would, by a known law of hydrostatics, destroy the equilibrium, and the motion of the globe would indicate whether the variation had inclined towards an increase or diminution of density, as in the former case it would ascend, in the latter it would descend.

Captain Phipps, in his north-polar voyage, and Colonel Roy, in order to correct his barometric observations, employed manometers, which gave the elastic tension of the atmosphere. They consisted of glass tubes similar in form to thermometer tubes, and of various sizes. Those of Colonel Roy were from four to eight feet in length, with bores from one-fifteenth to one twenty-fifth of an inch in diameter. The bulb and part of the tube being filled with air of known tension, and the remainder of the tube being partially occupied by a small column of mercury sufficient to cut off the communication between the internal and external air; any variation in the elastic tension of the latter, arising from change of weight, would be accurately measured by the ascent or descent of the mercurial column. For whenever the tension of the atmosphere exceeded that of the contained air, the column would move towards the bulb, and the contrary. But if the change in the tension of the atmosphere were partly attributable to a change of temperature, then the motion of the column would merely measure the difference of the variations in the tension of the internal and external air, because the tension of both would be equally affected by the change of temperature. The bulb was pear-shaped, so that the 'point being occasionally opened, dry or moist air could be readily admitted, and the bulb sealed again without any sensible alteration in its capacity.' (*Phil. Trans.*, vol. lxvii., p. 689.) The manometers of Varignon and Wolf were similar to the preceding.

A more convenient instrument, and one of more general use, consists of a siphon-barometer, the basin of which is enclosed air-tight in a globular or other conveniently shaped vessel, furnished with a number of cocks, by means of which and the pneumatic pump the contained gas may be removed, and other gases successively substituted in its place. If equal parts by weight of different gases be thus successively introduced, they will not be affected by any change which may take place in the surrounding atmosphere, except in so far as such change may affect their temperature; so that, providing the temperature remain constant, the relative tensions of these gases will be accurately measured by the weight of the mercurial column suspended in the longer arm of the barometer, above the level of the mercury in the basin; care being had to allow for any variation in the capacity of the receiver, arising from alteration in the level of the mercury in the basin, and likewise for the small tension always indicated by the barometer immediately previous to the introduction of a fresh gas, arising from the impossibility of forming a perfect vacuum.

If an approximate vacuum be formed in the receiver enveloping the basin of the barometer, and a small quantity of any liquid be then introduced, it will be immediately converted into vapour, and the elastic tension of this vapour will be measured in precisely the same way as that of permanent gases. The receiver is sometimes of sufficient size to contain animals and plants, the effect of which in increasing or diminishing the tension of the enclosed gas is then measured by the rise or fall of the mercury. If this manometer be transported from one place to another, where the temperature is the same, but the force of gravity different, this variation in the force of gravity will be manifested by a corresponding variation in the length of the mercurial column; that is, if the gravity increase, the tension of the enclosed gas will be counterbalanced by a shorter column of mercury, and the contrary; but as this method of measuring the variations in the force of gravity is not susceptible of that accuracy which is attained by the employment of the pendulum, it is rarely, if ever resorted to.

The exact determination of the elastic force of aqueous vapour at high temperatures being essential to the safe construction and management of steam-engines, the French government requested the Royal Academy of Sciences to institute a course of experiments, with a view to the attainment of so important an object. The care of making these experiments was confided by the Academy to MM. de Prony, Arago, Girard, and Dulong, who made their report in 1830. (*Annales de Chimie*, t. xliii., p. 74.) The manometer constructed for this purpose consisted of a straight glass tube of uniform bore, 1·7 mètres (67 inches) in length, and 5 millimètres (1·25 inches) in diameter and thickness, closed at the upper and open at the lower extremity. The capacity having been accurately determined, it was filled with perfectly dry air of known density, and enveloped in a cistern of water, which was kept at an uniform temperature. Another tube of equal bore and thickness, but 26 mètres (85 feet) in length, and open at both ends, was then erected, and the lower extremities of the two tubes were made to communicate with apertures in the opposite sides of a cylindrically-shaped reservoir, capable of holding about 1 cwt. of mercury. By means of a forcing-pump adjusted to the top of this reservoir, the pressure upon the surface of the contained mercury could be increased at pleasure; and this increased pressure, being transmitted to the lateral apertures already mentioned, would obviously cause the mercury to rise in both tubes, but to unequal heights; for in the longer tube it would rise until the weight of the mercurial column, together with that of the superincumbent atmosphere, were equal to the pressure; but in the shorter tube, only until this pressure was counterbalanced by the rapidly augmenting expansive force of the confined air, added to the weight of the small column of mercury forced into it. The expansive force of the compressed air would be measured by the difference of these two columns; and by this means, the shorter tube having been carefully graduated corresponding to pressures varying from one to twenty-nine atmospheres, the construction of the manometer was complete. The longer tube and the forcing-pump were then removed, as no longer necessary, and instead of the latter was substituted the actual pressure of steam at successively increased temperatures, the tension of which was indicated by the compression of the air in the manometer.

(For more minute information see the *Annales de Chimie*, as above cited; also Poisson, *Méchanisme*, &c.)

(See Poisson, *Mécanique*, tom. ii., p. 612-14; Biot, *Physique Experimentale*, i., p. 244; Gehler's *Dictionary of Physics*, iii. 135, v. 623; Fischer's *Ditto*, art. 'Manometer;' Sir H. Davy, in Nicholson's *Journal*, iv., p. 32; Gilbert's *Journal*, xv., p. 61; *Edinb. Phil. Jour.*, part i.)

MANON, a genus of Zoophyta, proposed by Schweigger, adopted by Goldfuss, and ranked by De Blainville among the Amorphozoa, with spongia, alcyonium, &c. It is an attached mass, full of lacunæ, composed of reticulated fibres, with its surface pierced by many distinct holes. Goldfuss gives nine species, of which five are from the chalk, two in Jura kalk, one in transition rocks.

MANOR (*Manerium*).

I. *Origin of Manors.*—At the time of the Norman conquest manerius or manerium (from *manere*, to dwell) denoted a large mansion or dwelling. The 'manerium' of the Exchequer Domesday is the 'mansio' of the Exeter Domesday, each being therefore the equivalent of the Anglo-Saxon or French term used by the officers who made the survey. [Exeter.] In France the corresponding word 'manoir' has never acquired any other signification than that of a mansion; and an estate possessing the peculiar incidents of an English manor never became so common in France as to require a specific name.

The modern English manor derives its origin from subinfeudation [Feudal System], as it existed before the modifications of the system of tenures introduced in 1225 by Magna Charta, and the still more important alterations made in 1290 by 'The King's Statute of buying and selling Lands,' commencing with the words 'Quia Emptores Terrarum,' and in 1324 by the statute 'De Prærogativâ Regis,' by which statutes, the process of subinfeudation, or of granting land, &c. in fee-simple, to be held by the grantee as a tenant or vassal to the grantor, was stopped.

Where a subinfeudation made by A to B extended to the whole of A's land, nothing remained in A but a seigniory with the ordinary feudal incidents of tenure, together with such rents or other services as might have been reserved upon the creation of the subtenure. This interest in A was a seigniory in gross, that is, a seigniory held by itself, unattached to any land, an incorporeal seigniory, termed by the French feudists 'un fief *en l'air*.' But in the case of subinfeudation of *part* of the land, the ordinary mode of proceeding was this:—A, a large proprietor, having a mansion and land at Dale, created a subtenure in a portion of his land by granting such portion to B and his heirs, to hold of A and his heirs, as of A's manerium (mansion) of Dale, which words created an implied condition that B should perform the service of attending, with the other tenants of A holding by virtue of similar subinfeudations, at A's halmote of Dale, that is, at A's court meeting in the hall of A's mansion at Dale (afterwards called A's court-baron of his manor of Dale), for the purpose of deciding judicially all disputes among A's free tenants holding of him by the same tenure as B, in respect of their lands so holden, and also all actions brought by persons claiming such lands.

Upon this subinfeudation being effected, A would continue to be the owner of the mansion of Dale and of that part of the land of Dale, of which he had made no subinfeudation, in demesne (in dominico suo),—as his own immediate property; and he would have the seigniory of lands of which B and others had been subinfeoffed, as a seigniory appendant or legally annexed to the mansion of Dale, and to the demesnes of Dale, of which the mansion formed part.

This conjoint or complex estate, taking its denomination from the mansion (manerium), which was considered as its head, and which, in the language of the Year Book of P. 14, Edward II. (Maynard, 426), 'drew to itself all the appendancies,' by degrees acquired the name of manerium or manor.

A manor therefore *originally* consisted of lands in demesne, upon which the lord had a mansion, and to which lands and mansion, and more especially to the latter, there was appendant a seigniory over freeholders qualified in respect of quantity of estate (*i.e.* by a tenancy for life at the least, if not a tenancy in fee-simple), and sufficient in point of number, to constitute a court-baron. These freeholders were called vavassors [Vavassor], and their lands 'tenemental lands,' *i.e.* lands granted out in tenure, to distinguish them from the lord's demesnes. These tenemental lands, antiently known by the denomination of vavassories, though held of the manor and within the seigniory (or, as it was usually termed, within the fee) of the lord, were not considered as part of the manor; but the services issuing from such tenemental lands were part of the manor and essential to its existence.

Afterwards it was sufficient if the site of a mansion at which the services had been reserved, or, as it was called, the site of the manor, formed part of the demesnes; and, at last, this vestige of the origin of the name of the estate was dispensed with, and if the lord retained any portion of the land, so that there would be some demesnes to which the seigniory over the freehold tenants of the manor, and the services rendered by them, might continue to be appendant, the compound estate called a manor was not dissolved, whether it could be shown that a mansion had ever stood on the part of the demesnes or lands retained, or not, and even if the lord had aliened and severed from his demesnes the spot on which the mansion had once stood.

II. *Nature and incidents of Manors.*—A manor is commonly said to consist of demesnes and services. It is quaintly, but perhaps more correctly, stated by Fulbeck, that these 'are the material causes of a manor;' for though there can be no manor unless there be both demesnes and services, other things may also be members and parcel of a manor.

1. The demesnes are those lands within the manor, of which the lord is seised, *i.e.* of which he has the freehold, whether they are in his own occupation, or in that of his tenants at will, or his tenants for years. The tenants at will have either a common-law estate, holding at the joint will of the lessor and of the lessee, or a customary estate, holding at the will of the lord according to the custom of the manor. [Copyhold.] The tenancy for years of lands within a manor is, in modern times, usually a common-law estate, though in the assessionable manors, parcel of the duchy of Cornwall, customary estates for years still subsist (VIII.); and where a copyholder surrenders for years, the surrenderee becomes a customary tenant for years of the portion of the demesnes so surrendered.

2. The services of a manor are, the rents, and other services, due from freehold tenants holding of the manor. These services are annexed or appendant to the seigniory over the lands holden by such freehold tenants. The lands holden by the freeholders of the manor are holden *of* the manor, but are not *within*, or *parcel of*, the manor, though within the lord's fee, or manerial seigniory.

Copyholds, being part of the demesnes, are not held of the manor, but are within and parcel of the manor.

The demesne lands were formerly called the *inland*, and the tenemental lands, the *outland*, of the manor.

3. But though a perfect legal manor cannot exist without demesnes and services, other incorporeal hereditaments, which are not services, may be parcel of the manor, as advowsons, rights of common, rights of way, &c., and, under peculiar circumstances, even rents-seck and rents-charge.

In general, the power of holding courts of justice, whether for the decision of criminal matters or for the determination of civil rights, can be exercised only under authority derived from the crown, either by actual grant or by prescription; and in order to prevent usurpations of such a power, the crown may at any time issue process for the purpose of instituting an inquiry by what authority [Quo Warranto] a subject holds a court of justice. But it is a distinguishing feature of the feudal system, to make civil jurisdiction necessarily, and criminal jurisdiction ordinarily, coextensive with tenure. Upon this principle there is inseparably incident to every manor a court-baron (curia baronum), being a court in which the freeholders of the manor are the sole judges, but in which the lord, by himself, or more commonly by his steward, presides. The jurisdiction of the court-baron extends over all personal actions in which the debt or damages sought to be recovered are under 40*s.*; and real actions in respect of lands held of the manor could not have been brought in any other court, except upon an allegation that the lord of the manor had in the particular instance granted or abandoned his court to the king (quia dominus remisit curiam). To a quo warranto therefore for holding a court-baron, it is a sufficient answer—that the defendant has a manor. As this court was essential to the due administration of justice in questions respecting the right of property held of the manor arising amongst the lord's tenants, there could never have been a perfect manor without a sufficient number of freeholders to constitute the court-baron, which number must consist of three, or two at the least; three being necessary where the litigation was between two of the freeholders. The practice, which prevailed in France, &c., of *borrowing* suitors from the court of the lord paramount, to make up a sufficient number of freeholders to constitute a court, does not appear to have been adopted in England.

4. Some things are popularly supposed to be incident to a manor, which have no necessary connexion with it. Thus the ownership of wastes within the district over which the manor extends, is frequently called a *manerial* right, though the right and interest of the lord in wastes, over which no acts of ownership can be shown to have been exercised by him, rests entirely upon the presumption in favour of the lord, arising out of the circumstance of his being the present owner of the demesne lands, and the former owner of the tenemental lands which adjoin such wastes. The same presumption would arise in favour of any other owner of an extensive district. It is however true that lords of manors in their original grants, both to their freehold and to their copyhold tenants, usually reserved the waste lands, giving to the freeholders and copyholders merely rights of common over the wastes. Hence it arises that, in point of fact, manors, in proportion to their extent, frequently contain a much larger portion of wastes than other estates. From this cause, and from the circumstance of manors being generally large properties in the hands of the nobility and gentry, several statutes have given to lords of manors privileges in respect of game, and the appointment of gamekeepers, which other estates, though they may be of greater extent and value, do not enjoy. But except in particular cases in which a free-chase, free-warren [Warren], or legal park [Park] is, by royal grant or prescription, annexed to a manor, the lord of a manor has no privilege, in respect of game, beyond what is given him by these modern statutes.

Copyholds are a common incident to the demesnes of a manor, but there are many manors in which this species of tenure does not appear to have ever existed, and many more in which it has been long extinct; and though there are now no copyholds unconnected with a manor, the custom of demising by the lord's rolls appears to have formerly been common to every lord or freeholder who had demesnes which were held in villenage. So the right to have a court-leet is a royal franchise [Leet], under which the grantee holds a court of criminal jurisdiction in the king's name, over the resiants (residents) within a particular district. This privilege may be granted to persons who are not lords of manors; and where the grantee has a manor, the limits of the manor and of the leet are not always co-extensive.

Confusion often arises in the use of the terms 'within the manor,' 'within the fee and seigniory of the manor,' and 'within the ambit of the manor.' The first of these terms (and its equivalent 'parcel of the manor') applies to lands, &c., in the actual possession of the lord, or of his leaseholders or copyholders; the second, to lands which, having been formerly within the manor, were, before the statute of Quia Emptores, or De Prærogativâ Regis, granted by the lord to be held of the grantor in fee, as of his manor; the term 'within the ambit of the manor' is applicable to land, which though surrounded by the manor, is neither parcel of the manor nor held of the manor; land which never was connected with the manor in point of tenure, or which having been formerly within the manor, has been in some way alienated from it in fee.

III. *Manors, how created.*—Since the statutes of Quia Emptores and De Prærogativâ Regis no manors have probably been created; and it has been commonly said that no new manor could afterwards be created. But as a proposition of law this appears to be stated too broadly. The former statute has been held not to apply to the immediate tenants of the king, who is not one of the 'magnates and other (*i.e.* inferior) lords.' The latter statute speaks only of lands held by knight's-service, and therefore, like the clause in the statute of wills imposing a restriction upon the devising of lands of that tenure, appears to be inapplicable since the abolition of military tenures. Besides, the statute of Quia Emptores Terrarum has been held to contain an implied exception in respect of alienations made with the licence of all lords, mediate or immediate; and in the statute De Prærogativâ Regis we find an express exception in favour of alienations made with the licence of the king. It seems to be questionable whether, even by the common law, the immediate tenant of the crown did not incur a forfeiture by making a subfeoffment without licence. (34 Edw. III., c. 15.) It has also been objected that a court-baron is necessary to a manor, and that a man cannot, by granting lands in tail, reserving suit at his court, create a court-baron. But this objection assumes that no greater subtenure can now be created than an estate tail; whereas, *with licence*, a subtenure in fee may be created, and the holding of a court-baron seems to be incidental at common law to the seigniory over tenants in fee-simple.

Practically however no entirely new manors are now created; but where, upon the partition of a manor, part of the demesnes and part of the services, including suit of court of a sufficient number of freehold tenants to constitute a court-baron, are assigned to one parcener, joint-tenant, or tenant in common, and other parts of the demesnes and services to another parcener, &c., each party has a manor, and may hold a court-baron. And it is said that if a manor extends into several townships, the lord may create separate manors by conveying the demesnes and services in township A to one, and those in township B to another.

It has been said that the king cannot at this day create a manor. From the nature of this species of estate it is obvious that the king never could create a manor. If the crown granted land to A, he might, with the licence of the crown, subinfeoff B, C, and D of parcels of the lands, retaining the mansion, with or without other demesnes, in his own hands, and stipulating with B, C, and D, that they should render their services at such mansion. A would then have a manor; but it would not have been created by the crown, as the king neither did nor could create the subtenures of B, C, and D, out of which arose the services that, in conjunction with the demesnes, constituted the manor.

IV. *Manors, how destroyed.*—A manor is not destroyed by the loss of those incidents which, though members, and forming part, of the manor, are not, like demesnes and services, the 'material causes of a manor.' Nor will the legal existence of the manor be affected by the alienation of *part* of the demesnes, or by the alienation or extinction of *part* of the services, or by the extinction of all the copyholds. But upon the alienation of all the demesnes, or the alienation or extinction of all the services, the manor ceases, and is said to be destroyed: and though any part of the demesnes, however small, will keep alive the manor, if there be sufficient services, it can exist no longer than whilst there can be found enough freehold tenants to constitute a court-baron. Thus if the lord purchase the lands of all his freehold tenants, or of all except one, or if the freeholds escheat, or if the lord release or alien the services, the manor ceases to exist. So, if the lord alien the freehold of all lands holden of him by copy of court-roll, or enfranchise all the copyholders, in a manor where there are no demesnes except the copyholds. So, if he alien all the demesnes. So if, upon a partition of the manor, the demesnes are allotted to one and the services to another. But in none of these cases is the destruction of the manor absolute and irrevocable. If there cease to be any demesnes, so that the manor is turned into a seigniory in gross, yet upon the event of any of the freeholds holden of the manor coming to the lord by escheat or purchase, the lands so escheating or purchased will become demesnes of the manor, as they were, before the subinfeudation of those lands, whereby they were originally severed from the manor, took place. Where a manor is destroyed by partition between co-parceners, if one die, and the other takes the share of the party dying as heir, the manor revives; but it would not be so in the case of a partition between joint-tenants or tenants in common, nor would the manor revive in the case of co-parceners if the severed portion of the manor were re-united, not by descent, but by purchase. Where all the freehold tenants have ceased to exist except one, there is no longer a complete legal manor, because there can be no court-baron; but if the remaining tenant convey his tenement in fee to different persons in severalty, as there will be now a sufficient number of freeholders holding of the manor, to constitute a court-baron, the manor will revive. But without such revival, the estate is by some lawyers considered to be still entitled to the designation of a manor, by reason of there being demesnes and a seigniory appendant, though over one tenant only. (1 Anderson, 257.) Such an estate is however more frequently called 'a manor by reputation,' a vague term, applied indiscriminately to all estates which have been manors, and which indeed would be equally applicable to a property which had acquired the name of a manor without having ever been one.

If the lord of a manor make a gift in tail, or a lease for life, of all the demesnes, this is such a severance and alienation of the demesnes from the manor, that there will, during the continuance of the particular estate, be no demesnes within the manor. Whilst the estate tail, or the estate for life, continues, the *services* of the entailee, or tenant for life, and the reversion expectant upon the determination of such estate, will be parcel of the manor, but the *land* itself will be *holden of* the manor, and will not be *parcel* of the manor. Instead of demesnes, and services, the lord will, for the time, have merely two classes of services, viz. those of the entailee, or tenant for life, and those of the antient freeholders in fee. During the continuance of this state of things the manor will be in suspense, and the lord will have, not a manor, but a double seigniory in gross, or rather two conjoint seigniories, one in respect of the entailee, or lessee for life, the other in respect of the antient freehold tenants of the manor in fee.

V. *Manors, Customary.*—So much importance formerly attached to the possession of a principal mansion at which the services of tenants might be rendered, that a person holding lands in customary villenage might grant portions of his villenage to be holden of the grantor, for as great an estate as the grantor had, as of his mansion or manerium. The estate of the grantor, which, after this operation, would consist of the mansion and the other ungranted portions of the villenage, with the services of the grantees appendant thereto, was called a customary manor.

The estate of a person to whom the lord of a manor has granted the freehold and seigniory of all the copyholds within the manor or within a certain district, has been sometimes loosely called 'a customary manor.' But such an estate cannot, in any sense, be said to consist of demesnes and services.

VI. *Manors in Antient Demesne* are those manors, which, though now mostly in the hands of subjects, formed part of the royal domain at the time of the Conquest, and are designated in Domesday as 'terra regis.' The peculiarity of these manors is, that there exists in them a particular class of tenants possessing certain customary privileges, supposed, by Lord Coke and others, to be derived from the indulgence of the crown in matters 'pertaining to the king's husbandry.' They were formerly called 'tenants in socage in antient tenure,' but are now commonly known as 'tenants in antient demesne,' a term not in itself very accurate, since all tenants within these antient demesne manors, whether copyholders or leaseholders, and even the lord himself, are strictly speaking tenants *in* antient demesne. In these customary tenures the freehold is not in the lord, but in the tenant, who is therefore called a customary *freeholder;* and it does not appear to be necessary to the continuance of the manor that there should be any other freehold tenants, though lands may be held of a manor in antient demesne by the ordinary freehold tenure, which lands are called lands in frank-fee by way of distinguishing them from the customary freeholds held by the 'tenants in socage in antient tenure,' now called 'tenants in antient demesne.'

Lord Coke enumerates six privileges as annexed to this peculiar tenure. (4 *Inst.*, 269; Bac., *Abr.*, 'Antient Demesne;' Com., *Dig.*, 'Antient Demesne.')

VII. *Manors in Border Counties.*—The exposed state of the northern borders of England, liable to hostile incursions in time of war, and scarcely less in times of nominal peace, created a peculiar species of tenure in the manors in the four northern counties. Persons holding by this tenure are called customary freeholders; though here the *freehold* is in the lord, and the timber and mines belong to him, and not (as in the tenure in antient demesne) to the tenants; but they are so called because they are allowed the privilege of passing their estates, as freeholders do, by feoffment and livery, a privilege perhaps derived from the irregularity with which the customary courts of the manor were held, and from the necessity of allowing persons whose tenure of land and of life was so uncertain to make immediate dispositions of their property.

VIII. *Manors, Assessionable,* a term peculiar to that part of the domain of the duke of Cornwall [Wales, Prince of] which is situate within the county of Cornwall, consisting of seventeen manors, namely, Launceston, Trematon, Tyntagell, Restormel, Stoke-Climsland, Tybeste, Tewington, Helston-in-Kerrier, Moresk, Tywarnhaile, Penkneth, Penlyn, Rellaton, Helston-in-Trigshire, Liskeard, Calstock, and Talskydy.

The earls and dukes of Cornwall, and, when no earl or duke, the crown, have sent from time to time(commonly every seven years) certain persons commissioned to visit these manors in succession, and to *assess* the lord's demesnes, *i.e.* to let them at such rents and upon such terms as might appear to them to be advantageous to the duchy. The courts held by the commissioners for the purpose of exercising the authority thus delegated to them were called *assessions*, or courts of *assession*. The course usually was to let the land until the next assession. From the conventions (covenants or engagements) entered into by the persons to whom those demesnes were so arrented, the interest demised was called a tenure *in conventione*, and the tenants were styled conventionaries. These demises were made both to freemen and villeins; the former being called free conventionaries, the latter villein or native conventionaries. The latter class appear to have become extinct in the 16th century.

By degrees the conventionary tenants acquired an inheritable interest in the certainty of the renewal of their holdings in favour of themselves and their descendants at each successive assession. The conventionary tenant thus acquired, like a copyholder of inheritance, an interest freehold in point of duration, without a freehold tenure.

In conventionary tenements the minerals belong to the lord, and not to the customary tenant; as it was held upon a trial at bar in 1829, which lasted seven days (*Rowe* v. *Brenton*, 3 Mann. and Ryl., 133-364.)

MANS, LE, a town in France, capital of the department of Sarthe, situated on the river Sarthe, in 48° 1′ N. lat. and 0° 11′ E. long.; 111 miles from Paris in a direct line west-south-west, or 122 miles by the road through Versailles and Chartres.

This town existed in the time of the Romans, and was called Suindinum. It was the capital of that division of the Aulerci called Cenomani or Cenomanni, from whom it took in the fourth century the name of Cenomanni, a fragment of which remains in its modern designation. In the age of Charlemagne it was considered one of the principal cities of France. It was the chief town of the province of Maine. It is said to have been besieged twenty-four times between the reign of Clovis and that of Henri IV. inclusive. It was occupied by the royalists of Vendée in A.D. 1793, to the number of 60,000. They were driven out by General Marceau with the loss of many men and much plunder. It was surprised by a party of Chouans in A.D. 1799.

The town stands on the left bank of the Sarthe, a little above its junction with the Huine, and consists of two parts or quarters. The old quarter, on the bank of the river, consists of four or five streets nearly parallel to each other, narrow, dark, and dirty, connected by lanes or passages, some of which have steps, while others are so steep as to be impracticable for horses and carriages. The new quarter, on a hill not immediately adjacent to the river, occupies a larger space than the old, and has an equal population: it is well built and agreeable, though irregularly laid out. The Place des Halles is the largest and finest in the town. The Place des Jacobins, planted with trees, was formed, together with an adjacent public walk, in 1790, on the suppression of the religious houses. The walk covers the site of a Roman amphitheatre, which was discovered by the workmen in laying it out. There is another public walk on the bank of the Sarthe. The principal building is the cathedral, built on the foundations of an antient temple. The nave is the most antient part, and is ascribed to the ninth century by some, but to the eleventh by others: the choir and transepts are of later date, perhaps of the fifteenth century. The choir is admired for the loftiness of its roof, the boldness of its architecture, and the beauty of its stained glass. There is a tower at the extremity of one of the transepts, rising above 200 feet from the ground. The cathedral is surrounded by thirteen small chapels. There are several other churches: that attached to the seminary for the priesthood and the Church of the Visitation are modern buildings. That of La Couture, formerly conventual, is antient. The abbey of St. Vincent is now occupied as the seminary for priests; it has a fine front: the building formerly used for the seminary is now a barrack. The high school is held in an old monastic building, and the abbey of La Couture has been converted into the prefect's office rooms in it are occupied by a public library of 40,000 or 50,000 volumes, and 700 MSS., a museum of natural history, and a collection of paintings. The town-hall is built on the site of the former palace of the counts of Le Mans, which itself occupied the site of some Roman building, of which there are yet some remains. The court-house is well laid out, and there is a theatre. The houses in the town are chiefly built of stone, and covered with slate.

. The population in 1831 was 19,672 town, 19,792 whole commune; in 1836 it was 23,164 for the commune. There are considerable manufactures of woollens, cottons and linens, hosiery, lace, wax candles, and soft soap. There are bleaching establishments for linen and wax, tan-yards, currying-shops, paper-mills, and breweries. Considerable trade is carried on in the manufactured articles and in the agricultural produce of the neighbourhood, including chesnuts, walnuts, dried fruits, fat fowls, which are sent to Paris, and trefoil seed, sent to Russia, Sweden, and England. The weekly cattle-market is well attended; and there are two yearly fairs of eight days each. The town is the emporium of the surrounding country. There are good inns, coffee-houses, reading-rooms, and public baths.

There are several fiscal or judicial government offices, a seminary, and a high school, a society of agriculture, sciences, and arts, a royal society of arts, a free school for drawing, an hospital, and some other charities. It is the seat of a bishopric, the diocese of which includes this department and that of Mayenne: the bishop is a suffragan of the archbishop of Tours.

The arrondissement of Le Mans comprehends ten cantons or districts, each under a justice of the peace, and 116 communes. The area of it is 734 square miles. The population in 1831 was 157,851; in 1836, 164,667.

MANSARD, the name of two French architects of great celebrity in the seventeenth century. *François Mansard*, the elder, whose father, Absalon, is said to have been architect to the king, or at least a builder in the royal service, was born at Paris in 1598. At the age of twenty-two he began to distinguish himself by his restoration of the Hôtel Toulouse; and a short time afterwards he was commissioned to execute the portal of the church of the Feuillans, in the Rue St. Honoré. The reputation he acquired by these works soon procured him abundant employment, and obtained for him ample opportunities for displaying his talents. Among the numerous châteaus erected after his designs, may be mentioned Berni near Paris, Baleray, Blerancourt, Choisy, and that of Maisons, which last was built for the president De Longueil, and is generally considered his *chef-d'œuvre* among his edifices of that class.

Among his churches the most noted is that of the Val de Grace at Paris, the dome of which, said to have been designed after that of the chapel of the Château de Fresnes, built by himself, has been generally extolled as a fine piece of architecture, although now it would be considered a grotesque composition remarkable for nothing so much as the impure and meagre taste it displays, many of the forms being absolutely barbarous. The façade of the church of the Minimes in the Place Royale is also by him; and has been admired as exhibiting the solution of a knotty problem, the metopes being perfect squares throughout! Such was the puerile and pedantic trifling that formerly engaged the attention of architects and connoisseurs, and for the sake of which they overlooked matters of infinitely greater importance in architectural taste and design.

François died in 1666. This architect is said to have been the inventor of the curb roof, called, after him, a *Mansard*, which consists of two planes on each side, a steeper one below and a flatter one above. It has however little beauty of form to recommend it, having very much the look of being broken or doubled.

MANSARD, JULES HARDOUIN, was the nephew of the preceding, being the son of a painter who had married the sister of François. Jules, who assumed his maternal family name on becoming heir to his uncle, was born in 1648. He was brought up by François to his own profession, in which he afterwards so greatly distinguished himself, as to become much the more celebrated of the two. Most assuredly he had ample field allowed him for the display of his talents, since, had he been employed on no other work, he was called to execute one which for lavish prodigality has hardly its parallel in any age or country. It becomes therefore quite as much a satire as a eulogium on his 'genius' to say that on that occasion, and with unlimited resources, he produced nothing better than Versailles—a huge pile of building, which our own eminent architect Sir C. Wren described as composed of 'heaps of littleness.' Even his biographer Quatremère de Quincy, though anxious to impress us with a high idea of his talents, is obliged to admit that his designs display 'une certaine mediocrité de goût,' to which he might have added, a mediocrity of ideas also. It would not be difficult to select from his works numerous instances of exceedingly bad taste, of puerile caprices, and downright solecisms. Undoubtedly the magnitude and the costliness of their decorations give them an imposing air, but the effect thus produced is not to be ascribed to the architect himself—at least he must consent to share the fame so derived to him, with others. After Versailles, the work which has chiefly contributed to his reputation is the dome of the Invalides at Paris, which, although as splendid as a coat of gilding can make it, is externally greatly inferior to that of our St. Paul's in harmony and majesty of design and proportions. The plan of the interior of the edifice presents far more that deserves commendation, the whole being most skilfully arranged for perspective effect. Both the Place Louis XIV. and that called Des Victoires at Paris were built after his designs, but have little at all remarkable, except it be that the one is an octagon, and the other an oval in plan.

With abundance of most lucrative employment, and enjoying the personal favour of a monarch who was uniformly lavishly profuse, and by whom many profitable appointments were bestowed upon him, it is no wonder that Jules Hardouin was enabled to amass a vast fortune. He died suddenly at Marly in 1708, in his sixty-third year, and was buried in the church of St. Paul, at Paris, where a monument was erected to him, executed by the sculptor Coysevox.

MANSFIELD, a market-town and parish in the northern division of Broxton wapentake, in the county of Nottingham. The population of the parish in 1831 was 9426. The town is seated in a valley near the little river Mann, or Maun, from which it probably takes its name, and is surrounded by the antient forest of Sherwood, the scene of Robin Hood's chief exploits. [HOOD, ROBIN.] Its direct distance from Nottingham is 12 miles north by west, and from London 128 miles north-north-west. The parish church, dedicated to St. Peter, is commodious; the living is a vicarage in the diocese of York and patronage of the dean of Lincoln, producing a net revenue of 158*l.* The principal streets are paved, and lighted with gas. A railway, seven miles in length, has been constructed at an expense of 30,000*l.*, connecting Mansfield with the Cromford canal, which is said to have proved very advantageous to the trading interests of the place. There are some extensive cotton-mills, besides manufactories of hosiery and lace. The market-day is Thursday, and the cattle-fairs are held on the 5th of April, 10th of July, and the second Thursday in October. The free grammar-school was founded by royal charter in the third year of the reign of Queen Elizabeth, who also established two scholarships of 10*l.* each at Jesus College, Cambridge, for scholars from this school. The insufficient state into which this school had been allowed to fall was a subject of general complaint among the inhabitants as recently as the year 1832. According to the charter of foundation the salaries of the master and usher are to be paid out of the produce of the church lands, which it is declared shall be distributed in the proportion of two-thirds to the vicar, two-ninths to the master, and the remaining one-ninth to the usher; and it appears that the master's share amounted to 115*l.* in 1833, when the number of scholars, including eight boarders, was twenty-seven.

In 1725 Faith Clarkson bequeathed 2000*l.*, part of which she directed should be appropriated to the erection of a charity-school in Mansfield, and the remainder invested in lands for charitable purposes. By a decree of the court of chancery in 1743 it was ordered that a portion of the rental of these lands should be applied to the maintenance of a master and mistress to instruct twenty poor boys and the like number of girls, in reading, writing, and arithmetic; the remainder was allotted to the clothing of all the children, and apprenticing a certain number of the boys. There is ample information as to the grammar-school and the other charitable institutions of Mansfield, in the Twenty-fifth Report of the Charity Commissioners, and in the second volume of Throsby's edition of Thoroton's *History of Nottinghamshire*, 4to., 1797.

In the neighbourhood of Mansfield-Woodhouse, a village about a mile and a half from the town of Mansfield, two Roman villas were discovered by Mr. Rooke in 1786; and in the vicinity of Mansfield numerous coins of the emperors Vespasian, Constantine, Antoninus Pius, and Marcus Aurelius have been found at different times.

(Horrod's *Hist. and Antiquities of Mansfield*, 4to., 1801; and *Parliamentary Papers*.)

MANSFIELD, WILLIAM MURRAY, EARL OF, lord-chief-justice of the king's bench, was born at Perth on the 2nd of March, 1704, o.s. He was the fourth son of Andrew Viscount Stormont. At the age of three he was removed to London, and in 1719 he was admitted a king's scholar at Westminster school. On the 18th of June, 1723, he was entered at Christ Church, Oxford, where, as before at Westminster, he distinguished himself by his classical attainments. After taking his degree of M.A. he left the university in 1730, and after travelling some time abroad he was called to the bar in Michaelmas term, 1731. In early life he appears to have associated a good deal with the 'men of wit about town.' Dr. Johnson said of him that 'when he first came to town he drank champagne with the wits.'

It has been said of him, as of other eminent lawyers, that he had been heard to say that he never knew the difference between a total want of employment and an income of 3000*l.* a year. But in 1732, the year after his being called to the bar, it appears that he was engaged in an important appeal case; and in the two following years he was frequently retained in similar cases before the House of Lords. (Holliday's *Life*, p. 28.) The first cause in the common-law courts in which Mr. Murray distinguished himself was an action for criminal conversation brought by Theophilus Cibber against Mr. Sloper. A sudden attack of illness having prevented his leader from appearing in court, the duty of conducting the defence devolved upon him. The result brought him an influx of business which at once raised his income from a few hundreds to thousands. In 1743 he was appointed solicitor-general, and obtained a seat in the House of Commons, where his eloquence and legal knowledge soon rendered him very powerful.

In the House, Murray and Pitt (Lord Chatham) were opposed to each other as the best speakers of their respective parties. Pitt's attacks on Murray seem to have occasionally exceeded the limits prescribed by modern parliamentary regulations. 'Brilliant and argumentative as was the oratory of Murray,' says Mr. H. Roscoe (*Lives of Eminent British Lawyers*, p. 180, in *Cabinet Cyclopædia*), 'he did not always possess the nerve necessary to ward off or to return assaults so terrible as these, and for the most part he bore in agitated silence the attacks to which he did not venture to make any reply.'

In 1754 Mr. Murray was made attorney-general, and in 1756 he received the appointment of chief-justice of the king's bench, and was immediately created a peer, by the title of Baron Mansfield, of Mansfield in the county of Nottingham. On his elevation to the seat of chief-justice, Lord Mansfield, contrary to the general usage, became a member of the cabinet.

Few lawyers have been more tempted than Lord Mansfield to quit their profession for politics. On several occasions (such was his power as a speaker and such was the opinion entertained of his abilities by his party) high political office, with the prospect of higher, of indeed the highest, was pressed upon his acceptance. But whether it was prudence or a certain timidity of character which appeared in him on many occasions throughout his life, that guided his conduct, it is certain that he was firm in refusing all offers of the kind and in adhering to his profession. Thus when the duchy of Lancaster and a pension of 2000*l.*, with the reversion of a valuable post for his nephew, Lord Stormont, were offered to him, and subsequently the amount of the proposed pension was raised to 6000*l.*, he was firm in his refusal. 'He knew,' says Walpole, 'that it was safer to expound laws than to be exposed to them; and he said peremptorily at last, that if he was not to be chief-justice, neither would he any longer be attorney-general.' Shortly after Lord Mansfield's promotion to the bench, on the dismissal of Mr. Pitt, and the resignation of Legge, the chancellor of the exchequer, the seals of the latter office were *pro tempore* placed in the hands of Lord

Mansfield, and he was entrusted by the king with full power to negotiate on the subject of a new administration with Mr. Pitt and the Duke of Newcastle. The same reasons which made him refuse political office seem to have induced him to decline the custody of the great seal when it was, upon more than one occasion, offered to him. He preferred the purely judicial office of chief-justice of the king's bench, where he was safe from political storms and the vicissitudes which they produce. Yet in that office, though safe from political, he was not safe from popular storms. His political leanings were not towards the popular side; and even his conduct as a judge, though now, when at a distance from him and his time we can survey it with calmness, it may appear deserving of a very small portion of the reprehension heaped on it by such writers as Junius, was at the time not free from the appearance of some bias against popular rights. The following passage from a speech of his in the House of Lords gives his opinion on the subject of seeking popularity, for which he always entertained a great contempt. 'It has been said by a noble lord on my left hand, that I likewise am running the race of popularity. If the noble lord means by popularity that applause bestowed by after-times on good and virtuous actions, I have long been struggling in that race, to what purpose all-trying time can alone determine; but if the noble lord means that mushroom popularity that is raised without merit and lost without a crime, he is much mistaken in his opinion. I defy the noble lord to point out a single action in my life, where the popularity of the times ever had the smallest influence on my determinations. I thank God, I have a more permanent and steady rule for my conduct—the dictates of my own heart. Those that have foregone that pleasing adviser, and given up their minds to be the slaves of every popular impulse, I sincerely pity; I pity them still more, if their vanity leads them to mistake the shouts of a mob for the trumpet of fame. Experience might inform them, that many, who have been saluted with the huzzas of a crowd one day, have received their execrations the next; and many who, by the popularity of their times, have been held up as spotless patriots, have nevertheless appeared upon the historian's page, when truth has triumphed over delusion, the assassins of liberty. Why, then, the noble lord can think that I am ambitious of present popularity, that relic of folly and shadow of renown, I am at a loss to determine.' (*Parl. Hist.*, vol. xvi., p. 977.)

In the cases of the trials of the publishers of Junius's letter to the king, Lord Mansfield incurred much popular odium by laying down the doctrine that the fact, not the law, was what the jury had to consider. In the trial of Woodfall, Lord Mansfield, in his summing up, directed the jury, 'that the printing and sense of the paper were alone what the jury had to consider of.' (*State Trials*, vol. xx., p. 900.)

In the case of Wilkes, which occurred in the same year, Lord Mansfield remained firm to his former opinion, and in allusion to the odium which he had incurred in consequence, thus expressed himself: 'I honour the king and respect the people; but many things, acquired by the favour of either, are, in my account, not worth ambition. I wish popularity, but it is that popularity which follows, not that which is run after. It is that popularity which, sooner or later, never fails to do justice to the pursuit of noble ends by noble means. I will not do that which my conscience tells me is wrong, upon this occasion, to gain the huzzas of thousands, or the daily praise of all the papers which come from the press: I will not avoid doing what I think is right, though it should draw on me the whole artillery of libels, all that falsehood and malice can invent, or the credulity of a deluded populace can swallow. I can say with a great magistrate, upon an occasion and under circumstances not unlike, "Ego hoc animo semper fui, ut invidiam virtute partam, gloriam, haud infamiam, putarem."'

In the famous riots of 1780, Lord Mansfield's house in Bloomsbury Square was attacked and set fire to by the populace. The walls were all that were left of it. His library of books and MSS., his private papers, pictures, furniture, and other valuables were all consumed. Though the treasury, in pursuance of a vote of the House of Commons, applied for the particulars and amount of his loss, with a view to compensation, his lordship declined returning any account of his loss, lest, he said in his letter to the Treasury, 'it might seem a claim or expectation of being indemnified.'

After having presided for upwards of 32 years in the court of king's bench, he retired from his office in 1788. He died on the 20th of March, 1793, in the 89th year of his age. He left no issue. The earldom of Mansfield, which was granted to him in 1776, descended to his nephew, Viscount Stormont.

Lord Mansfield's judicial character stands high. His acute and powerful intellect enabled him to take a clear and comprehensive view of every case. The depth of his legal learning has been questioned; probably not without reason. And this want of depth, assuming it to have existed, may account for his sometimes making law instead of expounding it—a thing sometimes unavoidable in a judge; and though extremely difficult to do well, easier to do ill or indifferently than to unravel and set forth in luminous order a large and confused mass of law already existing on a given subject: which suggests the reflection, that though that judge who is the profoundest lawyer will be the most competent to make law, at least to know when it is necessary to make it, yet those judges who are the least profound lawyers, and consequently the least able to say when law needs to be made, will be the most likely to evade the difficulty of elucidating the old law by making new. This is matter of every-day experience to lawyers. Lord Mansfield's judicial legislation has been most successful in some branches of commercial law. In the law of real property he was less successful. For example, his decision in the case of *Perrin* v. *Blake*, which involved an alteration in the old established rules of law, particularly as regarded what is called the rule in Shelley's case, was reversed in the Exchequer Chamber. (Fearne's *Contingent Remainders*, p. 158; and Dougl., *Rep.*, 329 or 343 of 3rd edition, in *note*.)

In reviewing the character of Lord Mansfield, his principles of toleration in matters of religion, which he maintained both in parliament and on the bench, *ought not to* be forgotten.

(*Life of Lord Mansfiell*, by Henry Roscoe, Esq., *Barrister* at Law, in Dr. Lardner's *Cabinet Cyclopædia.*)

MANSLAUGHTER. [MURDER.]

MANSOURA. [EGYPT.]

MANTEGNA, ANDREA, was born at Padua, in 1431. His parents were persons in humble life. It does not appear under what circumstances or at what age he became a pupil of Francesco Squaricone, who was so struck with his talents that he adopted him as his son. On Andrea marrying a daughter of Jacopo Bellini, Squaricone's competitor, the latter was offended, and censured his pupil as much as he had before praised him; but these censures, being in many instances well founded, only tended to his improvement, which was further promoted by the friendly advice of the brothers Gentile and Giovanni Bellini.

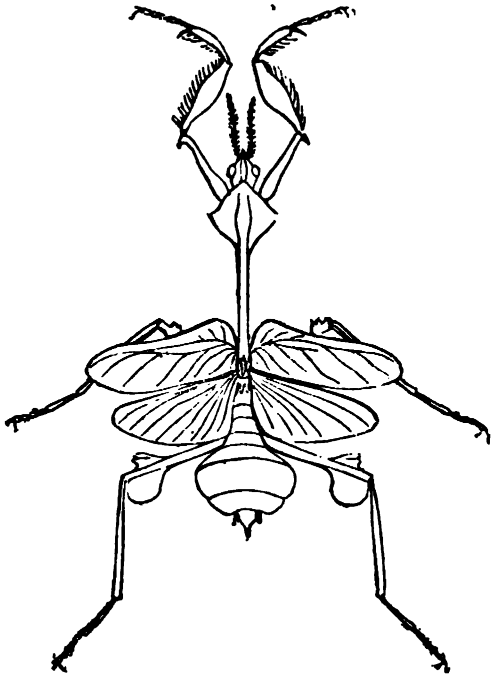
His chief residence and his school were at Mantua, where he settled under the patronage of the marquis Lodovico Gonzaga, but worked occasionally at other places, especially Rome. There are several of his oil paintings in Mantua. His master-piece, the picture Della Vittoria, which was in the Oratorio de' Padri di S. Filippo, was taken by the French and placed in the Louvre. We are not certain where it now is. M. Fuseli, who saw it in the Louvre, speaks of it in the highest terms. Few of this painter's works now remain, and most of them have been much injured. One of his greatest and most celebrated works, 'The Triumph of Julius Cæsar,' was part of the rich gallery of paintings that belonged to the Gonzaga family, which was purchased by King Charles I. for 80,000*l.* This, *the greatest* and most esteemed work of Mantegna, consisting of nine pictures, each 9 feet high and 9 feet wide, is now at Hampton Court. Unhappily it was coarsely painted over by Laguerre, in the time of William III. 'The Triumph of Scipio,' painted in black and white, and in admirable preservation, is in the possession of Sir George Vivyan. The earl of Pembroke has a picture by Mantegna, representing Judith with the head of Holofernes; and in the British Museum there is an admirable drawing in bistre touched with white, representing the dominion of the vices over the virtues, a counterpart to Mantegna's picture in the gallery of the Louvre (No. 1107), representing the vices expelled by the virtues. It is not probable that he painted many cabinet pictures, his time being so much occupied by large works and engraving: though not the inventor of this art, he was the first engraver of his time; the series of plates executed by his own hand exceeds fifty. Mantegna died in 1505, at the age of 74. (Pilkington and Fuseli, *Dictionary of Painters*; Waagen's *Arts and Artists in England.*)

MANTELLIA, a generic name proposed by Parkinson (*Org. Remains*) for certain alcyoniform fossils of the chalk. M. Brongniart has established the use of this word for certain cycadiform plants, to which Dr. Buckland has applied the title of Cycadeoidea. The specimens are chiefly found in the oolite of the Isle of Portland, but one (M. cylindrica) occurs in the lias of Luneville, according to M. Voltz. The stem of these plants is cylindrical or sphæroidal, and covered with transverse impressions of leaf bases. The internal structure resembles Cycas. (Buckland, in *Geol. Trans.*, 1828.)

MANTES. [SEINE ET OISE.]

MA'NTIDÆ, a family of Orthopterous insects, the species of which may be distinguished by the following characters:—Head exposed (not hidden by the thorax), furnished with three ocelli, or simple eyes, beside the ordinary pair of compound eyes; palpi short, slender, and cylindrical; antennæ generally setaceous, but sometimes pectinated; short in the females and long in the males; body elongated; the thorax usually very long, often dilated at the sides and dentate; abdomen long, and with the terminal segment small in the male sex, more or less dilated, and with this terminal segment large in the females; the apex furnished with two small appendages; legs long; the four posterior legs slender, the anterior legs with the coxæ very large and elongated; the femora also very large, dilated, and furnished with a double series of spines on the under side, between which (when the animal is in a state of repose) the tibiæ are placed: the tibiæ are rather short, armed with spines, and having a strong spine at the apex, which is recurved; tarsi usually five-jointed, but in some species the posterior tarsi have only three joints; wings horizontally folded when at rest.

The principal genera contained in this family are:—*Heteronytarsus*, *Eremiaphila*, and *Mantis*. The species of the first of these three genera are readily distinguished by there being only three joints to the posterior tarsi, there being five joints to the tarsi in all the species comprised in the remaining two genera. In the genus *Eremiaphila*, the palpi are obtusely pointed, and the head is partially enveloped in the thorax; the two posterior pairs of legs are long and slender, and the thighs are sometimes terminated by a small spine; the penultimate segment of the abdomen is furnished with two spines in the females. The elytra and wings are always very short. The genus *Mantis* (as now restricted) is distinguished from the last by the head being free, the palpi very slender and almost pointed, and the wings as long as the body, or nearly so; the penultimate segment of the abdomen is never furnished with spines.



Mantis gongylodes. (Lin.)

The Mantidæ are found in all warm countries, are exceedingly numerous, and remarkable for the grotesque forms which they usually assume. Their resemblance to a portion of a plant is often so great, that it is only by their motions they can be discovered. The names *religiosa*, *precaria sancta*, &c., have been applied to certain species on account of a peculiarity in their habits—that of erecting the thorax at an angle with the body, and placing together the large fore-legs, like the hands of a person when at prayer; in this position they will sometimes remain perfectly motionless for several hours. Their food consists of flies and other insects, which they are exceedingly dexterous in catching by means of their fore-legs; the prey is held by the fore-leg by bending back the tibia against the femur; the opposing surfaces of these two portions of the legs being covered with spines, enables them to retain their prey in this manner, and to convey it to the mouth.

The eggs are deposited by the female Mantis upon plants, and are covered by a glutinous substance, which soon becomes hard and forms a kind of case, in which they are arranged in a symmetrical manner. The form of the case varies according to the species. The young, when hatched, resemble the parents, except in size and in being destitute of wings.

Mantis gongylodes has been selected to illustrate a common form of the insects of the present family. This species inhabits the East Indies, and when alive is most probably of a green colour. The female is about four inches, and the male is about three and a half inches in length.

MANTINEIA was situated in the east part of Arcadia, in an elevated plain of considerable extent, which was bounded on the north by the plain of Orchomenus, and on the south by that of Tegea. [ARCADIA.] The inhabitants of Mantineia originally dwelt in four or five separate districts (Xen., *Hell.*, v. 2, § 7; Strabo, p. 337); but were afterwards collected into one city. The Mantineans had a democratical form of government, and were closely connected with Argos. Their political constitution, which appears to have been partly framed by Nicodromos, a friend of Diagoras of Melos, has received great praise from Polybius and Ælian. (Pol., vi., p. 487, C. (Casaubon); Æl., ii 22, 23.) Their form of government and their connection with Argos led them to oppose the Lacedæmonian interests. In B.C. 418 they formed an alliance with Elis and Argos against Sparta, but were entirely defeated and obliged to sue for peace. (Thucyd., v. 64-74, 81.)

In B.C. 385, the Spartans, suspecting the designs of the Mantineans, commanded them to destroy the walls of their city; and on their refusing to do so, the Spartans sent an army against the place, under the command of Agesipolis. Agesipolis took Mantineia by diverting the course of the river Ophis, which flowed through the city, and thereby causing an inundation, which undermined the walls. (Xen., *Hell.*, v. 2, § 1-7; Paus., viii. 8, § 5; Diod. xv. 5.) The city was then destroyed by the Spartans, the inhabitants compelled to live apart in four hamlets, as in antient times, and the form of government changed to an aristocracy. After the battle of Leuctra, the Mantineans again rebuilt their city; and it was in the vicinity of their town that the battle was fought, B.C. 362, between the Spartans and Thebans, in which Epaminondas fell. Mantineia, in later times, joined the Achæan league; but in consequence of the massacre of a garrison of Achæans, who had been placed in the town at the request of the inhabitants, the city was attacked and taken by the Achæans in connection with Antigonus Doson, who sold all the male population as slaves. In honour of Antigonus, the name of the city was changed to Antigoneia, which it retained till the time of Hadrian, who restored its original name. (Paus., viii. 8, § 6.) Pausanias, who visited this city in the second century, describes it as a large and flourishing place, and has devoted a considerable part of his eighth book to a description of its works of art.

The ruins of Mantineia, now called *Paleopoli*, are still considerable. Colonel Leake says, 'The circuit of the walls is entire, with the exception of a space of four or five towers on the eastern side; in no place are there more than three courses of masonry existing above the ground; and this height is so uniform, that one cannot but believe that the remainder of the works was constructed in sun-baked bricks, as it appears to have been when Agesipolis, by means of the little river Ophis, which flowed through the city, made an inundation, which submerged the foundation, and effected a breach in the superstructure. The facing only of the work is constructed with large wrought stones, put together without cement; the middle being filled up with a rubble of broken stones mixed with mortar; the inner lining was 2 feet thick, the outer 4 feet, the rubble 4 feet—total 10 feet. The form of the city was slightly elliptical, and about equal to a circle of 1250 yards in diameter, or 2½ miles in circumference. The number of towers, if I reckoned right, is 118, the curtains are generally about 80 feet long, the towers 23 feet in the face and 13 in the flanks. There are ten gates, the approach to which was carefully defended. The entire circuit of the walls is protected by a wet ditch, formed by a small stream, which flows in from the east, and, embracing the city so as to make it an island, flows westward from the opposite extremity.' (*Travels in the Morea*, i., p. 103-105.)

MA'NTOVA, DELEGAZIONE DI, a province of the Lombardo-Venetian kingdom, is bounded on the east by Verona and Rovigo, on the north by Brescia and the southern bank of the lake of Garda, on the west by Brescia and Cremona, and on the south by the duchies of Modena and Parma. The province of Mantova is entirely in the great plain of Lombardy, and forms part of the basin of the Po. It extends on both banks of that river, a part, though only a small one, lying on the south bank. The other rivers of the territory of Mantova are the Mincio and the Oglio, both affluents of the Po. The Mincio issues out of the lake of Garda at Peschiera, and for about ten miles marks the limits between Verona and Mantova, after which it flows across the territory of the latter, forms the lagoon in the midst of which stands the city of Mantua, and then enters the Po below Governolo. The length of the province from north to south is about 36 miles, and its breadth is about 32 miles: the population, in 1837, was 257,234, distributed in 17 districts, 13 of which are north of the Po, viz. Mantova, Ostiglia, Roverbella, Volta, Castiglion delle Stiviero, Castelgoffredo, Asola, Canneto, Morgaria, Borgoforte, Bozzolo, Sabbionetta, Viadana; and four south of the Po, namely, Gonzaga, Revere, Sermide, and Suzzara. There is no town of any importance except the capital.

The territory of Mantova is noted for its fertility. It contains numerous fine meadows well adapted for the grazing of cattle, which are irrigated by numerous streams and canals; vines and mulberry-trees also abound. Landed property is very valuable in this district, which labours however under two disadvantages, namely, the danger of the inundations of the Po, to prevent which the dykes and gates are kept in constant repair at a great expense, and the unwholesomeness of the air in summer.

MA'NTOVA (or MANTUA), the Town of, is on an island about five miles in circumference, in the middle of a lagoon formed by the Mincio, and is joined to the mainland by causeways, the shortest of which is about 1000 feet in length. The town and its approaches are regularly fortified, and it is considered the strongest fortress of Italy. The town is well built, with wide streets and squares, and contains many handsome structures. The principal buildings are—1. The cathedral, one of the finest in Italy, with many excellent paintings, chiefly by pupils of Giulio Romano. 2. The church of St. Andrea, raised by the architect Leon Battista Alberti, of Florence, and adorned with paintings by Giulio Romano and his pupils, and with the mausolea of several distinguished persons, the painter Mantegna, the sculptor Sperandio, the botanist Donato, the poet Cantelmi, the philosopher Pomponacio, and other illustrious Mantuans. Giulio Romano himself, who, as painter, architect, and engineer, has enriched Mantua with numerous works of art, is buried in the church of St. Barnaba, but the tombstone, with an inscription over his grave, has been obliterated in reconstructing the church. The house of Giulio Romano, built by himself, is still standing. 3. The church of Santa Barbara, rich in paintings. 4. The public library and museum: the sculpture gallery, although little noticed, is next in value to those of Rome, Florence, and Naples; the library contains 80,000 printed volumes and many MSS. 5. The ducal palace, an old, vast, irregular structure, partly rebuilt by Giulio Romano, with some good paintings, which have been much injured during the various sieges and invasions which Mantua has undergone. The portraits of the antient dukes of Mantua were bespattered with lime in 1797 by the political fanatics of that time, who testified in this manner their hatred of princes. 6. The gates and bridges of Mantua, especially the gate dei Mulini, by Giulio Romano. 7. A palace outside of the town, called 'of the T,' because some say it is built somewhat in the shape of that letter, whilst others pretend that the name is derived from the dialect word 'ejetto,' which means a drain for the marshy waters with which the ground was encumbered. This structure was originally intended for stables for the dukes Gonzaga, but under the direction of Giulio Romano it grew into a vast palace. The same artist, with his disciples, painted the apartments, one of which is called the Hall of the Giants, and contains a representation of the defeat of that mythological race by Jupiter.

Two miles from Mantua is the village of Pictole, which a vague tradition reports to be the same as Andes, Virgil's birthplace. The dukes of Mantua had a palace here, called La Virgiliana, which still exists, though much dilapidated.

The town of Mantua contains about 25,000 inhabitants, independent of the garrison. It is a bishop's see, has a lyceum and a gymnasium. In 1833 the province contained one hundred and fifty-six elementary schools for male children, and ninety-seven for females. (Serristori, *Saggio Statistico.*) The Jews, who are several thousands in number in Mantua, have their own schools and a house of industry supported by themselves.

The origin of Mantua is lost in the obscurity of the ante-Roman times. Virgil (*Æn.*, x. 201) boasts of its Etruscan origin, its former power, and says it was inhabited by three different races; and Pliny the elder (iii. 19) observes that it was the only relic of the Transpadane Etruscans, from whom it passed into the power of the Cenomani Gauls, and afterwards became subject to Rome with the rest of Cisalpine Gaul.

After the fall of the Western empire it was successively subject to the Goths, the Longobards, the Franks, and the German emperors. In the twelfth century it asserted its freedom as an independent municipality, like the other Lombard cities, but afterwards became subject to native tyrants or usurpers. The remaining history of Mantua is given under GONZAGA.

MANTUA. [LOMBARDY; MANTOVA.]

MANU (a word which implies 'rational,' from *man* to 'understand'), according to a judicious Hindu fiction, was the son or grandson of the creating deity Brahmâ, the first of rational beings, and the progenitor of mankind, who thence are called Mânavâs, or Manujâs (offspring of Manu). To this primeval sage, the father of the human race, and consequently their patriarchal ruler and legislator, is ascribed a celebrated system of religious and civil law, which in the beginning of time was revealed to him by Brahmâ, and has been handed down by tradition to the present age. In other words, the Sanskrit work now extant, and indiscriminately called Smriti (tradition), or Mânavadharmasâstra (the Institutes of Manu), is deemed by the Hindus not only the oldest but at the same time the holiest text after the Vedas. Before these pretensions of the sacred code to antiquity and authority can be duly appreciated, it will be convenient to state its contents, and to point out the leading features of a system at once so comprehensive and so complicated that it would be almost impossible to dwell upon its particular precepts without entering fully into the labyrinth of Hindu religion and ceremonies. The work is divided into the twelve following chapters:—i., On the creation; ii., On education, or on the first order; iii., On marriage, or on the second order; iv., On economics and private morals; v., On diet, purification, and women; vi., On devotion, or on the third and fourth orders; vii., On government, or on the military class; viii., On judicature, and on law, private and criminal; ix., On the commercial and servile classes; x., On the mixed classes, and on time of distress; xi., On penance and expiation; xii., On transmigration and final beatitude.

We shall not dwell on the first or last chapter; the first is occupied with a summary of the contents of the whole code, and with a problem of cosmogony, in accordance with the wild and fanciful conceptions of Hindu metaphysics and natural philosophy; the twelfth chapter contains a detailed system of metempsychosis and final punishments, closely connected with the institutes of temporal law. It is obvious that either a strict order in the arrangement of the judicial code has been neglected, or, what is more probable, the monarchical and civil laws (vii.-xi.) have purposely been separated from the general duties contained in the first half of the work. These for the most part are of a religious character, being engrafted on the most rigid distinction of caste, and therefore totally dependent upon the hierarchical rules of the first order, by which even the minutest actions of the inferior classes are invariably to be regulated. Without entering into the mass of formalities and customs by which the main structure of the Brahminical, and in fact of every hierarchy is largely cemented, and into those generally absurd and often ridiculous ceremonies inculcated upon the different branches of society, it will be sufficient to remark that they were evidently congenial to the religious prejudices, and to the habits and disposition of the Hindus, and that most of them had long been sanctioned when the sacred code was promulgated. This is expressly asserted by the author himself, who professes to give the system of law in its full extent, and the immemorial customs of the four classes, adding that immemorial custom is transcendent law, approved in sacred scripture, and that holy sages have embraced good usages long established. The principal duties of the four classes in general are stated as follows:—

To the first, or sacerdotal order, the supreme ruler assigned the duty of reading the Veda, and of teaching it; of giving advice to kings, of sacrificing and of assisting others to sacrifice, of giving alms and of receiving gifts, of promoting justice on earth, and of procuring happiness hereafter; in short, a Brahmin must ever be intent on divine worship, devotion, austerity, and abstinence. It is only in case of need that he is allowed to support himself by tillage or traffic, but never by service for hire. Although he is by right the chief of the whole creation, and, whether learned or ignorant, must be revered as a powerful divinity, nevertheless he should constantly shun worldly honour, and rather seek disrespect and poverty.

The Kshatriya, or military class, is bound to defend the people, to read the Veda, to sacrifice and to give alms; the Vaisya caste to cultivate land, to keep herds and flocks of cattle, to carry on trade, to lend at interest, to sacrifice, to read the scriptures, and to bestow presents. The business of the fourth, or Sudra class, is only to serve the three upper orders, and chiefly the Brahmins.

Now in these four classes, which may be called the pillars of Hindu society, those only who are born of wives equal in caste are to be considered as of the same class with their fathers. But by intermixture and marriage with women who ought not to be married, and by the omission of prescribed duties, a great number of impure classes have been formed, which in their turn are obliged to perform strictly the special rules and obligations enjoined on their caste, or else they will sink to a still lower degree in the scale of human society. These mixed classes are enumerated at large in the tenth chapter, and prove a far advanced state of civilization by the very great variety of professions which they exhibit. But as even the aboriginal tribes and the inhabitants of adjacent countries are asserted to have gradually sprung from the same source, we need scarcely remark that the institution of caste carried to this extent must be altogether imaginary; and moreover that a system of law founded on these vague and fanciful principles must be a partial and almost degrading one. Hence the punishments, consisting of pecuniary fines and confiscation of property, of mutilation of the body, and death, of exile and loss of caste (which is deemed moral death), are inflicted according to the privileges of the different classes; in general these punishments are slight and trifling for the highest order, but dreadfully severe and cruel for the same crimes when committed by an individual of inferior caste. Thus a soldier who defames a priest shall be fined a hundred panas, a merchant a hundred and fifty, but a mechanic or servile man shall be whipped; and while the slaying of a Sudra by a man of the sacerdotal class is exactly equivalent to the killing of a cat or dog, the murder of a Brahmin is an inexpiable crime, and he who barely assaults a priest with intention to hurt him shall be whirled about for a century in a place of future punishment, which is described as 'a dark hell.'

With regard to the penal provisions of the criminal law we shall only observe that in most of them the principle of retaliation has been sanctioned; for instance, whoever breaks a dam or sluice, by which an inundation would be caused (Buchanan, *Mysore*, i. 4), shall be drowned; an adulterer shall be burned on an iron bed; a cut-purse is to lose two fingers, and 'with whatever limb a thief commits the offence, even that limb shall the king amputate' (viii. 334; ix. 273, ff.). Nevertheless most of the punishments may be commuted for pecuniary fines; and in case a temporal chastisement proves unavailing, threats of future pain are often held out. A priest may by muttering imprecations and holy charms chastise those who injure him, without complaining to the king. In short the first part of the sacred code is entirely what we should call hieratical. This character is apparent not only in its inflexible severity where religion and its ministers are concerned, and the well-calculated distinction of castes, by which a free intercourse between the members of society would be prevented, and consequently a more close dependence on the priesthood ensured, but also in the spirit of sublime devotion, of benevolence and tenderness to all sentient creatures, by which sacerdotal institutes are generally distinguished.

The second part of the code, containing the monarchical and civil laws, is more congenial to social order, and although the same spirit of hierarchy prevails, it is often checked by rules of a sound policy and of regular administration. The king, born in the military class, is formed of particles drawn from the substance of the guardian deities; surpassing all mortals in glory, he is himself a divinity in a human shape, and consequently he must be the protector of all classes who discharge their duty (7, 4. 9, 301 ff). 'He must invariably speak truth and never transgress the rule of strict justice; but as just punishment cannot be inflicted by an ignorant and covetous king, he has to learn the science of criminal justice and of policy, the system of logic and metaphysics and sublime theological truth from learned priests, and from the people the theory of agriculture, commerce, and other practical arts.' Nothing is so often and so strongly inculcated by Manu as the equity and justice of kings in protecting the property of their subjects against fraud and violence. For this purpose the prince shall appoint a governor of one town with its district, another of ten towns, of twenty, of a hundred, and above all these inferior authorities, a high officer, whom we may perhaps call a lord-lieutenant, over each thousand towns. Also, to prevent the people being oppressed, a superintendent of all affairs shall be established in every large town to inspect the inferior officers. A large number of laws for the mercantile tribe, with rigorous regulations about the sale and purchase of marketable things, about weights and measures, tolls and freights for boats passing up and down rivers; the severe punishment of robbers and of those who will not restore loans and deposits, and the most subtle definitions of the law of inheritance—all tend to show that, however restricted by the rules of caste the social and personal condition of an individual might be, his property at least was respected and held inviolable. As to the laws of succession, it is laid down as a fundamental rule, probably derived from antient patriarchal manners, that, if possible, the whole property of the family should be kept together. Accordingly after the death of his father, the eldest son may take entire possession of the patrimony, and the others may live under him, unless they choose to separate. In this case, the widow and such persons as by crimes or mental and corporal defects are legally excluded from participation, being provided for, the heritage is divided into portions according to the minute and almost endless variety of regulations by which, owing to the real or imaginary intermarriage and mixture of classes, this part of Hindu law has become extremely abstruse and intricate. Property belonging to a sacerdotal student and to a minor must be guarded by the king, until the owner shall have concluded his studentship, or until his infancy shall have ceased in his sixteenth year. No tax is levied or charge made for this trusteeship nor for any tuition whatsoever; and except custom-duties and market-taxes, the only legal tax or annual revenue which a sovereign may receive from his whole dominion through his collectors is imposed on the mercantile and agricultural classes. He may take either a twelfth part of the crops, or an eighth, and in time of distress even a fourth part, but in every respect he must act like a father to his people. (7, 80, 10, 118 ff.) Serving men, artisans, and mechanics never pay taxes, but they must occasionally assist by their labour when needed. According to a theory most rigorously supported in a rude state of feudal and despotic government, by several Hindu lawgivers of modern times, and even by a passage in Strabo, the king has been declared sole possessor of the soil (*Digest of Hindu Law*, 1, 460; Strabo, p. 1030, *ἔστι δὲ ἡ χώρα βασιλικὴ πᾶσα*). But although the sovereign's right to an annual ground-rent, and his gifts of land, so often recorded in inscriptions and written documents, may originally have been founded on such a doctrine, its practical application would have proved ineffectual, and in fact it is nowhere adopted nor even mentioned by the sacred code. On the contrary, it is expressly stated as a rule laid down by antient sages, that cultivated land shall be the property of him who has cut away the wood, or who has cleared and tilled it (9, 44). To prove the inviolability of the tenure of land, in which the proprietor is rather protected than limited by government, many special laws might be produced, such as those concerning landmarks and boundaries, the common ponds by which the fields are watered, the punishment inflicted on herdsmen and owners for injuring cattle; and so far is the agricultural tenant from being disturbed in his possession, that even if land be injured by his neglect, he shall only be punished by a heavier tax.

The most striking feature by which, on the whole and notwithstanding its many glaring defects, this code is distinguished, is the rigour and purity of its morals. A complete system of ethics might be gathered from the scattered moral sentences, of which we subjoin the following few examples. 'Let not a man be querulous, even though in pain; let him not injure another in deed or in thought, let him not even utter a word by which his fellow-creature may suffer uneasiness (2, 161). Let him bear a reproachful speech with patience; let him speak reproachfully to no man; with an angry man let him not in return be angry; abused, let him speak mildly (6, 47). Let him say what is true, but let him say what is pleasing; let him speak no disagreeable truth, nor let him speak agreeable falsehood (4, 138 ff.). Though oppressed by penury, in consequence of his righteous dealings, let him never give his mind to unrighteousness (4, 171); let him be firm in his contentment and check all desire of acquiring more than he possesses, for happiness has its root in content, and discontent is the root of misery (4, 12). A wise man should constantly discharge all the moral duties, though he perform not constantly the ceremonies of religion (4, 204); he should act without any view of reward, and constantly shun religious hypocrisy, for he who describes himself to worthy men in a manner contrary to truth is the most sinful wretch in the world; he is the worst of thieves, a stealer of minds (4, 255). Even here below an unjust man attains no felicity, nor he whose wealth proceeds from giving false evidence; for the soul itself is its own witness: offend not thy soul, the supreme internal witness of men. The sinful have said in their hearts, "No one sees us." Yes, the gods distinctly see them, and so does the spirit within their breasts (4, 170, 8, 84). He who perseveres in good actions, in subduing his passions, in bestowing gifts, in gentleness of manners, who bears hardships patiently, who associates not with the malignant, who gives pain to no sentient being, obtains final beatitude (4, 246; 12, 10). Single is each man born, single he dies, single he receives the reward of his good, and single the punishment of his evil deeds. When he leaves his corpse, like a log or lump of clay on the ground, his kindred retire with averted faces, but his virtue accompanies his soul' (4, 240). The principal moral duties in general are summed up in the following passage: 'The avoiding of all injury to animated beings, veracity, the abstaining from theft and from unjust seizure of property, cleanliness and command over the bodily organs, form the compendious system of duty, which Manu has ordained for the four classes' (10, 63). To conclude with the words of Sir William Jones: 'The work contains abundance of curious matter, extremely interesting both to speculative lawyers and antiquaries, with many beauties which need not to be pointed out, and with many blemishes which cannot be justified or palliated; it is a system of despotism and priestcraft, both indeed limited by law, but artfully conspiring to give mutual support.'

The time at which the laws of Manu were composed is wholly uncertain, and it was only from conjecture that the eminent Sanskrit scholar whom we have just named fixed the twelfth century B.C. as the probable epoch of their composition. Generally speaking we may safely pronounce it the code of an already refined and enlightened people, and the work itself bears ample testimony that a very advanced degree of civilization had been acquired by the Hindus when these laws were promulgated. For producing every article of luxury an immense variety of professions would be required. And as a Sudra deciding causes of law, and even a Sudra-king, are mentioned (4, 61; 8, 21), and as king Vena is censured for having given rise to a confusion of classes (9, 66), it would seem that the order of things was then nearly the same as in modern times, in which, according to the remark of a judicious observer, 'every profession, with few exceptions, is open to every description of persons, and the discouragement arising from religious prejudices is not greater than what exists in Great Britain from the effects of municipal and corporation laws.' (Colebrooke, *Remarks on the Husbandry and Internal Commerce of Bengal*, Lond. 1806, p. 174; Rickards's *India, or Facts submitted to Illustrate the Character and Condition of the Native Inhabitants*, London, 1828.) Even intellectual culture is found to have made considerable progress: the Vedas are written, and must be read, with accents and letters well pronounced; heretical books are mentioned (2, 11), legal questions must be decided by arguments and rules drawn from local usages and from *written* codes (8, 3), and written edicts of kings were by their frequency liable to forgery (9, 232). But after all, and what is most important, the burning of widows is totally unknown: on the contrary, a widow is legally bound to devote herself to pious austerity, and may even be lawfully married to the brother of her deceased husband, as she could marry any other man during the reign of king Vena (3, 173; 5, 157). Now the duties of a Satti, so minutely detailed in works of later date, could not possibly be omitted in a sacred code of law, and therefore the work seems at least anterior to the invasion of India by the Macedonians, who were fully acquainted with these horrid sacrifices.

The learned Hindus agree that many laws enacted by Manu were confined to the first three ages of the world, and have no force in the present age; some of them have been abolished or modified by subsequent Hindu lawgivers, according to whom the work is rather to be honoured than to be strictly followed. In fact for a long time it has formed only a very small part of the juridical system, and may be considered as the oldest text-book of *law extant*, or as the Hindu 'Institutes,' preparatory to the copious '*Digests*,' 'Pandects,' and other legal works now in use among the different juridical schools in India. (Ellis, in *Madras Transactions*, vol i., and Sir Thomas Strange, *Hindu Law, principally with reference to such portions of it as concern the Administration of Justice in the King's Courts in India*, Lond. 1830.)

The 'Institutes' of Hindu law, or the 'Ordinances of Manu,' were verbally translated from the original by Sir William Jones, 1794. The Sanskrit text with the gloss of Kullûkabhatta was published at Calcutta in 1813, and a new edition of the metrical text, together with Sir William Jones's translation, carefully collated with the original, was prepared by Sir Graves Haughton, 1822, 1825. Another valuable edition, with select notes and a French interpretation, by Loiseleur des Longchamps, was published at Strasburg in 1830.

MANUCODIA'TA. [Birds of Paradise, vol. iv., p. 420.]

MANUEL, NICLAUS, who claims notice not only as an artist, but as a poet and author, and one who took an active part in the Reformation in Switzerland, was born at Bern in 1484. His real name is conjectured by his recent biographer, Dr. Grüneisen, to have been Alleman, but as he was illegitimate, it was, for family reasons, changed anagrammatically into that of Manuel. It is further conjectured that he was brought up by his maternal grandfather, Thüring Frickart. Having made choice of painting as a profession, he studied the art at Colmar, under the successors of the celebrated Martin Schön, until the fame of Titian attracted him to Venice, where he became one of his pupils. This period is fixed by his biographer about the year 1511, at which time he was married. He is said to have assisted Holbein, in 1515, in his 'Dance of Death;' yet this is very questionable, because he was himself employed at that time in painting the same subject at Bern, which he executed in fresco in the cloister of the Dominicans. He also ornamented his own house with a large fresco, representing Solomon worshipping idols. But of these and several other of his works nothing now remains except some small water-colour copies preserved in the library at Basle. It seems however that his pencil did not bring him sufficient for the maintenance of his family, on which account he resolved to try to advance himself in military and public affairs. He served, as quarter-master or commissary, among the Swiss allies who assisted Francis I. in his expedition against Milan, 1522, and was present both at the storming of Novara and the battle of Bicocca. In the following year he was chosen landvogt of Erlach; and from the year 1526 distinguished himself by his zeal in the cause of the Reformation. From this period he was entirely devoted to that cause, and to his various public employments. He died in 1530, when only 46 years of age.

As a writer he began to distinguish himself in 1509, by various popular poems and songs in the Swiss dialect, full of humour and sharp satire. His 'Fastnachtspiele,' or Dramatic Moralities and Mysteries, which he began to compose about 1522, are marked by the same qualities, in which, as may be almost taken for granted, his polemical pieces in support of the Reformation were not at all deficient.

MANUEL, FRANCISCO, one of the most eminent of the modern poets of Portugal, was born at Lisbon in 1734. His first study was music, but he afterwards devoted himself entirely to literature, and more especially to poetry, his talent for which obtained him many admirers, and also some enemies and persecutors. His enemies accused him not only of entertaining exceedingly heretical opinions, but of openly professing his contempt for the church, alleging against him his arguments in favour of toleration, his free remarks on the monks, and, not least of all, his translation of Molière's 'Tartuffe.' Being summoned to appear before the Inquisition, instead of obeying the mandate of the Holy Office, he attacked and disarmed the agent sent to apprehend him, and saved himself by immediate flight to Paris, in 1788; in which city he resided till February 25, 1819, when he died at the age of eighty-four.

Though a zealous cultivator of the purest models of Portuguese literature and poetry, Manuel was a no less ardent admirer of the classics. His veneration for the writers of antiquity was in some degree injurious, inasmuch as it led him to regard them rather as models invariably to be followed, than as studies upon which a sound poetical taste is to be formed. And to this predilection for the poets of antiquity is to be ascribed his dislike to rhyme. Nevertheless his merits and excellencies are undeniable; and it has been said of him that no Portuguese poet or writer since the time of Camoens did so much for the language, in which respect his services were more valuable than those of a whole academy. He excelled in lyric and satiric poetry, and among his productions of the former class his odes to D'Albuquerque and Washington are deservedly admired for their sublimity and grandeur. Many of his epistles, tales, and fables are also stamped by merit, though of a different kind. The services which he further performed for Portuguese literature were very considerable, for he produced admirable versions of Wieland's 'Oberon,' 'Silius Italicus,' Châteaubriand's 'Martyrs,' and La Fontaine's 'Fables.' Like his original compositions, these translations are distinguished by singular purity of style, carried occasionally perhaps rather too far, as his horror of Gallicisms and new-coined expressions frequently led him to adopt obsolete words, which carry with them something like an appearance of pedantry and affectation.

MANUMISSION. [LIBERTINUS; SLAVE.]

MANURE. Every substance which has been used to improve the natural soil, or to restore to it the fertility which is diminished by the crops annually carried away, has been included in the name of manure. Thus chalk, marl, clay, and even sand, when added to the soil for the purpose of improving its texture, have been called manures; and some confusion has arisen in our ideas in consequence of applying the same word to signify things which are essentially different. The French have a term by which they distinguish the substances which merely improve the mechanical texture of the soil from those which act more directly in nourishing the plants which grow in it. The former of these they call *amendements*, and the latter *engrais*. For want of another word there might be no impropriety in adopting the first of these, instead of the vaguer term of 'improving manures,' retaining the word 'manures' for those which are considered as stimulating or nourishing, and which are usually called enriching manures.

It is well known to all practical agriculturists that the texture of the soil and the proportions of the earths of which it is composed are the first and most important conditions of its productive powers. Where there is a good natural loam which retains moisture without becoming wet or overcharged with it, and permits the influence of the atmospheric air to pervade it, the crops cannot fail to be more certain and remunerating than in loose sands or tenacious clays, however rich they may be in those substances which are supposed to supply the elements from which the juices of plants are chiefly composed. But at the same time it is equally true, that the best texture of soil will not produce good crops for any length of time, without the help of dung or other rich manures to recruit the loss produced by vegetation.

The various means of improving the texture, such as tillage and the mixture of earths, are treated of separately. [LOAM; MARL; SOIL; TILLAGE.] We shall here confine our observations to that class of manures which stimulate or enrich the soil.

There are some substances which evidently belong to both classes of manure. Of these lime, either in its caustic state of quick-lime, or its milder form of a carbonate or chalk, is the principal. Lime, being an earth less porous than sand, and more so than clay, has an improving effect on soils in which either sand or clay prevails; but it has also a chemical effect as an alkaline earth, and, considered in this light, it acts on the soil in a peculiar manner, and greatly assists the effect of enriching manures, which are all of animal or vegetable origin.

Lime as a manure acts most powerfully in its caustic state, that is, when deprived of the carbonic acid which is generally united with it. The carbonic acid is expelled by the heat of a furnace or kiln, and limestone or marble is by this means reduced to the state of quick-lime. The water of crystallization, which makes the particles of marble or limestone adhere in a solid form, is driven out by the heat which reduces it to a light porous stone, very readily pulverized, and having so strong an attraction for moisture and carbonic acid, that, if it be left exposed to the atmosphere for any length of time, it absorbs both from it, and gradually returns to the state of hydrate and carbonate, or lime united with water and carbon, with this difference, that it is now a fine impalpable powder, instead of a hard stone.

Lime newly burnt has a peculiar effect upon all organic matter, which it burns or dissolves by taking from it a portion of the water and of the carbonic acid which it contains. On humus, which is the result of animal and vegetable decay in the earth, it has a peculiar effect, rendering it soluble in water, and thus fit to enter the minute fibres of the roots of plants. This circumstance is probably the secret of all the wonderful effects of lime on certain soils, while it appears almost inactive in others. In some places, where the soil is peculiarly poor, being evidently a pure silicious sand washed by the sea or by rivers, lime is found to do no good; but on the rich alluvial clays, which contain much organic matter, it is the best of manures, both in a caustic and mild state.

Caustic lime readily unites with the half-decomposed fibres of vegetable matter, such as straw, heath, and the like; it helps their decomposition and accelerates it; by its means the dead fibres of the roots of vegetables, which remain in the earth when the plant is removed, become soluble; and their elements, entering into new combinations, supply the materials for the various vegetable substances which are naturally produced. As long as there is a store of organic matter or humus in the soil, lime will be an excellent manure; as soon as this is exhausted, it will only add to the sterility by destroying every fibre which the seed might throw out from its own substance by the assistance of light and moisture. This will account for the various reports which have been made at different times of the effect of lime when put on land. In some instances the quantity which might be safely used appeared almost unlimited, in others a very small portion exhausted the powers of the soil.

Agricultural experiments are seldom conducted with sufficient precision. The man of science in his study operates on a minute portion of soil, and his experiments on vegetation are carried on at best in a few feet of garden-ground. The farmer is occupied with too many things to mark the minute differences which affect the results. Where lime has been found useful, and a good crop has been obtained by the abundant use of it, land is limed as often as can be done, with the same expectation of success. The same may be said of chalking and marling: if one application has done good, another, it is supposed, will be equally beneficial. On the same principle the quack doctors pretend that their medicines not only cure the diseased, but should also be taken continually by persons in health to prevent disease. The ignorant only are the dupes of these professions. Lime is a most excellent manure, and, when properly applied, most beneficial; but it may become inert, or even noxious, when applied injudiciously.

The property to which lime owes its chief power in promoting vegetation is, its combining with certain elements of decayed animal and vegetable matter, and forming a compound which is soluble in water, and which attracts carbonic acid and moisture from the atmosphere. This substance is readily taken up into the sap by the fibres of the roots, and supplies the plant with oxygen, hydrogen, and carbon, which are the elements of all vegetable substances, if we except a few which also contain nitrogen, one of the component elements of the atmosphere. Thus we see that air, water, and carbonic acid are sufficient to afford all the elements of vegetables, and that the use of the lime is chiefly to facilitate the absorption of these elements, besides depositing a very minute portion of the pure earth in certain parts of the vegetable. Thus far lime acts as a solvent, in the same manner as alkaline salts, which, in a much smaller quantity, would have the same effect. The alkalies are seldom used as manure in a pure state, but they abound in ashes, sea-weeds, and all woody fibres of vegetables; and when these are used as manures, the alkali produces its effect. Lime, being so much more abundant, and obtained at comparatively little cost, is preferred. But lime, besides its effect on the humus in the soil, acts also on the clay which it may contain; and where this is abundant, its effect is most beneficial. For this purpose it need not be in a caustic state; and chalk, which can be used in much greater quantity, from its abundance in many parts of England, effects a much more permanent improvement in the soil. But chalk acts also chemically wherever acids exist in too great abundance, whether they be mineral or vegetable: it neutralizes these acids, and in doing so generally gives out some of the carbonic acid which it is combined with: and this, before it is quite expanded into gas, is readily taken up by the moisture in the soil and carried into the vessels of the plants, where it deposits the carbon, letting the oxygen escape by the pores of the bark and leaves.

Where limestone is abundant, and the burning of it is expensive, it is sometimes broken and pounded fine: in this state it is of great use in stiff soils. At first it acts merely mechanically, as fine sand would do; but gradually pulverising and meeting with acids, its chemical effects become apparent.

The use of quick-lime in rendering inert vegetable fibres soluble, and hastening the decomposition of animal substances, is of the greatest importance in agriculture. Substances may be rendered highly enriching in a short time, which, without it, would have lain long dormant in the soil or the dung-heap. Its effects in this way will be more particularly noticed when we treat of composts.

Wherever there is peaty matter in the soil, which, owing to the tannin principle which it contains, is, by itself, perfectly incapable of putrefaction, lime is the true remedy. Assisted by fæculent matter to produce a degree of heat and fermentation in it, lime soon dissolves peat and converts it into real humus, than which there is no better food for vegetation. The ashes of burnt peat act in a different way; they contain alkaline salts and earths in a state of minute division. They do not furnish any substance from which a plant derives its chief increase in bulk, but they serve to prepare other substances in the earth and convert them into manure. They have also some effect in stimulating the action of the vessels which elaborate the different juices, as culinary salt has on the stomach of most animals. At least there is every reason to think so from analogy in the absence of positive proof. From all this the practical use of lime, chalk, or ashes is readily deduced. In a very stiff clay, chalk or lime will render it much more porous, and admit the influence of the atmosphere; it will correct acidity and assist the nutritious effects of animal and vegetable manures. Quick-lime spread on a soil abounding in vegetable matter will make it active by dissolving the half-decomposed fibres and converting them into a soluble mucilage: being extremely minutely divided by its property of attracting moisture rapidly, a very small quantity produces an immediate effect. Hence it is generally spread over fallows or clover-leys, which are preparing for wheat-sowing. If it were put on the land long before the seed is sown, it would have lost its chief power by attracting carbonic acid and returning to the state of carbonate or chalk, and all the expense of burning would be thrown away, except as far as it has thoroughly pulverised it. But frost does this with chalk spread before winter at a much cheaper rate; and a good dressing with chalk will last in the soil, and its effects be preserved, many years after all the lime would have disappeared. It is therefore a matter of mere experiment and calculation whether it be more profitable to put ten waggon-loads of chalk on an acre of stiff clay, or one or two waggon-loads of quick-lime. If the soil be very tenacious, the chalk will probably be the most profitable in the end as well as the cheapest; but for a few crops the lime may appear to have the advantage. Everything depends on situation, and the comparative facility with which lime and chalk can be procured.

On poor sands chalk will be found to produce a greater and more permanent improvement than the same value in lime, which, unless it be mixed with clay or vegetable substances, will not be of great use on such soils. When marl can be procured, or clay and chalk, these will be the best correctives for the porous nature of sand, whether mixed by nature or artificially. But marls are chiefly amendments, and as such will be noticed separately. [Marl.]

The substances which have generally been used as manures are numerous and various, and have been divided into stimulating and nourishing manures. All saline substances are ranked under the first, and all organic matter under the second.

When ignorance sheltered itself under vague terms, the fertility of the soil was attributed to the general term 'salt' or 'nitre,' both very undefined substances, which led to errors instead of promoting the investigation of truth by observation. Nitre was supposed to exist in dews, rains, and snow. All vegetables were supposed to consist of salt and earth, or more properly of soluble and insoluble substances, and on this uncertain foundation theories were built and practices recommended. It was said that when the soil was fallowed it imbibed nitre from the atmosphere, because it was known that animal and vegetable matters decomposing in a heap of earth gradually produced nitre, which, although it did not actually absorb it from the air, was certainly generated by combining the elements of atmospheric air with the alkali which existed in the organic matter; and, as the earth from which the nitre was extracted was an excellent manure, from the remaining portion of organic matter in it, it was supposed to be the effect of the nitre which remained. That nitre may be of use in some cases we will not deny; but there is not the slightest foundation for believing that it is the real pabulum of plants, or that the soil owes its fertility entirely to its presence.

From the most accurate analysis of the component parts of plants, it is ascertained that salts and earths form a very inconsiderable portion of their substance, and that carbon and water furnish by far the greatest part. The nitrogen of the atmosphere is found only in some of them, and all metallic substances seem entirely adventitious.

It has been supposed that all the carbon in plants might be supplied by the atmosphere, but this is not supported by any proof; on the contrary, plants will not thrive, unless there be in the soil in which they grow substances which contain carbon, that is, chiefly animal and vegetable substances, and chalk. The two first readily part with it, but the latter retains it too strongly to lead us to conclude that the plants draw any of it from this source, unless where a stronger acid is present to release the carbonic acid by its greater affinity to lime. We may conclude then, that from whatever source the oxygen and hydrogen of vegetable substances are derived, the carbon comes from the decomposition of organic substances, either animal or vegetable, and that these, in a certain state of decomposition, afford the supply of carbon by which the plant increases and secretes its juices. As in the animal digestion the chemical affinities, as observed in the raw materials, seem all to be set at defiance, or greatly modified by a vital energy of that organ, so in the conversion of the simple vegetable sap, differing but little from pure water, into the various substances which are produced by vegetation, no analogy can be drawn from the experiments of the laboratory. Nature alone has the secret of transmutation, and it is only by watching her operations and endeavouring to imitate them, that we can hope to come to useful practical results.

These preliminary observations are necessary to the consideration of the comparative importance of various substances used as manures.

The first and most important class of manures are the excrements of animals. The peculiar property of earth in absorbing putrid effluvia and removing disagreeable smells, appears an indication of nature to lead us to bury putrid animal substances, of which the excrements and dead carcasses of animals are the most numerous and obvious. It would require no length of experience to show that wherever this is done vegetation is more vigorous. There is therefore another motive for burying dung than merely to get rid of a disagreeable substance. From the most antient times of which there are any records, the dunging of a field has been an important part of cultivation. The preparing of the dung of animals, so as to render it more efficacious, is a later improvement, and has not yet attained the perfection of which it is capable, unless it be so in China, of which we read wonderful accounts. The fresh dung dropped on the ground, far from improving the herbage where it has fallen, appears to injure it, and render it unfit for cattle to eat; when it gradually disappears, and not till then, the spot is restored to its former verdure. But if the dung is dug into the ground and covered with earth, the fertilising effect will be immediately perceived. This is a sufficient lesson to the husbandman to make him bury the dung as soon as possible. But this not being always practicable, it is collected in heaps until it can be carried to the land prepared for its reception by ploughing or digging. By mixing the straw, which has served as litter to cattle, with their dung, the quantity is increased, and by allowing this mixture to heat and putrefy, a greater quantity of manure is produced. This is probably the history of the dunghill. Science has seldom been applied to show the most profitable mode of collecting dung and forming a dunghill; but experience has, in many countries, taught methods which accord well with what science might have taught. The manure must be soluble before it can be effective; this solubility can only be produced in the more solid portions, such as the straw, by putrefaction, which the dung promotes when duly moistened. All well-managed dunghills are therefore watered in dry weather, and turned over to let every portion undergo the same degree of putrefaction. The exact moment when it is most advantageous to bury it in the ground seems not yet fully decided. Some let the decomposition go on until a great portion of the heap is converted into a black, tough, oily substance, which, from early association, gives the idea of richness. It is no doubt a powerful manure which acts speedily, but is it the most economical? This may be disputed. A great portion of the substance must have been resolved into gases, which fly off and are lost. The remainder, evidently carbonaceous from its colour, has acquired too much of the appearance of charcoal to be very efficient; and it is only the exuding juice which is immediately fertilising. The most experienced farmers agree, that whenever the brown colour of a dungheap verges towards a black, the dung has lost something of its value, besides the diminution in its bulk by dissipation. The best state in which dung can be carried to the land is, according to the best informed practical agriculturists, when the straw is so rotten that it readily breaks into short pieces, without having entirely lost its form: it should then be of a brown or mahogany colour, uniform throughout the mass. Whenever dung is mentioned by foreign agricultural writers, it is generally understood to be in this state, which in English is called short dung.

As manure is wanted for the land at different seasons, it is of consequence that the dung from the yards and stables should be collected in such heaps, and managed so as to be in the exact state which is thought most advantageous at the time when it is carted on the land. To effect this some attention is required. The oldest portion must have its putrefaction retarded, and the newest accelerated, to bring them both to the same state. This is easily done. If a certain thickness of dung is kept trodden down by the cattle, it will be a long time before it decomposes, nor will it do this without being turned over to expose the under portions to the air. If, on the contrary, it be carried out into a heap in a loose state, and occasionally turned over and moistened when it appears dry, it will heat and be ready in a very short time. When a sufficient quantity of short dung can be carried to a field prepared to receive it, and immediately ploughed in with a shallow furrow, it will soon incorporate with the soil, and afford a succession of soluble humus or mucilage, which will give regular nourishment to the plants. This is said on the supposition that the soil is in that state when it only requires recruiting, and has a texture favourable to the crops raised upon it. In poor sands or wet clays some modification in the state of the dung may be necessary.

In speaking of dung, we have not said anything of the different kinds of dung produced from different domestic animals. In some cases it may be advantageous to keep these separate; for instance, the dung of cows from that of horses, of cattle feeding on oil-cakes or grain, with or without turnips, and those fed on straw or refuse hay only. Cow-dung, when in a fresh state, is thought best for light soils, and horse-dung for cold heavy soils. The richer the dung, from the nature of the food given to the animals, the less of it need be used, and this may be worth attending to. But in general a mixture of the dung of all the different animals kept on a farm with all the straw that can be afforded, will give a manure of an average strength, which may be used upon all kinds of land; with this difference, that for light soils it should be more decomposed than for the heavy, and also ploughed in deeper; for the air penetrates the light soil to a greater depth, and sooner acts on the manure. In heavy land the straw, if not so much decomposed, will form cavities to let in the air, and allow of a more regular evaporation. All this is well known to most farmers, but not always strictly attended to. It is better to manure slightly and often than to put on a large quantity at once, except for some particular crops, which require a rich earth and consume much manure, such as potatoes, beet-root, and ruta-baga, or Swedish turnips, whatever some authors may write to the contrary, led away by the old notion that roots impoverish the soil less than seeds, which is not universally the case. Any one who has raised the above-mentioned roots with the usual manuring, and drawn them off the land to be consumed elsewhere, will acknowledge that his subsequent corn was far inferior to that which had succeeded beans, tares, or clover, with the same quantity of manure. Those who do not agree in this opinion may readily be convinced by a fair trial.

The chief use of cattle on an arable farm, besides those which are necessary for the operations of husbandry, is to produce manure for the land. If the cattle repay their food and the expense and risk attending their keep, the manure is sufficient profit. Even with a moderate loss, they must be kept, when manure cannot be purchased; and a portion of the land must be cultivated solely for the maintenance of cattle. In some poor soils one-half of the land is not too much to produce manure sufficient for the other half. The loss, if any, on the cattle must be repaid by the increase of the corn crops. Manure is to a farm what daily food is to an animal; it must be procured at any sacrifice. It is better to let land remain uncultivated in rough pasture, as was once the case with a great part of Britain, and is still the case with extensive tracts on the Continent, than to break it up without having the means of manuring it. A few crops may be obtained at first, but the land is deteriorated for ever after, and what has been obtained from it is dearly paid for.

Various means have been adopted to increase the quantity and efficacy of manure. The simplest is to increase the number of cattle, and husband their manure. It is evident that to let cattle run in loose pastures is a great loss, not only on account of the dung which is dropped, and more than lost, but also the urine, which contains the very essence of manure. In all countries where stall-feeding is practised, the lands are highly manured, and the crops more certain and abundant. With this system is connected a much more economical management of the manure, by keeping the litter and more solid parts of the dung separate from the urine and liquid parts, which are collected in large reservoirs, and used either in the liquid state, and applied immediately to the land, or in the formation of compost heaps, with earth and vegetable substances collected for the purpose, and the straw which has served for litter. As this is a subject not generally known and seldom carried into practice in Britain, we will dwell a little upon it, availing ourselves of the information obtained from other countries, particularly from the husbandry of Flanders, of which an account has been published in the Farmer's series of the 'Library of Useful Knowledge,' Nos. 105, 106, and 107.

When the urine and a considerable portion of the solid dung are washed into a reservoir immediately from the stables, its strength can be much more readily ascertained than when they are mixed up with straw and thrown into a yard. The specific gravity of the liquid is readily ascertained by an instrument, and those who are in the habit of observing this liquid manure can judge most accurately of its strength, and of the degree of putrefaction which it has undergone.

Notwithstanding some apparently contradictory opinions, it is pretty generally acknowledged by those who have had long experience of its use, that urine and similar animal substances have a more powerful effect on the soil, when they have undergone a certain degree of putrefaction, than when they are used in a fresh state, and that this is produced with the least loss of substance when the liquid has been confined in close vaulted cisterns which admit the external air only partially. On light soils this liquid has a most fertilising effect, if it is used frequently in small portions at a time. On very heavy soils this effect is not so apparent, and for such soils the liquid is accordingly mixed with sand or any light earth before it is applied; or, instead of using it at once upon the land, it is poured over the litter, which has been collected in a heap or in a yard, after having served for the cattle. This litter, having been deprived of the urine which would otherwise have mixed with it, would rot very slowly and produce a very inferior kind of manure, unless it were moistened, and fermentation were excited by pouring the half-putrefied urine over it. It may be objected that if the urine is only collected to moisten the straw which has served as litter, it would be as well to let it be mixed at first, without the trouble of pumping it up and the expense of a cistern to hold it. But we shall soon see that there is a very wide difference. In the common mode of collecting farm-yard dung, the straw is very unequally impregnated with animal matter: at one time it will contain a large portion and run rapidly into fermentation; at another, there will be so little, that it is with difficulty that heat is excited in it. By separating the urine and litter, the straw will go much further, and can be mixed with the urine at the most advantageous time; thus it forms a much richer manure in a smaller compass, from not being so much diluted with water. Should there be a deficiency of straw, earth or sand will supply its place, in as far as soaking up the rich juices; for the addition to the manure from the decomposition of the straw itself is very small in proportion to that which animal juices afford. If the liquid is collected from a stable or a yard where cattle are kept as soon as it is produced, and is carried off into a cistern, there will be a much better and drier bed left for the cattle, especially if the rain is kept off by light shades. When the litter is soiled to a certain degree, it may be removed to a heap in a proper place, where its conversion into rich dung may be effected by the addition of putrefying urine, than which nothing will so soon rot vegetable fibres, if the air be admitted to the heap. The portion which is not wanted for some time may be left to decompose more slowly; and as the time approaches when it is wanted for the land, it may be managed so as to be in that state which experience has shown to be most effective in the improvement of the crops.

There is some appearance of certainty and regularity in this mode of making a dunghill, which there scarcely is in the common practice of accumulating straw, dung, and urine without any regularity in a farm-yard, turning it over when the cattle leave it for the pastures, and carrying so many cart-loads per acre on the land to be manured, without any measure of its comparative strength. One portion is often almost burnt black, and another appears like the fresh litter of the stables, not being even thoroughly soaked with moisture. It is true that good farmers pay more attention to their dung-heaps, and endeavour to carry out the manure in a proper state; but how much more readily would this be accomplished by the help of a large cistern full of the richest animal matter in a state of partial putrefaction. In those situations where straw bears a high price, it may be doubtful whether a cistern might not permit a considerable profit to be made by the sale of a portion of the straw, without any diminution of the manure required for the farm, since for light soils the liquid might be used alone, and for stiffer soils it might be mixed into a compost with earth, chalk, and any kind of refuse vegetable matter of less value than straw. It was an opinion expressed by a celebrated agriculturist* to the writer of this article, that he considered the use of straw in dung to be merely as a sponge to hold the liquid animal matter in its pores or tubes. In fact, straw or old thatch merely rotten by long exposure to air and moisture is of little or no value as a manure, although it will sometimes produce good potatoes, by rendering a stiff soil pervious and porous; but, in a light soil, a gallon of urine is worth ten times its weight of rotten straw. This doctrine may appear strange to some agriculturists, but it will bear the test of experiment.

The great use of liquid manure on light soils is to impregnate them with soluble matter, which, being diffused through their substance, supplies nourishment to the roots of plants, wherever they may shoot out. It may be applied to the land at any time before the seed is sown, and soon after, when the blade springs up or the seed begins to form; in short, whenever the plant requires fresh nourishment, or when that which existed in the soil is diminished. Without liquid manure, the poor silicious sands of Flanders could never be cultivated, much less produce crops which vie in quantity and quality with those on the best soils. The quantity of farm-yard dung, in a very rotten state, which this soil would require according to the common system of manuring, could never be produced by all the straw which can be raised upon it in its first state of cultivation. But cattle produce urine, and this produces roots for cattle. The great effect of liquid manure has set the farmers on finding some artificial substitute for the simple urine and diluted dung of cattle. Such substitutes are obtained by mixing all kinds of refuse animal matter with water, and inducing putrefaction. The emptyings of privies from towns is scarcely a substitute; for it is the same as the liquid from the stables in a more concentrated form; but the refuse of oil-mills and various manufactures, when diluted and mixed with a portion of putrid urine, soon become assimilated to it. This becomes a branch of trade in those countries where nothing will grow without manure, and is a resource where an increasing population demands the cultivation of inferior soils to supply the necessary increase of food, as well as an increase of produce from those which are naturally fertile.

The increase of manure by the formation of composts is well known in many parts of Britain, and by their means the land has in many districts been rendered much more productive. The fundamental principle upon which composts have been made, is that of impregnating portions of earth with those parts of the dung of cattle, which, from want of management in the common dunghills, would have been dissipated and lost; and also accelerating or retarding the decomposition of animal and vegetable substances by the addition of earths, such as chalk, marl, clay, and even sand, according to the nature of the soil on which the compost is to be used. All solid manure which is to be ploughed into the ground should contain certain parts already soluble in water, which promote vegetation: while other portions should be in a progressive state, so as to afford a succession of soluble matter by a gradual and slow decomposition. Though we have set forth the value and importance of liquid manure, and suggest the best mode of applying it, we would guard against its being supposed that solid dung may be altogether superseded by liquid. Liquid manure, however active and immediately effective, soon loses its power: whereas solid dung, well prepared and ploughed into the ground, will last for several crops. It is the judicious use of both these manures, conjointly, which has the best and most permanent effect. The dung or compost, having been ploughed in well, requires some time before it can have any direct effect on the germination of the seed or the nourishment of the plant. The liquid, on the contrary, acts from the moment it is poured on the surface. It is the milk of the young plant, which thrives upon it and stretches out its fibres through the earth, till it reaches the dung, which, having undergone that slow transmutation which forms humus, is now in a proper state to supply the more vigorous roots with sufficient nourishment. It is evident that the growth must be more rapid and regular, and not so liable to be checked from want of proper nourishment, nor are the young roots in danger of perishing by being too soon exposed to the immediate contact of rank dung. Every exertion should therefore be made by the industrious husbandman to increase the quantity and improve the quality of every species of manure both solid and liquid: and here careful experiment can alone be depended upon. Sir Humphry Davy, who so much enlarged the sphere of chemical science by his discoveries, hastily asserted that the dung from the stables and yards should be buried in the soil as soon as possible, because when it is collected in a dunghill a great portion of volatile and gaseous matter escapes into the atmosphere. But he did not proceed to show whether the ammonia or hydrogen which escapes would have been of any use in the soil; perhaps this exhalation, instead of diminishing the value, or even the bulk of the manure, actually improved it. It does not appear that fermenting dung produces carbonic acid, for a man may sleep on hot dung without much danger, which would not be the case if much carbonic acid were evolved; the ammonia is produced in the very first stage of decomposition, as may be perceived in opening the door of a stable where horses have been shut up for some time; but a heap of manure does not produce the same effect when its first heat is gone off. Most observant practical farmers have followed a contrary practice, and let their dung be tolerably short and rotten before it is ploughed into the soil. The Flemings pour liquid manure on the small heaps of dung in the field, to excite fermentation before they spread it and plough it in; some, on the other hand, let the manure remain spread over the soil, rolling it in order to pulverise it some time before it is ploughed in. Without pretending to decide between these opposite practices, we will venture to affirm that, until more light is thrown upon the process of vegetation and decomposition, the sure experience of the farmer is more trustworthy than the most plausible theories of men of science, unless they are supported by numerous and accurately conducted experiments on a large scale.

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* Mr. De Fellenberg, of Hofwyl, near Bern, in Switzerland.

In the formation of composts the principal objects are, to regulate the decomposition of the organic substances, and to increase the bulk of the manure by means of less expensive materials than straw. For these purposes lime or chalk is generally used: the former, in its caustic state, to accelerate the decomposition of fibrous matter; the latter to add to the mass, and absorb any portion of acid, which is always produced in a certain stage of the fermentation. The mode of doing this is so generally known, that it is needless to describe it: we shall only observe that the stiffest clay may be used with advantage in composts, where better soil is not at hand; and for light lands, the stiffer the clay the better, provided it be thoroughly incorporated with the manure. The most useful material, under proper management, is peat or turf. This may be laid in layers with quick-lime and earth; the whole being well soaked with liquid manure. If any kind of vegetable matter, such as fern, broom, the tops of heath, or pond weeds, can be added, it will be so much the richer. The lime and urine, acting on the peaty matter, decompose its tannin and transform it into humus, the woody fibre is dissolved, and the whole mass, when turned over and well mixed, becomes a very rich earth, which, being spread on the land and slightly ploughed or harrowed in, greatly enriches its surface. By this means many poor soils may be improved, where the cultivation is not sufficiently extended to produce straw. Potatoes grow readily in peaty soils which are drained and limed; and the potatoes when given to cattle will produce sufficient dung and urine to improve the land without much straw being used.

As a substitute for urine, several mixtures of animal and saline matters have been tried, which are supposed to resemble it in composition. There is no reason why such a liquid might not be formed artificially, and if it can be made with cheap materials, which may be obtained in abundance and at less expense than by keeping cattle, it would be a very important discovery.

Although bones have been treated of in a separate article [BONES], it may be proper to mention here, that if some easy means of dissolving their substance were discovered, they might be made of much greater use than they now are. At present they are put in with the seed in a broken state, and as they remain a long time undecomposed in the soil, their effect, after the first crop, is scarcely perceptible, unless a very large quantity is used. By mixing dissolved bones in a liquid state with earth, almost all the component parts of urine would be there.

Experiments have been made on the subject of artificial liquid manure by Mr. Kimberley of Trotsworth farm, Surrey, and we understand the result will shortly be made public by subscription.

The various substances which are generally enumerated, as occasionally used for manure, are chiefly the refuse of manufactures, consisting of earths, salts, and organic substances. Soapers' waste is chiefly lime with a small portion of alkali. The scrapings of leather, horn, bones, and the refuse of the shambles, the hair or wool of animals, and rags made of these, may be all classed together. They must be distinguished as acting in a two-fold manner; they absorb and retain moisture, at the same time that they afford nourishment by their gradual decomposition. Hence the great effect produced by them on certain plants, such as hops, and the length of time during which this effect is perceptible, especially in dry porous soils.

It is generally supposed that animal and vegetable manures produce their effect by giving nourishment to plants out of their own substance. This is no doubt true; but it appears also that they have a power of absorption, by which they attract not only moisture but also oxygen from the atmosphere, and probably hydrogen by the decomposition of the water. Thus the elements are at liberty to form new combinations, which are assisted by the vital action of the roots. This throws no great light on the subject, but it may be kept in mind, to prevent erroneous conclusions being drawn from the result of imperfect experiments, and to put us on our guard against applying the general principles of chemistry to the composition and use of manures without carefully attending to all the circumstances and watching all the appearances. We would recommend to all practical farmers to note down every particular in the formation and application of the manures which they employ, and also their apparent effect. It will require some years to enable a man to draw just conclusions, but the data will thus be established, and more will be discovered by such a course than by all the experiments which can be made on a small scale.

There is one substance which has been highly extolled as a manure, but which is scarcely known by name in English agriculture. This is called *urate*, being a compound of urine and plaster of Paris. It is formed by mixing sand and burnt gypsum with urine, and forming a hard compound, which is afterwards reduced to powder. The Royal Society of Agriculture at Paris caused some experiments to be made with this manure for the purpose of comparing it with those which are known to be most effective, such as dried nightsoil, pigeons' dung, &c. The result was in favour of the urate for the duration of its effect on lucern in a light soil, where the portion manured with the urate produced the greatest return at the third and fourth cuttings, when the nightsoil and pigeons' dung had lost a portion of their effect. It requires a moist season to act powerfully. When mixed with dried nightsoil its effect on various crops was very great. But it does not clearly appear whether this is to be ascribed to the urate chiefly, or to the dried nightsoil. Its effect on potatoes was superior to that of the dried nightsoil. It might be worth while to repeat these experiments, which may be found detailed in the *Dictionnaire d'Agriculture Pratique*, in 2 vols. 8vo., Paris, 1828. If it should furnish a substitute for bones, it would be very valuable, as it could be obtained to an almost unlimited extent from large towns.

The ashes of vegetable substances which have been burnt in the open air contain a great portion of potass, with some fine earths. They are consequently very effective in stimulating vegetation on lands which contain a good portion of humus. They are chiefly used as a top-dressing on young clovers and grasses; and wherever there is an appearance of sourness in the grass wood-ashes are of great use. It is however seldom that wood-ashes are used as manure until the greater part of the alkali has been extracted; but when the surface of the land is pared off and the dry sods are burnt, the ashes which result from this operation are very effective in producing a good crop without any other manure. [PARING AND BURNING.] The refuse ashes from bleachers' and soap-boilers' premises have still some portion of alkali in them, and as they contain lime and other earths in a very divided state, their effect on the soil is very perceptible. Sea-salt has been extolled and decried at different times, owing probably to the different circumstances under which it has been tried. In a very small quantity sea-salt may have a beneficial effect on the soil. Urine contains a great deal of it, and in the formation of composts sea-water has been found to hasten the putrefaction of the animal and vegetable matters which they contained, probably by absorbing moisture, which is essential to putrefaction. Quick-lime slaked with sea-water and mixed with sand forms a mortar which attracts moisture so strongly that walls built with it are scarcely ever dry. This suggests a mode of supplying the soil with moisture, and may account for the effect of salt in particular cases.

The experiments which have hitherto been made on artificial manures have not been sufficiently varied to lead to any very accurate conclusions as to their comparative merits, and the results have not been stated with the minuteness which would make them a foundation for practical rules. There is a wide field open to the chemist and the scientific agriculturist, and many important discoveries no doubt would be the result of patient and accurate investigation.

MANURING, in horticulture, requires to be considered in a somewhat different light from that process as applied to agricultural purposes. This is necessary because of the variety of plants, possessing different constitutional habits, to which the gardener is required to turn his attention, and also because of the different results which are expected in horticulture and agriculture. In preparing the present article the writer has confined himself to simple practical facts, and has adverted only occasionally to chemical explanations. In the present state of our knowledge of that branch of inquiry, improved as it is since the time of Davy, opinions are still too vague and unsettled to afford the cultivator a satisfactory solution of the physical problems suggested by the commonest facts in the art of manuring.

The gardener is called upon to cultivate species from almost every kind of soil on the surface of the globe, intermediate between the shifting sands of the desert and the most fertile alluvial land continually enriched by the decay of vegetable and animal substances. It is therefore obvious that considerable caution is requisite in applying manure and in determining the quantity or quality suited to the respective constitutions of the various subjects which the horticulturist takes under his care. Thus, although many plants can scarcely receive too much manure, others, such as the resinous trees, are actually killed by it.

The kind of manure chiefly used, and frequently the only kind procurable by the gardener, is that derived from the farm-yard; consisting chiefly of the dung of horses or of horned-cattle, more or less mixed with litter. Formerly it was very generally the custom to take advantage of the heat resulting from the fermentation of such dung in hot-bed forcing, and there are still some objects for which this kind is found preferable [HOT-BED]; but since the hot-water system of heating has received so many improvements, the continued fermentation and consequent degree of decomposition which dung undergoes in hot-beds is rendered a less important means of obtaining artificial warmth, and consequently it becomes the more important to inquire whether manure is most beneficially applied in a state of decomposition, as some have advocated, or in a state as recent as possible, no fermentation being permitted previous to its deposition in the soil.

It is said that rotten dung contains more *humin*, weight for weight, than fresh dung. But the experiment, in order to be just, would require to be tried with two equal quantities of fresh dung, one of them being analyzed at the time, and the other after being subjected to the requisite degree of decomposition; for the latter process will of course occasion a diminution of weight, which ought to be taken into account. If the fertilising power of manure can be proved to be in proportion to the quantity of *humin* which it contains, and if the quantity of this be as great as in the more bulky form of unrotten dung, the concentrated state would certainly be preferable, in point of economy, on account of the saving in labour and carriage; but in the present state of knowledge this cannot be asserted, and until theories become reconciled with each other, and with experience, the latter must form the only safe guide in practice.

If dung contains a large proportion of litter, and particularly if the latter be in a dry state, it will be advisable to subject it in nearly all cases to a moderate degree of fermentation, assisted by a sufficient quantity of moisture, in order that the fibre of the straw may be reduced into a state permeable by the spongioles of plants, and either become sufficiently dissolved for affording nourishment itself, or serve in the first instance as an absorbent reservoir for substances of still greater solubility. Where such preparation has not been attended to, litter has been frequently observed, when turned out of the ground after a dry summer, to be still in a dry musty state, having evidently been of little benefit to the crop; and in the case of many plants, which require much manure, litter in this state would actually prove very injurious. But if the dung be what is termed short, containing little straw, and that well saturated with the liquid proceeds of the stalls, it may be dug in without fermentation for most kitchen-garden crops, provided it is well divided and properly mixed with the soil in digging or trenching in. This is necessary in all cases, but more especially so when the manure is applied fresh; for disease is often induced by the roots entering into masses constituted of particular substances which either wholly or, at all events, too powerfully predominate over the proper nutritive solutions.

But on the other hand, if the soil is of a wet and stiff nature, then long unrotted dung is most proper, because its straws form so many minute drains which, to speak technically, keep the ground open; and in such soils, by means of littery manure and drilling, a crop of potatoes, for example, can be raised very superior in quantity and quality to that obtained from the application of rotten dung. In this case the previous reduction of the fibre of the straw is not requisite; for the moisture of such soils is sufficient to effect this by degrees, and whilst the process of growth is going on. The authority of Miller may be adduced on this subject; in his 'Gardener's Dictionary,' he observes, 'In very cold moist land, I have frequently seen new horse-dung buried as it came from the stables, and always observed that the crops have succeeded better than where the ground was dressed with very rotten dung.'

On the other hand, dung that has been moderately fermented, and frequently turned over, so as to be easily cut with a spade, is the most proper for such trees as require manure, or for slow-growing crops, where the roots have to remain for years in contact with it. If the heat arising from fermentation do not exceed 100° Fahr., *Sir Humphry Davy* considers that but little loss will arise from the process. With regard to trees and many perennial plants, no more injury would be incurred by using fresh dung instead of rotten, for the first season, or rather whilst vegetation continued active; but after the roots become nearly dormant, canker or disease of some sort is apt to ensue. The roots may have grown luxuriantly during the summer; but when they are arrested by the approach of winter, decomposition will still be going on amongst the materials on which they feed, and these materials may perhaps be chemically changed, at all events vitiated for the purpose of nourishment, before the roots are again called to action.

These remarks relate chiefly to the description of manure which is most generally used. Other substances which are or may be successfully applied to promote the growth of vegetation are exceedingly numerous; and although it would be impossible to particularise them, they may nevertheless be made sufficiently known by stating that they consist of—

1. All animal substances without exception.
2. The excrementitious secretions of all animals.
3. All kinds of vegetable substances, in one state or another.
4. A few mineral substances, of which one of the principal is lime.

Animal substances are very powerful manures, and require to be attenuated or diluted before plants can derive nourishment from them, or in fact before either roots or tops can be safely brought within their contact. If the roots of a plant be wholly immersed in oil or in blood, that plant will be destroyed. Blood is one of those liquid manures which is occasionally supplied to plants so situated as to render bulky manure inapplicable; but it should unquestionably be copiously diluted with water. Oily manures, such as blubber for instance, which will not dilute with water, must be divided by earthy matter or other substances, by which means a large surface will be exposed to atmospheric agency. Oil is impervious to air and water; and it may be taken as a general rule, that all substances impervious to these elements are unfit for the purpose of vegetable nourishment, and must therefore be subjected to some mode of decomposition in order to render them available. Supposing a mass of oily substance equal to one cubic foot were isolated, the surface exposed to the oxygen of the air (by which soluble matter in such substances, according to Sir Humphry Davy, is produced) is 864 square inches. If however this mass be separated by any substance sufficiently porous to admit air, such as earth, the air will pervade every interstice, and the requisite decomposition will be rapidly brought about. Bones are another form of animal matter much employed, and of considerable energy, especially in calcareous soils, provided they are reduced into small fragments and fermented before being used. Gardeners often use them in that state for forcing strawberries, and, reduced to dust, as a top-dressing for lawns.

The liquid portions of excrementitious manure likewise require either to be diluted with water or to receive an admixture of soil before they are brought in contact with the roots of plants. In the case of trees with roots lying deep in the ground, such dilution is not always necessary; but, generally speaking, adherence to the rule is advisable.

Sir Humphry Davy recommends covering dead animals with five or six times their bulk of soil mixed with one part of lime. This, when mixed, it may be observed, will still form a very strong manure, and for some plants much too strong; but for such as the vine it will form a valuable compost, particularly if broken bones are mixed with it.

Manures derived from the vegetable kingdom require little preparation if they consist of such plants as are chiefly parenchymatous, such as the brassica tribe; their substance is easily soluble, and they may therefore be turned fresh into the soil. The period of their growth when this is most beneficially performed is before they run to seed. Weeds may even be used with great advantage, if properly prepared; but bad consequences may result from their seeds rendering the ground foul, and thus occasioning much expenditure of labour to extirpate them again. Seeds, it is well known, will not germinate without air; but with this, and sufficient heat and moisture, nothing can prevent them from germinating. Therefore if weeds be thrown into a heap and turned, whilst at the same time fermentation is encouraged till the heat is fully equal to that which would naturally cause the germination of the seeds, taking care that the outside be turned into the centre, no danger will arise from using such manure after the process has been continued sufficiently long for the germination of the slowest vegetating seeds which the heap may contain, because under these circumstances the young plants will be continually perishing as the heap is turned over from week to week. There are many aquatic plants that will not grow on dry ground, and a preparation similar to the above is not essential for the purpose of killing their seeds before their application to dry ground, which is not, as it were, their proper element.

Yeast is a most powerful vegetable manure, especially if employed in a state of putrefaction; but it requires to be diluted with water till it appears of the colour of very small beer. Applied in that state, it has extraordinary power in stimulating the growth of annual crops of all kinds; but its effects are by no means permanent; for lawns however it is a restorative manure of great value. The same may be said of malt-dust.

It is observed by Sir Humphry Davy that mere woody fibre seems to be the only vegetable substance that absolutely requires fermentation to render it nutritive to plants; and he instances tanners' spent bark as a substance very absorbent and retentive of moisture, yet not penetrable by the roots of plants; or it might rather have been said, not capable of affording nourishment, from the predominance of some noxious principle, which requires to be decomposed; for when this principle is broken down by fermentation, plants, as may be observed in bark-beds, root very readily in tan. This deleterious principle is the tannin which bark contains, and the reason of its noxious effects upon plants is that it precipitates the azotized matter in which roots abound, and the presence of which, in an organisable state, is indispensable to the existence of roots. (Payen, in *Ann. Sc.*, new series, iii. 18.) Inert peaty matter is a substance of the same kind, and will remain for years exposed to air and water without undergoing change. When peat becomes inert, it is in vain to attempt to grow any sort of plant in it; but nothing is more certain than that if drained of stagnant mosture and mixed with lime and dung, it will become very fertile for most crops. It often happens that peat or *bog-mould*, frequently procured at a great expense for American plants, becomes inert; in such cases, a good result would be obtained by turning out the peat and mixing it up in a heap with a quantity of leaves or fresh litter sufficient to promote a moderate degree of fermentation; then, as in the case of tan, it will afford nourishment, and will, from a state of uselessness, become valuable.

Of mineral manures, *lime* is the most useful. It is not recommended for soils that contain a large proportion of soluble vegetable matter; but it produces excellent effects in such as abound in inert vegetable fibre. Gypsum, which is found in the ashes of grasses, proves a manure for lawns.

Common salt is sometimes employed in minute portions; especially in combination with vegetable matter, in the instance of sea-weeds, in which case it is found of good quality for fruit-trees and kitchen-garden crops; but vegetable life is certainly destroyed by it, if applied in any considerable quantity. Exceptions may be noticed in the case of marine plants; the Samphire (Crithmum maritimum), for example, requires it when cultivated in inland districts; and this is also true of the vegetable inhabitants of the great salt plains of Asia. Wood-ashes, which consist principally of vegetable alkali united to carbonic acid, are a good manure, but of short duration, and they leave peaty soil in a worse state than before their application. The burning of such soil cannot therefore be too much reprehended, although strongly advocated by some who have been led away by the immediate result of one or two enormous crops. The application of dung and lime, of composts of clay, marl, scourings of ditches, &c., would render peat *permanently* fertile, more especially so when draining is judiciously attended to.

There is no considerable number of plants to which manure is prejudicial. Coniferous species of all kinds are affected most injuriously by it, and it requires to be given very sparingly to all trees which yield gum in their bark, especially stone-fruits, such as cherries, plums, peaches, and nectarines. To many however it appears to be useless; orchidaceous plants for instance, which it is now the fashion to cultivate so extensively, seem insensible to its application in any form yet thought of; and American plants in general scarcely require it, unless the peat in which they are grown be regarded as a kind of manure.

MANUSCRIPTS. [PALÆOGRAPHY.]

MANU'ZIO, ALDO, born in 1447, at Bassiano in the Papal State, studied at Rome and at Ferrara. He became intimate with Pico, count of Mirandola, and with Alberto Pio, lord of Carpi, with whose assistance he established a printing-press at Venice. The art of printing was first introduced into Italy from Germany by two Benedictine monks, called Sweinheim and Pannartz, who printed the works of Lactantius in the monastery of Subiaco in 1465. This was the first book printed in Italy. In 1469 two other Germans from Speyer established printing-presses at Venice, and soon after the art spread rapidly through Italy. The first Greek book was printed at Milan, and the first Hebrew types were used at Soncino near Cremona. Nicholas Jehnson, a Frenchman, established a printing-press at Venice in 1471, which was distinguished for the elegance of its types. But Aldo Manuzio surpassed all other printers of his time in the correctness of his books. Being a man of learning as well as a printer, and having an extraordinary zeal for his profession, he procured the most correct MSS. from distant countries, and he established an academy in his house, with the view of obtaining assistance in the superintendence of his publications. Bembo and Navagero were among the members of that society. The first publications of Aldo appeared about 1490: the first with a date in 1494. In this year he published the poem of 'Hero and Leander' in Greek and Latin, and shortly after the Grammar of Lascaris, and that of Gaza, with Theocritus, and the works of Aristotle. He invented a new sort of type, which was light and resembled writing, called by the Italians 'corsivi,' and known to other nations by the name of 'Italic.' In this type he printed the Latin classics. A list of the Aldine editions was published at Padua in 1790: 'Serie delle edizioni Aldine per ordine alfabetico e cronologico;' and a still more complete catalogue has been since published at Paris by Renouard: 'Annales de l'Imprimerie des Aldes, ou Histoire des trois Manuces et de leurs editions,' 2 vols. 12mo., 1803; a second edition of which, in 3 vols., was published in 1825, and a third, much improved, in one vol. 8vo., Paris, 1834. It is said that the Greek books of Aldus are less correct than his Latin and Italian prints: but it must be recollected that his Greek books are often printed from a single MS., and that an imperfect one; a circumstance however that renders some of his Greek books very valuable at present, as being tolerably faithful transcripts of MSS. either now lost or not always accessible. These editions, especially when upon large paper, have often sold in modern times for considerable sums.

Aldo complains in several of his prefaces of the difficulties which he experienced, and the intense labour which he had to undergo in his profession, to which he devoted his whole life. He died at Venice in 1515, with the well-merited reputation of being not only an accurate printer, but a good scholar. He was the author of a Latin and Greek Grammar, a Greek and Latin Dictionary (the first of its kind), and several other works. His son Paolo Manuzio succeeded him in the direction of his printing establishment. Paolo was a man of learning, an author, and a critic. His principal works are: 1, 'Antiquitatum Romanarum liber de Legibus,' fol. 1569; 2, 'De Comitiis Romanorum;' 3, De Senatu Romano;' 4, 'De Civitate Romana;' besides notes and commentaries on Cicero's Epistles and Orations.

MAP (Latin, *mappa*, a napkin; French, *mappemonde*, a map of the world).

A map is a representation of the surface of a sphere, or a portion of a sphere on a plane. The name however is commonly applied to those plane drawings which represent the form, extent, position, and other particulars of the various countries of the earth.

Maps or delineations resembling them we may reasonably conclude were coeval with the earliest geographic knowledge, for we can scarcely conceive such knowledge to exist in a nation at all without being accompanied by some attempts at illustrations, however rude and defective, by means of linear representations on a plane surface. It is not possible indeed to fix the time of these first attempts to construct maps, but there is good reason for supposing that the Israelites were not altogether ignorant of the art; for we find Joshua commanding his selected men in the following terms: 'Ye shall therefore describe the land into seven parts, and bring the description hither to me, that I may cast lots for you here before the Lord our God.' (*Josh.*, xviii. 6.) This knowledge of the Israelites was most probably derived from the Egyptians. The geographical knowledge of the Greeks, as exhibited in the Homeric poems, comprehended only a small part of Europe, Asia, and Africa, and there is not the slightest allusion in them to any mode of delineating or representing the surface of a country. In the seventh and sixth centuries before the Christian æra, and even earlier, we know that the Greek nation was widely diffused by colonization, which, combined with their spirit for commercial enterprise, must have greatly extended their geographical knowledge. In their maritime adventures they are said to have been assisted by the nautical maps of the Phœnicians; but however this may be, we have no account of anything deserving the name of maps before those of Anaximander the Milesian, who is alleged to have been the first to construct a map of the world. There is a passage in Herodotus (iii. 136) which may perhaps indicate something like an attempt at mapping a coast. Certain Persians, being commissioned by Darius I., sailed from Sidon in Phœnicia to the coasts of Hellas, which they examined and 'registered,' or 'recorded' (ἀπεγράφοντο), till they arrived as far as Tarentum in Italy. The map of Aristagoras of Miletus is also deserving our especial attention, from its being so particularly described by Herodotus (v.), and from its likewise being among the first maps on record, at least in Greece. Aristagoras, in his interview with Cleomenes, king of Sparta, on the occasion of soliciting his assistance against the Persians, is described as appearing before Cleomenes 'with a tablet of copper in his hand, upon which was inscribed every known part of the habitable world, the seas, and the rivers.' Notwithstanding the imposing character of this description, some have thought that we should not receive it too literally; and that this map was probably nothing more than an itinerary of the country between Sardis and Susa. Itinerary maps of the places of encampment were almost indispensable to the commanders of armies; Diognetus and Beton are mentioned (Pliny, *Nat. Hist.*, vi. 17) as the surveyors of the marches of Alexander, who was very careful in examining the measures of his surveyors, and in obtaining his descriptions from the most skilful persons. The science of geography made rapid advances under Eratosthenes [ERATOSTHENES; GEOGRAPHY], who had the great merit of reducing geography to a regular system, and of founding it upon solid principles. He introduced into his map a regular parallel of latitude, which he accomplished by tracing a line over certain places whose longest day was observed to be of the same length. This parallel extended from the Strait of Gibraltar to the mountains of India, passing through the island of Rhodes; and from its central position with respect to the principal antient nations, it became a standard of reference in the maps of this period. Succeeding geographers made many attempts to determine the longitude of places by measurements on this line, but with no great success. Eratosthenes, in addition to the parallel above mentioned and other parallels, undertook to draw a meridian from Meroe through Syene to Alexandria (Strabo, ii. 114), and also to determine the earth's circumference by the actual measurement of a portion of one of its great circles. These discoveries and improvements very materially affected the dimensions of all the antient maps; and from this time the connection between astronomy and geography was so far established as to ensure an advantage to the latter by every advance in the former. This was eminently the case in the discoveries of Hipparchus, who fixed the construction of maps on a mathematical basis, and enabled the geographer to lay down his latitudes and longitudes upon certain principles.

To Strabo we are chiefly indebted for our information respecting the state of geography in the Augustan age. But the extent of the earth's surface known to this writer does not very much exceed that which was known to Herodotus four centuries earlier. His map of the world exhibits some remarkable errors. He supposed the Pyrenees to run north and south; cuts off the projecting province of Brittany from France, places Ireland not to the west but to the north of Britain, and makes the Caspian communicate with the northern ocean though Herodotus had accurately described it as a lake.

The Roman Itineraries show that their surveys were made with considerable care, although there are no traces of mathematical geography in those which have been handed down to us, the chief object in view being the clear direction of the march of their armies. All the provinces of the Roman empire had been surveyed when *Ptolemy* composed his system of geography, which has happily been preserved to us. It is not so much to his more perfect acquaintance with the earth that Ptolemy owes his reputation as a geographer, as to his giving solidity and unity to the science by fixing its unconnected details on a mathematical basis and carrying into full practice and to greater perfection the system of latitudes and longitudes of Hipparchus, whose invention had been much neglected for upwards of 250 years.

Ptolemy derived his information respecting the distances of places chiefly from itinerary measurements which usually exceeded the truth, and it is therefore not surprising that his map of the world should exhibit enormous errors; in addition to which consideration it cannot be supposed that he possessed real astronomical observations sufficient to determine all the latitudes and longitudes which he has given. It was not possible therefore that he should have been free from great mistakes, more especially in places beyond the Roman empire.

Some idea may be formed of the errors in his map from the circumstance of the northern coast of Africa being represented by him nearly as a straight line, the gulfs of the Great and Lesser Syrtis almost totally disappearing, and the Mediterranean being extended twenty degrees beyond its actual limits, which gross inaccuracy was continued in our maps until the middle of the seventeenth century. He also placed the mouth of the Ganges 46° to the eastward of its true position.

It seems not improbable that the maps found in the MSS. of Ptolemy are really copies of, or derived from, original maps constructed by him or under his care. [AGATHODÆMON.]

Some curious particulars have come down to us illustrative of the geographical ignorance of the middle ages, yet maps do not appear to have been uncommon even then. The maps of the middle ages may be generally classed as follows:—1st, those in which the notions of the antients were adhered to; 2nd, those which exhibited new discoveries or countries popularly believed to exist. Many maps of the first class are extant in which the old world is represented as one great island, Africa terminating to the north of the equator. Among maps of the second class are those which seem to show some important discoveries in the west of Europe and of Africa in the twelfth and thirteenth centuries.

The geography of the Arabians is but imperfectly known. Their most eminent geographer Edrisi or Eldrisi, who lived about the middle of the twelfth century, divided the world into seven climates from the equator northward, and each climate was again divided into eleven equal parts, from the western coast of Africa to the eastern coast of Asia, the inconvenience of which arrangement is very obvious.

Towards the middle of the seventeenth century several astronomers undertook to observe eclipses of the moon with a view of correcting the errors in the longitude of places. These observations however were so discordant as to lead to no satisfactory result. Galileo, by the discovery of the eclipses of the satellites of Jupiter, introduced a more certain method, which was rendered available by means of the simultaneous observations of Picard and Cassini at the observatories of Uraniburg and Paris.

Picard and De Lahire were then immediately employed in correcting the map of France, and from this period our maps have rapidly improved. The great perfection to which timekeepers have been brought, and the obvious application of these machines to the determination of the longitude, have greatly contributed to their accuracy. But notwithstanding the advanced state of our astronomical and geographical knowledge, and the science and skill displayed in our great national and other surveys, we may, with Dr. Blair, regard maps as works in progress—always unfinished, and still waiting the corrections to be supplied by the science and enterprise of succeeding ages.

Having thus briefly sketched the progress of map-making, we proceed to give a general outline of their application and construction.

On the Nature and Construction of Maps.—Maps, being plane representations of the surface of a sphere, may be obviously applied to various purposes; hence we not only have terrestrial maps to represent the surface of the earth, but celestial or astronomical maps to represent the sphere of the heavens; and these general distinctions have again their subdivisions.

There are two kinds of terrestrial maps—geographic or land maps, and hydrographic or sea maps: we shall confine our attention principally to the former; the latter, which are usually called charts, having been already described. [CHART.]

Geographic maps, as already noticed, are those which represent the forms and dimensions of the several parts of the earth, with their relative situations and the positions of the cities, mountains, rivers, &c., comprised within their limits. They may comprehend the whole earth, or one of its larger divisions, or a single district, and are called maps of the world, general maps, or particular maps accordingly. If they give the nature of the ground, the roads, buildings, &c., in detail, they become topographic maps, which, necessarily embracing a very small extent of country, are not usually referred to any spherical projection, but are represented as geometric planes, the objects in them occupying the positions severally assigned to them by the trigonometrical operations of the survey. The same distinction is made in charts of small bays and harbours. In either of these cases they are called plans.

When maps of the earth are made to illustrate any of the sciences, they are distinguished from geographic maps, properly so called, and bear their own peculiar names, as geological, or mineralogical, or botanical maps.

From the spherical form of the earth, it is obvious that the divisions and varieties of its surface may be most simply and most accurately represented by means of a globe, and in order to obtain a correct notion of its general geographic features, there is no mode of representation so satisfactory. Large globes however are expensive and inconvenient instruments, and small ones, by not admitting sufficient detail, are for most geographic purposes entirely useless. Hence we see the eminent utility of maps, notwithstanding the imperfections which necessarily accompany such a mode of representation, for a spherical surface can by no contrivance be extended into a plane without a distortion of some of its parts.

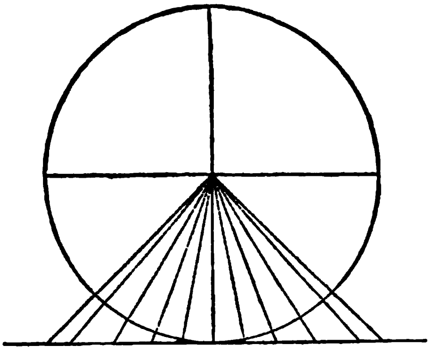
The methods adopted in the construction of maps are as various as the taste and judgment of geographers themselves, but they may all be referred to two principles, viz. *Projection* and *Development.*

By *Projection* is meant the representation of the surface of a sphere on a plane, according to the laws of perspective. By *Development* is to be understood the unfolding or spreading out of the spherical surface on a plane. This however first supposes the sphere to be converted into a cone or a cylinder—these being the forms, portions of which most resemble portions of a sphere, and which, at the same time, are susceptible of the required development.

We shall notice these two principles very briefly, as their mathematical investigation more properly belongs to the article PROJECTION.

There are four methods of spheric projection in general use, the *Gnomonic* or *Central*, the *Orthographic*, the *Stereographic*, and the *Globular*, distinguished from each other by the different positions of the projecting point in which the eye is supposed to be placed.

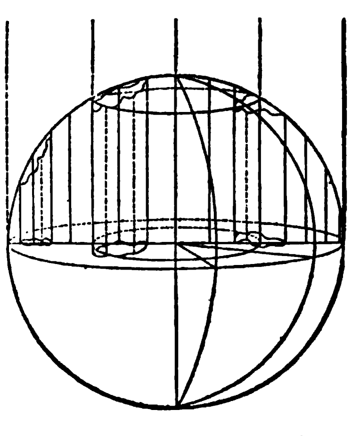
The *Gnomonic* or *Central Projection* supposes the eye to be placed in the centre of the sphere, and that the various objects to be delineated are transferred from the sphere to a plane, which is a tangent to its surface. The entire hemisphere can never be represented by this projection, since the circumference which terminates it is on a level with the eye, and is therefore parallel to the plane of projection. This method is chiefly used in dialling, but may be advantageously applied to maps of a limited extent, more especially if they are maps of the polar regions of the globe. In this case the meridians will be strait lines radiating from the centre, and the parallels of latitude concentric circles, whose distances from the centre will respectively be equal to the cotangents of their latitudes.



In the other cases of this projection, where the perspective plane is parallel to the horizon, or to any meridian, the construction is rendered troublesome on account of the parallels of latitude becoming curves of difficult delineation: these cases therefore are seldom brought into use.

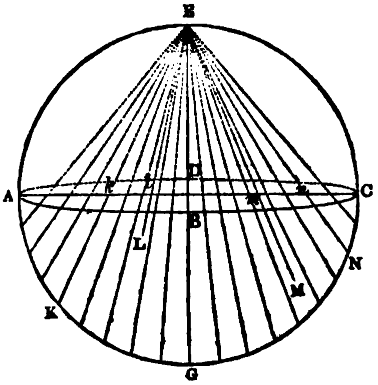
Orthographic Projection.—In this projection the eye is supposed to be at an infinite distance, so that the visual rays leave the sphere in parallel lines. The perspective plane on which a hemisphere is supposed to be delineated is the plane of that diameter which is perpendicular to the visual rays—hence every point of the hemisphere is transferred to this plane by perpendiculars let fall upon it. It will be immediately seen from the figure, that the representation will decrease in accuracy with the increase of distance from the centre; the parts near the circumference being much foreshortened and distorted.

In a *Polar map* of this projection, the meridians, as in the Gnomonic maps, will be radii, and the parallels concentric circles; these circles however will have their distance from the centre equal to the cosines, and not to the cotangents of their respective latitudes.



In an *Equatorial map*, or one in which the equatorial regions of the globe are made to occupy the centre of the map, the plane of projection coincides with the plane of one of the meridians. In this case the latitude circles will be projected in strait lines parallel to the equator, which is also a strait line, and will vary in distance from it according to the sines of their respective latitudes. The meridians will be portions of ellipses intersecting the equator in points similar in position to the intersecting points of the parallels on the polar diameter, and having their transverse axes coincident with this diameter and equal to it.

Stereographic Projection.—In this projection the eye is supposed to be placed at the surface of the sphere, and to view the concave of the opposite hemisphere through the plane of that circle, in the pole of which the eye is placed.



If E be the eye, and A, G, C the hemisphere to be represented, A, B, C, D will be the plane of projection; and the position on this plane of any point of the spherical surface will be indicated by a line drawn from that point through the plane to the eye. Thus the points K, L, M, N on the sphere will be transferred to the plane at *k*, *l*, *m*, *n*.

The advantages offered by this method of projection have brought it more into use than the methods before mentioned. It is especially calculated for maps of the world, as usually made in two hemispheres, from the circumstance of the representation being less distorted, and also on account of the meridians and parallels intersecting each other at right angles, as they do on the globe. Its construction also is less difficult than others, since all the great circles of the sphere are either circles or strait lines in the projection. The meridian of 20° W. is the one usually selected by English geographers for the plane of projection in these maps of the world, because this meridian passes very nearly between the eastern and western continents, which therefore occupy their respective hemispheres.

Globular Projection.—This projection which is a modification of the Stereographic, was invented by the astronomer De Lahire, who supposed the eye to be placed at a distance from the sphere equal to the sine of 45°; that is, if the diameter of the sphere be equal to 200, the distance of the eye from the nearest point of the circumference would be 70$\frac{7}{10}$. Some further modification was subsequently deemed desirable, in order that the meridians might intersect the equator at equal distances. This condition is very nearly fulfilled when the distance of the eye is 59½, the diameter being 200 as before.

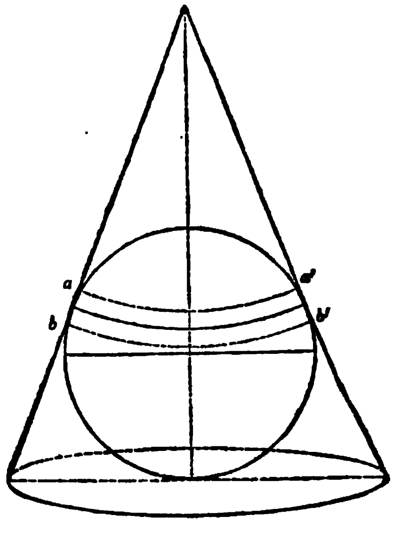
This projection is also much used in maps of the world, but to simplify their construction, the meridians and parallels are projected into circular instead of elliptical arcs, the deviation from the strict law of the projection being too slight to affect the practical utility of the map.

Of Projection by Development.

The developments to be mentioned are two—the *Conical* and *Cylindrical.*

Conical Projection.—In this projection the sphere is supposed to be circumscribed by a cone, which touches the sphere at the circle intended to represent the middle parallel of the map. If the points on the sphere be now projected on the cone by lines drawn from the centre, it is clear that in a zone extending but a short distance on each side the middle parallel, as the zone *a a′ b b′*, the points on the cone would very nearly coincide in position with the corresponding ones on the sphere. All the delineations having been thus made, the cone is then conceived to be unrolled, or developed on a plane surface.

Should the map be made to extend much above or below the middle parallel, the distant parts will be very much distorted. To remedy the defects of this projection, various modifications have been suggested, among which those of Flamsteed are generally held in the highest estimation. [CONIC PROJECTION.]



Cylindrical Projection.—From what has been said of the cone, it will be easily understood that a cylinder may be applied to the sphere in a similar manner, and that a zone of very limited extent in latitude may, without very material error, be developed on a cylinder. The peculiarity of this method is, that the meridians, as well as the latitude circles, are projected in parallel strait lines; a condition of the map which makes it very applicable to nautical purposes, and on which (partly) is founded the very ingenious method called *Mercator's Projection*, which is now so universally adopted in our charts, and to which, in conclusion, we will briefly allude.

Mercator's Projection.—The line on which a ship sails, when directing her course obliquely to the meridian, is on the globe a spiral, since it cuts all the meridians through which it passes at equal angles. This circumstance, combined with others, rendered a map constructed on the principles of the spherical projections very inadequate to the wants of the navigator. Mercator considered, very justly, that mariners do not employ maps to know the true figures of countries, so much as to determine the course they shall steer, and the bearing and distance of those points or places which lie near their track; and this projection is the result of his efforts to secure to the seaman these desirable ends. The merit of this most useful method is thought by many to be more justly due to Wright; for although Mercator published his first chart in 1556, he omitted to declare the principles on which he proceeded, and his degrees of latitude did not preserve a just proportion in their increase towards the poles. Wright, in 1599, corrected these errors, and explained the principles of his improved construction, in which the degrees of latitude on the chart were made to increase towards the poles, in the same ratio as they decrease on the globe; by which means the course which a ship steers by the mariner's compass becomes on the chart a strait line; the various regions of the map, however distorted, preserve their true relative bearing, and the distances between them can be accurately measured.

MAPLE. [ACER.]

MARACAIBO. [VENEZUELA.]

MARAGHA. [PERSIA.]

MARANHAO (Province). [BRAZIL.]

MARANHAO, or S. LUIZ DO MARANHÃO, is a town on the northern coast of Brazil, in 2° 30′ 40″ S. lat. and 43° 50′ W. long. It lies on the north-western peninsula of an island, called Ilha do Maranhao. This island, which is nearly twenty miles long, extends along the shores of the continent, from which it is separated by a shallow channel, called Rio do Mosquito. This channel is, on an average, only 100 yards wide, and terminates in two large bays, the Bahia de S. Jozé on the east, and the Bahia de S. Marcos on the west. The island is generally low and swampy, and almost entirely covered with wood.

The town is built on the northern shores of a small peninsula, formed by two rivers, or rather small inlets of the sea, the Rio de S. Francisco on the north, and the Rio da Bacanya on the south. It is divided into two sections. The more ancient and populous part of the town, called Bairro da Praia Grande, extends along the shores on a broken surface. The streets are crooked, uneven, and badly paved; some of them are not paved at all. The houses have two or three floors, and are mostly built of sandstone. In this part of the town is a large square, surrounded by the palace of the governor, the college of the Jesuits, the town-hall, and the prisons, which are substantial buildings. At the back of this section lies the other, called Bairro de N. Senhora da Conceiçao, which consists of small houses, many of which are surrounded by gardens and plantations. Each division has its own parochial church, besides which there are three other churches, two chapels, and four churches belonging to four convents. The town is defended by three small fortresses, now in a dilapidated state.

The harbour is good and safe, but the entrance is difficult, on account of a bank called Coroa do Meio, about thirty miles north of the town, on the east and west of which are deep channels leading into the harbour. The eastern, which is the most navigated, has on the east the great bank, or Coroa Grande, which extends between the northern shores of the island and the Ilha de S. Anna. The tide rises eighteen feet in the harbour, and twelve feet without it.

The mean annual temperature is 80° of Fahrenheit. The regular succession of the sea and land breezes, and the prevalence of northern winds, moderate the heat, and the climate of the town is considered healthy. The population, which amounts to about 30,000, contains a great number of unmixed descendants of Portuguese and negroes, the half-breeds being comparatively few in number.

The inhabitants are chiefly engaged in commerce: only the most common articles of domestic use are made in the town; the rest are imported from Europe. The trade is rapidly increasing. The number of vessels that annually entered the harbour amounted to more than 140 twenty years ago; they came from Lisbon, Oporto, Viana, Liverpool, and New York. The imports consist of wine, brandy, oil, flour, fruits, silk, cotton and linen goods, hardware and metals, and articles brought from the East Indies, as spices, &c., and drugs. The exports are cotton, which is by far the most considerable article, rice, tanned and raw hides, &c. Sugar and coffee are imported from Pernambuco, Bahia, and other ports of Brazil. (Spix and Martius, *Reise in Brasilien.*)

MARAÑON. [AMAZON.]

MARANS. [CHARENTE INFERIEURE.]

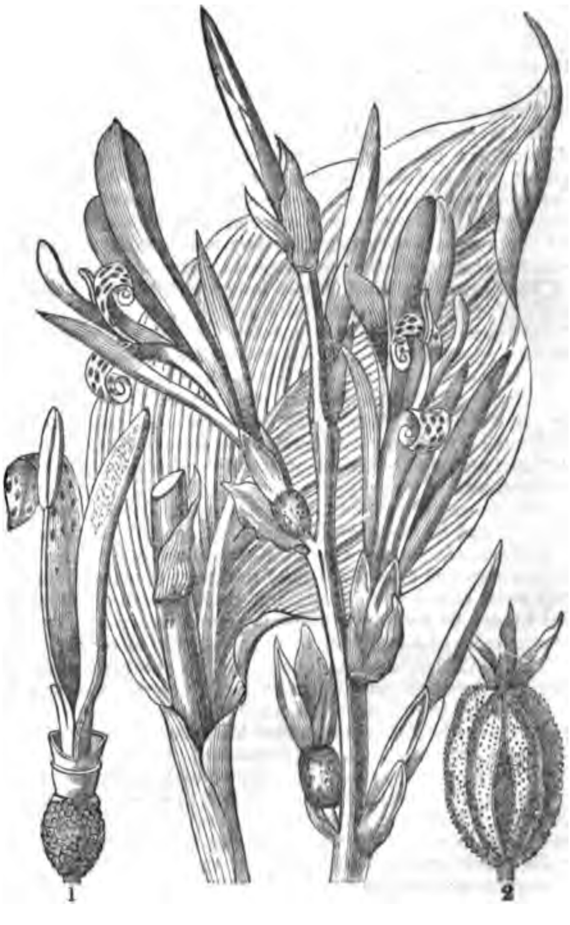
MARANTA ARUNDINA'CEA (Linn.). To this plant is referred the arrow-root of commerce, but it is also procured in large quantities from a variety of closely-allied, and even many distinct, plants. Thus the Surinam and Bermuda arrow-root is the produce of the M. arundinacea, while the Jamaica arrow-root is obtained from the M. indica (Tussac); which plant, along with several Curcumas, yields also the East Indian arrow-root. The West Indian arrow-root has mostly a pure white colour, the East Indian a yellow tinge.

The tubers, root-stocks, or offsets are grated or bruised, and repeatedly washed with water, which is passed through a fine hair-sieve, so long as it runs off with a milky appearance. It is allowed to subside, the supernatant water drained off, and the powder dried: 100 parts of the fresh plant yield 10 parts of arrow-root; but Benzon states 100 parts to yield 23 or 26 parts. According to the analysis of this chemist, it consists of volatile oil 0·07, starch 26, vegetable albumen 1·58, gummy extract 0·6, chloride of calcium, insoluble fibre 6, water 65·6. The volatile oil imparts a slight odour to the solution in warm water, which helps to distinguish genuine arrow-root from several of the articles substituted for it. Arrow-root has scarcely any taste, being bland and insipid; the powder, when pressed in the hand, emits a crackling noise, and retains the impression of the fingers, which common starch from wheat does not. Cassava (manioc, from Jatropha or Janipha Manihot) also retains the impression of the fingers, but it has more odour and a somewhat acrid taste.

The meals of any cereal grain may easily be distinguished from arrow-root by the nitrogen which they contain, and the ammoniacal products which they yield by distillation. Potatoe-starch is however most frequently used to adulterate arrow-root, or as a substitute for it. Microscopic observation of the form and size of the grains will point out the difference, as first indicated by Raspail (*Annales des Sciences Nat.*, t. vi.), those of arrow-root being smaller: the different habitudes of the starch with re-agents will also do this. (See MM. Payen et Chevalier, *Traité de la Pomme de Terre*, p. 126; see also *Journal de Pharmacie*, Août, 1838.) Potatoe-starch is not soluble in cold water, which is the case with arrow-root. Dissolved in absolute alcohol, arrow-root separates into two distinct portions, which neither wheat nor potatoe-starch does. In equal proportions dissolved in warm water, arrow-root yields a thinner solution, with a more slimy aspect than wheat-starch.

Arrow-root dissolved in water, milk, or any other appropriate vehicle, constitutes, from its easy digestibility, a most excellent article of diet for delicate persons and young children. It may be given plain, or with wine or spices, according to circumstances. The valuable property just mentioned does not belong to either wheat or potatoe-starch. The latter, if prepared from potatoes in spring, is very liable to disturb the stomach; but less so if prepared in October or November. Potatoe-starch may be prepared at a very cheap rate, and kept for a long period unchanged, thus affording a protection against times of scarcity. (Sir John Sinclair, *On the Culture and Uses of Potatoes*, Edinb. 1828.)

MARANTA'CEÆ, a natural order of endogenous plants, which have either no stems or annual ones only, whose leaves have diverging veins, and whose flowers are constructed with an inferior ovary surmounted by a three-leaved calyculus; very irregular flowers, white, red, or yellow; and a single stamen, whose anther has but one lobe.



Canna Indica.

1, A flower with the calyx and petals cut off, the petaloid, stamen, and style alone remaining. 2, A capsule.

With the exception of the genus Calathea, and of Canna, which is commonly cultivated, under the name of Indian shot, because of its beautiful flowers, the species included in this order are of small size, and by no means attractive, but the fleshy tubers of some of them abound in starchy matter, which renders them nutritious. Arrow-root of the finest quality is obtained from Maranta arundinacea, and a similar product is yielded by Canna edulis and others. The order is known from Zingiberaceæ by the anther having but one lobe, instead of two.

All the species are found wild in tropical countries only.

MARASMUS (emaciation) is a term often used by the older medical writers to designate those cases in which no particular cause for the atrophy of the body was discovered. It is now very rarely employed, since the condition which was thus named is known to be the result of some local disease, by which the complete nutrition of the body is prevented, or by which a quantity of its material is constantly abstracted; as disease of the mesenteric glands, pulmonary consumption, &c.

MARAT, JEAN PAUL, born near Neuchâtel in 1744, studied medicine at Paris. Although not deficient in intelligence and quickness, he wanted the application and perseverance requisite for the regular study of his profession, and he became an empiric. At the first symptoms of the Revolution in 1789, he showed himself a furious demagogue, addressing himself to the passions of the Paris populace, and preaching open insurrection and massacre. He was one of the members of the club of the Cordeliers, founded by Danton in 1790. He then became editor of a journal entitled 'L'Ami du Peuple,' which was hawked about the streets, and became a favourite with the lower orders. In this periodical he urged the poor to rise against the rich, the private soldiers against their officers, and the nation at large against the king. In 1792 he became a member of the first committee of public safety, and as such sent circulars all over France to recommend the massacre of the so-called aristocrats. He said in his paper that France would never be happy unless 270,000 heads were struck off by the guillotine; and he actually published long lists of individuals whom he denounced as proper objects of public vengeance. And yet this man was returned by the department of Paris to the national convention.

In the convention Marat was the declared enemy of the Girondins: he attacked them in April, 1793; but Robespierre, who was more cautious, checked him then: things were not yet ripe for their proscription. Marat was even impeached, and underwent a mock trial before his friends of the revolutionary tribunal, but was acquitted, and re-entered the convention in triumph. He saw the downfall of the Girondins, but did not long survive them. On the 13th of July, 1793, while taking a bath, a young woman from Normandy, named Charlotte Corday, was introduced to him, under the pretext of having some pressing information to communicate. She showed him a list of pretended aristocrats in her own district; and while Marat was reading it, she stabbed him to the heart, boasting that she had delivered France of a sanguinary monster. She was guillotined, and died with the greatest composure. [CORDAY D'ARMANS.]

Marat was proclaimed by the jacobins as a martyr of liberty, and his body was interred with great honour in the Pantheon, the former church of St. Généviève, from which it was removed after the end of the reign of terror. Marat has been called a madman, but there was method in his madness; he was one of those depraved men whom revolutionary convulsions throw up to the surface of society.

MA'RATHON, a small plain in the north-east part of Attica [ATTICA], about five miles in length and two in breadth (Dodwell), which is chiefly memorable for the victory which the Athenians under Miltiades gained over the Persians here, B.C. 490. [MILTIADES.] Marathon was the first place in Attica that was occupied by Pisistratus and his partisans, after he had been compelled to retire to Eretria in Eubœa. (Herod., i. 62.) The town of Marathon originally belonged to one of the four towns which formed the Tetrapolis, which consisted of Œnoe, Marathon, Probalinthus, and Tricorythus; but the name was afterwards applied to the whole district. (Steph. Byz., under τετράπολις τῆς Ἀττικῆς.) Marathon is about three miles from the sea, and is said by Plutarch to have derived its name from the hero Marathos. It is mentioned in the 'Odyssey' as a place of considerable importance (viii. 80); and it was near this place that the Athenians are said to have defeated Eurystheus, when they took up arms in defence of the Heraclidæ. Dodwell (*Classical Tour*, ii., p. 158) says that Marathon is 18 miles in a direct line from Athens to the village of Marathon; and that it is at least 22 miles by the shortest road to the commencement of the plain. According to Pausanias, it was half-way between Athens and Carystus in Eubœa (i. 32, § 3). Marathon belonged to the tribe of Leontis.

The plain of Marathon was watered by a small stream, called Asopus by Ptolemy, which forms marshes near the sea, in which, according to Pausanias (i. 32, § 6) a great many of the Persians perished. The Athenians who fell in the battle were buried in the plain; and also, but apart from the Athenians, the Platæans, Bœotians, and slaves. A large tumulus of earth still rises from the centre of the plain; and near the sea there are two others, much lower than the former. (Dodwell.) A little way above the plain, Pausanias mentions a natural cave, sacred to Pan (i. 36, § 6); which, according to Dodwell, is scarcely worth the trouble of visiting.

MARATTI, CARLO, the last painter of the Roman school, was born at Camurano, in the March of Ancona, in the year 1625. From his childhood he manifested a great fondness for drawing and painting. In his eleventh year he went to Rome, and became the favourite pupil of Andrea Sacchi, with whom he remained till he was 19 years of age. By studying the works of Raphael, the Caracci, and Guido Reni, he formed a style peculiar to himself, and acquired during his lifetime the reputation of being one of the first painters in Europe, though his talents were certainly not of the highest order. He was particularly celebrated for the lovely, modest, and yet dignified air of his Madonnas, which procured him the name of Carlo delle *Madonne*. He painted for Louis XIV. his celebrated picture of '*Daphne*.' Pope Clement IX., whose portrait he painted, gave him a pension, and conferred on him an order of knighthood. The churches and palaces of Rome, which are filled with his works, are proofs of the esteem in which he was held. He was employed also in restoring the frescos of Raphael in the Vatican, and of Annibale Caracci in the Farnese palace. Fuseli says, 'The picture which gives the most advantageous opinion of his powers is "Bathsheba viewed by David," a work the charm of which it is easier to feel than to describe, which has no rival, and seems to preclude all hope of equal success in any future repetition of the same subject.' He also etched several beautiful plates. Of his pupils, the best known are F. Joranis and Chiari. He likewise promoted the art of engraving, and the famous engraver Jacob Frey was his scholar. In private life he was highly esteemed for his modesty and obliging disposition. He died at Rome in 1713, at the age of 88.

MARAZION. [CORNWALL.]

MARBECK, JOHN, who, as composer of the solemn and now venerable notes set to the *Preces* and Responses, which are still in use, with some alterations, in all our cathedrals, is entitled to our notice, was organist of Windsor during the reigns of Henry VIII. and his successor. A zeal for religious reformation led him to join a society in furtherance of that object, among the members whereof were a priest, a singing-man of St. George's chapel, and a tradesman of the town. Their papers were seized, and in the hand-writing of Marbeck were found notes on the Bible, together with a Concordance, in English. He and his three colleagues were found guilty of heresy, condemned to the stake, and all were executed according to their sentence, except Marbeck, who, on account of his great musical talents, and being rather favoured by Gardiner, bishop of Winchester, was pardoned, and lived to witness the triumph of his principles, and to publish his work, which appeared under the title of 'The Boke of Common Praier, noted;' the colophon being, 'Imprinted by Richard Grafton, printer to the kinges majestie, 1550, cum privilegio ad imprimendum solum.' In the same year appeared also his Concordance; and in 1574, 'The Lives of Holy Saincts, Prophets, Patriarchs, and others;' and subsequently his other books connected with religious history and controversy. It is stated by Sir John Hawkins, highly to the honour of Marbeck, that, 'under the greatest of all temptations, he behaved (after his trial) with the utmost integrity and uprightness, refusing to make any discovery to the hurt of others.'

MARBLE. A strict definition of this term is perhaps impracticable, unless, with Da Costa, we limit it to the calcareous rocks, 'of very lively colours, and of a constitution so fine that they will readily take a good polish.' In a vague sense other ornamental stones, as granite and porphyry, may be ranked among marbles, but the catalogue of the typical or calcareous marbles is long enough without these somewhat inconvenient additions. A limestone which will admit of being worked easily and equally in all directions is properly called 'freestone,' as the Bath or Ketton freestone; a rock of similar chemical composition, generally capable of being worked equally in all directions, and also of taking a good polish, deserves the title of marble; when it is granular and of a white colour, it may be useful in statuary.

Da Costa, in his 'Natural History of Fossils,' gives a large catalogue of marbles, disposed in a methodical order, which we shall follow in the following brief notices of this extensive subject.

Division I. Marbles of one plain colour.

Section 1. Black marbles. Most of these contain bitumen, and are fetid when bruised.

Examples. The Namur marble, the marble of Ashford in Derbyshire, Dent in Yorkshire, near Crickhowell, Tenby, Kilkenny, &c. The marble, antiently called Marmor Luculleum, and now Nero Antico.

Section 2. White marbles.

Examples. The marble of Paros, in which the Laocoon and Antinous are executed; the Carrara marble, of finer grain, much used in modern sculpture; the Skye marble, noticed by Dr. MacCulloch; that of Inverary, Assynt, Blair Athol, &c.

Section 3. Ash and grey marbles.

Examples. A beautiful marble, of compact oolitic texture, at Orelton, near the Clee Hills in Shropshire, deserves mention.

Section 4. Brown and red marbles.

Examples. The Rosso Antico; a rival to which, at least in colour, has been found on the estate of the duke of Devonshire, near Buxton. The mottled brown marble of Beetham Fell, near Milnthorp, is of good quality.

Section 5. Yellow marbles.

Example. The Giallo Antico. Siena marble, also dug at Mafra, near Lisbon. That used in antient Rome is said to be from Numidia.

Section 6. Blue marbles.

Example near St. Pons in Languedoc.

Section 7. Green marbles.

Example. The Marmor Lacedæmonicum of Pliny. It is dug near Verona.

Division II. Marbles of two colours.

Section 1. Black marbles variegated with other colours.

Example. Near Ashburton in Devonshire, Torbay in the same county, Bianco e Nero Antico, the African Breccia of the antients, Giallo e Nero Antico.

Section 2. White marbles variegated with other colours.

Example. Marble imported from Italy. Marbles of this general character occur in Siberia, at Plymouth, at Killarney, in Sweden, &c.

Section 3. Ash and grey marbles variegated with other colours. These are very numerous, and occur in various parts of Europe.

Section 4. Brown and red marbles variegated with other colours.

Section 5. Yellow marbles variegated with other colours.

Section 6. Green marbles variegated with other colours.

Examples. Egyptian marbles—the Marmor Tiberium and Augustum of Pliny; some Verde Antico, as that dug near Susa in Piedmont, the beautiful marble of Anglesey (called Mona marble), the marble of Kolmerden in Sweden.

Division III. Marbles variegated with many colours.

Example. Some of the Plymouth marble, the beautiful Brocatello or Brocade marble of Italy and Spain.

Marbles containing shells, corals, and other extraneous bodies.

In this division of marbles the British Islands are rich. Some of the Plymouth, Ashburton, and other Devonian limestones are extremely beautiful, from the abundance of fine corals exquisitely preserved in them; the crinoidal marbles of Flintshire, Derbyshire, and Garsdale in Yorkshire, are elegant examples of the carboniferous limestone; the shell marbles of Rance (Northamptonshire), Buckingham, Whichwood Forest, Stamford, Yeovil, may be noticed from the oolitic rocks; that of Petworth and Purbeck, from the Wealden strata, has been extensively used by the architects of the middle ages. In general the working of the English marbles is costly, and their use limited.

MARBLEHEAD. [Massachusetts.]

MARBURG, the capital of the province of Upper Hesse, in the electorate of Hesse-Cassel, is situated in 50° 50′ N. lat. and 8° 47′ E. long. It is built on the banks of the Lahn, which divides the town from the suburb of Weidenhausen. The town is situated on the side of a hill, and the streets are very steep. On the top of the eminence overlooking the town there is a large castle, which was formerly well fortified and was the residence of the landgrave. The town is partly surrounded by a wall, in which there are five gates. Marburg has a university, which was founded in 1527, by the landgrave Philip the Generous. This university has very considerable revenues, and all the usual appendages of the German universities, with a library of 100,000 volumes, an anatomical theatre, a lying-in hospital, a chemical laboratory, a veterinary school, a botanical garden, a philological seminary, cabinets of mineralogy, &c. The number of students, which in 1818 was only 220, was 359 in 1828, 422 in 1833, and at present is about 450. The town has one Calvinist, one Roman Catholic, a French Protestant, and two Lutheran churches, one hospital, two infirmaries, an orphan asylum, a school of industry, &c. The church of St. Elizabeth contains the fine monument of St. Elizabeth, which was however much damaged under the Westphalian government. Marburg being the seat of the provincial government, of the criminal tribunal, a board of trade, a commission of police, and a Lutheran superintendant, the inhabitants, 7520 in number, derive their chief support from the presence of these and from the university. The place has some manufactories of woollen, linen, cotton, hats, tobacco, and tobacco-pipes.

MARCA D'ANCO'NA, an old denomination of a geographical division of the Papal State, whose limits correspond in great measure to those of antient Picenum, and which is now subdivided into the three administrative delegazioni or provinces of Ancona, Fermo ed Ascoli, and Macerata e Camerino. This fine region extends from the frontiers of Abruzzo to the boundaries of the former duchy of Urbino, now the province of Pesaro e Urbino, and from the Apennines to the Adriatic, along which sea it occupies a line of coast more than sixty miles in length. It has been called La Marca, 'the March,' since the time of the Carlovingian emperors and kings of Italy, from being governed by marchiones, or marquises, in the same manner as the Marca Trevigiana, or province of Treviso, in the county of the Veneti. [Treviso.] March ('mark,' in German) meant originally a frontier district, but the term was afterwards applied rather capriciously, and the number of marquisates was multiplied in various parts of the revived Western empire. In the time of the Longobards the county, afterwards called Marca, was called Pentapolis, from its five principal towns, Ancona, Fanume, Pisaurum, Auximum (now Osimo), and Humana or Numana. The name of Marchia Anconæ is found in a diploma of the emperor Frederic I., of 1162. His son Henry VI. united it to the duchy of Ravenna. Innocent III. conquered the March, and placed it under the allegiance of the Roman see. During the troubles of the middle ages it was divided among several petty princes or tyrants, Varano of Camerino, Sforza, and others. Cesare Borgia subdued the country by force and treachery, and it became from that time annexed to the papal territories. It was then generally called Marca d'Ancona, from its principal town; but the south-east part of it was also sometimes called Marca di Fermo, and the two together were often designated, in the plural number, 'Le Marche.'

The Picentes, or antient inhabitants of Picenum, are said to have been a colony of the Sabines. Their country extended along the Adriatic, from the Æsis to the Truentum, which are also the limits of the modern Marca; but the Prætutii, who lived south of the Truentum as far as the river Matrinus (now Piomba), and formed a separate community, are included by Pliny and other antient geographers within the boundaries of the Picenum. The Æsis separated the Picentes from the country of the Senones; but some antient writers have considered the Picenum to extend as far as Ariminum. Asculum, Firmum, Pollentia, Ricina (believed to be Macerata), Treia, and Tollentinum, were towns of the Picentes. The Picentes made alliance with Rome, B.C. 299. During the war of Pyrrhus they joined the Samnites, Lucanians, and others against Rome, were defeated, sued for peace and obtained it, and a Roman colony was sent to Ariminum on that occasion. (Livy, *Epitome XV.*) Picenum then became a Roman province, and was administered by a proconsul.

The Picentes were foremost in the league of the Italian nations in the Social war: they killed the proconsul Servilius, and defeated Cn. Pompeius Strabo, but were afterwards defeated by him. [Ascoli.] They however obtained the civitas, like the other Italian people.

The actual delegazione of Ancona, bounded on the east and north-east by the Adriatic, on the north-west and west by the province of Pesaro e Urbino, and on the south by Macerata e Camerino, contains 155,000 inhabitants, distributed among six towns and thirty-four 'terre,' having communal councils. The principal towns are, 1, Ancona; 2, Jesi (the antient Asium), with 14,000 inhabitants; 3, Osimo, with 5000 inhabitants. (Calindri, *Saggio Statistico.*) The account of the other two provinces is given under Fermo ed Ascoli and Macerata e Camerino.

(Compagnoni, *Reggia Picena;* Colucci, *Antichità Picene,* 31 vols. 4to., Fermo, 1786-97.)

MARCELLIN, ST. [Isère.]

MARCELLI'NUS. [Ammianus Marcellinus.]

MARCELLI'NUS was bishop of Rome in the reign of the emperor Diocletian. He has been represented by some as having, through fear during the persecution raised under that emperor, offered incense to the heathen deities, but this is contested by others. He died A.D. 304.

MARCELLO, BENEDETTO, a patrician of Venice, son of Agostino Marcello, a senator, was born in 1686. His elder brother, Alessandro, who was much distinguished for his knowledge in natural philosophy and mathematics, as well as for his musical acquirements, had weekly music-parties at his house, to which probably the early predilection of Benedetto may be attributed. Among the masters to whom the care of his education was assigned are mentioned Gasparini and Lotti, under whom he studied composition, but we do not find that he produced anything particularly worthy of notice till 1716, in which year a serenata from his pen was performed at Vienna, when the birth of the first son of the emperor Charles VI. was there celebrated with much ceremony and splendour

His great work, and that to which is to be ascribed the celebrity of his name throughout Europe—for as a Venetian noble he would have been known only in a small district, and but for a brief period—was published in 8 vols. folio, in the years 1724 and 1726, under the title of *Estro Poetico-armonico, Parafrasi sopra i 50 primi Salmi, Poesia di G. A. Giustiniani, musica de B. Marcello, patrizi Veneti.* The learned M. Suard, whose reputation as a musical critic once stood high, seems to approve the rather strong term with which this title commences; for, says he, nothing equals the enthusiasm that reigns in all these compositions; it transfers to music the energy of Oriental thought, and converts the composer at once into a Pindar and a Michael Angelo. Whatever may have been the degree of enthusiasm possessed by Marcello—and doubtless it was great—there is certainly too much of it in this opinion. Graceful and appropriate melody, supported by harmony of the purest kind, is his true characteristic. He occasionally, though not often, is grand, but this grandeur springs out of simple sources, and does not count learned combinations and complicated parts among its elements. In his style is to be traced sound musical knowledge, guided by good sense and polished by good taste. He is always elegant, never gorgeous, and as to the sublimity implied in the remark of the French critic, we have never discovered any signs of it in the works of the noble Venetian, much as we admire them for other valuable qualities.

Mr. Avison, in his well known *Essay on Musical Expression,* carries his admiration of Marcello's Psalms to great lengths, and leaves us to infer that he considers them at least on a level with the works of the Italian's great contemporary, Handel. Time has shown the extravagance of this opinion, and assigned to the Venetian composer his true rank, which undoubtedly is high, but far from being of the loftiest kind. Avison however evinced the sincerity of his admiration by issuing proposals for publishing an edition of the *Salmi* set to English words; but the execution of this design devolved on Mr. Garth, organist of Durham, who very skilfully adapted to the music our own prose translation of the Psalms, and published the work (which is now to be found in most musical libraries) in eight handsome folio volumes.

Marcello composed many other works besides his Psalms, but few, if any of them, have survived. He did not confine his attention to music, but was an active magistrate, and during many years one of the Council of Forty. He died in 1739.

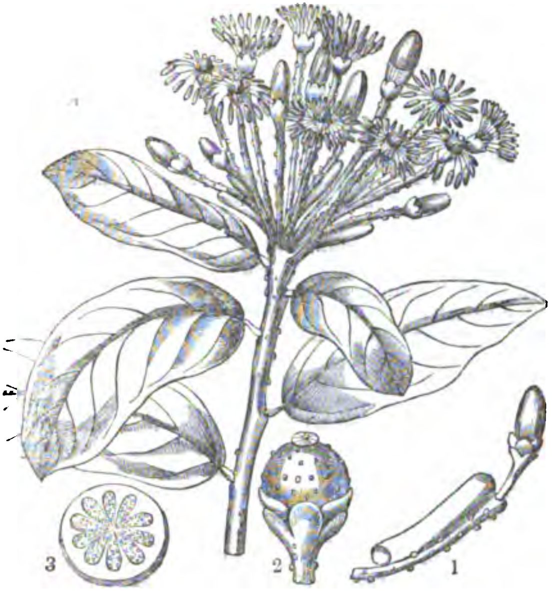
MARCELLUS, MARCUS CLAUDIUS, born of a Roman consular family, after passing through the offices of ædile and quæstor, was made consul B.C. 224. The Transpadane Gauls having declared war against Rome, Marcellus marched against them, defeated them near Acerræ on the Addua, killed their king Viridomarus, and carried off his arms, the 'spolia opima,' which were exhibited in his triumph. At the beginning of the second Punic war, Marcellus was sent to Sicily as prætor to administer the Roman part of the island, and had also the task of keeping the Syracusans firm to their alliance with Rome. After the battle of Cannæ he was recalled to Italy, to oppose Hannibal. He took the command of the relics of the Roman forces in Apulia, kept Hannibal in check, and defended Nola. In the year 214 B.C., being again consul, he took Casilinum by surprise. He was next sent to Sicily, where Syracuse had declared against Rome. [Hieronymus.] After a siege of nearly three years, the town was taken in the year 212 B.C., and Marcellus returned to Rome with the rich spoils. Archimedes lost his life on the occasion of this taking of Syracuse. [Archimedes.] Marcellus did not obtain the triumph, but only the ovation, as the war in Sicily was not entirely terminated. In the year 210 he was again chosen consul, and had the direction of the war against Hannibal in Apulia, when he took the town of Salapia, and fought several partial engagements with the Carthaginians without any definite result. In the following year he continued in command of the army, and fought a battle against Hannibal near Canusium, in which the Romans were defeated and ran away. On the following day Marcellus renewed the fight and defeated the Carthaginians, upon which Hannibal withdrew to the mountains of the Bruttii. In the next year, B.C. 208, Marcellus was elected consul, for the fifth time, with T. Quintus Crispinus. He continued to carry on the war against Hannibal, when, being encamped near Venusia, he rashly ventured out, fell into an ambuscade of advanced posts, and was killed. Hannibal caused his body to be buried with honours. (Livy, xxvii. 2, 14, 29.) He was one of the most distinguished Roman commanders during the second Punic war, and had the honourable reputation of a disinterested man.

MARCELLUS, EMPI'RICUS, was born at Bordeaux, and was *magister officiorum* in the reign of Theodosius the Great. The only work of his which has come down to us is entitled 'De Medicamentis empiricis, physicis et rationalibus,' published at Basle, 1537, Venice, 1547; and with the 'Medici Principes,' Paris, 1567. Though Marcellus does not appear to have belonged to the medical profession, he gives us much curious information respecting the manner in which medicine was studied at that time in Gaul.

MARCELLUS I. succeeded Marcellinus as bishop of Rome, but we know little of him, except that he is said to have been strict in enforcing the discipline of the church. He died A.D. 310.

MARCELLUS II. was elected after the death of Pope Julius III. in 1555, but died in less than a month after his election. He was succeeded by Paul IV.

MARCGRAA'VIACEÆ, a natural order of Polypetalous exogens, having an imbricated calyx, numerous hypogynous stamens, and a superior ovary with a discoid stigma and many polyspermous cells. They are all inhabitants of the tropical parts of America, and are usually scrambling shrubs, which are sometimes true parasites. The order is of no known use, and of but little interest, except in a systematical point of view; unless for the sake of its very curious bracts, which vary in form in different species, but which are usually more or less pitcher-shaped.



Marcgravia umbellata.

1, a pitcher-shaped inverted bract adhering to the peduncle of an unexpanded flower; 2, a ripe fruit seated in the persistent imbricated calyx; 3, a transverse section of the same.

MARCH, the third month of the year according to modern computation, containing thirty-one days. The Roman year originally began with March [JANUARY], and was in fact so considered in England before the alteration of the style, the legal year commencing on the 25th of March. Our Anglo-Saxon ancestors called it most commonly *Hlyd monath*, loud or stormy month; and sometimes *Hræd* or *Rhæd monath*, which some interpret Rheda's, others *Rhede* or *Rethe*, the rugged or rough month. The name of the month is said to be derived from that of Mars, the god of war.

Before 1564 the computation of the French year began from Easter, so that occasionally the same year might comprehend two months of March, *Mars avant*, and *Mars après*. If Easter occurred in March itself, the month began in one year and ended in another. The change of computation from the first of January to Easter, in that country, was directed by an edict of Charles IX.

There is an old proverb, mentioned by various writers, which represents March as borrowing certain days from April. These are called, by the rustics in many parts both of England and Scotland, the *Borrowed Days*. They are particularly noticed in the poem called 'The Complaynt of Scotland:'

'March said to Aperill,
I see three hogs upon a hill;
But lend your three first days to me,
And I'll be bound to gar them die.
The first it shall be wind and weet,
The next it shall be snaw and sleet,
The third it shall be sic a freeze,
Sall gar the birds stick to the trees.
But when the borrowed days were gane,
The three silly hogs came hirplin hame.'

Dr. Jamieson, in his 'Etymological Dictionary,' says, 'These days being generally stormy, our forefathers have endeavoured to account for this circumstance by pretending that March *borrowed* them from April, that he might extend his power so much longer. . . . Those,' he adds, 'who are much addicted to superstition, will neither borrow nor lend on any of these days. If any one would propose to borrow of them, they would consider it as an evidence that the person wished to employ the article borrowed for the purposes of witchcraft against the lenders.'

Ray, in his Collection, has a different proverb relating to this month, viz. that 'A bushel of March dust is worth a king's ransom;' thereby expressing the importance of dry or dusty weather at this particular season of the year, in an agricultural point of view.

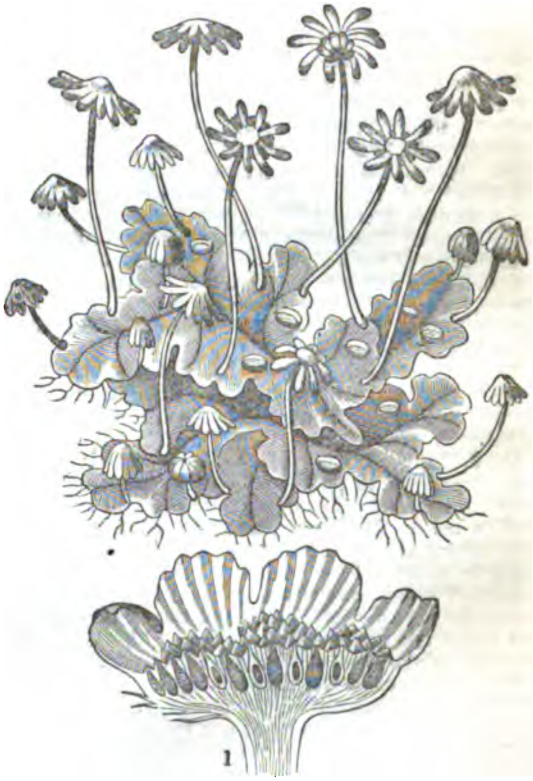
(Brady's *Clavis Calendaria*, 8vo., Lond., 1812, vol. i., p. 63; Furetière, *Dictionnaire Universel;* Brand's *Popular Antiquities*, 4to. edit., vol. i., pp. 86, 460.)

MARCH, in music, is, properly speaking, an air in duple time, played by martial instruments—*i.e.* by inflatile and pulsatile instruments—to mark the steps of the infantry, as well as to amuse and cheer troops of all kinds. It however has long since gained admission wherever music is heard, and consequently is written for every kind of musical instrument. Hence some of the most striking compositions by the greatest masters; as, for instance, the marches in Handel's oratorios; the religious marches (*Marches religieuses*) in Gluck's *Alceste* and Mozart's *Zauberflöte;* the two funeral marches (*Marcie funebri*) of Beethoven, &c.

The true March is always written in common time, or in what is called a compound of that measure, and begins on a broken part of the bar, with an odd crotchet or a quaver. It is slow for grand or parade occasions, quick for ordinary marching. We are told by Rousseau, that Marshal Saxe used the march also for the purpose of accelerating or retarding the pace of his troops in battle. In his days there was more form, more ceremony used; something like etiquette was kept up in fighting: we doubt whether the movements of the battalions in the fields of Austerlitz and Waterloo were performed to musical movements, or even to the simple beat of drums.

MARCHANTIA'CEÆ, a small natural order of Acrogens or Cryptogamic plants, forming part of the old group called Hepaticæ. They are plants of a low organization, in most instances having no distinction of leaves and stem, but a thin, leafy, lobed thallus in their room, in which respect they resemble lichens, but are furnished with breathing pores and an approach to spiral vessels in the form of elaters, which latter circumstances elevate them to the level of Lycopodiaceæ and Marsileaceæ.

Marchantiaceæ differ from Jungermanniaceæ, with which they were formerly combined under the old name of Hepaticæ, in not having a distinct stem, and in their fruit not being four-valved. Marchantia itself, a common plant under the north side of old walls and hedges, upon damp ground, forms deep green patches with a lobed lichenoid thallus, and has reproductive organs of two kinds arranged separately below mushroom-shaped heads; one of them appears to be male and the other female. None of the species are of any known use.



Marchantia polymorpha.

1, A vertical section of an involucrum, with the young capsules imbedded in the receptacle.

Endlicher separates the order into four, with the following distinctive characters:—

1. RICCIACEÆ. Frondose. Involucre none. Capsules bursting irregularly. Elaters none. Aquatics.

2. ANTHOCEROTEÆ. Frondose or leafy. Involucre none. Capsules 1-2-valved, with a central columella. Elaters.

3. **Targioniaceæ.** Frondose. Involucre heterogeneous. Capsules opening by teeth. Elaters.

4. Marchantiaceæ. Frondose. Both involucre and involucel. Capsules various, opening irregularly by teeth. Elaters. Flowers capitate.

MARCHE, LA, one of the provinces or military governments into which France was divided before the Revolution. It was bounded on the north by Berri, on the east by Auvergne, on the south by Limousin, and on the west by Poitou and a small portion of Angoumois. Its name, which denotes a frontier district, was derived from its situation on the border of Limousin (of which province it was formerly accounted a subdivision, being sometimes called La Marche du Limousin) toward Poitou and Berri. It was subdivided into La Haute Marche (Upper Marche), on the east side, of which Gueret (population 3100 town, 3921 whole commune) was the capital, and Aubusson (pop. 4354 town, 4847 whole commune), Bourganeuf (pop. 2110 town, 2849 whole commune), and Felletin (pop. 2816 town, 3228 whole commune), chief towns; and La Basse Marche (Lower Marche) on the west side, of which Bellac (pop. 3025 town, 3607 whole commune) was the capital, and Le Dorat (pop. 1805 town, 2237 whole commune) and Confolens (pop. 2215 town, 2687 whole commune), chief towns. La Haute Marche now constitutes the department of Creuse; La Basse Marche is included in the departments of Haute Vienne, Indre, and Charente.

This district was included in the territory of the Lemovices, a Celtic nation, who also occupied Limousin. In Roman Gaul it was comprehended in the province of Aquitania Prima, and afterwards was successively occupied by the Visigoths and Franks, under the latter of whom it made part of the duchy and kingdom of Aquitaine. In the tenth century it formed a county under Boson I., who was also count of Perigord. The county of Marche continued in the possession of the descendants of Boson until the beginning of the fourteenth century, when it was seized by Philippe IV. le Bel. It was subsequently given by Philippe V. le Long, as an apanage, to his brother Charles, who, upon coming to the crown, exchanged the county of Marche with Louis I., duke of Bourbon, for the county of Clermont. Upon the death of Louis, duke of Bourbon, the county of Marche came to his second son, Jacques or James of Bourbon, who was appointed by the king Jean II. constable of France. Jacques struggled against the English under the Black Prince, but with so little success that he resigned to the king his sword, the ensign of the constable's office. He was taken prisoner at Poictiers, A.D. 1356, and was killed A.D. 1361, with his son Pierre, fighting against the disbanded mercenaries, called the Tard-venus, near Lyon. [Lyon.] The county of Marche passed subsequently to the counts of Pardeac, a branch of the family of Armagnac, and from them to the dukes of Bourbon; and upon the confiscation of the territories of Charles, duke of Bourbon, by Francis I., it came to the crown, A.D. 1523, with which it was finally united.

The name of La Marche or Les Marches was formerly given to the frontier of Basse (Lower) Normandie, towards Maine and Perche. The towns of Argentun and Séez were included in this district.

MARCHES, THE. *Mark*, Anglo-Saxon meaꞃc, is a word common to almost all the languages of Teutonic origin, in sense scarcely varying from the word as at present used, a *mark*. But from denoting a *mark* in general, it came to denote in a specific and peculiar sense those important *marks* by which the boundaries of wide domains were indicated, and in this sense it is found in Anglo-Saxon writings. Hence the word *the marches*, that is, the country lying near and about the *marks* which indicated the limits of two kingdoms, dukedoms, or other extensive jurisdictions.

The word is used in Germany, and upon it is founded one of their titles of honour, the *markgraf* (*margrave*), or lord of the marches; and our own *marquis* is of the same origin, though it does not appear that the few persons who in early times (there was no English marquis before the reign of Richard II.) bore this title had any particular connection with the marches.

Great part of England being bounded by the sea, there could be but little march-land. But on the side toward Wales, and in the north where England abuts upon Scotland, there was march-land; and when we speak of the marches, the land near the borders of the two countries is what is meant.

Wales being conquered by King Edward I., we hear little in history of the marches of Wales. But the term continued in use long after the conquest of that country. The great family so celebrated in the early history of England, whose hereditary name was De Mortuo Mari ('of the Dead Sea'), contracted and Gallicized into Mortimer, and whose chief residence was at Wigmore Castle in Herefordshire, had the chief management of the affairs of the Welsh marches, and was known by the title of Earl of March. King Edward IV., their lineal descendant and heir-general, was called Earl of March while his father was the Duke of York.

But Scotland remaining a distinct sovereignty for several centuries after the subjugation of Wales, the marches towards that country are frequently mentioned in history, and especially as being the scene of those predatory excursions in which the people of both countries frequently engaged, or of conflicts arising out of national jealousies and disputed rights. The maintenance of authority in those regions, lawless, or constantly liable to become so, was an object of great importance; and for this purpose the marches towards Scotland were divided into two portions, the western and the middle marches, each of which had courts peculiar to itself, and a kind of president or governor, who was called the warden.

MARCIA'NUS, born in Thrace, of obscure parents, towards the end of the fourth century, entered the army, rose gradually by his merit to high rank, and was made a senator by Theodosius II. When Theodosius died (A.D. 450) his sister Pulcheria, then fifty-two years old, offered her hand to Marcianus, who was near sixty, because she thought him capable of bearing the crown with dignity and advantage to the state. Marcianus married her, and was proclaimed emperor. His reign, which lasted little more than six years, was peaceful, and his administration was equitable and firm. He refused to pay to Attila the tribute to which Theodosius had submitted. In the year 455 Marcianus acknowledged Avitus as emperor of the West. Marcianus died in 457; his wife Pulcheria had died before him. He was succeeded by Leo I.

MARCHIENNES. [Nord.]

MARCIONITES, a religious sect of the second and third centuries of our æra, so called from their teacher Marcion, a native of Sinope and a priest, who adopted the old Oriental belief of two independent, eternal, co-existing principles, one evil and the other good. He endeavoured to apply this doctrine to Christianity, asserting that our souls are emanations of the good principle, but our bodies and the whole visible world are the creation of the evil genius, who strives to chain down our spiritual nature by corporeal fetters, so as to make the soul forget its pure and noble origin. He further maintained that the law of Moses, with its threats and promises of things terrestrial, was a contrivance of the evil principle in order to bind men still more to the earth; but that the good principle, in order to dissipate these delusions, sent Jesus Christ, a pure emanation of itself, giving him a corporeal appearance and semblance of bodily form, in order to remind men of their intellectual nature, and that they cannot expect to find happiness until they are reunited to the principle of good from which they are derived. Marcion and his disciples condemned all pleasures which are not spiritual; they taught that it was necessary to combat every impulse that attaches us to the visible world; they condemned marriage, and some of them even regretted the necessity of eating of the fruits of the earth, which they believed to have been created by the evil principle. The Marcionites spread far in the East, and especially in Persia. The chief opponent of Marcion was Tertullianus, who wrote a book to refute his doctrines.

(Tertullianus *Adversus Marcionem*; Pluquet, *Dictionnaire des Hérésies*.)

MARDIN, a town of Northern Mesopotamia, built on a steep hill which forms part of the chain that divides the basin of the Upper Tigris, or country of Diarbekr, from the plains of Sinjar, which are watered by the affluents of the Euphrates. Mardin is a considerable though poor town, and is said to contain 20,000 inhabitants, two-thirds of whom are Moslems, and the rest Christians, with some Jews. The Christians are divided between Syrians of the Greek Church, Nestorians, and Armenians. The Syrians, who are the most numerous, have two churches in the town and two convents in the neighbourhood. They read their church service in the Syriac language, which few of the congregation understand, the vulgar tongue being the Arabic. Their patriarch showed to Mr Buckingham a handsome copy of the Gospels in Syriac, written on parchment, richly illuminated, and bearing the date of 1150.

Mardin has eight mosques, several bazaars, and some public baths. The castle, which is built on the summit of the hill above the town, is strong by its situation. The town of Mardin is nearly half-way between Diarbekr and Mozul, and on the road from Constantinople to Bagdad.

(Niebuhr; Buckingham.)

MAREMME, the name given in Italy to the unwholesome lowlands which extend along the coast of the Mediterranean. The name is especially applied to the lowlands of Tuscany and of the Papal State, which are the most extensive. The Maremme may be divided into basins. The first basin begins north of Lucca, and extends along the sea-coast as far as Leghorn, south of which town the ridge of Montenero projects as far as the sea-coast. This basin extends inland from ten to twelve miles to the hills east of Pisa; it also includes the lowest part of the course both of the Serchio and the Arno, and is called Maremma Pisana. The next basin is that of the Cecina, a river which enters the sea about eighteen miles south of Leghorn. This basin, which is called the Maremma of Volterra, is of small extent, for the hills again approach close to the sea a few miles south of the mouth of the Cecina. The third basin begins at Piombino, and extends as far as Monte Argentaro, a distance of about 60 miles in a direct line. It stretches from 10 to 20 miles inland, and includes the lower course of the rivers Cornia, Bruna, Ombrone, and Albegna, and the lakes or marshes of Castiglione and Orbetello. This large tract is called Maremma Senese, because it forms part of the province of Siena. It is also called the Maremma of Grosseto, from the town of that name which is situated in the midst of it. A description of these tracts, which constitute the Tuscan Maremme, is given under Pisa and Siena (Provinces).

The Roman Maremma, which is a continuation of that of Siena (for there is no interruption of hills near the coast between one state and the other), begins at the river Pescia, which marks the boundary of the two countries, and extends as far as Terracina on the frontiers of Naples. The whole of this tract, of more than 120 miles in length, is low and unhealthy; but its depth inland is very unequal, owing to various offsets of the lower Apennines, and also to detached ridges which approach the sea without coming close to it, and which partly enclose the lowlands. The Roman Maremma may therefore be divided into three basins. 1. That of the lake of Bolsena, including the banks of that lake and the course of its outlet, the river Marta, as well as the rivers Fiora, Arone, and Mignone. The mountains of Santa Fiora, on the borders of Tuscany, bound this basin on the north-west; and Mount Cimino, which is of volcanic formation, on the south-east, divides it from the basin of the Tiber. The lower steps of the ridge of Cimino approach the sea at La Tolfa, near Civitavecchia. This basin, which is generally called the Maremma of Corneto, includes the districts of Corneto, Montalto, Canino, Castro, and Civitavecchia. A description of it is given under Papal States.

The second basin, that of the lower Tiber, extends from Civitavecchia to Anzo. The volcanic ridge of the Alban Mount divides it on the south-east from the basin of the Pomptine Marshes. A description of both, with some account of the various phenomena of the soil and atmosphere, is given under Campagna di Roma. The Maremme are of two kinds; some are marshy, and others dry, but both are unwholesome, especially in summer.

The name of Maremma is not commonly used in the kingdom of Naples to designate the unhealthy lowlands of that country, which are also extensive, but the synonymous word Paduli, a corruption of paludi, is used instead.

The Tuscan government has of late years effected great improvements in its Maremma; the marshes have been drained, the lakes embanked, the ground has been brought into tillage, and colonies established. The government has published an interesting account of the works executed for these objects, with an atlas, fol., Florence, 1838.

MARENGO. [Alessandria; Bonaparte.]

MARENNES. [Charente Inferieure.]

MARE'NZIO, LUCA, certainly the most voluminous, and, in the opinion of many, the best of all the composers of madrigals, was born at Concaglia in Brescia, about the middle of the sixteenth century. His parents were poor, but his fine voice recommended him to the protection of the principal ecclesiastic of the place, who had him instructed in music by Giovanni Contini, the author, we are told, of many sacred compositions. His first appointment was as *maestro di Capella* to the cardinal Luigi d'Este, and at Rome, says Adami, he was beloved and caressed by many great personages, and among the number by the king of Poland, on whose invitation he paid a visit to the dominions of that monarch. Peacham, in his 'Complete Gentleman,' tells us that he was 'in displeasure with the pope, for overmuch familiarity with a kinswoman of his holiness,' which was the cause of his quitting Italy for a time. He states other particulars relative to this, which are extraordinary at least, and not now worth investigating. Marenzio returned however to the papal city, and was admitted into the pope's chapel, but in what capacity does not appear; Peacham says as organist; Dr. Burney denies this, assigning as the reason of his disbelief, that in the papal chapel there is no organ. The former, who certainly was acquainted with Marenzio, describes him as a 'little black man,' and mentions the first, second, and third parts of his *Thyrsis*, as 'songs the Muses themselves might not have been ashamed to compose.' He died at Rome in 1599.

In relation to his style of composition the Italians described him as *il piu dolce cigno* (the sweetest swan), and the praise thus poetically expressed was perfectly just. Indeed as respects tenderness of air and gracefulness of harmony he has had few rivals. In vigour of imagination he has superiors, among whom our own best English madrigalists may be named without incurring the charge of national partiality. Even Peacham, his eulogist, mentions several English composers who, he says, 'are inferior to none in the world (how much soever the Italian attributes to himselfe) for depth of skill and richnesse of conceipt.' As he was one of the earliest composers of eminence, his works have been open to all, and he has been more or less imitated by many writers of vocal music in parts. Handel and Purcell, as Dr Burney remarks, did not disdain to become his debtor.

MAREO'TIS. [Alexandria; Egypt.]

MARGARET, daughter of Waldemar III., king of Denmark, married in 1363 Haquin, king of Norway, on the death of Waldemar. In 1375 Margaret's son Olaus, then a minor, succeeded to the crown of Denmark under the guardianship of his mother. His father Haquin dying, Margaret was acknowledged queen of Norway. Olaus died in 1387, and the Danes also acknowledged Margaret as their queen. She turned her arms against Albert, king of Sweden, who was not popular with his subjects, defeated him, and made him prisoner, and was then acknowledged queen of Sweden. After seven years' confinement, she released Albert, on condition of his formally renouncing the crown of Sweden. In 1396 the estates of the three kingdoms assembled at Calmar, where it was agreed that in future they should all be ruled by one and the same sovereign. This act was called the 'Calmar Union.' On this occasion Margaret designated her nephew Erick as her successor. She died in November, 1411, being 59 years of age.

Margaret had many great qualities; but her political conduct, especially in her transactions with Sweden, was not free from duplicity and violence. To the Danes however she proved a good queen. She loved pomp and splendor, was brave and resolute, and had rather the qualities of the stronger sex than those of her own. [Erick XIII. of Sweden.]

MARGARET OF ANJOU. [Henry VI.]

MARGARET OF RICHMOND. [Henry VII.]

MARGARIC ACID, a fatty acid, so called by Chevreul, who discovered it, from 'margarites' (μαργαρίτης), *a pearl*, on account of its peculiar lustre. It is prepared from soap made with olive-oil and potash; this is to be perfectly dried, and then macerated for twenty-four hours in twice its weight of cold alcohol. The *oleate of potash*, which the soap also contains, is dissolved by the alcohol, while the margarate of potash remains unacted upon; this is to be well washed with cold alcohol, and then dissolved in 200 parts of boiling alcohol: on cooling, the margarate of potash crystallizes; and as it contains a little oleate, it is to be crystallized a second time: it is then to be decomposed, and the margaric acid precipitated by the addition of hydrochloric acid.

The properties of this acid are, that on cooling, after fusion, it crystallizes in pearly needles; it is insoluble in water, and hence its precipitation from its compounds and solution by the stronger acids. It has an acid reaction; and its salts, except those of the alkalis, are very sparingly soluble in water. Its saline compounds are termed *margarates*.

Acccording to the analysis of Berzelius, it consists of—

Thirty-three equivalents of hydrogen	33	or	12·59
Thirty-five equivalents of carbon .	210		78·38
Three equivalents of oxygen . .	24		9·03
Equivalent	267		100·

The crystals contain 3·4 per cent. of water, which can be separated only by converting the acid into a margarate by combining it with a base.

Margarate of Potash is obtained as above stated by the action of alcohol on soap made of olive-oil and potash; it separates from its solution in boiling alcohol in brilliant scales: with ten times its weight of water, at about 158°, it forms a limpid solution, which begins to become turbid at about 140°, and at 60° it becomes gelatinous; a larger quantity of water partially decomposes it, and converts it into bimargarate: at 55°, when exposed to a moist atmosphere, it absorbs its weight of water without becoming liquid; 100 parts of alcohol are capable of holding 1·21 part in solution when cold, 10 parts when hot. Æther, when heated, separates a little margaric acid.

Bimargarate of Potash is soluble in hot alcohol, 100 parts (of sp. gr. 0·834) dissolving 31·17 parts at 148° Fahr., of which however only 1·13 part remains dissolved at 68°.

Margarates of Soda strongly resemble those of potash: the neutral salt dissolves in 10 times its weight of water at 172°, and the solution becomes gelatinous at 148°, and contains a little acidulous salt.

Margarates of Lead.—Of these there are three, a sub-, neutral-, and super-salt. The neutral is produced by double decomposition: it contains combined water, and fuses at about 170°: boiling alcohol of sp. gr. ·823 dissolves about $\frac{3}{100}$ of its weight; it is less soluble in boiling æther.

When fat is boiled with the alkalis, as in preparing soap, it appears that the elements of the fat, without either yielding anything to or absorbing anything from the air, are converted into one or more fatty acids and glycerin; to these changes the elements of the water however contribute; the new acids, combining with the alkalis, form soap, which collect on the surface of the fluid, while the glycerin remains in solution.

MARGARIN, a peculiar fatty matter contained in vegetable oils, and also in animal fats, as mutton-suet and hog's-lard: when these have been treated with æther, for the purpose of obtaining stearin from them, the æthereal liquors, by spontaneous evaporation, deposit a portion of the solid matter which they contain, and this is to be collected on a linen cloth, strongly pressed, and then exposed for a long time to the heat of a salt-water bath. This substance is very soluble in cold æther, which distinguishes it from stearin. It appears probable however that by boiling in alkaline solutions it is converted into stearic acid; but additional experiments are required to determine its nature with precision.

MARGARI'TA, Dr. Leach's name for the 'Concha margaritifera or Matrix Perlarum, *Mytilus margaritiferus* of Linnæus, *Meleagrina margaritifera* of Lamarck. [AVICULA.]

MARGARITA'CEA, M. de Blainville's name for his third family of *Lamellibranchiata*. This family comprises the genera *Vulsella, Malleus, Perna, Crenatula, Inoceramus, Catellus, Pulvinites, Gervillia*, and *Avicula*. [AVICULA; MALLEACEA.]

MARGARITIC ACID. When eight parts of castor oil are saponified by two parts of hydrate of potash dissolved in four parts of water, by heating them together for some minutes the oil is rendered completely soluble in water. MM. Bussy and Lecanu have discovered in this soap three different fatty acids, the *margaritic, ricinic*, and *elaiodic*, which are obtained by saturating the base with hydrochloric acid. These acids form a reddish yellow oil, which at a temperature of about 60° Fahr. deposits a small quantity of solid matter, which is the margaritic acid. This is to be pressed between folds of blotting-paper, then dissolved in boiling alcohol, from which it separates on cooling in pearly scales which redden litmus paper. This acid fuses at about 270° Fahr.; its saline compounds, which however are but little known, are called *margaritates*. According to Bussy and Lecanu hydrated margaritic acid is composed of—Hydrogen, 10·91; Carbon, 70·50; Oxygen, 18·59.

MA'RGARON, a solid white fatty matter which crystallizes in pearly scales, and is obtained by distilling margaric acid with excess of lime. It fuses at about 170° Fahr., is volatile, soluble in fifty times its weight of hot alcohol, and five times its weight of boiling æther. Exposed to the action of heat in close vessels it distils almost unchanged; it burns in the air with a brilliant flame. Nitric acid acts but slightly upon it; sulphuric acid chars it, and sulphurous acid is given out. The alkalis do not act upon margaron.

This substance is composed of—Hydrogen, 13·42; Carbon, 83·37; Oxygen, 3·21.

MARGATE, a seaport town on the coast of Kent, in the parish of St. John, hundred of Ringslaw, and Isle of Thanet, 40 miles east-north-east from Maidstone, and 65 east from London (direct distances). Its name is probably derived from Meregate, signifying an opening or gate into the sea. Hasted, in his 'History of Kent,' published in 1799, says, 'The town of Margate was till of late years a poor inconsiderable fishing-town, built for the most part in the valley adjoining the harbour, the houses of which were in general mean and low; one dirty narrow lane called King Street having been the principal street of it.' At present the principal streets of Margate are regularly constructed and well paved, and lighted with gas; and many of the houses and public buildings, including an esplanade, squares, &c., are of a superior description. The spring-water is excellent and the supply abundant. The shore is well adapted to sea-bathing, and to this circumstance, added to the generally acknowledged salubrity of the air, and the facility of communication with the metropolis by means of steam-vessels, must be attributed the rapid increase in the population of the parish of St. John, which in 1831 amounted to 10,339. A handsome new church has been built at Margate within these few years. There is an hospital, called Draper's Hospital, founded in 1709 by Michael Yoakley, a member of the Society of Friends, for the housing and maintenance of decayed housekeepers. The sea-bathing infirmary at West-Brook, near Margate, was established by the benevolent Dr. Lettsom in the year 1792, assisted by committees which had been formed both in London and Margate. The object of the founders was to enable poor people to participate in the advantages of sea-bathing. The building consists of a centre building and two wings, and contains wards for the reception of nearly one hundred patients. The national school affords gratuitous instruction to about 400 children of both sexes.

The present stone pier was erected under the superintendence of Messrs. Rennie and Jessop, at an expense exceeding 100,000*l*. It is 900 feet long, and at its extremity is the lighthouse, built from a design of Mr. Edmunds. The erection of this pier has added greatly to the utility of the harbour, which is much exposed to winds from the north-east.

Margate is within the jurisdiction of Dover, one of the Cinque-ports. In the year 1787 the inhabitants thought their town of too much importance to be longer subjected to this jurisdiction, and accordingly applied to the crown for a charter of incorporation; but upon the case being heard before the attorney-general, the opposition of Dover was so strong that their petition was refused, and since then the application has not been renewed. [CINQUE PORTS.]

(Hasted's *Hist. of Kent; Beauties of England and Wales; Population Returns.*)

MARGINELLA. [VOLUTIDÆ.]

MARGINO'PORA, a genus of MILLEPORÆA.

MARIA THERE'SA, archduchess of Austria, queen of Hungary and Bohemia, and empress of Germany, born in 1717, was the eldest daughter of Charles VI. of Austria, emperor of Germany. [CHARLES VI.] In 1724 Charles by his will, known by the name of the Pragmatic Sanction, regulated the order of succession in the family of Austria, declaring that, in default of male issue, his eldest daughter should be heiress of all the Austrian dominions, and her children after her. The Pragmatic Sanction was guaranteed by the diet of the empire, and by all the German princes individually, and also by several other powers of Europe, but not by the Bourbons.

In 1736 Maria Theresa married Francis of Lorraine, who, by the peace of Vienna of the preceding year, had been recognised as the future grand-duke of Tuscany, after the death of Gian Gastone, the last offspring of the house of

Medici. Gian Gastone died in July, 1737, and Tuscany became subject to Francis, who, in January, 1739, repaired to Florence with his consort. Upon the death of Charles VI., in 1740, the king of Prussia, the elector of Bavaria, the elector of Saxony, France, Spain, and the king of Sardinia, agreed to dismember the Austrian monarchy, to parts of which each of those powers laid claim. Maria Theresa however, with a spirit and decision remarkable for her age, lost no time in repairing to Vienna and taking possession of Austria, Bohemia, and her other German states; she then proceeded to Presburg, took the oaths to the constitution of Hungary, and was solemnly proclaimed queen of that kingdom in 1741. Frederic of Prussia offered the young queen his friendship on the condition of her surrendering Silesia to him; but she resolutely refused, and Frederic invaded that province. The elector of Bavaria on his part, assisted by French auxiliaries, invaded Austria and Bohemia, and pushed his troops to the gates of Vienna. Maria Theresa being obliged to quit her capital, repaired to Presburg. Convoking the Hungarian diet, she appeared in the midst of that assembly with her infant son Joseph in her arms. She told the magnates, prelates, and deputies, that 'being assailed by enemies on every side, forsaken by her friends, and finding even her own relatives hostile to her, she had no hopes except in their loyalty, and that she had come to place under their protection the daughter and the son of their kings.' This heart-stirring appeal was answered by a burst of chivalric enthusiasm. The Hungarian nobles, drawing their swords, unanimously cried out, 'Moriamur pro Rege nostro Maria Theresa,' and the whole military force of Hungary was soon in arms to defend their queen. Her troops under General Kevenhüller and Prince Charles of Lorraine, her brother-in-law, fought gallantly, and drove the French and Bavarians out of the hereditary states. In the meantime Charles Albert, elector of Bavaria, was elected emperor of Germany, by the diet assembled at Frankfort, by the name of Charles VII.

Frederic of Prussia soon made peace with Maria Theresa, who was obliged to surrender Silesia to him. She also made not only a peace but a treaty of alliance with the king of Sardinia against the French and Spaniards, who were kept in check on the side of Italy. In 1743 the French were entirely driven out of Bohemia. In 1744 Frederic again declared war against Maria Theresa, and invaded Bohemia; but the elector of Saxony, who had made his peace with her, sent the queen reinforcements which obliged the Prussians to evacuate the country. In 1745 Charles VII. died, and Francis, Maria Theresa's husband, was elected emperor. In 1746 the Austrian and Piedmontese troops obtained great advantages in Italy; they gained the battle of Piacenza against the French and Spaniards, and occupied Genoa, which however they afterwards lost through a popular insurrection. In 1747 the war continued to rage in Italy and Flanders, with various success. In 1748 the peace of Aix-la-Chapelle terminated the war called 'the war of the Austrian succession,' and Maria Theresa was left in peaceful possession of all her hereditary dominions, except Silesia, which the king of Prussia kept.

In 1756 began the Seven Years' War, between France, Austria, and Russia on one side, and Frederic of Prussia on the other. [FREDERIC II.] It ended in 1763, leaving both Austria and Prussia with the same boundaries as before. In 1765 Maria Theresa lost her husband, for whom she continued to wear mourning till her death, and her son Joseph was elected emperor. [JOSEPH II.] She however retained in her hands the administration of her dominions, and devoted all her cares to promote their prosperity and to the improvement of the people under her sway.

The only act of Maria Theresa's political life with which she can be reproached is her participation in the first partition of Poland. The plan however did not originate with her, and she for some time refused to accede to the treaty of partition drawn up by Prussia and Russia in 1772, until she was plainly told that Russia and Prussia would effect the dismemberment of Poland without her consent, and that by refusing to accede to it she would only endanger her own dominions. Prince Kaunitz and her own son Joseph II. urged her to join the two other powers; she was told that Gallicia and other parts of Poland were antient dependencies of the crown of Hungary, and at last she gave her assent.

The improvements which Maria Theresa made in her dominions are many and important. In 1776 she abolished the torture in her hereditary states, and in the kingdoms of Hungary and Bohemia. In 1777 she abolished the rural and personal services which the peasants of Bohemia owed to their feudal superiors, and commuted them for a sum of money. Literary piracy was forbidden under severe penalties. Between the years 1774-8 she occupied herself with the establishment of a general system of popular education in her dominions. She divided the schools into three classes: 1, 'normal schools,' one in each province, to serve as a model for all the other schools in the province; 2, 'principal schools,' in the large towns; 3, 'communal schools,' in the small towns and villages. A director had the superintendence of the normal schools; those of the large towns were under the superintendence of a magistrate; and the communal schools under the parish priest and an assessor of the communal council. A central commission of studies was also appointed to superintend the whole, which received annual reports, and examined candidates for the masterships. Maria Theresa also suggested the addition of manual labour to intellectual instruction in the communal schools. She promised an extra remuneration to those teachers whose wives taught the girls sewing, knitting, spinning, &c. This plan answered extremely well, especially among the peasantry of Bohemia. Little girls thus taught were able to earn as much as half a florin a day. This was the beginning of that system of popular education which has since been extended through the Austrian monarchy.

Maria Theresa was a pious woman: she was a sincere Roman Catholic, but not a blind devotee of the court of Rome, and she knew how to discriminate between the temporal and spiritual jurisdictions. In her instructions to the Junta, or Board of Public Economy, dated June, 1768, she states the principle that 'everything which is not of divine institution is subject to the supreme legislative authority of the state.' Agreeably to this principle she made several important reforms in the temporalities of the clergy: she suppressed the pensions charged at Rome upon benefices; she forbade the alienation of landed property in favour of ecclesiastical bodies; she ordered all the property of the clergy to be registered; she placed the convents under the jurisdiction of the respective bishops, and in temporal matters under that of the civil magistrate. She put a check to the arbitrary power of the Inquisition, which still existed in her Italian dominions: she took out of its hands the censorship of books and gave it to a commission of civil magistrates appointed for the purpose. In Tuscany, which was administered by a council of regency in the name of her second son Leopold, she ordered that lay assessors should be joined to the inquisitors in all suits for heresy. She also took away the sbirri, or armed force, which was before under the orders of the inquisitors. The Inquisition of Lombardy and Tuscany was finally abolished under the reign of her sons Joseph and Leopold.

Maria Theresa possessed the strong affection of her Belgian subjects, and it required all the subsequent rashness of Joseph II. to detach them from their loyalty to Austria. The Belgian capitalists eagerly supplied the loans which the court of Vienna was obliged to contract during the Seven Years' War.

In Lombardy the administration of Maria Theresa and of her minister Count Firmian was a period of returning happiness for that fine country, after the vicissitudes of the preceding wars and the previous long misrule of the Spanish governors. The empress ordered a new censimento, or valuation of estates, for the purpose of an equitable assessment of the land-tax; she caused the bilancio camerale, or a regular budget of the public revenue and expenditure, to be made; she abolished the custom of farming the various branches of the indirect duties to the highest bidder, made regulations to protect the peasants against the oppression of their feudal superiors, and established representative communal councils to superintend the local expenditure; she began, in short, and effected to a considerable extent, that great legislative and administrative reform which was completed under her successor Joseph II. Firmian encouraged men of learning, and protected them against the cabals of their enemies. Pietro Verri was made counsellor and president of the financial board; Beccaria was appointed professor of political philosophy; Carli was made president of the council of commerce; and the advice and suggestions of these men were listened to, appreciated, and followed. The naviglio, or navigable canal of Paderno, which joins the Adda to the Martesana, was executed under Maria

Theresa. In 1749, soon after she obtained peaceful possession of Lombardy, the duchy of Milan contained 900,000 inhabitants; in 1770 the population had risen to 1,130,000.

'Lombardy,' says a liberal writer of our times, 'had never enjoyed so much happiness and tranquillity as under her reign; it is recorded to her praise that she wished to be informed of every act of the administration, that she gave free access to her presence to the humble and poor as well as to the noble and rich, that she listened benignantly to all, either granting their petitions, or, if she denied them, giving reasons for her refusal, without illusory promises or vague circumlocutions. She declared, just before her death, which happened at Vienna on the 29th November, 1780, that if anything reprehensible had been done in her name, it was certainly without her knowledge, as she had always wished the welfare of her subjects. During a forty years' reign she always showed a love of justice and truth, and she stated, as a principle of her conduct, that it is only the pleasure of alleviating distress and doing good to the people that can render the weight of a crown supportable to the wearer.' (Bossi, *Storia d'Italia*, b. vi., ch. 15.) Another merit of Maria Theresa is the propriety of her private character; her whole conduct was characterised by that decency and self-respect, united with much simplicity of manners, which is become a distinctive characteristic of the Austrian imperial family. Maria Theresa will ever rank high among illustrious women, and among those sovereigns who have been the benefactors of mankind. With her ended the house of Austria Habsburg, and at the same time began the present dynasty of Austria Lorraine.

Frederic II. appeared really affected when he heard of the death of Maria Theresa. Writing to D'Alembert, he said that 'although he had made war against her, he had never been her personal enemy; that he always respected her, and that she was an honour to her sex and the glory of her throne.'

MARIA'NA, JUAN, was born at Talavera in 1536. He early showed great talents, which were developed under the eminent teachers of the university of Alcalá, such as Father Cyprian of Huerga and others.

At the age of seventeen Mariana joined the Jesuits, who had already acquired a reputation which attracted to them the ablest students. He had to pass two probationary years at Simancas, under Saint Francis of Borja, the hereditary duke of Gandía, and favourite of Charles V., who had renounced the world to join the new order. After this probation Mariana returned to Alcalá to resume his studies. In 1568 he was appointed to a professorship by Laynez, the second general of his order, who framed the rules of the Jesuits, raised their aspirations, prepared them for the influence which they afterwards exercised, and opened their splendid college 'Il Gesu,' at Rome.

In this college Mariana, at the age of twenty-four, taught scholastic philosophy and divinity. Among his pupils was the young Jesuit (afterwards cardinal) Bellarmin. Mariana was sent in 1565 to open a course of divinity in Sicily, and thence to Paris two years after on the same mission, in which he was still more successful. Seven years of unremitting application in an uncongenial climate so greatly impaired Mariana's health, that he was permitted to retire to Toledo, near his birthplace. But his talents and moral worth were still put in requisition. He restored and edited the works of Saint Isidore, to which he added some valuable notes. When Leon de Castro questioned the orthodoxy of Arias Montano, for introducing Rabbinical readings and commentaries into the 'Plantina Regia,' or 'Philippina Polyglott,' a new edition of the 'Complutensis,' which Montano had undertaken at the command of Philip II., Mariana silenced the noisy polemic by his historical, ecclesiastical, and biblical lore, as well as by the fair and candid tone of his discussion.

In the mean time he proceeded during his leisure hours with the great work which he had long contemplated. He had observed that the sudden rise and ascendency of Spain excited a general interest and curiosity abroad, while its origin and causes were either unknown or misunderstood. The Spanish historians, though numerous, were at that time little read, and some of them were hardly known. His 'History of Spain' first appeared in twenty books, under the title 'Historiæ de rebus Hispaniæ,' fol., Toleti, 1592, libri xx. It was subsequently extended to thirty books, in which form it appeared in the complete edition of 1605, published at Mainz. This compact and lucid exhibition of an unbroken chronological narrative, from the origin of the Spanish nation to the death of Ferdinand the Catholic (a period of twenty-five centuries at least), embraces the history of all the Spanish kingdoms, which had hitherto been treated separately. A subject so extensive, expressed in classical Latin, met with universal favour and acceptance. A Spanish translation soon became necessary, and fortunately Mariana accomplished the task himself, and carried the work through four successive Spanish editions in his lifetime.

Mariana has been charged with credulity; but traditions held sacred in times past, although rejected in the present age—prodigies which formed part of history, and which Mariana could not dismiss with the disdainful smile or the ready presumption of modern criticism, are spots which will never obscure the brilliancy of his digressions on the most important events of the world, events which appear as great causes when so admirably interwoven with those peculiarly belonging to the history of Spain.

The manly feelings of the historian, his noble indignation against crimes, his bold exposure of the misdeeds of princes and their abettors, deserve still higher commendation. Yet he, as well as Ferreras and Masdeu more recently, has spared a gross instance of Queen Urraca's licentious conduct; but on the other hand, the defence of Queen Blanca's honour is highly creditable to Mariana. It is true also that Mariana did not always examine all the original authorities, as Ranke observes in the 'Kritik neuerer Geschichtschreiber;' but to institute an inquiry into every minor detail, to comprehend a wide field of inquiry, and yet to open new and to disdain all trodden paths, would have required the perusal of whole libraries, and a single life would not have been sufficient to complete the undertaking. And if others had been invited to join in the labour of the investigation, a motley compilation might have been the only result of so much research, which it is almost impossible ever to combine into one harmonious whole. Mariana's portraits of lords and favourites were found too original and faithful by the living; as in the case of the Condestable of Castile, Ferdandez Velasco, and his worthy secretary Pedro Mantaono. The secretary, after having been a panegyrist of the new historian, tried to serve his master by his attack on Mariana, entitled 'Advertencias á la Historia de Mariana.' He was discovered however, and roughly treated by Tamayo Vargas in 'La Defensa de Mariana.' Probably to this criticism may be traced many improvements in Mariana's second Spanish edition of his history, which appeared at Madrid, 1608. It is on this edition and the various readings selected from the editions of 1617 and 1623, that the edition of Valencia is based, which contains ample notes and illustrations, 9 vols. 8vo., 1783-96. This edition also closes, like the original, with the reign of Ferdinand the Catholic (1515-16). There has subsequently been published at Madrid—1, The continuation of Mariana, by Miñana, translated from the Latin, by Romero, fol., 1804; 2, A complete Mariana, continued down to the death of Charles III., 1788, by Sabau y Blanco, 20 vols. 4to., 1817-22; 3, Another by the same, brought down to the year 1808, 9 vols. 8vo., with portraits.

Mariana's little respect for potentates and great personages was denounced with greater asperity when his 'De Rege et Regis Institutione' appeared in 1599. By his attempt on the life of Henri IV., in 1594, Jean Chatelet, who had studied among the Jesuits, not only involved the whole body in the odium of his crime, but provoked a decree for their expulsion from France. Finally the assassination of Henri, in 1610, which was supposed to have been instigated by the Jesuits, excited such horror, that the parliament of Paris condemned the new tract of Mariana to the flames; and his treasonable doctrines, as they were called, continued during the whole of that age of loyalty and part of the following to furnish a common subject of animadversion and a chief ground of accusation against the Jesuits. The Jesuits have indeed occasionally supported the claims of the people against their rulers, but always with a view to the interests of their own body only. Mariana, on the contrary, discussed this subject on better and higher grounds. Mankind occupied his thoughts, and had a much stronger hold on his affections than the interests and plans of his order. By his defence of Arias Montano, already mentioned, he lost all chance of preferment, which however he was glad to exchange for learned leisure and the gratification of his love of historical research. Mariana published also, in 1599, his imperfect work, 'De Ponderibus et Mensuris,' a subject which his countrymen Lebrija or Nebrija, Diego Covarrubias, Pedro Ambrosio Morales, and Arias Montano, had treated before, and which Eisenschmidt, Freret, Paucton, &c., have pursued much further since.

The noble character and the profound erudition of Mariana are also displayed in his 'Tractatus Septem,' Cologne, 1609. The second of these treatises, 'De Editione Vulgatâ,' is an epitome of his report on the fierce controversy between Arias Montano and Leon de Castro. The fourth, 'De Mutatione Monetæ,' provoked the indignation of the duke of Lerma and his partners in the system of general peculation and frauds which Mariana exposed. He foretold the calamities which threatened the Spanish nation; and his words, which had been disregarded, were remembered when the opportunity was gone. As a reward for proclaiming such unwelcome truths, at the age of 73 he suffered a whole year of judicial trickery, humiliations, and confinement in the convent of St. Francis at Madrid. In searching his papers another exposure was found, entitled 'Del Gobierno de la Compañía,' or on the defects of his order, in which he also pointed out the means of correcting them. Copies of this MS. had multiplied so alarmingly, that, the year after the author's death, the general of the Jesuits, Vitaleschi, issued a circular, dated Rome, July 29, 1624, enjoining the collection of such papers in order to be burnt. Still that measure did not prevent its being printed at Bordeaux in 1625, and reprinted elsewhere in several languages. This curious circular was found in the archives of the Jesuits of Valencia at the time of their sudden expulsion from the Spanish dominions in 1767; a blow which helped to complete that downfal against which Mariana had most earnestly warned his brethren so long before.

After his persecution he made an epitome of the 'Bibliotheca' of Photius, translated some homilies, revised his 'History of Spain,' and published a supplement, or rather a summary, or concise annals of Spain from 1515 to 1612. At the age of eighty-three he published his 'Scholia' on the Old and New Testament, availing himself of the best Hebrew commentaries, and some valuable and very early MSS. which dated from the age of the antient Gothic dominion in Spain. This work secured for him a place among the best commentators in the 'Histoire critique du Vieux Testament' of the hypercritical Father Simon, who is usually unfavourable to Spaniards.

Bayle, in his 'Dictionary,' supposes Mariana to be also author of a work 'De Republicâ Christianâ,' but neither Alegambe nor Nicolas Antonio, both of them Spaniards, mentions it. Stevens, the English translator of Mariana's history, misstates some particulars of the author's life, and very unaptly compares him with Raleigh.

Mariana left MSS. of at least twice the extent of all his publications. He ended a long life, almost entirely devoted to the service of his own and future generations, on the 6th of February, 1623, in the eighty-seventh year of his age and the forty-ninth of his retirement to Toledo. On hearing of his death, the illustrious Francis Contreras, president of the council of Castile, said, 'To-day has the council lost its restraint.'

Besides the authorities quoted there may be added:—Mondejar, *Advertencias á Mariana; Juicio y Noticia de los Historiadores de España;* Andrade, *Vida de Mariana;* Acosta, *Vida de Mariana;* Andr. Schot., *Hispan. Illustrat.;* Baronius, *Annal. Ecclesiast.;* Bernard. Girald., *Pro Senatu Veneto*,' quoted in Colomesius, *Hispania Orientalis;* René Rapin, *Reflexions sur l'Histoire.*

MARIE ANTOINETTE, born at Vienna, in November, 1755, was the daughter of Francis of Lorraine, emperor of Germany, and of Maria Theresa of Austria. In May, 1770, she married Louis, the dauphin, grandson of Louis XV., who in 1774 became king of France, under the name of Louis XVI. She was handsome, lively, and thoughtless, but kind-hearted and with good intentions. She disliked the etiquette and reserve of the court, but she affected, rather too ostentatiously, a taste for privacy and domestic familiarity. Although her thoughtlessness afforded a pretence for slander, her private conduct has been generally allowed to have been guiltless. When the difficulties and dissensions which produced the Revolution began, Marie Antoinette was on the side that was for making resistance; but unable to impart energy to her husband, she only led him into inconsistencies. She did not disguise her aversion to those leaders who had begun the Revolution, and would never stoop to conciliate their favour. After the national assembly had assumed the supreme power, she refused the offers of Mirabeau to support the interests of the crown, and thus drove that able but unprincipled orator back into the ranks of the revolutionists. But her influence in the councils of Louis has been much exaggerated by her enemies. Louis, naturally disposed to concession, was by temper irresolute, and he allowed himself to be led away by the course of events, instead of striving to direct them. Marie Antoinette was one of the advisers of the attempted flight of the king, which proved unsuccessful, and only served to excite the public animosity against her and her husband. After that epoch there was no longer much opportunity for her to exercise any political influence; her husband had lost all power; besides which, a strong faction supported by the armed masses had determined to do away with the kingly office altogether. Marie Antoinette showed great courage during the various attacks made against the royal family; she appeared much more anxious about her husband and her children than about herself. She shared their captivity with resignation; her demeanour, under the most trying circumstances, never lost its dignity. Adversity imparted firmness to her mind, and she exhibited a moral strength which astonished while it irritated her bitterest enemies. After the death of her husband, she seemed forgotten for a time; but the terrorist faction having overthrown the Girondins, its leaders resolved to make away with the ex-queen, an act of cruelty the more odious as it was entirely useless. They brought her to trial before the convention. She was of course found guilty, and condemned to death. In the presence of her judges her fortitude never forsook her, and the burst of indignant maternal feeling with which she appealed to the mothers who might be there present, when an infamous and absurd charge was brought against her, overawed even her accusers.

On the 16th of October, 1793, Marie Antoinette was removed in a common cart from the prison of the Conciergerie to the place of execution. On her way she was reviled and abused by the ferocious mob in the most unfeeling manner; but she appeared heedless of their vociferations, and suffered death with firmness and composure. She was forty-two years of age, but her sufferings had given her a much older appearance. She left one son, who died in prison (Louis XVII.), and a daughter, who is the present duchess of Angoulême.

Medal of Marie Antoinette.

MARIE DE' ME'DICI, the daughter of Francis I., grand-duke of Tuscany, and of the archduchess Joan of Austria, was born at Florence in 1573, and was married in 1600 to Henri IV. of France. She was handsome, and Henri was for a time really attached to her; but she was violent, jealous, and obstinate, and seldom passed a week without quarrelling with her husband. The memoirs of Sully and others contain details of these domestic bickerings. But the best historical critics acquit her of any more serious misconduct, and especially of the odious insinuation thrown out by some writers, that she was privy to the murder of her husband. Henri at that time was just going to set off for the army, and he had signified his intention to leave her regent of the kingdom. Hérault only observes that she did not show sufficient grief for the death of her husband. Mary was weak rather than wicked; she had the aspirations of ambition without corresponding mental powers; and when she became regent, during her son's minority, she found herself incapable of bearing the weight of the administration. [LOUIS XIII.] She next quarrelled with her son, and made peace with him by means of Richelieu, whom she had introduced into the council; but she afterwards grew jealous of his great influence, and plotted against him. She was exiled, A.D. 1630; went to Belgium, England, and Germany; and at last died at Cologne, in 1642, in a state bordering upon destitution.

MARIE-GALANTE, an island in the 'Carribean Sea, about 15 miles south of Guadaloupe. It is of a circular form, and about 14 miles in diameter. This island was discovered by Columbus in 1493, and was first settled by the French in 1647. It has always been considered a dependency of Guadaloupe, and has uniformly followed the fate of that island when taken by any foreign power. [GUADALOUPE.] The surface of Marie-Galante is of moderate elevation, and rises gradually towards the north; the western side is flat. The soil is productive, and yields abundantly the several West Indian products; but its exports and imports having always been included in the official statements with those of Guadaloupe, we have no record of the amount of its productions. The same course has been followed with regard to other statistical details, and we are therefore unacquainted with the amount of its population. Some authorities state it to be about 10,000. The only town, Basseterre, stands on the south-west point of the island, in 15° 52′ N. lat. and 61° 22′ W. long.

MARIE-AUX-MINES, SAINTE. [RHIN, HAUT.]

MARIENBERG, a town in the kingdom of Saxony, in 50° 4′ N. lat. and 16° 45′ E. long., at an elevation of 2000 feet above the level of the sea. It has mines of silver, iron, tin, and cobalt, and produces arsenic and vitriol. The inhabitants, about 4000, besides working the mines, manufacture lace, linen, calico, &c. The silver mines were discovered at the beginning of the sixteenth century, and the town was founded in consequence in 1519 by Henry duke of Saxony. It is well built, with straight streets, a handsome market-place, a church, a gymnasium, an orphan asylum, and an institution for poor or disabled miners.

MARIENBURG, a town of West Prussia, in the government of Danzig, is situated in 54° 1′ N. lat. and 19° 2′ E. long., on the banks of the Nogat, over which there is a pontoon bridge 540 feet in length. It is chiefly celebrated as having been the seat of the Grand-master of the Teutonic Order from the year 1309 to 1466. The antient castle, and the lofty towers and parapets, which are the remains of the old fortifications, give it, when seen at a distance, a grand and striking appearance. The style of building is antient but irregular. Here and there are some more modern edifices, especially in the principal street, which however do not harmonise with the general character of the architecture. In front of the houses on both sides of the streets there is a connected line of porticos, the origin of which dates from the first building of the town in 1276 by the Teutonic knights. The remains of the palace of the Order are extremely grand, and his royal highness the crown-prince of Prussia has caused it to be repaired and partly restored to its antient splendour. The town is surrounded by a rampart, outside of which are two suburbs. There are extensive breweries and distilleries, and some manufactures of linen, woollens, leather, and cotton, but scarcely sufficient for the consumption of the town. The inhabitants carry on a considerable trade in the exportation of corn, timber, and fish, and likewise in the less important articles of quills and hogs' bristles. The population, 9000 in number, are chiefly Roman Catholics and partly Lutherans.

MARIENWERDER, one of the two governments into which West Prussia is now divided, lies between 52° 46′ and 54° 6′ N. lat., and 16° and 21° E. long., and is bounded on the north by the government of Danzig, on the east by that of Königsberg, on the south by Poland, on the south-west by Posen, on the west by Brandenburg, and on the north-west by Pomerania. Its area is 6880 square miles, and the population 460,000. The government is divided into 13 circles.

The circle of Marienwerder contains 343 square miles, with a population of 45,000.

Marienwerder, the capital, situated on the Liebe and the Little Nogat, two miles from the Vistula, over which there is a pontoon bridge 2700 feet in length, has 5500 inhabitants. It is a very neat town, with four suburbs, and has considerably increased during the present century. It is the seat of the provincial courts and the government offices. There are manufactories of woollens, hats, soap, and leather. The breweries and distilleries are very considerable.

MARIENZELL, or MARIAZELL, a small town in Upper Styria, the most celebrated place of pilgrimage in the Austrian dominions, is situated on a low hill in the middle of an extensive valley. It consists of only three streets, with 120 houses, of which nearly 50 are inns and taverns, and the population does not exceed 1000. The most considerable edifice is the church, built in the Gothic style, in which is the famous statue of the Virgin Mary, which was brought here 700 years ago. Princes and nobles rivalled each other during many centuries in bestowing the most costly gifts upon the church, and its treasury contained immense riches, which however have been greatly diminished in modern times by various accidents, especially by the great fire in 1827, when the whole town, except nine houses, was reduced to ashes. The roof and the steeple of the church were destroyed, but the treasury and the statue of the Virgin Mary were saved. It was however necessary to sell a great part of the treasures in order to repair the church, which is now more splendid than ever. The number of pilgrims that resort thither from all parts of the Austrian monarchy is estimated at 100,000 every summer. Under the reign of the emperor Joseph II., all processions of pilgrims, and particularly those to Marienzell, were prohibited, but were again permitted in 1796 by the emperor Francis. The procession, in 1819, consisted of about 12,000 pilgrims, who, being handsomely dressed in the costume of the several provinces from which they came, presented a striking and interesting appearance.

MARIESTAD. [SWEDEN.]

MARIKINA. [MIDAS.]

MARIMONDA. [ATELES, vol. ii., p. 547.]

MARINE INSURANCE. The general principle upon which insurances are made, whether of property against the chance of fire, of human life against the accidents or contingencies of mortality, or of ships and their cargoes against the multiplied risks to which they are exposed, is the same: viz. that of reducing to each individual in every case, his possibility of loss down to the average loss of a great number of individuals or cases. Marine insurances differ however from fire and life insurances in the mode of conducting the business, as well as in the diversified nature of the risks against which security is sought. The chief of these in time of peace include the chances of fire, of piracy, of barratry of the master or crew, *i.e.* the running away with the vessel by these parties, as well as the more ordinary mischances resulting from storms, sunken rocks, fogs, and the like. To these are superadded, in time of war, the chances of capture by an enemy, and all restraints of foreign princes or governments.

Until a recent period nearly all the marine insurances effected in London, which is the great emporium of such business, were made with individuals who became answerable for comparatively small portions of the sum insured, differing thus from other kinds of insurances where the whole risk was taken by a joint-stock association. Until 1824 it was not lawful for any two or more individuals, with the exceptions that will be mentioned, to combine together for taking upon themselves sea-risks, and all the business of this kind transacted in London was undertaken by a class of persons called underwriters, from the mode employed of binding themselves to the conditions of the contract by writing their names and the sums which they assured under the deed in which these conditions were set forth. The exceptions to the limitation of partnership, just mentioned, were made in favour of two chartered joint-stock companies, the Royal Exchange and the London Assurance companies. Endeavours were made at various times to alter the law in this respect, and were always successfully resisted on the part of the underwriters until 1824, but since that time it has been lawful for any number of persons to associate themselves together for undertaking marine insurances, and many joint-stock companies for that purpose have been formed and put in action with advantage to the public. Before the year 1824, several insurance clubs, which were in fact mutual insurance associations, existed and were considered legal. In those there was no payment made of premium, but each member of the club was periodically called upon to pay a proportion of the losses sustained by the members of the club generally, the rate of his contribution being made to depend upon the value of the property, in respect of which he might have sustained loss, that would have been made good to him. These clubs, which still exist, are usually confined to persons engaged in particular branches of trade, such as the coal-trade of the North of England, where the risks incurred by the different members are generally equal in degree, a condition which is necessary in order to render the association equitable.

The policy, or contract of insurance, must contain the name of the ship, when known, and of the master, with the nature of the voyage, and must describe also in good faith any circumstances which are out of the ordinary or understood course in similar risks or voyages, such as any contemplated deviation from the route usually followed. The business of effecting insurances is sometimes done by the merchants or owners of the ships or goods insured, but more frequently through the agency of insurance-brokers, whose remuneration comes from the underwriters or insurance-offices, as the case may be, and not from the assured, their employers. That remuneration consists in an allowance of 5 per cent. on the amount of the gross premium in each case, and in a further allowance of 12 per cent. upon the net amount of premiums paid by them to the underwriters or offices at the end of the year, after deducting all losses and averages recovered for the assured.

The policy of insurance, when underwritten by the assurer, bears a declaration of the amount of premium having been paid, but in practice that payment is not made until some months after the expiration of the current year in which the risks are taken, unless in the case of a total or partial loss, when all premiums outstanding upon the account of the merchant or broker, as the case may be, are allowed as a set-off against the amount of the loss. Where a broker is employed, the underwriters give credit to him, and not to his employers, for the amount of premiums, and they have recourse for the same only to the broker. As some compensation to the broker for the 12 per cent. allowance above mentioned, which he foregoes in the event of a loss, he makes a charge against the merchant by whom he is employed of ten shillings for every hundred pounds upon the amount recovered.

The rate of premium varies of course with the nature of the voyage, the period of the year, and the quality of the ship. As regards this latter point the underwriters and managers of insurance companies are enabled to judge with great accuracy by means of a register kept under the superintendence of a committee of merchants and underwriters, in which every necessary particular concerning every mercantile ship is inserted from the surveys of competent officers appointed for the purpose, who are paid certain fees for their trouble by the owners. This register is of as much importance to the shipowner as it is to the underwriter. If the quality of the vessel is seen to be good, the charge made for premium of insurance is less than where that quality is bad or doubtful; and in the event of loss it gives readier means for rebutting the charge of unseaworthiness than might otherwise be found, such a charge, when proved, being held in law to exonerate the underwriter from payment of the loss.

The losses for which underwriters are liable are either total or partial. In some cases it may happen that the claim upon an underwriter exceeds the amount of his subscription, as where a ship meets with damage, and after quitting a port where she has been repaired or refitted, is wrecked or otherwise lost. The claim in such cases would be not only for the amount expended in repairs, but also for the value of the ship or goods, when lost. Partial loss or damage is called an average loss, and averages again are divided into the two classes of general average and particular average. Under the first of these heads are included all losses of a part of the property voluntarily incurred for the preservation of the remainder. If a ship is thrown on her beam ends, and to right her the masts are cut away, this constitutes a general average, and the loss must be borne in shares proportionate to their value by the owners or insurers, as the case may be, of the ship and the cargo. So if a ship lying at anchor should be in danger of dragging her anchor, and so going on shore, and the cable should be cut, or if to lighten her in a storm part of her stores or cargo should be thrown overboard, this would constitute a general average, and must be met by the owners or insurers of the whole property as before described. Particular average arises when the ship or the cargo meets with damage from any of the chances against which insurance is provided, but which is not incurred voluntarily and to prevent a greater loss. In these cases the damage must be made good by the insurer of the ship or of the goods which are damaged, and not by a general contribution from all. Where this partial damage happens to the ship it is usual for the underwriters to reinstate the same, paying two-thirds only of the cost, it being considered that the owners of the vessel will benefit to the extent of the remaining one-third by receiving new articles in place of those in use which have been lost, or by the better state in which the vessel will be placed by the repair. Goods which are peculiarly liable to damage, either from their nature or from the manner in which they are packed, are not entitled to claim particular average except the ship be stranded, or except the damage shall exceed a certain per centage of the value. Corn, seed, flour, fish, salt, and fruit are not liable to particular average, whatever be the amount of damage, except the ship be stranded; and sugar, tobacco, hemp, flax, hides, and skins are warranted by the assured free of particular average, unless the damage should amount to five per cent. or more of their value, with the like exception as regards stranding.

It is not possible to give within reasonable limits more than a very general view of the law and practice connected with marine insurances, concerning which many volumes have been published.

Policies of insurance on sea risks are liable to stamp duties, which vary according to the nature of the voyage and the rate of the premium, viz.:—

On coasting risks where the premium does not exceed 20*s.* per cent. the stamp duty is 1*s.* 3*d.* per cent.; and where the premium exceeds that rate it is 2*s.* 6*d.* per cent. On foreign risks, where the premium is not higher than 15*s.* per cent., the duty is 1*s.* 3*d.* per cent.; when the premium is between 15*s.* and 30*s.* per cent. the duty is 2*s.* 6*d.* per cent.; and when the premium exceeds 30*s.* the duty is 5*s.* per cent.

Vessels engaged in voyages of long duration, such as the South Sea whaling-ships, or vessels employed in a particular line where the risk is unvarying, are sometimes insured for a specific time. The stamp duty in such cases is 2*s.* 6*d.* per cent. for a period not exceeding three months, and 5*s.* per cent. between three months and twelve months, but no time risk for a longer period than twelve months can be covered by the same stamp, and a new policy must then be taken out.

MARINER'S COMPASS. [COMPASS, MARINER'S.]

MARINES, men embodied to serve as soldiers on board of ships of war in naval engagements; and on shore, in the event of a descent being made upon an enemy's coast. In the British service, they also assist occasionally in performing some of the operations connected with the working of the ship; they cannot however be sent aloft at the command of a naval officer.

Originally in this country, as well as in France, the national fleets were composed of merchants' ships, which were armed on occasion for war; and then there were no soldiers particularly destined for the naval service. The first troops of this kind in France were men skilled in the practice of the useful trades, who, when unemployed by the government, lived on shore on half-pay; receiving only the full pay when called upon to serve at sea. This regulation did not however long subsist; and, subsequently to the administration of Cardinal Richelieu, companies of marine soldiers have been constantly retained on full pay.

It is not precisely known at what period distinct corps were appointed, in Britain, to this branch of the public service. In 1684 mention is made of the duke of York's maritime regiment of foot; and in the reign of William III. several regiments were placed on the establishment of the navy, but these were subsequently disbanded. At that time the marine soldiers seem to have been retained as persons in training to become good seamen; and, in Burchet's 'Naval History,' quoted by Grose ('Mil. Antiq.,' vol. i.), it is said that they were discharged from the regiments and entered on the ship's books as foremast-men as soon as they became qualified to serve as such.

In the beginning of Queen Anne's reign (1702), six regiments of maritime soldiers were raised; and among the regulations concerning their service it is stated that they were to be quartered, when on shore, near the principal seaports. Whether at sea or on shore, they were to be paid at the same rate as the land forces, and the same deductions were to be made for clothing. At sea they were to be allowed provisions equal in every respect to the shares of the seamen, without suffering any diminution of pay on that account.

In 1749, the then existing regiments of marine soldiers, ten in number, were disbanded; and six years afterwards, on the recommendation of Lord Anson, there were raised 130 companies, consisting in all of above 5000 men, who were put under the immediate command of the lords of the admiralty, and whose head-quarters were appointed to be at Plymouth, Portsmouth, and Chatham. The corps of marines, as it was then called, has subsequently been considerably increased; in 1759 it numbered 18,000 men; and during the late war its strength amounted to about 20,000 men. An additional division was, by an order of council in 1805, established at Woolwich; and there are two companies of marine artillery, whose head-quarters are at Portsmouth.

The marines are now clothed and armed in the same manner as the infantry of the line, and, like all the other royal regiments, their scarlet uniform has blue facings. In an engagement at sea, they annoy the enemy by a fire of musketry from the tops and deck; and they repel with the bayonet any attempt to board the ship. The gallant *jollies*, as the marines are familiarly called, have often distinguished themselves when acting on shore; and their meritorious services at the taking of Belleisle (1761), in the battle of Bunker's Hill (1775), in the defence of Acre (1799), and very recently, under Lord John Hay, on the coast of Spain, have earned for themselves a lasting reputation.

The royal corps is commanded by a lieutenant and a major-general, who are naval officers holding, in addition to their rank as such, those military titles. There are also four colonels-commandant of divisions, besides four colonels and second commandants. No commissions in the corps are obtained by purchase; and the officers of marines rise in it by seniority, as high only however as the rank of colonels-commandant.

MARI'NO, SAN. [San Marino.]

MARIOTTE, EDME. Little is known of his life. He was a Burgundian born, a priest by profession, and resided in the earlier part of his philosophical career at Dijon. He was afterwards prior of Saint Martin, near Beaune, and died May 12, 1684, having been one of the first members of the Academy of Sciences. See the éloge by Condorcet, vol. i., p. 74, of his collection.

Several of the writings of Mariotte were published by himself, and one or two more after his death. Those of the former class were several times reprinted, and the whole were finally collected under the title 'Œuvres de Mariotte,' in two volumes quarto, Leyden, 1717. Another edition (perhaps the same with a new title) was published at the Hague, in 1740. This collection contains treatises on percussion, on vegetation, on the nature of the air, on heat and cold, on the nature of colours, on hydraulics, on some phenomena connected with sight, on levelling, on the motion of the pendulum, on the congelation of water, and on the logic of the sciences.

Condorcet says of Mariotte, that 'he was the first Frenchman who carried with him into experimental philosophy a spirit of observation and doubt, and inspired others with that caution and timidity which are so necessary to those who interrogate nature and undertake to interpret her responses.' His writings, though more connected with mathematical deduction than those of Robert Boyle, somewhat resemble them in the miscellaneous character of the experiments with which they are crowded.

The principal results by which the name of Mariotte is known to a reader of modern works are the following:—

1. He was the discoverer of that law of elastic fluids which now goes by his name; that is, of the elastic force being exactly in the inverse proportion of the space which a given mass of fluid occupies. Subject to such alterations as difference of temperature may require, the formula derived from this law is now one of the fundamental parts of aerostatics.

2. He discovered that air, and air in a state of condensation, exists in liquids.

3. He found that the part of the retina in which it meets the optic nerve is not capable of conveying the impression of sight.

Among minor matters, we may mention the now common guinea and feather experiment, which he first made with the air-pump.

MARITIME LAW. [Admiralty Courts; Shipping.]

MARITZA, the modern name of the Hebrus, the principal river of Thrace. The basin of the Hebrus is enclosed between the chain of Hæmus, or the Balkan, on the north, and Mount Rhodope, the modern Despoto, on the south; the first divides it from the basin of the Danube, and the other from that of the Strymon. [Amphipolis.] The Hebrus rises at the foot of Mount Rhodope, in about 42° N. lat. and 24° E. long., and flows in an easterly direction for more than 100 miles, receiving numerous affluents from both chains of mountains: it passes by Tatar Bazardjik, Philippopolis, and Chirmenli (the antient Assus), where it diverges to the south-east until it reaches Adrianople, where it is joined by two large streams, the Toonja, or Tonzus, from the north, and the Arda, or Harpessus. After passing Adrianople the Hebrus turns to the south, receives the Erkeneh (the antient Agrianes), coming from the direction of Constantinople, flows by Demotica, and, after numerous windings, enters the gulf of Ænos by two mouths, opposite the island of Samothrace. The whole course of the Hebrus is above 300 miles. It is navigable for small craft as far as Adrianople, about one-third of its course.

MA'RIUS, CAIUS, was born of humble parents, at or in the neighbourhood of Arpinum, about B.C. 157. He served at the siege of Numantia, B.C. 134, under Scipio Africanus, together with Jugurtha, where he highly distinguished himself. He received great marks of honour from Scipio, who used frequently to invite him to his table; and when, one evening at supper, Scipio was asked, where they should find so great a general when he was gone, he is said to have replied, placing his hand upon the shoulder of Marius, 'Here perhaps.'

In B.C. 119 he was elected tribune of the plebs, through the influence of Cæcilius Metellus, according to Plutarch, but more probably in consequence of the fame he had acquired in the Numantine war. In this office he showed himself, as he did throughout the whole of his life, a most determined enemy to the patrician order, and one who was not easily to be put down by the threats and opposition of his enemies. Having proposed a law to prevent illegal voting at elections, the senate passed a decree that the law should not be put to the vote in the popular assembly, and summoned Marius before them to answer for his conduct. Marius not only appeared, but threatened to commit the consuls to prison, if they did not repeal the decree; and when Metellus continued to support it, he commanded him to be led away to prison.

Marius obtained the prætorship with great difficulty, in consequence of the violent opposition of the patrician order, who accused him of having obtained the office by means of bribery. At the expiration of his prætorship the province of Spain was assigned to him, which he cleared of robbers. On his return to Rome, he was anxious to obtain the consulship; but he did not venture to become a candidate for many years after. He continued however to rise in public opinion, and appears about this time to have married Julia, one of the Julian family, who was aunt to the celebrated Julius Cæsar.

In B.C. 109 he accompanied Metellus into Africa in the capacity of *legatus* (second in command); and by his prudence and courage in the war with Jugurtha he added greatly to his military reputation. His friends took advantage of his increasing popularity at Rome to persuade the people that the war with Jugurtha would never be concluded until the command was given to Marius. This led to an open rupture between him and Metellus; and it was with the greatest difficulty that Metellus allowed his lieutenant leave of absence to go to Rome in order to stand for the consulship. Marius was however successful; he obtained the consulship (B.C. 107) and the command of the Jugurthine war. On his arrival in Africa, Marius prosecuted the war with the greatest vigour; and in the following year (B.C. 106) obtained possession of the person of Jugurtha, who was treacherously given up by Bocchus to his quæstor Sulla. [Jugurtha.] Marius remained in Africa during the next year (B.C. 105); in which the consul Manilius and the proconsul Cæpio were defeated by the Teutones and Cimbri in Gaul, with the prodigious loss, according to Livy (*Ep.* 67) of 80,000 soldiers, besides 40,000 camp-followers. The news of their defeat caused the greatest consternation at Rome, especially as the Teutones and Cimbri threatened the immediate invasion of Italy; and Marius was accordingly elected consul in his absence, without any opposition even from the patrician party, as the only man in the state who was able to save it from impending ruin.

Marius entered upon his second consulship B.C. 104, and triumphed on account of his victories over Jugurtha; but in consequence of the threatened invasion of Italy having been deferred by an irruption of the Cimbri into Spain, Marius was again chosen consul in the two following years (B.C. 103, 102). In the fourth consulship of Marius (B.C. 102) the Cimbri, having been defeated by the Celtiberi in Spain, returned to Gaul, and resolved to invade Italy in two divisions; the one, consisting of the Teutones and Ambrones (a Gallic people), through Gallia Narbonensis; and the other, comprising the Cimbri, by way of Noricum. Marius defeated the Teutones and Ambrones near Aquæ Sextiæ (*Aix*) in Gaul; but Catulus, who was stationed at the foot of the Alps to oppose the passage of the Cimbri, retreated first to the other side of the Athesis (Adige), and afterwards quitted this position also without waiting for the enemy's attack. In the following year, B.C. 101, Marius, who was again elected consul, for the fifth time, joined his forces with those of Catulus, and entirely defeated the Cimbri in the plain of Vercellæ (Vercelli), situated to the north of the Po, near the Sessites (Sesia). In these two battles the Teutones and Ambrones are said to have lost the incredible number of 290,000 men (200,000 slain and 90,000 taken prisoners); and the Cimbri 200,000 men (140,000 slain, and 60,000 taken prisoners). (Livy, *Ep.* 68.)

Marius again became candidate for the consulship for the following year; but now that the fear of the Gallic invasion was removed, he was opposed by the whole strength of the patrician party. He nevertheless obtained the consulship, in great part owing to the exertions of Saturninus, the tribune, who is described as a man who scrupled at the commission of no crime in order to obtain his object. The events of the sixth consulship of Marius, which are some of the most important in this period of Roman history, are imperfectly narrated by the historians. It appears that an Agrarian law, proposed by Saturninus and supported by Marius and one of the prætors named Glaucia, was carried notwithstanding the most violent opposition of the patrician party; and that Metellus Numidicus was driven into exile in consequence of refusing to take the oath of conforming to the law. When the election of consuls for the ensuing year came on, Memmius, who opposed Glaucia as a candidate for the office, was murdered by order of Saturninus; and the senate, perceiving the city to be in a state of anarchy, passed the usual decree, 'that the consuls should take care that the republic should receive no injury,' by which almost absolute power was vested in the consuls. Marius, unable or unwilling to protect his old friends, besieged Saturninus and Glaucia, who had seized upon the capitol. They surrendered themselves to Marius on the promise that their lives should be spared, but they were all immediately put to death. It appears probable that Marius, after the blow which had been given to the popular party by the surrender of Saturninus and Glaucia, would not have been able to save their lives, even if he had made the attempt.

At the expiration of his consulship, Marius left Rome to avoid witnessing the triumph of the patrician party in the return of his old enemy Metellus, whose sentence of banishment was repealed after the death of Saturninus. According to Plutarch, Marius went to Cappadocia and Galatia, under the pretence of offering a sacrifice which he had vowed to Cybele; but with the real object of exciting Mithridates to war, in order that he might be again employed in military affairs, since he did not obtain much distinction in peace.

In B.C. 90 the Marsian or Social war broke out; in which both Marius and Sulla were engaged as legati to the two consuls. Marius gained several victories over the enemy, but he no longer possessed that activity and energy which had distinguished him in his earlier years; and disgusted, it is said, with the increasing reputation of Sulla, he resigned his command before the conclusion of the war.

The Marsian war had scarcely been brought to an end, before the civil war broke between Marius and Sulla. The command of the Mithridatic war had been assigned to Sulla, who was now consul (B.C. 88); but Marius used every effort to wrest it from him, and is said by Plutarch to have gone every day to the Campus Martius, and to have performed his exercises with the young men, although he was now in his 70th year and very corpulent, in order to show that he was not incapacitated by age. He was warmly supported by P. Sulpitius, the tribune, who possessed great property and influence; and a law was eventually passed that the command should be taken from Sulla and given to Marius. Sulla was with the army at the time besieging Nola; but as soon as he heard of the law which had been passed, he marched to Rome; and Marius and his adherents were obliged to quit the city. After wandering through many parts of Italy, Marius escaped with the greatest difficulty to Africa; but he had no sooner landed at Carthage, than Sextilius, the governor of the province, sent word to him, that unless he quitted Africa, he should treat him as a public enemy. 'Go and tell him,' replied Marius, 'that you have seen the exile Marius sitting on the ruins of Carthage.' But in the following year (B.C. 87), in the absence of Sulla, who had gone to Greece to oppose Archelaus, Marius returned to Italy in order to join the consul Cinna, who, in his attempts to abrogate the laws of Sulla, had been driven from Rome by his colleague Octavius, supported by the patrician party. Shortly afterwards Marius and Cinna entered the city at the head of a large army; and a general massacre of the opposite party ensued. Marius always appears to have been of a fierce and unrelenting temper; and the sufferings he had lately undergone, which at his time of life must have greatly impaired his health, tended to exasperate him more than ever against the party which had opposed and thwarted him during the whole of his life. All the leaders of the patrician party who were unable to escape from Rome were put to death: Lutatius Catulus, who had been the colleague of Marius in the war with the Cimbri, put himself to death in order to avoid assassination; and among the numerous illustrious patricians who fell were C. and L. Julius Cæsar, and the celebrated orator M. Antonius, who is so frequently praised by Cicero, and is one of the principal speakers in the treatise 'On the Orator.'

Marius and Cinna declared themselves consuls for the ensuing year (B.C. 86), without even holding the comitia; but Marius died of a fever in the beginning of the year, on the 17th day of his consulship, according to Plutarch (c. 46), or the 13th, according to Livy (*Ep.* 80).

The character of Marius is chiefly known to us from his life by Plutarch, who appears to have taken his account from the 'Memoirs of Sulla,' the inveterate enemy of Marius. It cannot be denied that after his return from exile Marius was guilty of the greatest cruelties, but even these were surpassed by the atrocities of Sulla; and we should not be doing justice to Marius, if we ascribed to him, during the whole of his life, the character which he displayed in his seventh consulship. 'I have seen,' says Plutarch (c. 2), 'the statue of Marius at Ravenna in Gaul, which expresses in a remarkable manner his sternness and severity. Since he was naturally robust and warlike, and more acquainted with the arts of war than those of peace, he was fierce and haughty when in authority. It is said that he never learnt Greek, and that he would not make use of that language on any serious occasion; as if it were ridiculous to learn the language of a people who were subject to others. If he could have been persuaded to pay his court to the Grecian muses and graces, he would not, after bearing so many honourable offices and performing so many glorious exploits, have crowned the whole by a most savage and infamous old age, in consequence of his yielding to anger, ill-timed ambition, and insatiable avarice.'

(Plutarch's *Life of Marius;* Sallust's *Jugurthine War; Epitomes* of Livy; Velleius Paterculus; Cicero, *De Oratore,* iii. 2, 3; Clinton's *Fasti Hellenici.*)

MARIVAUX, PIERRE CARLET DE CHAMBLAIN DE, born at Paris, in 1688, was one of the most popular romance writers of the eighteenth century, and one to whom that branch of literature is mainly indebted for the character and authority which it has acquired as a representation of actual life and manners, illustrated by the analysis of conduct and motives, sentiments and feelings. He began his career as a dramatic writer, and his pieces were for a long time the support of the Théâtre Italien. Yet although they display much ingenuity and talent, and procured for their author a seat in the French Academy, they now possess little interest, except as being productions of the same pen which gave the world 'La Vie de Marianne,' and the 'Paysan Parvenu.' Marivaux also wrote another romance, entitled 'Pharsamon,' every way inferior to the two on which his reputation rests; also 'Le Spectateur François,' and 'Le Philosophe Indigent.' The inequality of his taste was also manifested by his 'Homère Travesti,' which was published in 1716, was neglected from the very first, and has long been deservedly forgotten; while his two novels still charm by the master-touches with which they abound, by their accurate and highly finished delineations of character, and by the intimate knowledge which they display of the human heart. Marivaux was no less estimable as a man than as an author. He was not one of those who put on morality as a holiday suit when they show themselves in public; he did not, like Sterne, dip merely his pen in sentiment; nor was he, as too many others have been both before and since, the eloquent advocate of a philosophy which his own conduct belied. On the contrary, his life illustrated the lessons which he endeavoured to impress upon others. Benevolence to all, active sympathy for the unfortunate, and a philosophic indifference towards wealth and distinctions, were prominent traits in his character. He died at Paris in 1763.

MARJORAM, an aromatic potherb, used in cookery, especially among the French. It is the Origanum Majorana of Linnæus, or Majorana hortensis of Mœnch, a native of Barbary and the Himalaya mountains. In gardens it is little better than an annual; in a wild state it is a suffruticose perennial.

MARK. [MONEY.]

MARK, ST., the Evangelist, is supposed by the greater number of antient and modern writers to be the same person as John Mark, who is mentioned in the 'Acts of the Apostles' (xii. 12, 25; xiii. 5, 13; xv. 37). It is most probable that John was his Jewish name, and that he took the surname of Marcus when he went to preach among the Gentiles. He was the son of Mary, a pious woman at Jerusalem, in whose house the disciples were wont to meet (*Acts*, xii. 12), and the nephew of Barnabas (*Col.* iv. 10). He left Jerusalem with Paul and Barnabas, about A.D. 44 (*Acts*, xii. 25), and accompanied them in their return to Antioch, and thence in their mission (*Acts*, xiii. 5) as far as Perga in Pamphylia, where he parted from them and returned to Jerusalem (*Acts*, xiii. 13). About A.D. 53 we find him again at Antioch, when Paul proposed to Barnabas to visit the Asiatic churches. Barnabas wished to take Mark with them, but Paul refusing on account of his having deserted them in their former journey, they separated from each other, and Mark accompanied Barnabas to Cyprus (*Acts*, xv. 37-39). Paul appears to have been reconciled to him afterwards, for we find him at Rome with the apostle during his imprisonment, and he is honourably mentioned in some of Paul's Epistles (*Col.* iv. 10; *Philemon*, ver. 24; 2 Tim. iv. 11). We also find him with Peter in Asia (1 *Pet.* v. 13; see Steiger's 'Commentary on the First Epistle of Peter,' *in loco*); and it is supposed that he accompanied that apostle to Rome. According to Eusebius, Epiphanius, and Jerome, he afterwards went to Egypt, and founded a church at Alexandria, where he died and was buried, according to Jerome, in the eighth year of Nero's reign, A.D. 62. But this date appears to fix his death earlier than other circumstances in his history will warrant.

All the early writers affirm that Mark was intimately acquainted with St. Peter: Papias, Irenæus, and Tertullian call him 'Peter's interpreter.' It has been supposed that he was converted to Christianity by St. Peter, as that apostle calls him 'my son' (see Kuinoel's note on *Matt.* xii. 27). Some of the later Fathers mention him as one of the seventy evangelists; but there is no good authority for this tradition, and it is contradicted by Papias, who expressly says that he had heard from the presbyter John, who was contemporary with the apostles, that Mark was not a hearer nor a follower of Christ, but of Peter. (Eusebius, *Ecc. Hist.*, iii. 39.)

MARK, ST., THE GOSPEL OF. The genuineness and authenticity of this Gospel are attested by the unanimous voice of ecclesiastical writers. Michaelis has indeed objected to its canonical authority, in common with that of Luke, but on no good ground. [LUKE, GOSPEL OF.] According to Papias, Irenæus, and other early writers, Mark committed to writing the gospel which was preached by Peter; and Clement of Alexandria states that he did so at the request of Peter's hearers at Rome. Other early writers add that in this work Mark had the approbation and assistance of Peter; and many passages of the gospel have been thought to bear traces of being written under Peter's direction. From the tradition mentioned above, and from Latinisms and explanations of Jewish phrases and customs contained in Mark's gospel, it appears to have been written at Rome for the benefit of the Latin Christians.

The time when it was written is uncertain. Irenæus says that it was composed *μετὰ τὴν τούτων ἔξοδον* (Peter and Paul); but whether he means *after the death* of Peter and Paul, or *after their departure* from Rome, is a question much disputed. Upon the whole, the most probable date appears to be about A.D. 64 or 66.

According to the unanimous testimony of the early ecclesiastical authors, the gospel of Mark was written in Greek. The Latin MS. at Venice, said to be part of St. Mark's *autograph*, has long since been proved to be nothing of the kind.

The contents of St. Mark's gospel have been divided into the three following parts:—

Part I. The baptism and temptation of Christ (i. 1-13).

Part II. The public ministry of Christ, up to his last journey to Jerusalem (i. 14—x.).

Part III. Transactions at Jerusalem, the death, resurrection, and ascension of Christ (xi.—xvi.).

The opinion that Mark's gospel is an abridgment of Matthew's has been satisfactorily refuted by Michaelis; for notwithstanding the coincidences between these two gospels, we find, on comparing them, that there are in Mark omissions of and discrepancies with what is contained in Matthew, which it is difficult to account for on the supposition that he wrote with the gospel of Matthew before him. The true mode of explaining these coincidences and discrepancies belongs to the more general question respecting the origin of the first three gospels. [GOSPEL.] Those who believe that each evangelist composed his narrative from independent sources of information have no difficulty in proving Mark's qualifications for the task; for besides the assistance which he probably received from Peter, what we know of his life proves that he must have had opportunities of constant intercourse with the apostles and first Christians.

(Lardner's *Credibility* and *Lives of the Apostles and Evangelists;* Cave's *Lives of the Apostles and Evangelists;* Kuinoel, *Comment. in Lib. Hist. N. T.*, *Proleg. in Marc.;* the *Introductions* of Michaelis, De Wette, Hug, and Horne.)

MARKET (*mercatum*), a public place and fixed time for the meeting of buyers and sellers. A legal market can exist only by virtue of a charter from the crown or by immemorial user, from which it will be presumed that a royal charter once existed, although it can be no longer produced. A market is usually granted to the owner of the soil in which it is appointed to be held, who, as such grantee, becomes the owner, or lord, of the market. In upland towns, that is, towns which, not being walled, had not attained the dignity of boroughs, markets were frequently granted to lords of manors; but in walled towns or boroughs, particularly in such as were incorporated, the ownership of the soil having usually, by grant from the crown, or other lords of whom the borough was originally holden, been vested in the incorporated burgesses, the course has commonly been to grant markets to the municipal body.

The prerogative of conferring a right to hold a market is however subject to this limitation, that the grant must not be prejudicial to others, more especially to the owners of existing markets. In order that the crown may not be surprised into the making of an improper grant, the first step is, to issue a writ ad quod damnum, under which the sheriff of the county is to summon a jury before him to inquire whether the proposed grant will be to the damage of the king or of any of his subjects. This writ must be executed in a fair and open manner, and the sheriff is bound to receive evidence tendered against, as well as in favour of the grant. But as the writ does not purport to affect the interest of any person in particular, it is not necessary that notice should be given of the time or place at which it is meant to be executed. Notwithstanding a finding by the jury that the proposed market will not be injurious, any party who conceives that his interests are affected by the grant when made, whether he appeared upon the inquiry under the writ ad quod damnum or not, may traverse the finding, or sue out a writ of scire facias, which, after reciting the alleged injury, calls upon the grantee, in the name of the crown, to show cause why the grant should not be cancelled. If a new market be set up without any grant from the crown, the party is liable to be called upon by the crown to show by what warrant he exercises such a franchise [LIBERTY; QUO WARRANTO]; and he is also liable to an action on the case for damages, at the suit of any person to whose market, or to whose property, the market so set up by the defendant is a nuisance. A new market is presumed to be injurious to another held within the distance of twenty miles, even though it be on a different day, but this presumption may be rebutted.

Formerly markets were held chiefly on Sundays and holidays, for the convenience of dealers and customers, brought together for the purpose of hearing divine service. But in 1285, by 13 Edward I., c. 5, fairs and markets were forbidden to be held in churchyards; and in 1448, by 27 Henry VI., c. 5, all showing of goods and merchandise, except necessary victuals, in fairs and markets, was to cease on the great festivals of the church, and on all Sundays, except the four Sundays in harvest. The holding of fairs and markets for any purpose on any Sunday was prohibited in 1677, by 29 Charles II., c. 7.

The grantee of a market has a court of record called a court of pie-powder (pieds pouldreux, 'dusty feet'), for the prompt decision of matters arising in the market. [PIE-POWDER COURT.] Such a court being considered necessary for the expedition of justice and for the support of the market, the power of holding it is incident to a grant of a market, even though the royal letters patent by which the grant is made be entirely silent on the subject.

Sales in markets may be of goods actually brought within the precincts of the market, or of goods not so brought. Goods not within the precincts of the market are sold sometimes by sample, sometimes without sample. Where goods are usually brought into the market for sale, it is incumbent on the lord of the market to take care that every thing be sold by correct and legal weights and measures.

For the security of dealings in markets, contracts were formerly required to be made in the presence of an officer appointed for that purpose by the lord of the market, for which service he received from the buyer a small remuneration called market-toll. [TOLL.]

It is a rule of the common law that every sale in market-overt (open market) transfers to the buyer a complete property in the thing sold; so that however defective the title of the vendor may be, yet that acquired by the vendee is perfect, even where the property belongs to a person who is under legal disability, as an infant, a married woman, an idiot, or a person in prison or beyond sea. In London every shop is market-overt for goods usually sold there.

This rule is subject to certain exceptions and restrictions. A sale in market-overt does not bind the rights of the crown; nor does it bind the rights of others, unless the sale be in an open place, as a shop, and not a warehouse or other private part of the house, so that those who go along cannot see what is doing, and not in a shop with the shop-door or windows shut, so that the goods cannot be seen. The articles bought must be such as the party usually deals in. The sale must be without fraud on the part of the buyer, and without any knowledge on his part of any want of title in the vendor. If the seller acquire the goods again, the effect of the sale in barring the true owner is defeated. There must be a sale and contract; and therefore the property is not altered in market-overt in goods given, or in goods pawned, or in goods sold to the real owner. The sale must be between sunrise and sunset, and must be commenced and completed in the market.

By 21 Henry VIII., c. 2, 'If any felon rob or take away money, goods, or chattels, and be indicted and found guilty, or otherwise attainted upon evidence given by the owner or party robbed, or by any other by their procurement, the owner or party robbed shall be restored to his money, goods, or chattels.' Since this statute, stolen goods, specified in the indictment, have, upon the conviction of the offender, been restored to the prosecutor, notwithstanding any sale in market-overt.

As stolen horses can be easily conveyed to distant markets, the legislature has frequently interposed to protect the owner against the consequences of a sale in market-overt. By 2 and 3 Philip and Mary, c. 7, 'No sale of a horse stolen binds the property, unless it stand or be ridden an hour together between ten o'clock and sunset, in an open part of the market, and all parties to the bargain come with the horse to the book-keeper and enter the colour, and one mark, at the least, of the horse sold, and pay the toll, if any due, else a penny.' And further, by 31 Elizabeth, c. 12, 'No person shall in any fair or market sell, give, exchange, or put away any horse, mare, &c., unless the toll-taker, book-keeper, bailiff, or other chief officer will take upon him perfect knowledge of the person that shall so sell, give, or exchange any horse, &c., and of his true name, surname, and dwelling-place, and shall enter the same in a book there kept for sale of horses, or else that he so selling or offering to sell, &c. any horse, &c., shall bring unto the toll-taker or other officer aforesaid of the same fair or market, one sufficient and credible person, that can testify before such toll-taker, &c., that he knows the party that so sells, &c., such horse, &c., and his true name, surname, mistery, and dwelling-place, and there enter in the book of the toll-taker or officer, as well the true name, surname, mistery, and place of dwelling of him that so sells, &c., such horse, &c., as of him that so shall testify his knowledge of the same person, and shall also enter the true price that he shall have for the same horse, &c., and that no toll-taker, &c., shall take toll or make entry of any sale, &c., of any horse, &c., unless he knoweth the party that so sells, &c., such horse, &c., and his true name, surname, mistery, and place of dwelling, or the party that shall testify his knowledge of the same person so selling, &c., any such horse, &c., and his true name, &c., and shall make a perfect entry in the book of such his knowledge and of the true price taken or had for any such horse, &c., so sold, &c., so far as he can understand the same; and then give to the buyer a note in writing of the full contents of the same, subscribed with his hand; on pain that every person that shall so sell, &c., any horse, &c., without being known to the toll-taker, &c., or without bringing such witness, or causing the same to be entered as aforesaid, and every person making any untrue testimony, and every toll-taker, &c., offending in the premises, shall forfeit 5*l.*, and that every sale, &c., of any horse, &c., in fair or market not used in all points as aforesaid shall be void.' And by sect. 4, 'If any horse, &c., be stolen, and afterwards sold in open fair or market, and the sale shall be used in all points and circumstances as aforesaid, yet the sale of any such horse, &c., within six months after the felony, shall not take away the property of the owner, so as claim be made within six months, before the mayor or other head officer of the town or parish, if the horse, &c., happen to be found in any town corporate or market-town, or else before any justice of peace of the county near to the place where such horse, &c., shall be found, if it be out of a town corporate or market-town, and so as proof be made within forty days, by two sufficient witnesses, before such head officer or justice, that the property of the horse, &c., so claimed, was in the party by whom such claim is made, and was stolen within six months next before such claim, but that the party from whom the horse, &c., was stolen may at all times after, notwithstanding any sale in fair or market, have property and power to take again the said horse, &c., upon payment or offer to pay the party that shall have the possession and interest of the same horse, &c., if he will accept it, so much money as the party shall depose and swear before such head officer or justice of peace, that he paid for the same *bonâ fide* without fraud or collusion.' This statute extends to a horse taken by wrong, though it be not stolen.

By 1 James I., c. 21, 'No sale, exchange, pawn, or mortgage, of any jewels, plate, apparel, household stuff, or other goods, wrongfully purloined, taken, robbed, or stolen, and sold, uttered, delivered, exchanged, pawned, or done away, within London and its liberties, or Westminster, or Southwark, or within two miles of London, to any broker or pawn-taker, shall work or make any change or alteration of the property or interest.'

A market is generally appointed to be held once, twice, or three times in a week, for the current supply of commodities, mostly of provisions. A large market held once or twice a year is called a fair; and, according to Lord Coke, a large fair held once a year is a mart.

Fairs have all the legal incidents of markets, and are subjected to further regulations by 2 Edw. III., c. 15, one of which requires, that at the opening of the fair, proclamation be made of the time it is to continue.

MARKETS, AGRICULTURAL. The more numerous markets are in any well cultivated country, provided they are at a sufficient distance not to interfere with each other, and on different days of the week, the greater saving there is of time and labour of conveyance. Good roads or navigable rivers are of great importance to a market-town; and if there are mills in the neighbourhood, where corn can be ground, they will increase the advantage to the farmer by causing a regular demand above what the immediate consumption of the place may require.

The vicinity of a good market where every kind of agricultural produce will always find purchasers at a fair price, greatly adds to the value of a farm, especially if good roads lead to it; and the advantage is the greater if it be a populous town, which not only consumes much produce, but from which various kinds of manure may be brought by the teams which have carried the produce to market. It is this which so much enhances the rent of land near London and all great cities, and makes the agriculture there approach nearer to horticulture, which entirely depends on extraneous manure.

Few things are so bulky as corn; a sack weighing 240 lbs. when brought to market may be worth a guinea or thirty shillings, but if it is carred 50 miles to a market, the net value will be much reduced; and if at that market there is no demand beyond what is required for the immediate neighbourhood, and no means of exportation, a very small surplus will glut it, and reduce the price still lower. The nature and situation of the markets are consequently a most important consideration in any agricultural enterprise. Where markets are very distant, the only profitable produce is live-stock, which can be driven a long way at a small expense. All countries, however fruitful the soil, which are thinly peopled, and have no ready markets for corn, must necessarily remain in pasture or be uncultivated. An increase in the population and the establishment of manufactures give rise to an increased number of markets, and bring more land into a state of profitable cultivation as arable land. If a regular supply of food is essential in a manufacturing population, so the demand for it causes more to be produced. A regular supply to the markets keeps prices regular, fluctuating only according to the abundance or scantiness of the crops.

It is for the general advantage that the farmers should bring their corn in regularly, without speculating on a rise or fall of prices. As a general principle, a farmer should thrash his corn at a time when the work out of doors is less important, or when the weather is unfavourable for it. He must do so whenever the fodder for his cattle diminishes, and a fresh supply of straw is required: and as soon as the grain is in sufficient quantity to require a team to take it to market, it should be sold. But many circumstances may make this regular course inconvenient. There may not always be a demand for the article, and if a sale is forced, a diminution in the price must be submitted to. In some situations purchasers cannot always be found, at any price, and a granary to store corn in becomes indispensable. In commercial countries there are always speculators in corn, who make their profit by buying and selling the commodity. The farmer is tempted to withhold his corn when the price is low, in order to have a greater profit when it rises; and, to a certain degree, he is justified in doing so: but if he speculates on his own corn, when he can obtain a fair price for it, he becomes a merchant, as much as if he purchased to sell at a profit. When there is a good market at hand, the produce of the farm should be regularly sold, so as to give the farmer a constant supply of money for his operations, besides a portion set apart for the rent and other regular payments. In this way he will, at the end of the year, have had the average price, without risk and without speculation; and by a little caution he may obtain somewhat more than a mere average, provided he has always more money at hand than his immediate wants require, and is never forced to sell.

In order that the farmer may not be imposed upon, he must either make himself acquainted with the transactions in different neighbouring markets, or he must rely on the honesty and judgment of an agent, whose business it is to attend markets and buy and sell for others. These men are generally called salesmen or factors, and when their character for honesty is established, the small sum which is paid them on the sales will generally be found to be fully compensated by the advantage which their knowledge of the markets and of the quality of the articles gives them. This is particularly the case in the buying and selling of live-stock, which requires much more knowledge and experience than most other articles. The people whom the farmer has to deal with in fairs and markets have generally a thorough knowledge of the real value of the articles offered for sale, by constantly frequenting markets, and confining their attention to buying and selling only. The farmer is therefore seldom a match for the dealer, and will find it his interest to employ a person equally skilled in these matters. The farmer would lose too much valuable time, and be led to unnecessary expense, if he attempted to obtain the requisite knowledge, by frequenting different and distant markets, as the dealers do

Notwithstanding this, a certain knowledge of markets and prices is necessary to enable a farmer to detect imposition or ignorance in the person he employs, and the occasional attendance at fairs and markets is indispensable to obtain this knowledge.

When the whole bulk of the articles to be sold is brought into the market and exposed for sale, the market is called a *pitched* market; when only a small portion is brought, to show the quality of the whole, it is called a *sample* market. Each has its peculiar advantages and inconveniences. In a pitched market the buyer sees what he purchases, and can thoroughly examine it; he may therefore be induced to offer a more liberal price; but it often happens that he has to carry a load away by the same road by which it was brought; the sacks also have to be returned, which causes frequent mistakes and losses; and there is an evident waste of time and labour. When the article is sold by sample there is more reliance on the honesty of the seller, and the buyer naturally keeps on the safe side, by offering somewhat less, as a kind of insurance against slight deceptions. The buyer keeps half the sample and the seller the other, that they may be compared with the bulk in case of any dispute. The seller sends the article sold on a day agreed upon; and if it is corn the sacks are brought back when the waggon or cart returns home. The price is usually paid on the next market-day. In very large dealings the selling by sample is generally adopted; small quantities are usually pitched.

Great inconvenience arose formerly from the various measures used in different markets; and dealers required tables to reduce them to one standard. The law which has established one uniform standard of weights and measures has removed all difficulty, and the rapid and frequent communications which now take place between the great towns and every inhabited spot in the kingdom have made prices much more nearly alike, for all articles of general necessity in all parts of Great Britain, than in any other country; and the prices in the markets of the great towns differ so little, that in the country these are generally regulated by those of London, Liverpool, or Edinburgh. Every farmer who cultivates land to any extent must attend to the fluctuations of the markets, and his operations may be much influenced by the comparative prices of different kinds of grain.

MARKLAND, JEREMIAH, was born the 29th of October, 1693, at Childwall, in Lancashire, of which his father was vicar. He was educated at Christ's Hospital, London, whence he was sent to St. Peter's College, Cambridge, in 1710. He took his degree of M.A. in 1717, and was soon afterwards elected a fellow and tutor of his college. After residing at Cambridge for some time, he removed to Punsborn, in Hertfordshire, to undertake the education of Mr. Shode's son, and afterwards travelled with his pupil on the Continent. During the latter part of his life he resided at a small village near Dorking, in Surrey, where he died on the 7th of July, 1776.

Markland lived in the greatest retirement, and devoted a long life to the diligent study of the Greek and Roman writers. He was one of the best English scholars and critics of the last century, but wrote very little. He edited the 'Sylvæ' of Statius (Lond., 1728), the 'Supplices' (1763), and the two Iphigenias of Euripides (1771), which have been republished by Gaisford. Subjoined to his edition of the 'Supplices' are his 'Explicationes veterum aliquot Auctorum.' He also contributed some observations to Taylor's edition of Lysias, to Bowyer's reprint of Küster on the Middle Verb in Greek, and to Musgrave's edition of the 'Hippolytus.' In 1745 he published 'Remarks on the Epistles of Cicero to Brutus, and of Brutus to Cicero, in a Letter to a Friend;' in which he attempts to prove that they could not have been written by Brutus or Cicero; and in an Appendix to this work he also maintains that the four orations which occupy a place in Cicero's works, under the titles of 'Pro Domo sua apud Pontifices,' 'De Haruspicum Responsis,' 'Post Reditum in Senatu,' and 'Ad Quirites post Reditum,' are also spurious. This opinion has been supported by F. A. Wolff and many other able critics.

MARL. A mixture of calcareous and argillaceous earth is commonly called marl; in Norfolk soft chalk used on the lands is called marl; in Worcestershire and Somersetshire red clays are termed marls. In geology we have the red marl, the black marl at the base of the lias, the chalk marl, the freshwater marls of Headon Hill in the Isle of Wight. The term is too vague for scientific descriptions.

MARL, an earthy substance found at various depths under the soil, and extensively used for the improvement of land. It consists of calcareous and argillaceous earth, in various proportions, and as the former or the latter prevails, so it is beneficially employed on clays or sands. There are several distinct sorts of marl—clay marl, shell marl, slate marl, and stone marl. The clay marl has probably been formed by the slow deposition of clay suspended in water and mixed with the particles of decomposed shells. When these shells have retained their form, or appear in fragments in the marl, it is called *shell marl.* A considerable compression and a complete decomposition of the shells form slate marl and stone marl. The effect of marl is the same as that of clay and chalk upon sandy soils; on heavy soils its effect is proportioned to the quantity of calcareous earth which it contains. The peculiar advantage of marl is its readily crumbling to powder by the effect of air and moisture. If it is too compact to dissolve under these influences, it can only be made useful by burning, and in this case it is only a substitute for lime, its value depending on the proportion of calcareous earth in the marl. To ascertain this proportion, the marl is thoroughly dried over the fire and pulverised; a certain quantity is weighed and put into a cup; diluted nitric acid or strong vinegar is poured slowly upon it, out of a vessel containing a known quantity, until all effervescence ceases. A quantity of the acid equal to that which has been used is placed in a cup, and fine marble dust is gradually put into this, from a certain quantity which has been weighed, as long as any effervescence appears. The weight of the marble dust used for this purpose evidently gives the quantity of calcareous earth in the marl, since it takes the same quantity of acid to dissolve it.

Marl is often found very near the surface, so as to mix with the soil in ploughing; but unless there be a sufficient depth of soil above, its presence does not indicate great fertility. It is generally best when found at a moderate depth, so as to be readily dug out and carted on the adjacent lands. In Norfolk, where a marl containing a large proportion of clay is found in many places under a light soil, it is frequently spread over the surface at the rate of two or three hundred cart-loads per acre. This dressing, joined to underdraining, makes a wonderful improvement on soils which before were scarcely worth cultivating, owing to their being loose and wet in winter. The clay marl makes them retain sufficient moisture, while the superfluous water is carried off by the drains.

Marl being often found with blue veins through it, a marbled earth containing sulphate of iron, or vitriol, has sometimes been mistaken for it; but this, far from being useful, is quite the reverse; for sulphate of iron in any quantities will produce absolute sterility in a soil. The nature of marl can always be detected by pouring a little vinegar on it; if it does not effervesce, it is only clay, and probably contains iron, which is readily discovered by the red colour on burning a portion in the fire, or by mixing it with water and then adding an infusion of gallnuts in the strained liquor: the black colour immediately detects the sulphate of iron.

Marl when put fresh upon the land requires some time in order to become effective. It should therefore be laid on the surface and spread before winter, leaving it there for a considerable time before it is ploughed in. It is most advantageous to put it on the land when it is in grass, and to roll and harrow it repeatedly, in order to expose it to the effect of the air and rains. Alternate frosts and thaws greatly assist its pulverization.

Too much marl may be put upon land, and it is better to repeat the marling after a few years than to put on a great quantity at once. The proper dose depends on the nature of the soil and that of the marl. Sand will take a very large quantity of clay marl: but even shell marl should be put cautiously on clay soils; they may not always be improved by a great addition of calcareous matter. There is no greater mistake than to imagine that marl is a substitute for dung. Light land which has been marled becomes less hungry, and marl will make dung go further, but it will not act well on a poor soil without dung; and if the land is severely cropped after marling, and not sufficiently recruited with enriching manures, it will be sooner exhausted than if it had not been marled; for marl, like lime, renders soluble the natural humus in the soil.

It is very easy to judge of the value of any marl on a given soil when the proportion of calcareous earth and clay in its composition has been ascertained. We have only to consider what improvement will be produced in the texture by the addition of so much lime and so much clay. The advantage of marl over pure chalk is only that it is more readily pulverised; but wherever chalk can be had at an equal expense, it is far more effectual and of longer duration on clay soil than the best marl. On sands it may be different, and the fat marls containing much unctuous clay are preferable from their binding nature.

An excellent use of marl is in forming composts with dung and peat earth. It is laid in layers with the dung and peat, and if the heap is well soaked with urine or the washings of stable-yards, it will in a short time become a most valuable manure for all kinds of soils. Many peat bogs are formed on a marly bottom; where this is the case, and it can be drained, or the water got rid of in any way, the marl, when laid on the surface, consolidates the peat by its pressure, and soon makes it capable of producing good herbage by converting it into a rich vegetable mould.

The expense of marling land can only be calculated when the distance of the marl and the depth from which it is raised are known; when it lies in a stratum under the land, it is generally the cheapest plan to open a pit in each field; for the carriage of the marl is the chief expense. Within a distance of two hundred yards from the pit, it is found by experience that the cheapest way of putting it on the land is by means of men wheeling it in barrows with the help of planks, as is done in digging canals and other similar public works.

MARLBOROUGH. [Wiltshire.]

MARLBOROUGH, JOHN CHURCHILL, DUKE OF, the ablest general and most consummate statesman of his times, was born at Ashe in Devonshire, on the 24th of June, 1650. He was the second son of Sir Winston Churchill, a gentleman of antient family, whose fortunes had suffered severely in the civil war, through his devotion to the royal cause; and whose loyalty, after the Restoration, was rewarded with sundry small offices under the crown for himself, and with the more questionable benefit of appointments for his children in the profligate court of Charles II. Arabella Churchill, his daughter, became first maid of honour to the Duchess of York, and next mistress to her husband the Duke, afterwards James II.; and John Churchill, who was appointed page to the same prince, doubtless owed his early advancement to this disgraceful connection. It is remarkable that one of its fruits, James FitzJames, duke of Berwick, proved a commander of renown only less illustrious than his maternal uncle.

The natural talents and merits of Churchill however were of too high an order to be solely dependent on the patronage which had sullied the honour of his house. Notwithstanding the disadvantages of a neglected education, which seems to have been confined to a short residence at St. Paul's school, he gave early indications of spirit and intelligence; and his desire for a military life having been gratified by his patron with a commission, he invariably distinguished himself in each of his early campaigns: in the defence of Tangiers against the Moors; and in the successive operations in which the English troops shared as auxiliaries to the French armies under Louis XIV. during the unprincipled alliance of Charles II. with that monarch against the Dutch. On the great theatre of continental warfare, in which Churchill continued to serve from 1672 to 1677, his brilliant courage and ability, no less than the singular graces of his person, attracted the notice of the illustrious Turenne, who pronounced, with prophetic sagacity, that 'his handsome Englishman' would one day prove himself a master of the art of war.

On the conclusion of the peace of Nimeguen, Churchill, now a colonel, returned to England, and was happily rescued from too licentious a career of dissipation by an ardent attachment for the celebrated woman who became his wife, and who, for good and evil, influenced the whole tenor of his subsequent life. This was Sarah Jennings, a young lady of birth, genius, and beauty, whose irreproachable purity in a vicious age might have rendered her worthy of the uxorious love of the hero, if her imperious temper had not disgraced his submission to its tyranny, alienated his political friends, and embittered his domestic peace. She had been placed, like himself, at an early age, in the household of the Duke and Duchess of York, where she had become the favourite associate of their daughter the Princess Anne, and had acquired over the spirit of the future queen that commanding influence which it belongs to the stronger to exercise over the weaker mind. Her marriage separated neither her husband nor herself from their service in the ducal household; Churchill was confidentially employed by the Duke of York on many political occasions; and when the Princess Anne was married, his wife was, by her express desire, made a lady of her bedchamber. Churchill had previously been raised, through the interest of James, to a Scotch barony; and when that prince succeeded his brother on the throne, he was further promoted to an English peerage by the style of Baron Churchill of Sandridge. Under this title he contributed by very effectual military service to the suppression of Monmouth's rebellion, and was rewarded with his master's unbounded reliance on his fidelity.

This confidence he basely betrayed, before and after the landing of William of Orange, with a deliberate treachery, which all the sophistry of political and religious party has vainly laboured to justify, and the infamy of which no excuse, even in the difficult circumstances of the times, can be found to palliate. After offering his services to the Prince of Orange, he accepted the command of a large body of James's troops to oppose him; after accepting that command, he deserted to the prince; and when William became king, he received at his hands the title of earl of Marlborough, and the offices of privy-counsellor and lord of the bedchamber, as the reward of his ingratitude. His subsequent conduct throughout the reign of William was consonant to this outset: for he corresponded and intrigued with the exiled king. By this double treason and perjury, he for ever took from the former desertion of his deluded sovereign all extenuation of a conscientious principle; he broke his allegiance to the new king whose favours he had accepted; and he branded his own inconsistency with the meanest motives of self-interest and self-preservation.

William III., who knew equally well how to estimate the capacity and the sincerity of Marlborough, alternately imprisoned and employed, cashiered and re-commissioned, the man whom he is said on his death-bed to have recommended to his successor as the fittest person to 'lead her armies and direct her councils.' The favour of Marlborough's wife with Queen Anne was probably a more powerful, though less rational, motive for the appointment which he now received to the command of the allied forces in the war of the Spanish succession; and he immediately entered on a course of glorious achievement which since the days of Henry V. had never been equalled, and which until our own eventful times was never surpassed by any British commander or army.

When Marlborough landed at the Hague, in June, 1702, to take the command of the allied army, the French under the skilful Boufflers, by the superior force and vigour of their preparations, had already been able everywhere to assume the offensive; the very frontiers of the Seven Provinces were threatened; and it was feared that the efforts of the English general must be restricted to the defence of the republican territory. Moreover, he had to encounter the petty jealousies and disobedience of the other allied commanders, and the opposition of the Dutch deputies, whom the states-general sent into the field to control the movements of their troops, and whose ignorance of war and dread of responsibility were grievous impediments to every bold enterprise. Yet, notwithstanding these obstacles, which shackled all his operations and heavily taxed his forbearance, he succeeded, by a series of masterly movements, in compelling the French armies to retreat in all quarters, delivered the Dutch frontiers from their presence, and closed the campaign by the sieges and capture of Venloo, Ruremond, Stevenswaert, and Liège. These services, short as they fell of the results which might have been attained if the genius of the commander had been allowed its full play, were so far beyond the anticipation of the allies, that the states-general loaded him with eulogy, and Queen Anne elevated him to the ducal title.

The following campaign of 1703 presented a repetition of the same obstacles to the enterprising spirit of Marlborough. Arrested by the timidity of the field-deputies, and harassed by the misconduct of the Dutch generals, he was allowed to effect nothing in the Netherlands except the reduction of Bonn, Huy, Limburg, and Guelders: while the elector of Bavaria with his own troops, and the French under Villars, broke into the Imperial dominions on the Danube, signally defeated the forces of the emperor, alarmed that prince for the safety of his capital, and threatened dissolution to the grand alliance itself. These dangers roused Marlborough to attempt the masterstroke of his military career. Early in the campaign of 1704, after providing for the safety of the Netherlands, he secretly conceived and executed upon his own responsibility the bold design of marching into Germany at the head of the English troops. He formed a junction on the Danube with the Imperialists: stormed the strong Gallo-Bavarian lines at Donauwerth: and finally, in concert with the Imperial commander Prince Eugene of Savoy, a kindred spirit, attacked the enemy on the 13th of August, 1704, at and near the village of Blenheim on the Danube, with such skill and impetuosity as to inflict on them a total defeat. In this memorable battle, the French and Bavarians, who were commanded by the elector in person and Marshals Tallard and Marsin, lost above 30,000 men in killed, wounded, and prisoners, Marshal Tallard himself being among the latter. But the moral and political effects of the victory were yet greater: it dimmed the lustre which the successes of Louis XIV. had shed upon the French arms, and destroyed the charm of their invincibility; it delivered the empire; and it laid Bavaria prostrate before the allies. For this great exploit Marlborough was rewarded with the conveyance to himself and his heirs of the crown lands at Woodstock, on which it was also resolved to erect for him a palace at the royal cost. This noble design to perpetuate the memory of his services was ultimately realised, under the direction of the architect Vanbrugh, in the majestic though cumbrous pile which still bears the title of the castle *of Blenheim*; but the public enthusiasm which had dictated so splendid a monument was stifled in faction, and the completion of the work is indebted more to the care of his high-spirited widow, than to the good faith of the crown or the munificence of the nation. The gratitude of the Imperial house for the preservation of its capital and dominions was neither less loud nor more durable. The territory of Mindelheim, with the title of prince of the Holy Roman empire, was conferred upon the victor of Blenheim; but though the premature death of his only son left him without heirs male, the dignity was not allowed to descend in the female line; and when the lands of Mindelheim were included in the districts restored to Bavaria at the peace, the Imperial court had the meanness to withhold any compensation from its deliverer.

The march into Germany had liberated Marlborough from the paralyzing control of the Dutch field-deputies and the wretched intrigues of their officers. But his return to the Netherlands subjected him again to the same impediments and annoyances; and in the campaign of 1705, though he skilfully forced the French lines between Namur and Antwerp, he was once more restrained from striking any decisive blow upon the enemy. But in the following year (1706), happily for his wishes, the great efforts of the French in the Low Countries under Villeroy enabled him to tempt them to an encounter; and in the great battle of Ramilies he gained a second victory, so complete that the enemy, with a loss of 13,000 men, eighty standards, and all their cannon, were compelled to evacuate the whole of Spanish Flanders. Brussels, Ghent, Antwerp, and Oudenarde opened their gates to the conqueror, and the strong fortresses of Ostend, Menin, Dendermonde, and Ath were reduced by regular sieges.

Through the apathy of the Dutch these successes were followed, in 1707, by a year of inaction; but in the summer of 1708 an attempt of the enemy to recover possession of Spanish Flanders brought on a general engagement at Oudenarde, which terminated in the utter rout of the French under the dukes of Burgundy and Vendôme, with a loss of 14,000 men. The forcing of the passage of the Schelde and reduction of the great fortress of Lisle, a place of first-rate strength, and defended by a garrison of 15,000 men under Boufflers, were the chief fruits of this victory. The following year (1709) was distinguished by the sanguinary combat of Malplaquet, the most dubious of Marlborough's exploits; since, though he was undoubtedly victorious, the assault of an immense army under Villars in a position of tremendous strength, has exposed him and his colleague Eugene to the charge of reckless temerity; and the result produced no advantages equivalent to the frightful carnage by which it was purchased. The next campaign (of 1710) opened with another successful passage of the enemy's lines by Marlborough, which was followed by the reduction of Douay, Bethune, and other posts. Villars employed the autumn and winter in constructing a series of strong lines on the Flemish frontiers, to cover the interior of France against the further advance of the victorious allies; and so confident was he in the impregnable character of these works, that he openly boasted of having 'at last brought Marlborough to his *ne plus ultra*.' The futility of this vaunt was disgracefully exposed, and never did the military genius of Marlborough break forth with more splendour than in this, which was destined to be his final campaign; even while his mind was distracted, and his energies were crippled by the malignant intrigues of his political enemies in England. On the 5th of August, 1711, by a sudden and unexpected manœuvre, he burst through the lines of his able though gasconading antagonist near Bouchain, formed the siege of that strong fortress, and effected its capture—his last achievement—under the eyes of the superior French army.

The political intrigues which disgraced the court of Queen Anne, and closed the triumphs of Marlborough, belong rather to general history than to the biography of the illustrious leader who was their victim. But they were fomented in his domestic circle; and his imperious wife, if she had assisted his rise, was also the real instrument of his fall. So romantic was the friendship which the queen had cherished for her, that utterly impatient of the etiquette and restraints of a court, and under the assumed name of Mrs. Morley, laying aside every distinction of her rank, she corresponded, in all the freedom and affectionate intimacy of an equal, with the duchess as 'her dear Mrs. Freeman.' If the duchess had been contented to use her influence with moderation, the easy nature of the queen might never have felt the yoke. But Anne was sincerely attached to Tory principles, the duchess was a violent politician, and notwithstanding her husband's Tory connections and prepossessions, she had become as warmly devoted to the Whig as the queen to the opposite party. As long as William III. lived, an aversion which they shared to that prince and his government, united the two ladies in a band of political sympathy more powerful than their own differences of opinion. But when his death relieved them from an object of common dislike and apprehension, Anne gave way to her Tory predilections; the duchess ardently advocated the rival cause; and so arrogantly and intemperately were her tyrannical injunctions enforced, that they ceased not until the weak queen had been compelled to surround herself with the leaders of a party whom she detested. Thus goaded and outraged, Anne was gradually alienated from her former friend, whom at last she learned to hate as cordially as she had once loved her; the intriguer Harley, the most perfidious of political adventurers, found it easy to increase the feud; and the machinations of the bedchamber-woman, whom he made his instrument, were sufficient to change the political aspect of Europe.

The hatred of the queen for the duchess was soon unjustly and ungratefully extended to the man who had achieved the principal glories of her reign, and whose great merits were innocent of personal offence. The abject entreaties to which Marlborough descended, in vainly imploring the queen to spare his duchess the mortification of a dismissal from her place in the royal household, present the most humiliating scene of his life. The next blow struck by his enemies was his own removal from command; and this measure was envenomed by their malignity with a charge of peculation, which really appears to have been unfounded. Before the storm thus raised against him Marlborough withdrew to the Continent, where he remained until just previous to the death of Queen Anne. George I., immediately on his accession, restored him to his military offices of captain-general and master of the ordnance; and in the undisturbed enjoyment of these dignities he passed the eight remaining years of his life. In this interval, two paralytic strokes shook his strength, but without at all seriously impairing his faculties; and the line which Johnson inserted in the 'Vanity of Human Wishes,'—

> 'From Marlborough's eyes the streams of dotage flow,'

was at least a poetical exaggeration. For he continued to attend his parliamentary and official duties until a few months before his death, which occurred when he was in the full possession of his senses, and in the seventy-second year of his age, on the 16th of June, 1722. On the death of his son, which happened during the duke's lifetime, the reversion to the ducal title and estate of Blenheim had been settled on his daughters and their heirs male; and the eldest, who thus succeeded her father, having died leaving no son, the family honours descended through her next sister, the lady of Charles Spencer, earl of Sunderland, to the house which still inherits them, and which, in our own age, has assumed the name of Churchill.

In estimating the character of Marlborough under its twofold aspect of political and military greatness, it will readily be concluded that he was the most distinguished personage of his country and times. As a statesman, he was unrivalled in personal address and diplomatic skill, in the arts of persuasion, and in the powers of combination and arrangement. He was the life and soul of the grand alliance which arrested the ambitious career of Louis XIV. and preserved the liberties of Europe; his influence pervaded every continental court; and by his energetic hand was set in motion every spring of that vast confederacy, which centred its only real point of confidence in his spirit. One of his bitterest enemies and ablest contemporaries, Bolingbroke, was not ashamed to acknowledge, after the grave had closed over him, that he was the greatest minister that this country had ever possessed.

As a general, it has not been the fate of Marlborough to be numbered with the few, such as Maurice of Nassau, Gustavus Adolphus, or Frederic of Prussia, whose genius has stamped its impress upon the warfare of their times, and made a distinct epoch in military science. He left the art, which he practised with unrivalled ability, in the same state in which he had found it; nor is there a single change or improvement in strategy attributed to his master-mind. But if this absence of inventive power may seem to detract from his claim to the very highest order of military merit, it must not the less be remembered that he was beyond comparison the most accomplished commander of his warlike age. It was an age of formal tactics and deliberate sieges; which had produced Vauban and Coehorn, raised the art of fortifying for the time to an apparent perfection, and exaggerated the importance of regular fortresses and long-drawn lines of intrenchment. In the system of operations which naturally grew out of such circumstances, Marlborough greatly excelled; and of six conspicuous occasions on which he is recorded to have penetrated the intrenched positions of his opponents, five were nearly bloodless triumphs of his tactical skill. In all these, his success equally proclaims his own superiority over his antagonists, and the vicious practice of the age, which, in attempting to cover an assailable country with extended chains of intrenchment, laboriously invited as many points of attack as it multiplied works. But Marlborough himself, in his own practice, adhered to the same rules of defence, of which his success might have shown him the futility. Once indeed, after the victory of Oudenarde, he broke through the pedantry of rules, and proposed to Eugene, by masking Lisle and Tournay with a corps of observation, to penetrate into the heart of France: a plan which, instead of consuming the remainder of a victorious campaign in the siege of two fortresses, might have triumphantly ended the war. But the bold proposal seemed too hazardous even to Eugene.

Each however of Marlborough's great battles, and of the operations which preceded them, will testify that his skill comprehended much more than the conduct of a war of sieges and intrenchments. The consummate adroitness with which the objects of his memorable march into Germany in 1704 were concealed from the enemy, and their fears successively misdirected to the Moselle, to Alsace, and to Landau, until it was too late to prevent his real designs on the Danube, must ever be numbered among the most perfect efforts of military science. So also may be cited, with equal admiration, the singular and beautiful manœuvres by which the battle of Ramilies was won, and of which the curious military reader may find an ample and lucid account in the memoirs of General Kane, himself an eye-witness and an excellent tactician. And when it is considered that the successes of Marlborough were gained with an army in which the native British contingent never amounted to 20,000 men, and of which three-fourths were composed of a motley roll of Dutchmen, Hanoverians, and

Hessians, Danes, Wirtembergers, and Prussians, and moreover that his plans were in almost every enterprise marred by the timidity or obstinacy of the Dutch deputies, the moral triumphs of victory with such heterogeneous materials, and under such heavy disadvantages and discouragements, must very much raise our estimate of the genius by which they were won.

As a man, it is less easy to form a true judgment of the character of Marlborough than as a statesman or a general. If we were to estimate his moral worth by his double treachery to James II. and to William III., by his tame submission to the ingratitude of Queen Anne, and by the avarice which degraded his private habits, he might justly be numbered among the greatest and meanest of mankind. Nor is there any weight in the extenuation which has been attempted for his political falsehood, that he was no worse than his contemporaries; since it is the test of true greatness to rise above, not to sink to, the level of a common corruption. Yet with all his faults, it would be easy to prove that there were not wanting in Marlborough many of the qualities of a good patriot and a good man. His friend the lord treasurer Godolphin and himself appear, of all their contemporaries, to have been most free from the virulent spirit of faction and most sincerely devoted to the true honour and interests of their country. The attachment of Marlborough to the tenets and principles of the Church of England was sincere and pure; he was unaffectedly a person of strong religious feeling and practice; and in these respects the example which, as a commander, he held out to his troops, and enforced in his camp, of a piety without fanaticism, was as salutary as it has been infrequent. His courage too, which the inconceivable baseness of faction affected to doubt, and which in his youth had been fiery and impetuous, displayed in his later years the calm and collected spirit of the Christian hero. In public action he was ever as humane and merciful, as towards personal enemies he was placable and magnanimous. In private life, if we except the stain of parsimony, his conduct, at least after his marriage, was a pattern of moral virtue; his temper was imperturbably sweet, gentle, and affectionate; and he was but too fond a husband, too confiding a friend, and too indulgent a master.

The principal biographies of Marlborough and memoirs relating to his campaigns are:—1, Lediard's Life of him (3 vols. 8vo., London, 1736). 2, An anonymous Life, published in 8vo. in 1713, and accompanied by a Life of Prince Eugene, evidently written by one who had served under the duke and shared his confidence. 3, Dumont and Rousset, 'The Military History of Prince Eugene of Savoy, the Duke of Marlborough,' &c. (translated from the French by P. Chamberlen, folio, London, 1736). 4, 'Histoire de Jean Churchill, duc de Marlborough' (3 vols. 8vo., Paris, 1808): a signal foreign tribute to his greatness, since it was composed by order of Bonaparte, and written, with a few exceptions, in a fair and candid spirit. 5, Coxe's 'Memoirs of John, duke of Marlborough' (3 vols. 4to., London, 1818-19):—a work of which the chief value consists in a great mass of original correspondence, published from the family papers at Blenheim and other sources. 6, Brodrick's 'Complete History of the late War in the Netherlands' (8vo., London, 1713). 7, Kane's 'Campaigns of King William and Queen Anne, from 1689 to 1712,' &c. (8vo., London, 1745). 8, Millner's 'Journal of all the Marches, Battles, Sieges, &c. of the Confederate High Allies, from 1701 to 1712, under the conduct and command of the Duke of Marlborough' (8vo., London, 1733).

MARLOW, GREAT, a market-town, parliamentary borough, and parish, in the county of Bucks and hundred of Desborough. The situation of the town, on the left bank of the Thames, is pleasant and picturesque. Its direct distance from Buckingham is 30 miles south by east, and from London about 29 miles west by north. There are two principal streets, in the form of a T, and three smaller ones. The parish church, dedicated to All Saints, is a handsome modern structure, which was consecrated in 1835, and is surmounted by a spire. A suspension bridge was erected over the Thames in 1835; its span from pier to pier is 75 yards. The living, a vicarage in the diocese of Lincoln and patronage of the dean and chapter of Gloucester, produces a net income of 172*l.* In the year 1628 Sir William Borlase founded a school here for the education of poor boys. The number of scholars in 1833 was twenty-four, and the subjects then taught were reading, writing, and arithmetic. The income of the charity at the latter date was 118*l.* 12*s.* 10*d.*, out of which the schoolmaster received a salary of 50*l.* A portion of the remaining income has been appropriated since 1822 to the payment of a schoolmistress, who teaches twelve poor girls to read, make lace, and do plain work. Besides the above there is a national school, supported by voluntary donations, for educating children of both sexes; there are also the Oxford Lane almshouses, and several other benevolent foundations of minor importance. (See the *Further Report of the Commissioners on Charities*, pp. 133-145.) The borough has returned two members to parliament since the reign of Edward I. Its population in 1831 was 4237.

(Langley's *History of the Hundred of Desborough and Deanery of Wycombe*, Lond., 1797, 4to.; *Parliamentary Papers*, &c.)

MARLOWE, CHRISTOPHER, a dramatic writer of some eminence, was born, according to Malone, in 1565, but the exact date is unknown. All that is known of his life may be given in a very few lines. He was entered of Corpus Christi College, Cambridge, took his bachelor of arts' degree in 1583, and that of master of arts in 1587. On leaving the university he became a playwright, and perhaps an actor. His moral character appears to have been bad. He was killed in a quarrel of a disgraceful nature, June 1st, 1593, as appears from the register of the old church at Deptford, from Anthony à Wood, and others.

The following plays are attributed to him:—'Dr. Faustus,' 'Edward the Second,' 'The Jew of Malta,' 'Tamburlaine the Great,' 'Lust's Dominion,' 'The Massacre at Paris,' and 'Dido, Queen of Carthage.' The prevailing opinion however is that the three first only are his sole productions.

Both the matter and the style of 'Tamburlaine' are asserted to differ materially from Marlowe's other compositions, and there is reason to believe that 'Lust's Dominion' is later than his time.

There remain, then, 'The Massacre of Paris,' 'The Jew of Malta,' 'Edward the Second,' and 'Faustus.' Of the first little need be said; for the text, as it now stands, is an imperfect copy of a hasty work, as Collier has very well shown by a comparison of the received version with one leaf of a contemporary MS.

'The Jew of Malta' is one of those extraordinary impersonations which imply in the chief character a villainy more than human; such, in fact, as was ascribed only to the nation to whom Barabas belongs. There is a general resemblance between Barabas, the 'Jew's dochter,' in the old ballad, and Shylock; but they are like, not as imitations of each other, but as representations of one class, supposed to contain in itself malignity and avarice, and cruelty beyond all comparison.

'Faustus,' which succeeded 'The Jew of Malta,' is a play to which greater interest is attached at present than fifty years ago, owing to the celebrity of Goethe's 'Faust.'

Those who consider that the 'Faust' of Germany is the greatest conception of human invention—who believe that a deep meaning lies hid behind all the apparent absurdities, and that the moral influence of the work is of a high and impressive kind—will of course laugh at any attempt at comparing the German with his English predecessor. At the same time they must allow that Marlowe's play is one of the first, if not the very first attempt at portraying the struggles of a man whose faith is wavering, the first exhibition in a dramatic shape of that doubting spirit which has been on the ascendant for the last four centuries. Moreover the solitary horror of Faust's death far surpasses the stage-effects which tell so strongly in the last scene of the first part of the German poem; and it would not be hard to show that Goethe has borrowed not a little from his English rival.

Perhaps, on the whole, we must assign the first place among Marlowe's works to 'Edward the Second.' It is the prelude to the Shaksperian 'History,' and contains many passages which almost come up to Shakspere's manner. Those who wish to pursue the subject at greater length may consult an interesting article in the 'Quarterly Review,' which adds much to our information on the subject of the English drama.

Owing to the carelessness of the printers, many lines have been confused in Marlowe's plays, to the grievous injury of various passages, which now appear to be prose, though they are in reality verse.

Marlowe has been compared to Æschylus: there is something specious in the comparison, but it can only be very general. To him we are indebted for the first regular form of the English drama cleared of rhymes; and he may be considered as the link between Shakspere and the Moralities. 'Faustus' is nearly a 'morality;' 'Edward the Second' is a regularly formed 'history.'

Besides his plays Marlowe translated Ovid's 'Art of Love' and some other classical works.

(Collier's *History of Dramatic Poetry*; Preface to Marlowe's Works, ed. 1826; and *Quarterly Review*.)

MARLSTONE. Sandy, calcareous, and irony strata, which divide the upper from the lower lias clays, are thus designated. (GEOLOGY.) This mass of rocks is nowhere so well developed as in Yorkshire and Leicestershire.

MARLY. [SEINE ET OISE.]

MARMALADE, a sort of preserve, made with sugar and the Seville or bitter orange, a variety of the fruit of the Citrus Bigaradia. It is more wholesome when properly made, *i.e.* when the rind is soft, than most other sweet preserves, as the bitter communicates tonic and stomachic properties to it.

MARMANDE. [LOT ET GARONNE.]

MARMONTEL, JEAN FRANÇOIS, was born at Bort in Limousin, in 1723. His parents were of very humble condition, and he owed his instruction in the Latin tongue to the gratuitous tuition which he received in a college under the direction of the Jesuits. His father placed him with a tradesman at Clermont, but a love for literature interfered with all commercial pursuits. At an early age he became professor of philosophy at a seminary of the Bernardins at Toulouse, and supported his mother and family after the death of his father. An acquaintance with Voltaire, to whom he had sent some poems, and who encouraged his attempts, brought him to Paris in 1745. Voltaire introduced him to several persons of distinction, and the success of his first tragedy, 'Denys le Tyran,' stamped him as a dramatic poet. Owing to the patronage of Madame Pompadour he was made historiographer of the royal buildings (*Historiographe des Bâtimens du Roi*), with a pension of 1500 livres, and he also obtained the right of publishing the 'Mercure,' by which he gained 40,000 livres. He was falsely suspected of satirising a person of distinction, and in consequence lost the 'Mercure,' and was confined in the Bastile. His celebrated *Contes Moraux*—which, however dubious as to their moral character, are exquisite specimens of the lighter kind of French writing—followed his release, and gained him great reputation. On the death of Duclos he became Historiographer of France; and in 1783 he was made secretary to the Académie in the place of D'Alembert. He lost his appointments and his property on the breaking out of the Revolution, and he removed some distance from Paris in a state of destitution. In 1796 he became member of the National Institute, and in 1797 was elected into the council of the antients, but this election having been reversed after the 18th Fructidor (Sept. 4) in the same year, he retired to Abbeville, where he died in obscurity in 1799, and was buried in his own garden by Catholic priests.

The works by which Marmontel is chiefly known are his *Contes Moraux*, his romances 'Belisaire' and 'Les Incas,' and his 'Mémoires.' The 'Contes Moraux' and 'Belisaire' are so familiar in an English shape, that they are almost British classics.

MA'RMORA, or MARMARA, SEA OF, the *Propontis* of the antients, is situated between the Grecian Archipelago and the Black Sea, communicating with the former by the Dardanelles, the antient Hellespont, and with the latter by the strait of Constantinople, the antient Bosporus. Towards the east it terminates in the long and narrow gulf of Ismid, and towards the south-east in the gulf of Modanieh. These were respectively the Astacenus or Olbianus Sinus (afterthe Gulf of Nicomedia) and the Cianus Sinus of the antients.

The early Greek geographers, more especially those before the time of Ptolemy, appear to have been very much mistaken respecting the general position of this sea. They represent its greatest length in a direction nearly north and south, instead of east and west, placing the Thracian Bosporus and the Hellespont on the same meridian. Eratosthenes however is thought to have possessed the requisite data for determining its great inclination from the west towards the east, having described the parallel of Amisus as passing through the Propontis and the Hellespont; and the reason assigned for his making no use of this knowledge is his unwillingness to depart from the prevailing opinion of the age in which he lived. Polybius also seems to have been aware of the inclination of the Propontis to the east.

Herodotus gives the length of the Propontis at 1400 stadia, and its breadth at 500 (iv., 85): he allows 400 stadia as the length of the Hellespont (Dardanelles). Strabo (p. 125, Casaub.) gives 1500 stadia as the length of the Propontis from Byzantium to the Troad, and reckons its breadth nearly the same. He also adopts the opinion of Pytheas as to its direction, placing the Hellespont and the Bosporus under the same meridian, and it is not until the time of Ptolemy that we find the Propontis beginning to assume an inclination from west to east, and even then the error in its position received but a slight correction.

Turning to our modern maps, the Sea of Marmora is comprehended between the parallels of 40° 18′ and 41° 5′ N. lat., and the meridians of 26° 40′ and 30° 5′ E. long. Its extreme length, from west to east, including the gulf of Ismid, is about 160 geographic miles; from strait to strait, in a west-south-west and east-north-east direction, 110 miles; and its greatest breadth is 43 miles.

Its shores are described by modern travellers as highly cultivated and picturesque, with a greater boldness of character on the Asiatic than on the European side.

The depth of this sea is in many parts very considerable. In the Admiralty Chart published in 1833 we find 133 fathoms about five miles north-east of Marmora Island, and about the same distance due north of it no bottom at 355 fathoms; from which we may infer that the depth is very much greater midway between the two shores.

Since there are no regular tides in the eastern basin of the Mediterranean nor in the Black Sea, they are much less to be expected in the Sea of Marmora. We accordingly find that there is no periodical ebb and flow of its waters; but a current sets through it from the Bosporus, varying its velocity according to the season and the prevailing winds, and continuing its course through the Dardanelles to the Archipelago. Its navigation is by no means difficult: it is generally free from dangers, and good anchorage may be found all along its northern shore, under its various islands, and inside the peninsula of Artaki.

The most remarkable islands in this sea are, Marmora (from which the sea takes its name), Rabi, and Liman-Pasha, occupying its western division; Papa, or Kalolimno, off the gulf of Modanieh; and the group called the Princes Islands, near the Asiatic shore, about ten miles south-east of Constantinople. The Princes Islands are nine in number, two of which, Oxeia and Rata, are uninhabited. Of the others, Prinkipos (the antient Pityusa) and Kalki (the antient Chalcitis) were once distinguished for their copper-mines. Their scenery is described as being very beautiful, and the Frank merchants of Pera and others have their summer residences on them.

The remarkable peninsula of Artaki was formerly an island, on which stood the once flourishing city of Cyzicus, the ruins of which are still to be seen, and which confirm the historical testimony of its opulence. The modern town of Artaki, which gives its name to the peninsula, and which is thought to occupy the site of the antient Artace, is not a town of much note. It is said to contain about 4000 inhabitants, and has some trade in wine, oil, and silk.

In addition to Constantinople, at the entrance of the Bosporus, and Gallipoli, at the entrance of the Dardanelles, the principal towns of the Sea of Marmora are, Rodosto, Erekli, and Silivri, on the northern, and Kemeris, Karabouga, Panorma, and Modanieh, on the southern shore. There is also Ismid, at the head of the gulf of that name, and Gumehlek, at the head of the gulf of Modanieh. The chief rivers which enter this sea are the Tchorlu and the Iatidji, in Europe, and the Ustvola (the antient Granicus), the Boklu, or Sataldere (the antient Æsepus), and the Mualitsh (the antient Rhyndacus), in Asia. There are two other rivers on the European side which appear to be of some importance; they are called Karasudere and Taslidere in the large map of European Turkey, Vienna, 1829.

MARMORA, or MARMARA (the antient Proconnesus), is an island in the sea above described. It was early celebrated for its marble quarries, from which Cyzicus and other neighbouring cities were supplied with materials for their edifices. (Strabo, p. 588.) More recently Constantinople has been indebted to these quarries for the embellishment of its mosques, fountains, and other public buildings; but the marble is now principally used for the sepulchral monuments of the Turks and Armenians. It is said to have abounded with deer, from which circumstance the Greek names Proconnesus and its earlier appellation Elaphonnesus are said to be derived.

It has a mountainous range of moderate height, has rather a sterile aspect, and is poorly inhabited. The chief town, which is also called Marmora, is situated on its south-west side, and is built of wood. The island has several villages, and its inhabitants are chiefly Greek Christians.

MARMORA, a town of Asiatic Turkey, in the province of Anatolia, in 28° 43′ N. lat. and 28° 5′ E. long.

MARMOT. [MURIDÆ.]

MARNE, a river in France belonging to the system of the Seine, which it joins just above Paris. [SEINE.]

MARNE, a department of France, bounded on the north by the department of Ardennes, on the east by that of Meuse, on the south-east by that of Haute Marne, on the south by that of Aube, on the south-west by that of Seine et Marne, and on the west and north-west by that of Aisne. Its form is irregular. The greatest length is from north-west to south-east, from the neighbourhood of Fismes on the Vesle to the neighbourhood of St. Dizier (Haute Marne) on the Marne, 74 miles; its greatest breadth, at right angles to the length, is from the village of Petit St. Hilaire on the Suippe to the bank of the Seine, near the junction of the Aube, 62 miles; the area is estimated at 3158 square miles, an area exceeding that of any English county except Yorkshire, and exceeding by above 100 square miles that of the two counties of Essex and Suffolk. The population, in 1831, was 337,076; in 1836, 345,245, showing an increase in five years of 8169, or about 2·5 per cent., and giving 109 inhabitants to a square mile. In amount of population it is very far below the two English counties with which we have compared it, not very much indeed surpassing the single county of Essex, the more populous of the two. In density of population it is far below the average of France, and below every English county except Westmoreland. Châlons sur Marne, the capital, is in 48° 57′ N. lat. and 4° 21′ E. long., 89 miles in a direct line east of Paris, or 102 miles by the road through Meaux, Château-Thierri, and Epernay.

The department consists of extensive plains, or of undulating or hilly tracts, in which the greatest elevations do not exceed 1200 feet above the level of the sea. The general inclination of the surface is toward the west and north-west, in which directions the waters flow. The western side of the department is occupied by the supracretaceous formations of the Paris basin, and the rest of the department by the chalk itself, except just along the eastern border, where the formations that underlie the chalk crop out. The mineral treasures consist in quarries of freestone for building, and of stone from which the best millstones in Europe are made, fine sand in much request for glass-works, and potters' earth. Peat is dug in considerable quantity, especially in the valley of the Vesle; about 1000 tons of potters' earth are sent yearly to Paris, or into the departments of Meurthe and Aisne. The millstones of this department are sent into the east and south of France, and even into Germany. About 1000 tons of rough chalk and 1500 tons of refined chalk are sent yearly to Paris, or into Lorraine, Alsace, and Germany. Near Vitry is a bed of considerable thickness of sulphureous ashes, which however are not wrought, at least to any extent. There are several mineral springs: those of Sermaize on the Saulx, near the eastern boundary of the department, are in the highest repute.

The rivers all belong to the system of the Seine, in the basin of which the whole department is included. An arm of the Seine, called the 'Canal Sauvage,' and the main stream of the river itself, just touch the southern border of the department, which they separate for seven or eight miles from the department of Aube. The Aube has a small part of its course in this department, on the border of which it joins the Seine. The Auges joins the Aube. The Marne enters this department in the south-east, from the department of Haute Marne, and flows through it in a channel the direction of which bends gradually from north-west to west. It receives on its right bank the Orne or Ornain (into which fall the Saulx and the Chée), and several other smaller streams. The Morin, the Petit Morin, and the Melun or Sumerlin rise in this department, but join the Marne beyond the boundary. The rivers in the north and north-east are the Aisne, a principal feeder of the Oise, and the Suippe and the Vesle, feeders of the Aisne. The inland navigation of the department is thus stated in the government returns:—Seine, 3 miles; Aube, 9 miles; Marne, 102 miles: total, 114. None of the other rivers are navigable, and there are no canals.

The number of government roads is eight: they had (in Jan., 1837) an aggregate length of 364 miles, viz. 238 miles in repair, 99 out of repair, and 27 unfinished. The principal road is that from Paris, by Dormans and Epernay, to Châlons, from which place one branch runs by Ste. Ménéhould to Verdun and Metz, and from thence to Mayence or Mentz, and Frankfort in Germany; the other to Vitry, Bar le Duc, Nancy, and Strasbourg. The great road from Paris to Mezières, and so to Namur and Liège in Belgium, passes through Fismes and Reims. Another road from Paris to Châlons branches off from the great road at La Ferté-sous-Jouarre (Seine et Marne), and passes through Montmirail; and a road from Paris to Vitry passes through Coulommiers (Seine et Marne) and Sezanne. Roads from Châlons lead to Reims and Laon (Aisne), and to Arcis-sur-Aube and Troyes (Aube); and a road from Reims leads by Epernay and Sezanne to Nogent-sur-Seine (Aube). The departmental roads were fifteen in number (Jan., 1837), and had an aggregate length of 289 miles, viz. 113 in repair, 50 out of repair, and 126 unfinished. The bye-roads and paths amounted to above five thousand.

The soil of the department varies greatly: nearly two-thirds consist of chalky plains covered with a thin layer of vegetable, often sandy, soil, producing good crops of grain, but scarcely admitting the growth of trees, except Scotch firs, and other trees of similar kind, which have lately been planted to a great extent. In the southern parts of the department these chalky plains are so desolate as to have incurred in former times the reproachful epithet of 'Champagne Pouilleuse.' The kinds of grain chiefly cultivated are wheat, barley, and oats (in all of which the produce is considerably above the average of France), and especially rye and maslin, or mixed corn. Vegetables, fruit of excellent quality (especially the melons of Châlons), and mushrooms, are grown; flax, hemp, and oleaginous plants are pretty generally cultivated, and the osier-beds are extensive. About 250 tons weight of rape, linseed, or other vegetable oils are sent yearly from Châlons to Paris, Lyon, and Reims. Champagne wine is however the staple production of the department: it is distinguished as *vin de rivière* (wine of the river), and *vin de montagne* (wine of the hills), the first growing on or near the banks of the Marne, and being chiefly white—the second at a distance from that river, and being chiefly red. The vineyards occupy an extent of from 45,000 to 50,000 acres: the wines are sparkling or creaming, and still. The proportion of sparkling or creaming wine has much increased of late years. The best growths of the vin de rivière are from the right bank of the Marne in the neighbourhood of Epernay. Of these the wines of Ay, Mareuil, and Hauvilliers have the highest reputation. The best vin de montagne are the white wines of Sillery, and the red wines of Ambouay, Verzy, Verzenay, and other places in the arrondissement of Reims. About three-fourths of the sparkling and creaming wines of Champagne are exported to Italy, Switzerland, Germany, Poland, Russia, and England. The red wines are sent to Paris, and into the departments of Somme, Aisne, Ardennes, and Nord. The woodlands are extensive: the chief trees are the oak, the birch, and the various species of pine and fir. Charcoal is made near Sainte Ménéhould, and sent to Paris.

The meadow and pasture lands occupy 95,000 to 100,000 acres. A great number of horses are bred, but the quantity of horned cattle is below the average of France. There are numerous flocks of sheep of various breeds, merinos, English and native; and the Tibet goat has been introduced of late years. The quantity of wool grown is below the average of the departments of France. Bees are numerous; and the streams and ponds of the department abound with fish.

The department is divided into five arrondissements, as follows:—

Name.	Situation.	Area in Sq. Miles.	Population in 1831.	Population in 1836.	Communes.
Châlons	Central	627	48,099	48,535	109
Epernay	S.W.	818	83,278	86,452	185
Reims	N.W.	685	120,680	123,919	181
Ste. Ménéhould	N.E.	428	34,952	35,812	82
Vitry	S.E.	600	50,067	50,527	133
		3158	337,076	345,245	690

There are thirty-two cantons or districts, each under a justice of the peace.

In the arrondissement of Châlons are Châlons-sur-Marne (pop. in 1831, 12,413; in 1836, 12,952), [Chalons], on the Marne; and Suippe or Suippes (pop. 2324), on the Suippe. The long village of Courtisols, or Courtisou, on the road from Châlons to Ste. Ménéhould, consists in fact of three villages, forming two parallel streets or roads, and extending in all about five or six miles. They have about 2000 inhabitants, distinguished from the surrounding population by their peculiar dialect, customs, and agricultural skill, circumstances which have been the subject of much antiquarian conjecture. Near the village are the traces of a Roman road and of the camp of Attila.

In the arrondissement of Epernay are Epernay (pop. in 1831, 5318; in 1836, 5457), [Epernay]; Damerie and Dormans, on the Marne; Orbais, on the Sumerlin; Montmirail (pop. about 2000), on the Petit Morin; Sézanne and Courgivaux, near the Morin; Anglure, on the Aube; Fère Champenoise (pop. 2049), on a branch of the Auges; Barbonne, Vertus, Avize, and St. Martin d'Ablois. Dormans is in a district producing excellent wine. The inhabitants carry on a considerable trade: oats, timber, and charcoal are sent down the Marne to Paris and Meaux, and gypsum is brought up that river from Château-Thierri. Spinning and weaving are carried on, and tiles and pottery of good quality are made near Dormans, which is also the mart for linens made in the neighbourhood. Montmirail was the scene of one of Bonaparte's victories over the allies in the hard-fought campaign of 1814. Millstones are quarried in the neighbourhood. Sézanne (pop. above 4000 in 1827) was once a place of greater consequence. It was taken by the English, destroyed by the Protestants under Charles IX., and consumed by fire in 1632. It is now the seat of considerable trade in agricultural produce. At St. Martin d'Ablois millstones of inferior quality are produced, and paper and cardboard or pasteboard manufactured. Vertus and Avize are in the midst of vineyards, which produce excellent wine. Fère Champenoise suffered much in the campaign of 1814.

In the arrondissement of Reims are Reims (pop. in 1831, 35,971; in 1836, 38,359), [Reims], and Fismes (pop. 1962 town, 2110 whole commune), on the Vesle; Cormicy, in the country north of that river; and Mareuil, Ay (pop. about 2500), Avenay, and Châtillon-sur-Marne, on or near the Marne. Fismes was the birth-place of Velly, one of the best of the French historians: the inhabitants manufacture coarse woollens. Ay and Mareuil are surrounded by vineyards, producing some of the best wine in the department.

In the arrondissement of Ste. Ménéhould are Ste. Ménénould (pop. in 1836, 3962 for the commune), and Vienne le Château, on or near the Aisne. The former is a regularly built town, with houses of brick and stone, and a town-hall of elegant architecture. The manufactures of the town, pottery, glass, and leather, are inconsiderable; but a good deal of fruit is grown in the country round. Ste. Ménéhould was the first place besieged by Louis XIV., who entered it through the breach. Louis XVI. was recognised here in attempting to escape from France.

In the arrondissement of Vitry are Vitry (pop. in 1831, 6976; in 1836, 6822), on the Marne; and Heiltz-le-Maurup and Sermaize (pop. 1790), on or near the Orne, or Ornain. Vitry arose from the ruins of another town of the same name in the immediate neighbourhood, now a village distinguished as Vitry-le-Brulé. This antient Vitry was taken by Louis VII. le Jeune, from Thibaud, count of Champagne; and as he scrupled to stain the church with the blood of thirteen hundred people who had taken refuge in it, he ordered the edifice to be set on fire, and the unhappy fugitives to be burnt alive. From this detestable act the place acquired its surname 'le brulé,' or 'the burnt.' The ill-fated town was subsequently burnt by Jean of Luxembourg, and entirely ruined by the army of the emperor Charles V. After this last catastrophe Francis I. determined to rebuild it, but not on the same site. The new town, distinguished by the name of Vitry-le-François (not le Francais), or Vitry-sur-Marne, rose on the bank of the Marne. It has broad and straight streets; and the houses, though built of wood, are respectable. It was intended to fortify the town, but it has never had any better defence than an earthen rampart and a ditch. There are a considerable number of manufactories of hats, cotton yarn, and cotton hose. There are also some oil-presses. There are extensive nursery-grounds round the town; and in the arrondissement strong hemp is grown, which is sent to Paris and the department of Seine Inférieure by the Aube and Marne. Sermaize has mineral springs, which are in tolerable repute.

The population, when not otherwise specified, is that of the commune, and is chiefly taken from the returns of 1831.

The manufacturing industry of the department is considerable. Wool-combing or carding, spinning, weaving, dyeing, and the other processes connected with the manufacture of woollen cloths, kerseymeres, flannels, blankets, merinos, shawls, and other woollen goods, and some cotton goods, are carried on to a considerable extent in the districts of which Reims is the centre. Many of these processes are carried on by the workmen and their families on their own account. It is not many years since the factory system was introduced at Reims; before that, the same room served for the dwelling-place and workshop of the manufacturer. Some linens and silks are made; also leather, earthenware, wax candles, soap, cutlery, hats, and paper. The exports, both of agricultural produce, especially corn, wine, and oil, and of manufactured goods, are considerable. They are sent down the Marne from Vitry, Châlons, Epernay, and Dormans.

The department of Marne is divided between the diocese of Châlons, which comprehends the arrondissements of Châlons, Epernay, Vitry, and Ste. Ménéhould; and the archdiocese of Reims, which comprehends the arrondissement of Reims, with the adjacent department of Ardennes. The bishop of Châlons is a suffragan of the archbishop of Reims. The department is included in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Paris. It is included in the second military division, of which the head-quarters are at Châlons. It returns six members to the Chamber of Deputies.

The state of education in this department is considerably above the average of France; it ranks as the tenth department in this respect. The number of those enrolled in the military census of 1828-9 who could read and write was sixty-three in every hundred, the average of France being thirty-nine.

This department was comprehended at the time of Cæsar's invasion of Gaul in the territories of the Suessiones, or Suessones (Σουεσσίονες and Σουεσσῶνες, Strabo), the Remi (‘Ρημοὶ, Ptol. and Strabo), and the Catalauni, confederated Belgic tribes; and of the Tricasses, a Celtic people. In the Roman division of the country the Belgic tribes were comprehended in the province of Belgica Secunda; the Tricasses in that of Lugdunensis Quarta or Senonia. Several Gallic or Roman towns were included in its limits; as Durocortorum, capital of the Remi, afterwards called Remi, now Reims; Basilia, perhaps Baconne, between the Vesle and the Suippe, in the territory of the same people; Fines, now Fismes, on the frontier between the Remi and the Suessiones; Duro Catalaunum, capital of the Catalauni, afterwards called Catalauni, and now Châlons; Fanum Minervæ, near Le Cheppe, on a feeder of the Vesle, and Ariola, now Vroil, near the Ornain, in the territory of the same people; and Bibe, perhaps St. Martin d'Ablois, in the territory either of the Catalauni or the Suessiones. In the downfal of the Roman empire this department was the scene of contest between Ætius, the Roman general, with his allies, the Franks, Burgundians, and Visigoths; and Attila, king of the Huns, with his allies, the Alans, the Gepidæ, and the Ostrogoths. The defeat of Attila at Châlons led to the evacuation of Gaul by him. Subsequently the department became subject to the Franks of Austrasia, and in the feudal ages formed part of the county of Champagne, which came, in 1335, into the hands of Philippe VI. de Valois, and in A.D. 1361 was formally united to the French crown by Jéan II. In the campaign of 1792 this part of France was the scene of contest between the Austrian and Prussian forces under the duke of Brunswick, and the French under Dumourier and Kellerman; and in the campaign of 1814, between the Russian and Prussian forces under Blucher, and the French under Napoleon and his generals.

MARNE, HAUTE, a department in the north-eastern part of France. It is bounded on the north-east by the department of Meuse, on the east by that of Vosges, on the south-east by that of Haute Saône, on the south-west by that of Côte d'Or, on the west by that of Aube, and on the north-west by that of Marne. Its form approximates to an oval, having its greatest length from north-north-west, near St. Dizier, to south-south-east in the neighbourhood of Fay-le-Billot, 80 miles; and its greatest breadth, at right angles to the length, from the neighbourhood of La Ferté-sur-Aube to that of Bourmont, on the Meuse, 48 miles. Its area is estimated at 2420 square miles, which is rather less than that of the English county of Devon, or rather more than the conjoint area of the two counties of Wilts and Dorset. The population, in 1831, was 249,827; in 1836 it was 255,969, showing an increase in five years of 6142, or about 2·5 per cent., and giving about 106 inhabitants to a square mile. In amount of population and in density of population it is to the average of the French departments in the proportion of 2 to 3, and falls very far below the English counties with which we have compared it. Chaumont, the capital, is in 48° 7′ N. lat. and 5° 9′ E. long., 135 miles in a direct line east-south-east of Paris, or 148 miles by the road through Provins, Troyes, and Bar-sur-Aube.

The department is hilly, and even mountainous in the southern and eastern parts. The heights of Langres and the Faucilles mountains, which constitute a continuous range, and form part of the chain that unites the Cévennes with the Vosges, cross the department in a north-eastern direction near the south-eastern boundary. Lateral branches from this main range run to the north-west, separating the valleys watered by small streams belonging to the system of the Seine; and near the eastern extremity of the department a more important lateral branch runs in a northern direction, separating the basin of the Meuse from that of the Seine. The summits of the main ridge are not very lofty, scarcely rising in any instance to more than 1600 feet. The strata which intervene between the chalk and the saliferous sandstone occupy the whole of the department. The mineral treasures are, iron in abundance in the centre and northern parts; freestone, which bears a fine polish, whetstones, gypsum, brick earth, fullers' earth, and marl. There are many turf-pits, and several mineral springs, of which those of Bourbonne-les-Bains are in the highest repute. The heights of Langres with the Faucilles, and the principal lateral branch from them, divide the department between the three great slopes, the Western or oceanic, the Rhenish, and the Mediterranean. [FRANCE.] The central, northern, and western parts belong to the oceanic slope, and are included in the basin of the Seine. Most of the streams which water this part rise on the north-western slope of the heights of Langres, and have a north-western course. The source of the Ource, one of the earlier feeders of the Seine, is just within the western boundary; next to it are those of the Aube, and its feeder the Aujon; and then those of the Marne with its feeders, the Sure, the Treyre, and the Rognon. The Marne, the most important of these streams, flows through the department in nearly its whole length, receiving by the way the above-mentioned tributaries, and becoming navigable just before it quits the department. The Blaise, another tributary of the Marne, rises at the foot of the heights of Langres, and waters the western side of the department, but does not join the Marne within the boundary. The Voire, a tributary of the Aube, waters the north-western parts. The eastern side of the department belongs to the Rhenish slope, and is comprehended in the basin of the Meuse, which has its source and a small part of its course within the boundary. The south-eastern part belongs to the Mediterranean slope, and is comprehended in the basin of the Rhône. It is watered by the Vingeane, the Saulon, and the Amance, feeders of the Saône, which rise on the south-eastern slope of the heights of Langres. There are few lakes or pools: the only marshes are in some parts of the valleys of the Meuse and the Amance. The only inland navigation is that of the Marne, about seven or eight miles long.

There are only six Routes Royales, or government roads, having an aggregate length of 253 miles; viz. 174 in repair, 78 miles out of repair, and 1 mile unfinished. The principal road is that from Paris to Bâle, which enters the department on the west and passes south-east through Chaumont, Langres, and Fay-le-Billot. The road from Paris to Bar-le-Duc and Strasbourg just crosses the northern corner of the department through St. Dizier, from whence a road follows the valley of the Marne through Joinville and Vignory to Chaumont. A road from Langres leads to Dijon (Côte d'Or), sending off a branch road by the way to Gray (Haute Saône) and Besançon (Doubs): another road from Langres leads along the valley of the Meuse to Neufchâteau (Vosges); and a road from Troyes (Aube) to Toul and Nancy (Meurthe) crosses the department through Doulevant and Joinville. There are several departmental roads, of which about 136 miles are in repair. There are a great number of bye-roads and paths, with an aggregate length of above 4000 miles.

The soil of the department varies much, but is on the whole fertile: the vegetable soil rests chiefly on a calcareous subsoil. There are fertile plains, beautiful valleys, and well wooded heights; with here and there naked and barren rocks. Agriculture has undergone considerable improvement; the marshes and other tracts previously uncultivated have been for the most part turned to good account. More than half the soil of the department is under the plough. The quantity of wheat and of buckwheat grown, though below the average of the departments of France if quantity alone be considered, is considerably above the average if taken in relation to the population; the quantity of rye and maslin, and of potatoes, is far below the average, however regarded; that of barley and of oats nearly twice the average. Pulse, rape, and mustard are grown; together with a considerable quantity of gentian and other medical herbs. Walnut-trees and cherry-trees are numerous. The cultivation of the vine is an object of considerable attention: the vineyards cover 32,000 or 33,000 acres, and are remarkably productive. The wines of Aubigny and Montsaugeon, on the south-eastern slope of the heights of Langres, are red wines of the first class; those of Vaux, Rivière-les-Fosses, and Prautboy are among the best of the second class. The grass lands constitute about one-tenth of the department; more than half of them are meadows, the rest are heaths or commons, or other open pastures. The number of horses reared is very great. They are of small size and middling quality. The number of horned cattle is about equal to that in the average of the departments; but relatively to the population is above the average. Cows predominate and are considered excellent milkers. The sheep are much esteemed *for their flesh*; but the quantity of wool grown is not considerable. Goats are numerous; but pigs not so. Bees are very generally kept, and in some places a great number of turkeys are reared. The rivers and pools yield fish and crayfish; small game is abundant; and the forests and mountains are the haunts of the wild boar, the wolf, the fox, the roebuck, and the stag.

The woodlands are extensive, and their produce forms an important article of export. The chief timber is oak and beech. It was estimated twelve years ago that above 30,000 tons of firewood, and 15,000 tons of timber, both of oak, were yearly sent down the Marne to Paris; 10,000 tons of ship timber and 1,200,000 deals, of the weight of 12,000 tons, with 2500 tons of fir poles with the bark on, were also yearly sent down the Marne from St. Dizier, chiefly to Paris. The exportation of timber and faggots from the department has probably increased since that period, with the growth of the population of Paris.

The department is divided into three arrondissements, as follows:—

Name.	Situation.	Area in sq. miles.	Population in 1831.	1836.	Communes.
Chaumont	Central	967	84,965	87,271	195
Langres	S.E.	838	98,422	100,528	210
Vassy	N.W.	615	66,440	68,170	145
		2420	249,827	255,969	550

There are twenty-eight cantons or districts, each under a justice of the peace.

In the arrondissement of Chaumont are Chaumont, distinguished as Chaumont en Bassigni (pop. in 1831, 6104 town, 6318 whole commune; in 1836, 6318 for the commune) [CHAUMONT], and Vignory, on or near the Marne; La Ferté-sur-Aube on the Aube; Arc-en-Barrois and Château-Vilain on the Aujon; Nogent-le-Roi on the Treyre; Andelot on the Rognon; Bourmont on the Meuse; and Reynel and Saint Blain between the Rognon and the Meuse. There are iron-works at La Ferté. Château Vilain (with a population amounting probably to nearly 2000) also has some iron-works; and the inhabitants manufacture black calf-skin. Nogent-le-Roi (pop. 2314 town, 2401 whole commune) has a considerable manufacture of cutlery. Bourmont (with a population scarcely exceeding 1000) is the centre of a district in which the same manufacture is carried on to a considerable extent. The town is delightfully situated, and commands an extensive view of the valley of the Meuse: it has a public library.

In the arrondissement of Langres are Langres (pop. in 1831, 5960 town, 7460 whole commune; in 1836, 7677 whole commune [LANGRES], near the source of the Marne; Fayle-Billot (pop. 2321 town, 2411 whole commune), near the source of the Saulon; and Bourbonne-les-Bains [BOURBONNE-LES-BAINS] on a feeder of the Saône. Fay-le-Billot has bleaching-grounds; the inhabitants carry on trade in basket-work and leather.

In the arrondissement of Vassy are Vassy (pop. in 1831, 2333 town, 2583 whole commune; in 1836, 2694 commune). Doulevant and Eclaron on the Blaise; Sonnevoire and Montierender on the Voire; and St. Urbain, Joinville (pop. 3015 town, 3035 whole commune), and St. Dizier (pop. 5957 town, 6197 whole commune), on or near the Marne. Vassy, or Wassy, is known in history for the collision which took place between the retinue of the duke of Guise and a Huguenot congregation, which led to the massacre of many of the latter, and was the immediate cause of the religious wars of the sixteenth century in France. The manufactures of the town are yarn, druggets, woollen cloths, nails, and leather. The neighbourhood abounds with iron-works. Sonnevoire, or Sommevoire, has a small woollen manufacture. Joinville has its antient castle, in which were born the Sieur de Joinville, companion and historian of St. Louis in his crusade, and the cardinal of Lorraine, brother of the duke of Guise. Woollen and cotton yarn, and worsted stockings, are made here. At St. Dizier the navigation of the Marne commences. The timber and iron of the department, and the iron of the adjacent department of the Meuse, are deposited in stores here, previous to their being put in boats for Paris, or forwarded by land carriage, one part to Paris, another to Flanders. Boat-building is actively carried on here; a hundred boats, each of 100 tons burden on the average, are yearly built. Nails and tires for wheels are also manufactured. The town is pleasantly situated, well built, and surrounded with public walks. There is a handsome townhall lately built. Two engagements were fought near this town in 1814, between the French and the allies.

The manufactures of the department are considerable, though checked by the insufficiency of the means of transport. That of iron is the chief. There were in 1834, 71 iron-works of different kinds, with 58 furnaces for producing pig-iron and 124 forges for wrought-iron. Charcoal was the universal fuel. A considerable quantity of fine cutlery is made at Langres, Chaumont, Bourmont, and Nogent-le-Roi; nails, files of every description, iron pipe, and other hardwares; wax candles, paper, leather, gloves, glass, porcelain, stockings, knit and woven, and some woollen cloths are also manufactured. The exports are manufactured goods as above, wax, corn, wine, and timber.

The department constitutes the diocese of Langres, the bishop of which is a suffragan of the archbishop of Lyon et Vienne: it is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Dijon; and in the eighteenth military division, the head-quarters of which are at Dijon. It returns four members to the Chamber of Deputies.

In respect of education this department is one of the most advanced. It is exceeded only by the three departments of Meuse, Doubs, and Jura. Of every hundred young men enrolled in the military census of 1828-29, seventy-two were able to read and write; while on the average of the whole of France the number was only about thirty-nine.

This department originally constituted part of the territories of the Lingones, a Celtic people; and of the Catalauni and the Leuci, Belgic nations. In the Roman division of Gaul, the Lingones were included in the province of Lugdunensis Prima; the Leuci in that of Belgica Prima; and the Catalauni in that of Belgica Secunda. The limits of the present department included the towns of Andematunum, the capital of the Lingones, afterward called Lingones, now Langres; and of Aquæ Borvonis, now Bourbonne-les-Bains, also in the territory of the Lingones. On the downfal of the Roman empire this district came into the hands of the Burgundians and of the Franks; and part of it was comprehended in the county, afterwards duchy, of Langres in Champagne, united to the crown A.D. 1179. Another part formed a detached portion of Le Barrois.

MARNES IRISE'ES. The French geologists intend by this term to designate the upper party-coloured 'marls' or clays of the new red formation. In Germany these are the Keuper marls, and in England the gypseous and saliferous marls of Cheshire, Worcestershire, Nottinghamshire, &c. (See Sedgwick on 'Magnesian Limestone,' in *Geol. Trans.*; Murchison's *Silurian System*, &c.)

MAROCCO, called by the natives Mogh'rib-el-acsâ ('the farthest west'), or briefly Mogh'rib, whence the inhabitants are called Moghribins, is an empire in Northern Africa, which extends from south to north between 27° and 36° N. lat., the most northern districts forming the southern coast of the Straits of Gibraltar, and from east to west between 1° 20′ and 11° 30′ W. long. On the north it borders on the Mediterranean, on the north-west and west on the Atlantic Ocean, on the south on the Sahara, and on the east on Algiers. Its surface is estimated by Graberg at 274,000 square miles, or about 50,000 square miles more than that of France.

Surface and Soil; Coast.—The surface of this extensive country is extremely diversified by mountains, hills, plains, and valleys. The Atlas traverses it in its greatest length, running, at some distance from its southern and eastern boundary, from Cape Nun on the Atlantic Ocean, to Cape dell' Acqua, west of the mouth of the river Mulwia, on the Mediterranean. The general direction of the Atlas is from south-west to north-east; south of 32° it is called the Greater Atlas, and north of it the Lesser Atlas. [ATLAS.] The Greater Atlas, towards its southern extremity, consists of two ranges, both beginning near the Atlantic; the southern, commencing at Cape Nun (south of 29°), is called Mount Adrar, and the northern, commencing at Cape Gher (south of 31°), or Ras Aferni, bears the name of Mount Bebauan. The two ranges unite about 31° N. lat., and about 100 miles from the shore. Between these two ranges is the plain of Tarudant, or Sus-el-acsâ. Both the ranges, as well as the remainder of the Greater Atlas, are covered with snow for several months in the year, but probably none of the summits attain the limits of perpetual congelation. The Greater Atlas is not very wide, being generally traversed in two or three days. Two mountain-passes lead over Mount Bebauan, one called Bebauan, not far from Cape Gher, and another called Belavin, about 60 miles farther east, which connects the town of Tarudant with Fruga, in the plains of Marocco. A third pass is stated by Caillié to lead from the town of Tatta in Drah, or Daraa, to the town of Marocco; but it has never been traversed by Europeans. The interior of the range consists of ridges and valleys, and sometimes also mountain-plains: it is well cultivated in some parts, and in others it serves as pasture-ground: towards the southern declivity it is nearly a bare rock.

Between 31° and 32° N. lat., and near 5° W. long., where the range turns more to the north, and takes the name of the Lesser Atlas, the width of the range increases considerably, and as most of the large rivers rise in this part of the Atlas, it was thought that the highest summits also occurred here: some were said to rise to 13,000 feet and upwards, but Caillié, who seems to have traversed this tract in an oblique direction, on his return from Timbuctoo, does not mention any elevated summits, nor does he speak of having seen snow on the mountains. The Lesser Atlas, though, according to appearances, much less elevated than the Greater Atlas, probably occupies a greater width, sending lateral branches to the east and west, between which there are fertile valleys. Near 34° N. lat. and 4° W. long. the Lesser Atlas divides into two branches, of which the eastern runs north-east and terminates at Cape dell'Acqua; the other, called Er-Riff, turns first north-west, then west, and again north-west, until it terminates in the high and mountainous coast which forms the southern shores of the Straits of Gibraltar, between Punta di Africa, near Ceuta, on the east, and Cape Spartel on the west. The country which is included between these two lateral ranges of the Lesser Atlas and the Mediterranean Sea is the most extensive mountain-region in Marocco. Though the mountains do not rise to a great elevation, the whole tract is covered with masses of bare rock, with narrow valleys between them. The whole coast-line along the Mediterranean, which from Twunt, or Tawunt, to Cape Spartel is about 320 miles, is high and rocky. Level tracts of inconsiderable extent occur at the mouths of the small rivers only. Mount Abyla, or the Monkeys' Hill, opposite the rock of Gibraltar, rises to a considerable height.

The elevated and rocky coast continues along the Atlantic nearly as far south as the mouth of the river El Kos, or Luccos. The country adjacent to the coast is rather hilly than mountainous, though a few rocky masses rise to 2500 feet; the soil is mostly gravelly, and sustains only a scanty vegetation, with a few trees. The river (wadi) El Kos traverses an immense plain called M'shiara-er-Rumla, which extends eastward to the ranges of the Lesser Atlas, and southward to the banks of the river Seboo. Its surface is partly level, and partly traversed by low ranges of hills. Its slope towards the Atlantic appears to be gradual, as the rivers make numerous bends in the plain and have a gentle course. On its western border the sea has formed a range of sand-hills, by which several small rivers are prevented from reaching the ocean, and form along the shores two lakes, the smaller of which, Muley Buselham, is 5 miles long, and the larger, Murja Ras el Dowla ('the lake with the winding head'), 20 miles long by one and a half broad. The range of sand-hills which separates these lakes from the sea is about 250 feet high. The harbours along this low coast are nearly filled up with sand, and can only be entered by small vessels. The plain of M'shiara-er-Rumla, though the soil is light, is very productive in corn, and contains excellent pasture-grounds. It is also connected on the east with the fertile valley that extends east of the town of Fez, between the offsets of the Lesser Atlas.

The plains continue south of the Seboo river to the banks of the Oom-er-begh, or Morbeya, and still farther south; but they gradually change their character, and their fertility greatly diminishes. The country also rises from the sea-shore, which in many places is rocky and inaccessible, and extends in wide plains ascending like terraces one above the other, the eastern being always some hundred feet higher than that immediately west of it, until at the base of the Lesser Atlas they probably attain an elevation of 4000 feet. The inferior fertility of these plains seems to depend more on the climate than the soil, which chiefly consists of a light loam. Water is found only at the depth of from 100 to 200 feet. The rivers run in channels several feet below the surface of the plains. Only isolated spots are cultivated, and there are no trees except stunted palms.

A range of hills, rising between 500 and 1200 feet above the plains, divides them from the southern plain, which extends along the base of the Greater Atlas. Where the town of Marocco is situated, from which it obtains the name of the Plain of Marocco, it is about 25 miles wide, but it grows still wider as it advances westward. This plain, which is drained by the river Tensift, is about 1500 feet high near the town; but it grows lower towards the sea, and terminates, between Cape Cantin and Mogadore, in a low shore, generally sandy, and sometimes rocky. In fertility it is much superior to the central plains.

The plain of Tarudant, which is the most southern, lies between the ranges of the Bebauan and Adrar mountains. It appears to be traversed nearly in the middle by a range of hills which divide it into two wide valleys. The northern, which alone has been visited by Europeans, is level, and of great fertility, as the extensive woods and plantations of olive-trees show, but the greater part of it is uncultivated.

The countries east of Mount Adrar and south of the Greater Atlas are known under the names of Draha or Daraa, Tafilet, and Segelmesa, and are parts of the Bilud-ul-Gerid, or the 'country of the palms.' They have not been visited by any European except Caillié, who represents them as situated within the range of the Atlas, and as consisting of valleys and small plains, enclosed by low and sterile hills. The valleys and plains are also frequently rocky, and exhibit a scanty vegetation; but some parts are cultivated or covered with extensive groves of date-trees.

That portion of the empire of Marocco which lies on the east of the Lesser Atlas, and comprehends the basin of the river Mulwia, has never been visited by Europeans. According to Graberg, the southern part of it, near the sources of the river, contains some fertile plains or valleys, which are good pasture-grounds; but the northern districts are said to be occupied by two sterile regions, the deserts of Aduhra and Angad.

Rivers.—The Mulwia, or Muluya, which rises at or near the southern extremity of the Lesser Atlas, and runs northward into the Mediterranean Sea, has a course of about 400 miles; but as it traverses a country which has not been visited by Europeans, its peculiarities are not known. It is the only considerable river in Marocco which falls into the Mediterranean. Seven rivers fall into the Atlantic Ocean. The most northern, the El Kos, or Luccos, rises in the range of Er-Riff, and in its course of nearly 100 miles is used to fertilise the adjacent country by irrigation. Farther south is the Seboo river, which rises in numerous branches on the western declivity of the Lesser Atlas, and is joined by several affluents which descend from the southern declivity of the range of Er-Riff. After a course of about 230 miles it enters the Atlantic, near the town of Mehedia. Though a considerable river, with rather a large volume of water when compared with other rivers of this country, its mouth does not afford a harbour; a bar of sand, a quarter of a mile from its outlet, extends almost across, and is nearly dry at low-water of spring-tides. Inside the bar there are from three to four fathoms water, and the tide rises seven or eight feet. The waters are used for irrigating the adjacent country.

Bu Regreb is an inconsiderable river running hardly more than 100 miles; but its waters are used for irrigation, and its mouth forms the harbour of the towns of Salé or Sla, and Rabatt or Arbat. A bar, about one-eighth of a mile from the entrance, runs almost across in a west-south-western direction, with three or four feet water on it at low-water, leaving a channel at each end. The north-eastern channel is that which is used. The tide rises from nine to ten feet; inside, the harbour is sheltered, and has sufficient water for a frigate.

The Oom-er-begh, or Morbeya, the largest of the rivers that fall into the Atlantic, likewise rises in several branches in the western declivity of the Lesser Atlas, and probably runs more than 300 miles. In the upper part of its course it fertilises several valleys; but in its course through the plains it flows between high banks of sandy clay, and cannot be used for the purpose of irrigation. At its mouth is the small town of Azamor, which has no commerce: a bar of sand which lies across the mouth of the river is almost dry at low-water, and boats alone can enter it.

The Tensift, which waters the plain of Marocco, rises in a subordinate range of high hills, about 40 miles east of the town, and runs nearly 150 miles with a winding course. It is very probable that the mouth of this river also is closed by a bar.

Through the plain of Tarudant, or Sus-el-acsâ, flows the river Sus, which rises in Mount Bebauan, north-east of Tarudant, and flows westward to the sea, which it enters at some distance south of the harbour of S. Cruz, or Agadir. It may be considered as the southern boundary of the empire, the Arabian chiefs who govern the country south of it being only nominally subject to the emperor of Marocco.

The most southern river which falls into the Atlantic is the Draha, or Daraâ. Until lately it was supposed that this river was lost in the moving sands of the Sahara; but according to the statement of Wilkinson (*London Geographical Journal*, vii.), it reaches the sea 32 miles south-west of Cape Nun, where it is called on our maps Akassa. If this statement is true, the Draha, which rises on the southern declivity of the Greater Atlas, south-east of the town of Marocco, must have a course of more than 500 miles; but nearly the whole of it is unknown. It is however said that it flows through the productive districts of Draha and El Harib; and that two considerable towns, Tatta and Akka, stand on its banks.

From the southern declivity of Mount Atlas descend three other rivers, the Fileli, Ziz, and Ghir. We are not further acquainted with them than that they run southward, and are lost in the sands of the Sahara.

Climate.—The climate is not so hot as might be expected from the position of this country. A great part of the empire is subject to the alternation of the sea and land breezes, and those districts which lie beyond their reach are cooled to some extent by the winds which blow from the mountains. Frost and snow only occur on the mountains. Along the sea the thermometer never falls below 39° or 40°; and even in the hottest places, at S. Cruz and Tarudant, it generally does not rise above 84°, and rarely to 90°. The seasons are divided into the dry and wet. The wet season happens in our winter. Abundant rains fall towards the end of October, and last for about three weeks: these rains are followed by some dry weather, but they set in again about the middle of November, and showers are frequent till the month of March, when the dry season begins, which is rarely interrupted by showers. The rains are less general and frequent south of the river Seboo, and also less certain, which is probably the cause of the inferior fertility of these districts, as they are subject to frequent drought. Little is known of the climate south of Mount Bebauan, except that the heat is very great, and that the southern declivity of Mount Atlas has no rain, being exposed to the dry and hot winds that blow from the Sahara and disperse the few vapours which occasionally rise.

Productions.—Besides wheat and barley, which are extensively raised in most of the districts of the plains, rice, Indian corn, and holcus sorghum, or dhurra, are cultivated, especially the last-mentioned species of grain, which is very prolific, and constitutes the principal food of the lower classes. Other objects of cultivation are cotton, tobacco, sesamum, hemp, saffron, and different kinds of beans and peas. The plantations of olive-trees and almond-trees are very extensive. The fruit-trees of southern Europe are also common, especially the fig and the pomegranate. The date-tree is only cultivated on the southern declivity of Mount Atlas, and the best come from Draha and Tafilet.

In the districts south of the Oom-er-begh there are large plantations of henna (Lawsonia inermis).

The southern declivities of Mount Atlas are bare, but on the northern there are extensive forests, consisting of the olive, carob (Ceratonia siliqua), walnut, acacia, cedar, stunted palms, and rose-trees, and also cork-trees. The timber is fine, but not large.

Domestic animals of every kind are numerous. The horses are distinguished by their beauty, those of the native breed as well as those of Arab origin; the sheep, which are considered as indigenous, and are supposed to have spread from the declivities of the Atlas over all the world, produce a wool not inferior to any for softness, fineness, and whiteness; sheep and goats are more numerous than any other domestic animals. Goat-skins constitute one of the most important articles of export. Cows, asses, mules, and camels are also reared in considerable numbers. In the large uncultivated tracts wild animals abound, as lions, panthers, hyænas, wolves, and several species of antelopes and deer, as well as monkeys and wild boars. Wild boars are abundant in all parts, but most of the other ferocious animals are limited to the southern regions. Ostriches are found in the desert bordering on the southern and eastern districts, and their feathers constitute an article of export. Cranes and storks abound. The locusts sometimes lay waste the provinces bordering on the deserts. Bees are common, and wax is exported.

The mineral wealth of Marocco is very imperfectly known. Metals seem to occur in the greatest abundance on the southern declivity of Mount Atlas, especially in those parts which surround the plain of Sus-el-acsà, where gold and silver occur, but not in abundance; the latter occurs in the river Draha or Akassa (Assaca). Copper, which in Strabo's (p. 830, Casaub.) time was worked in these countries, is still abundant; the richest mine which is worked is near Teseleght, in Sus-al-acsà, but there are others in the neighbourhood of Tarudant. Lead is found in Mount Adrar and in the Lesser Atlas. Iron is worked in several places; and there is also antimony. Rock-salt is also said to be abundant, but is not worked. The several small lakes which lie along the sea-shore are natural salt-pans, which produce this useful article in abundance. Fullers'-earth, which is considered not inferior to the English, occurs in several places.

Inhabitants.—The population of this empire is differently estimated. Jackson thought that it amounted to fourteen millions, which number is reduced by Captain Washington to five or six millions. Graberg assigns to it 8,500,000 inhabitants, and states that the population is composed of the following nations, in this proportion:—

Amazirghis, namely,	
Berbers	2,300,000
Shelluhs	1,450,000
Arabs, namely,	
Moors, Ludayas, and other mixed tribes	3,550,000
Beduins, and others of pure blood	740,000
Jews	339,500
Negroes, slaves and freemen from Soudan, Foulahs, Mandingoes, &c.	120,000
Europeans, Christians	300
Renegadoes	200
	8,500,000

The Amazirghis, or Mazirghis [BERBERS], are the most antient inhabitants of Northern Africa, and one of the most widely-spread nations of that continent, as is proved by the language, the different dialects of which are spoken by the tribes which extend from the banks of the Nile to the Atlantic, as the Tibboos and Tuaricks of the desert, the Fillelis in Segelmesa and Tafilet, and the different Shelluh tribes on the Atlas and Mount Bebauan. Most of the tribes occupying the southern districts of Tunis and Algiers also speak the same language. The Amazirghis in Marocco are divided into Berbers and Shelluhs. The Berbers occupy exclusively the mountain-region which extends along the Mediterranean, where they are called Riffins, from inhabiting the mountains of Er-Riff, and are divided into several tribes. Other tribes are spread over the mountains of the Lesser Atlas and the basin of the river Mulwia as far south as the source of that river. The Shelluhs occupy the Greater Atlas and its great branches Mount Bebauan and Mount Adrar. It is now the general opinion that their languages are only dialects of one language; but the tribes differ somewhat in their physical character and in their customs. The Berbers are nearly white, of middle size, well formed, and rather robust and athletic; their hair is frequently fair, resembling that of the northern people of Europe rather than any nation of Africa, and they have very little hair on their chins. They live generally under tents, or in caves situated on steep and nearly inaccessible mountains. They pay little regard to the orders of the sultan, and obey only their hereditary princes or chosen magistrates. In the plains they build houses of stone or wood, but always enclose them with walls. Their chief occupation is that of huntsmen and herdsmen, yet they cultivate some patches of ground and rear bees.

The Shelluhs are chiefly agriculturists, and exercise several trades; their houses are always built of stone, and covered with tiles or slates. They are less robust than the Berbers; their colour is sallow, and they resemble in some measure the Portuguese, from whom some authors think they are descended. They are much more advanced in civilization than the Berbers.

The Moors are the most numerous of the nations that inhabit Marocco. Their language, which is called Moghreb, or Occidental, is a dialect of the Arabic; but it is intermixed with many words from the language of the Amazirghis, and still more with Spanish words. The latter circumstance may be ascribed to the emigration of their ancestors from Spain after the conquest of Granada. These emigrants settled in the towns and plains along the Atlantic.

The Moors of Marocco are of middling size, and rather slender when young, but grow stout as they advance in years. Their colour varies between yellow and black, which is principally to be ascribed to their frequently marrying black women from Sudan. They are the only nation of Marocco with which the Europeans have an immediate intercourse, and they are the principal inhabitants of the towns; they fill the high offices of government, and form the military class. [MOORS.]

The Arabs are the descendants of those who emigrated at the time when the Mohammedan religion was diffused from the Hejaz, Yemen, and Hadramaut. A few families live in the towns, but the Beduins are dispersed over the plains, where they adhere to their wandering life, living in tents, and following the pastoral occupation. They are a hardy race, slightly made, and under the middle size. Their language is the Koreish, or Arabic of the Koran, which they pretend to speak in its purity.

The Jews are intermixed among all these nations: their condition is best among the Berbers, where they follow different trades; but among the Shelluhs and Moors they are much oppressed, and exposed to the most ignominious treatment. They are very numerous in the seaports and commercial towns

The negroes, who are imported as slaves, frequently obtain their liberty; and as they are distinguished by fidelity, the emperor has thought it expedient to form his bodyguard of them, which is the only standing army of the empire, and at present not above 5000 strong.

Manufactures.—As the inhabitants dress chiefly in wool, the manufacture of woollen cloth is general, but the material is usually coarse. In some places however there are manufactories on a large scale, which supply articles of export. In the town of Fez the red caps are made which are used in all the countries that border on the Mediterranean, besides several kinds of silk goods, especially scarfs, which are used like girdles, and sometimes are interwoven with gold thread. The best kinds of silk stuffs, called *Culauan*, are made of silk imported from Syria; the more common material is got from the Beduins, whose wives rear silkworms. The inhabitants of Fez are also distinguished as goldsmiths, jewellers, and cutters of precious stones; many of them are also occupied in making marocco leather and different kinds of earthenware.

Tanning is well understood. Very good leather is made in the neighbourhood of the towns of El Kasar and Mekinez. The tanyards in the capital are very extensive, and the leather which they produce is superior to any made in Europe. The tanners possess the art of tanning the skins of lions and panthers, and giving them a snow-white colour, with the softness of silk. The marocco leather of the capital is yellow, that made in Tafilet green, and in Fez it is dyed red. Their bright colours are considered inimitable in Europe. Very good sole-leather is made in Rabatt and Tetuan.

Carpets are chiefly made in the province of Ducalla, south of the river Oom-er-begh, and are known in Europe by the name of Turkey carpets. They are much esteemed for their colours and the great variety of the pattern: the better kinds are very dear.

Political Division and Towns.—The empire of Marocco is composed of the two kingdoms of Fez and Marocco, of which the former occupies the countries north of the river Oom-er-begh and the basin of the river Mulwia; the kingdom of Marocco comprehends the remainder, with the exception of the countries south of the Greater Atlas and Mount Bebauan, which are considered as a separate kingdom, called that of Tafilet. At present the whole country is divided into thirty governments, of which fifteen belong to Fez and fifteen to Marocco. In the latter the country between Mount Bebauan and Mount Adrar is included. The countries of Draha, Tafilet, and Segelmesa are divided into two other governments.

Along the coast of the Mediterranean the Spaniards possess Melilla, near Ras-ul-dir, or Cape Tres Forcas, and farther westward Alhucemas and Peñon de Velez, three small fortresses, which have no communication with the interior.

Not far from the Straits of Gibraltar is Tetuan, built on the declivity of a hill, about half a mile from a small river (Martil) which falls into the Mediterranean about five miles from the town: the mouth of the river forms a harbour for vessels of middling size. It carries on a considerable commerce with Spain, France, and Italy, exporting wool, barley, wax, leather, hides, cattle, mules, and fruits, of which the valley of Tetuan produces abundance of the finest quality. The streets are narrow and unpaved. The population is 18,000 (Graberg), or 40,000 (Semple).

Near the eastern entrance of the Straits of Gibraltar is the Spanish town of Ceuta [CEUTA], and near the western the town of Tangier, where the European consuls-general reside. Tangier is built on a hill, near a spacious bay, 14 miles west of Cape Spartel, and its harbour is defended by three small fortresses. The streets are wider and straighter than in other towns of the empire; but except the houses of the European consuls, and a few belonging to rich persons, they are all small and inconvenient. The Jews have here several synagogues, and the Roman Catholics have a church, the only Christian establishment of this kind in the empire. The commerce of this place is limited to some trade with Gibraltar and the opposite coast of Spain. The population is 9500 (Graberg), or 8000 (Washington).

Along the Atlantic, from north to south, are the following towns: El Araish, or Larash, at the mouth of the river El Kos, containing 4000 inhabitants (Graberg and Washington), has a good harbour; the bar at the mouth of the river has 16 feet of water at spring-tides, and spacious anchoring-ground within, with water enough for frigates. Sla, or Salé, and Rabatt, are separated from each other by the river Bu Regreb, which forms their common harbour; they contain together 50,000 (Graberg) or 31,000 inhabitants (Washington). Salé, formerly noted for the boldness of its pirates, is badly built and partly in ruins; but Rabatt is a thriving town, and has some good streets. Its commerce is still considerable, though a portion of it has been transferred to Mogadore, and its trade with Genoa and Marseille is extensive. The principal articles of exportation are wool, corn, and wax, and the manufactured goods of Fez and Mekinez. The European and East India goods, destined for Fez and the northern provinces, are imported through this town. Saffi, or Asafi, farther south, not far from Cape Cantin, is between two hills in a valley, and is subject to inundations. It formerly exported many products of the country, as its roadstead affords excellent anchorage; but since the rise of Mogadore it has been on the decline. The population is 12,000, including 3000 Jews.

Mogadore, or Suera, as the Moghrebins call it, the port of the town of Marocco, lies on the sea-shore between Cape Cantin and Cape Gher. It was founded in 1760. Mogadore is built on a low shore, consisting of moving sand, which extends from 5 to 15 miles inland, where a fertile country begins. It is regularly built, the streets being straight, but somewhat narrow. The Europeans settled here have erected several large buildings in the African style. The town is divided into two parts, one of which is called the Fortress, and contains the custom-house, the palace of the Pasha, the other public buildings, and the houses of Europeans; the other part is only inhabited by Jews. The harbour is formed by a small island, lying south west of the town and about two miles in circumference. At low tides there are only 10 or 12 feet of water in the harbour, and large vessels are obliged to anchor without, at a distance of about two miles. The commerce of this place with London, Amsterdam, Cadiz, Leghorn, Genoa, the Canary Islands, Hamburg, and the United States of America, is considerable. The population is 10,000 (Jackson), or 17,000 (Graberg).

Agadir, or S. Cruz, farther south, has a good harbour, and formerly carried on a considerable trade, which however was transferred to Mogadore by order of the government.

In the interior there are several populous towns, of which the following are the principal: Teza, or Taza, on one of the upper branches of the Seboo river, in a very fertile country, has 10,000 or 12,000 inhabitants (Graberg), some manufactures, and a considerable trade with Tlemsan in Algiers (being situated near one of the most frequented passes of the Lesser Atlas), and with Fez. Al Kassar, or Ksar, on the El Kos river, is well built, and has some manufactures, with 8000 (Washington) or 5000 (Graberg) inhabitants.

Fez, or Fas, the most industrious and commercial town of the empire, is situated in a valley which is drained by one of the upper branches of the Seboo river. It contains upwards of 100 mosques and seven public schools with numerous pupils. The mosque called El Karubin is a magnificent building, and that of Mula Driss, the founder of the town (807), is the object of many pilgrimages and an asylum for thieves and murderers. The imperial palace, with the buildings and gardens annexed to it, occupies a great space. The number of persons employed in manufactures is considerable. Every trade is carried on in a separate street; generally only one kind of goods is sold in each shop. The commerce of this town with the seaports, especially Rabatt, and by means of the caravans with Tunis, Kahira, and Sudan, is very great. The streets are narrow, and, owing to the great height of the houses, also dark: there are numerous extensive caravansaries, or public inns, where the travelling merchants find lodging. The population is 88,000 (Graberg), or 20,000 (Caillié).

Mekinez, or Miknas, west of Fez, a large town built on a hill in a wide and fertile plain, has also narrow crooked streets. It has many manufactures, especially of leather. The imperial palace is more than two miles in circuit, and has large orchards and gardens annexed to it. The population is 56,000 (Graberg).

Tefza is situated in one of those fine valleys which are watered by the numerous branches of the Oom-er-begh, not far from the base of the Atlas. It has large manufactures of woollen cloths, which are exported to Italy and elsewhere. The population is 10,500 (Graberg).

Demnet, or Dimnit, a considerable place east of the town of Marocco, near the base of a branch of Mount Atlas, carries on a considerable trade. The caravans which go from Marocco to Draha and Sudan here begin to ascend the mountain-pass which leads to Tatta.

Marocco, the capital of the empire and the residence of the sultan, is situated on level ground, four miles south of the river Tensift, and is surrounded by a strong wall thirty feet high, with square turrets at every fifty paces. The walls are near six miles in circuit, but the area enclosed is far from being covered with buildings, there being several large gardens and open spaces. The streets are narrow and irregular, and in many cases, as in Fez and Mekinez, connected by arches and gates. Several open places, which cannot be called squares, are used as market-places. The houses, which are only of one story, have flat roofs and terraces, like those of Spain, and the rooms open into a court, which is sometimes surrounded by arcades and embellished by a fountain. The houses have no windows, no fire-place, and no furniture, except a cushion or two. Large aqueducts, which convey the water of the river Tensift to the city, surround it, and some of them are ten or twelve feet deep. They are continued southward towards the Atlas, in some place to a distance of 20 miles. These aqueducts supply the fountains with water: the fountains are numerous, and some of them have traces of delicate sculpture. On the south of the town, but without the walls, is the imperial palace: a wall of a quadrangular form, enclosing a space about 1500 yards long by 600 wide, is equal in strength and height to the walls of the town. The enclosed space is divided into squares, laid out in gardens, round which are detached pavilions, forming the imperial residences. The floors of the rooms are tessellated with various coloured tiles, but otherwise they are plain, the furniture consisting of a mat, a small carpet at one end, and some cushions. There are nineteen mosques, two colleges or medrasses, and one hospital in this town. The principal mosque, El Kontubía, is distinguished by a lofty tower, 220 feet high, a master-piece of Arabic architecture. The bazaar, or kaisseria, is a long range of shops, covered in and divided into compartments, in which the productions of the agricultural and manufacturing industry of the country, as well as goods from China, India, and England, are exposed for sale. There are some manufactures; the tanneries of Marocco have been already mentioned. Capt. Washington states that the population cannot exceed 100,000, and is perhaps not above 80,000, including 5000 Jews; Graberg assigns it only 50,000 inhabitants. Plague and famine have reduced a population which was formerly much greater.

In the province of Sus-el-acsà is Tarudant, once the capital of a separate kingdom, about 60 miles from the seaport of Agadir or S. Cruz. It is built in the middle of an extensive plain, and its walls, which are now in a ruinous state, are very extensive. The houses are low and built of earth, and each of them is surrounded by a garden and wall, so that the place rather resembles a well peopled country, than a town. The inhabitants are industrious, and the woollen dresses and marocco leather made here are much esteemed; copper and saltpetre are abundant in the neighbourhood, and a considerable quantity of the copper is made into domestic utensils in this town. The population is 22,000 (Graberg).

In this province are also the towns of Tedsi, with 15,000 industrious inhabitants (Graberg), and Tagavost, which is said to be more populous. Farther to the south-west, near the banks of the river Draha, is the village of Nun, 50 miles from the sea, with 2000 inhabitants. It is one of the points from which the caravans depart for Sudan.

On the southern declivity of Mount Atlas are Tafilet and Tatta, two other places from which the caravans start on their route to Sudan. The former is said to be a considerable place, with 10,000 inhabitants (Graberg), but Caillié in traversing this country neither saw nor heard of any town of this name.

Education.—The Moors send their children to school at the age of six years. The elementary schools, which are very numerous, both in the towns and in the country, are either private or public establishments. The former are called *mesid*, or *mektib*, and the latter *jamd*. In these schools reading, writing, and correct pronunciation are taught; the children also learn by heart some passages of the Koran. The method of teaching resembles in some respect that of Bell and Lancaster, which seems to have been used in the East from a very early time. In a few schools, established for girls, they teach reading and writing, and some things which are connected with domestic economy. Boys sometimes remain in these schools, until they know the whole of the Koran by heart, when they pass for their further education into the higher schools, called in the singular *mudersa*, and in the plural *mudaris*, where they are prepared for the university of Fez, called Dar-el-i'lm (or the House of Science), or other colleges. In the colleges they are instructed in grammar, theology, logic, rhetoric, poetry, arithmetic, geometry, astrology, and medicine. The commentaries and traditions relating to the Koran, the laws, legal procedure, and all the formalities to be observed in the courts, are also explained. There are three degrees; students called *taleb*, doctors called *f'kih*, and wise men *a'lem*, in the plural *o'lama*. As there are no printing establishments, calligraphy, called *gedvel*, is enumerated among the sciences.

Commerce.—The Moghrebins carry on a very active commerce with Sudan or the interior of Africa, and with Egypt and Arabia by caravans, and with several parts of Europe by sea. The caravans, when they set out from the commercial towns of Tetuan, Fez, Marocco, and Tafilet, generally consist of about 150 persons and 1000 or 1500 camels, and are then called *cafilas;* but when they have united at Tatta or Akka, on the Draha river, the point where they enter the desert, they consist of about 500 or 600 persons, with 16,000 and even 20,000 camels. Towards the southern border of the desert they come to the oases of Touadenni and El A'rauan, where there are immense deposits of rock-salt, of which they buy large quantities for the market of Sudan. From Timbuctoo, as a central point, the merchants traverse the adjacent countries, exchanging their goods for those of Sudan. They import into these countries rock-salt, woollen cloth and dresses, scarfs, tobacco, Turkish daggers, and blue cloth, and take in return ivory, rhinoceros' horns, incense, gold in bars and powder, ostrich feathers, gum-arabic, cotton, assafœtida, indigo, and slaves. Graberg estimates the annual value of the exported goods at one million of Spanish dollars, and that of the returns at ten times that sum; two-thirds of the imports are again exported to Algiers and Tunis.

The caravans which go to Mecca are chiefly composed of pilgrims, and are much more numerous. They depart only once in the year, and follow two routes. The northern leads from Fez through Teza over the Lesser Atlas, traversing the northern districts of Algiers and Tripoli, in which latter country it may be said to terminate at Kairoan. Hence it passes southward through Gadamis and Fezzan to Alexandria and Kahira, and ultimately to Mecca. The southern road passes from Marocco to Tefza, and thence through the southern districts of Algiers and Tunis to Gadamis and Fezzan, whence it leads to Alexandria and Mecca. Indigo, cochineal, ostrich-feathers, skins, and leather, with the woollen articles manufactured in Fez, Tefza, and Tafilet, are exported by these caravans, and they import the cotton and silk goods of India, some Persian silk-stuffs, rose-oil, amber, musk, balsam, and spices, but particularly cotton, wool, and raw silk. The raw silk is chiefly purchased at Kahira, and Graberg thinks that the annual transactions of the caravans in that town amount to two millions of Spanish dollars.

European vessels visit the harbours of Tetuan, Rabatt, Saffi, and Mogadore, and export the produce of the empire to Italy, France, Spain, England, and Holland. The principal goods exported are:—wool of good quality, which goes principally to Genoa, Marseille, and Holland; wax, to Leghorn, Marseille, Cadiz, Lisbon, and London; hides of cattle and camels, to Leghorn, Marseille, and London; gum-arabic, which is inferior to that brought from the Senegal, mostly to London and Holland; copper, to Holland; bitter and some sweet almonds, from Mogadore to Holland; goat-skins, especially those brought from Tafilet, to England; oil, made of the fruits of the elæodendron argan, or argan-oil (Graberg), and also olive-oil; archil; ivory, especially to Holland; ostrich-feathers, white and grey, to England; dates, to England and Lisbon; and corn, to all places where its exportation is permitted. Among the less important articles are some manufactured in the empire, as scarfs of wool and silk, red or yellow marocco leather slippers and shoes, the black cloaks of Tarudant, and the shawls of Fez and Tefza.

Among the goods which are imported, the cotton-cloths brought from the East Indies and from England constitute by far the most important articles. There are also imported different kinds of woollen stuffs; raw silk and silk stuffs; colonial merchandise, especially sugar, pepper, and ginger; very little coffee is used, but much tea; opium, arsenic, mastich, cochineal, alum, bar-iron from England; steel from England and Trieste; iron-wire, tin and nails, corals, looking-glasses, knives, cotton, brimstone, earthenware, and glass. In 1831 the number of vessels which entered the seaports was sixty-four, and the tonnage 3870 tons. In the same year ninety-four vessels left the ports, with a tonnage of 5849 tons. The imports were valued at 172,000*l.*, and the exports at somewhat more than 131,000*l.*

Government.—The goverment is absolutely despotic, even more so than in the Turkish empire; the people are much oppressed, and the Christian merchants exposed to great losses by capricious ordinances.

(Graberg of Hemsö, *Specchio Geografico e Statistico dell' Impero di Marocco;* Jackson's *History of Marocco* and *Shabeeny;* Washington, in the *London Geographical Journal;* Lempriere's *Tour from Gibraltar to Tangier,* &c.; Caillié's *Travels through Central Africa,* &c.; and Semple's *Second Tour in Spain,* &c.)

MARONITES, the name of a community of Christians belonging to the Western or Roman church, and living on Mount Lebanon. They are neighbours of, and allied to, and in some places mixed with the Druses, and, like them, independent, in great measure, of the Turkish power. The Maronites occupy the valleys and fastnesses of the principal ridge of Lebanon east of Beyroot and Tripoli, and they extend inland as far as the Bekaa, or plain between the Libanus and Anti-Libanus, where they are mixed with the Druses, though they do not intermarry with them. The town of Zhaklé, in the valley of Bekaa, contains between ten and twelve thousand inhabitants, chiefly Maronites. There are also many Maronites at Beyroot and Tripoli; but the tract of country in which the great bulk of the Maronites reside is called Kesrouan. It extends along the ridge of Libanus from the Nahr el Kelb, a stream which enters the sea 12 miles north of Beyroot, to the Nahr el Kebir, which enters the sea north of Tripoli, near the island of Ruad, the antient Aradus, on which side the Maronites border on the Nosaïris, or Ansarieh, who extend to the northward towards Latakieh, and the Ismaelians, who live farther inland near the banks of the Orontes. [ISMAELITES.] To the eastward the Maronites have for neighbours the Metualis, a tribe of independent Moslems, of the sect of Ali, who live under their own emir, and occupy the belad or district of Baalbek and part of the Anti-Libanus; and on the south they border on the territory of the Druses, with whom they form one political body, being subject to the Emir Beschir [DRUSES], in so far as they join him when he calls them to arms for the common defence, and pay him their share of the tribute, which the emir paid formerly to the Porte, and now pays to the pasha of Egypt. But in their internal concerns the Maronites are governed by their own sheiks, of whom there is one in every village, from whose decision there is an appeal to the bishops, who have great authority; and in some cases to the emir of the Druses, and his divan, or council. The clergy are very numerous; the secular parish clergy are married, as in the Greek church; but the regular clergy, who are said to amount to 20,000, and are distributed among about 200 convents, follow the rule of St. Anthony, and are bound by vows of chastity and obedience. The Maronite monks are not idle; they cultivate the land belonging to their convents, and live by its produce. Every convent is a farm The convents are under the jurisdiction of bishops, of whom there is one in every large village. The bishops are under the obligation of celibacy. The bishops collectively elect the patriarch, who is confirmed by the pope, and who resides at the convent of Kanobin, in a valley of the Libanus, south-east of Tripoli, where there is a printing-press, which furnishes the elementary books for the use of the Maronite schools. Not far from Kanobin is the large village of Eden, ten miles above which, and high up the Libanus, is the famed clump of old cedars, called the 'Cedars of Solomon,' of large dimensions, but now reduced to seven in number (Lamartine, *Voyage en Orient;* Richardson), not including the younger and smaller ones. Dr. Richardson measured the trunk of one of the old trees, and found it 32 feet in circumference. The whole clump of old and young trees may be walked round in about half an hour. Old cedars are not found in any other part of Libanus.

At the opposite or southern extremity of the Kesrouan is the handsome convent of Antoura, which is the residence of the papal legate and of some European missionaries. Near it is a convent of Maronite nuns.

The Maronites derive their name from a monk of the name of Maro, who, in the fifth century, collected a number of followers, and founded several convents in these mountains. When the Monothelite heresy prevailed in the East in the seventh century, and was favoured by the court of Constantinople, many Christians who did not embrace its tenets took refuge in the fastnesses of Libanus, around the convents, and thus the name of Maronites was assumed by the population of the mountains. This is the account of the Maronites themselves: others pretend that the Maronites were Monothelites, who took refuge in the Libanus after the emperor Anastasius II. had condemned and proscribed their sect, in the beginning of the eighth century. [EUTYCHIANS.] Joseph Simonius Assemani, and his friend Ambarach, better known as Father Benedetti, have defended the Maronites from the charge of Monothelitism. Ambarach translated from the Arabic into Latin the work of Stephen, patriarch of Antioch, concerning the origin and the liturgy of the Maronites. In 1736, at a great synod held at Marhanna, the Maronite church formally acknowledged the canons of the Council of Trent, but they retained the mass in the Syriac language and the marriage of priests. Before that time they received the sacrament under both forms, as in the Greek church. At mass the priest turns towards the congregation and reads the gospel of the day in Arabic, which is the vulgar tongue.

The Maronite population is said to be above 200,000 individuals, and to contain between thirty and forty thousand men fit for military service. Every Maronite is armed, and they are all soldiers in case of need. Volney reckoned them, in 1784, at 120,000, but the population has been rapidly increasing since that time. Their language is Arabic, and by their appearance and habits they belong to the Arabian race. They are a fine-looking people, high-spirited, civil and hospitable, especially towards European travellers, and perfectly honest. Robbery and other acts of violence are hardly known among them. They are altogether an interesting race, full of vigour, and perhaps destined with the Druses to act an important part in the future vicissitudes of Syria. (Jowett, Light, Lamartine, and other travellers in Syria.)

There is at Rome, on the Quirinal Mount, a convent of Maronite monks, who perform the service of the mass in the Syriac language, according to the liturgy of their country. This church was founded by Pope Gregory XIII., and is dedicated to St. John. The monastery serves as a college for young Maronites who come to Rome to study and take orders, after which they return to their own country. It is one of those exotic colonies which give a peculiar interest to the city of Rome.

The ceremonies of these Maronites of Rome on great festivals, their chanting in Syriac, and their curious musical instruments, are described by the Abbé Richard, in his 'Voyage en Italie.'

MAROONS. [JAMAICA.]

MAROT, CLEMENT, born at Cahors in 1495, entered the service of the duchess of Alençon as page. He afterwards followed Francis I. to Italy, and was wounded and taken prisoner at the battle of Pavia. On his return to France he wrote poetry for Diana of Poitiers, the king's mistress, who showed him favour; but having presumed too much upon his familiarity with her, she discarded him, and he was soon after put in prison, through her agency as some have believed, in 1525. During his imprisonment he wrote his 'Enfer,' a satire against the lawyers, and he revised his 'Roman de la Rose.' When Francis I. returned from his Spanish captivity, Marot was released, and re-appeared at court. Margaret, queen of Navarre, was much pleased with him; but as usual his vanity made him too presumptuous, and he fell into disgrace. He then turned Calvinist, and went to Geneva; but soon finding himself in an atmosphere little suited to him, he returned to Lyon, abjured Calvinism, and served again under Francis I. in the Italian campaign of 1535. Some years afterwards he published a French version of part of the Psalms, which was read with pleasure, but the Sorbonne condemned it, and Marot took refuge at Turin, where he died in poverty in 1544. He wrote epistles in verse, elegies, satires, ballads, rondeaux, and epigrams. His style has the simplicity of his age, united with grace and poetical fancy. He left a natural son, Michel Marot, who was also a poet. The works of both father and son were published together at Lyon in 4 vols. 4to., 1731.

MARPURG. [MARBURG.]

MARPURG, FRIEDRICH WILHELM, a very eminent writer on the theory of music, was born in 1718, at Sechausen in Prussia. According to M. Fayolle he was a counsellor of war to Frederick II. of Prussia, but his friend Gerber says that he was secretary to one of that king's ministers; both however agree that he latterly held the office of director of the lotteries at Berlin. Little more is known of his personal history than that early in life he passed a considerable time in Paris—which probably led to his adop tion of the theory of Rameau, though he was by no means a slave to it—that his learning was considerable, his industry indefatigable, his morals exemplary, and his manners engaging. In 1793 M. Gerber spent some weeks with him at Berlin; he then possessed all the vivacity of youth, and his conversation was witty and agreeable. Shortly after this he began to show symptoms of mental as well as bodily decay, and died early in 1795.

Marpurg is one of the most estimable didactic writers on the subject of music that Germany has produced. To a profound knowledge of its principles (says his French biographer) he joined a correct judgment and a refined taste. 'He was, perhaps,' Dr. Burney remarks, 'the first German theorist who could patiently be read by persons of taste, so addicted were former writers to prolixity and pedantry.' Among his works are two which claim particular notice, his 'Manual of Harmony and Composition' (*Handbuch bey dem General-bass*, &c.), and his 'Traité de la Fugue et du Contrepoint.' The first is exceedingly methodical and clear, and may be considered as a musical Euclid. The second would be the best and most complete treatise on fugue and canon that has ever appeared, were it not lamentably deficient in method and arrangement, and also too much devoted to instrumental music, to the exclusion of that of the vocal kind. But in a new edition of this, M. Choron has remedied much of the evil of which there was such ample reason to complain.

Marpurg was author also of many other works, all of them possessing more or less merit, a full and descriptive list of which is given in Gerber's 'Lexicon,' and in the French Dictionary which has supplied part of the foregoing notice.

MARQUE, LETTRES DE. [Privateering.]

MARQUESAS ISLANDS were so called in honour of the Marquis Mendoça de Canete, by Mendaña de Neyra, who discovered them in 1595; others call them the Mandaña Archipelago. They are situated in the Pacific, and extend about 200 miles in a north-west and south-east direction, between 10° 30′ and 7° 50′ S. lat., and 139° and 141° W. long. A wide channel divides them into two groups, of which the south-eastern contains five and the north-western eight islands. The latter, having been discovered by the Americans in 1797, are also called Washington's Islands.

The largest islands of the southern group are Santa Dominica, or Hiwaoa, Santa Christina, or Tahuata, and Hood's Island, or Tiboa. They are about 10 miles long from south-south-west to north-north-east. The principal islands of the northern group are, Noukahivah, or Nouhivah, Uahuga, and Uapoa, or Roapoa. Noukahivah, the largest, is nearly 20 miles long from south-east to north-west, and 70 miles in circumference.

An elevated ridge of rocky mountains traverses each island lengthways, and in the larger one rises to an elevation of 2000 or 3000 feet. The mountains have on both sides high offsets, which extend to the shores of the sea, and thus divide the low land along the shores into valleys, which have no communication with one another except across the highlands that separate them. The mountains in the interior are mostly bare, rugged, and inaccessible. The coast is rocky, abrupt, and beaten by a surf; no coral reef encircles or protects the islands, though the detritus of coral is abundant on the beach. Noukahivah is of volcanic origin, which may be the case with the rest also. The soil is rich; in the valleys it is clay, mixed with vegetable mould, but on the lower declivities of the hills it is thin, and covered by coarse grass in tufts. There are numerous harbours, and many of them very safe, as Resolution Bay, on Tahuata; and the three harbours, Anna Maria, or Tayo-Hoae, Cho-ome, or Comptroller's Bay, and Hapoa, or Tshitshagoff, on Noukahivah.

The climate is rather warm. The thermometer seldom descends below 64° or 68°. In May it ranges between 72° and 77°, and in June about 80°. Winter is characterised by abundant showers of rain. Sometimes however not a drop of rain falls for nine or ten months, the consequence of which is famine. The prevailing wind is the eastern trade-wind, which blows strongest in autumn. The south-west wind prevails in winter, and the north wind is frequent in summer. West and north-west winds are nearly unknown. Thunder-storms are of rare occurrence. The climate is very healthy, and diseases are rare. The fruit-trees are chiefly the cocoa-nut, bread-fruit, and papaw (*Carica papaya*). The inhabitants also cultivate bananas, plantains, sweet-potatoes, and taro (*Caladium sagittifolium*). From the bark of the mulberry-tree (*Morus papyrifera*) they make their garments. The wild cotton is superior to that which is cultivated in some other islands, and the sugar-cane is abundant, large in growth, and of excellent quality. Tobacco is extensively cultivated. There are no animals except hogs and rats. Fish is abundant, and constitutes one of the most common articles of food.

The inhabitants belong to the same race that peopled the Society and Sandwich Islands, of which their language and bodily conformation offer undoubted proof. Their complexion is of a dark copper, but the women are much lighter than the men. Many of the navigators speak of their figure in terms of admiration, and consider them as perfect models of symmetry. Langsdorf states that the measures taken on the body of one of their chiefs agreed exactly with those of the Apollo Belvedere. Later travellers do not confirm such statements, and it seems that the difference between individuals is greater here than in most other countries, and that the men vary in height between four feet ten inches and six feet. They have carried the art of tatooing the body to a greater degree of perfection than any nation, the bodies of distinguished persons being covered all over with regular figures of a very tasteful pattern. The people are cannibals. They eat both the bodies of their enemies, who are killed in battle, and also other persons, at the instigation of their priests, or rather sorcerers. In time of famine, which occasionally happens, women and children are killed for food. They have chiefs, but they are without authority. Their sorcerers have acquired a great influence over them, as they believe in spirits, who punish those who transgress what has been determined by the sorcerers. They have always shown themselves very friendly towards Europeans, but the missionaries who have been among them have not been successful in their labours.

(Cook's *Second Voyage;* Krusenstern's *Voyage;* Langsdorf's *Voyages and Travels in various Parts of the World;* Waldegrave and Bennett, in *London Geogr. Journal*, vols. iii. and vii.)

MARQUIS, a title of honour used in England and on the Continent. Persons who have this title in England are the second in the five orders of English nobility. The dukes only are above them. In parliament all peers have the same privileges, by whatever title they are known. Marquises in England have this privilege above earls, that their younger sons are addressed as 'my lord,' as Lord Henry Petty, Lord John Thynne.

All titles of honour seem to have been originally the names of important offices, or to have denoted persons invested with a peculiar political character. Marquis is generally supposed, as we think justly, though other origins have been suggested, to have designated originally persons who had the care of the marches of a country. [Marches.] In Germany the corresponding term is *markgraf* (margrave), which seems to be 'lord of the marches.'

There were no English marquises before the reign of Richard II. In the reign of Edward III. a foreign marquis, the marquis of Juliers, was made an English peer with the title of earl of Cambridge, and this circumstance probably suggested to King Richard the introduction of this new order of nobility. The person on whom it was conferred was his great favourite Robert de Vere, earl of Oxford, who was created duke of Ireland and marquis of Dublin in 1385. But the title had no long continuance in him, for three years after he was attainted and his honours forfeited.

In 1397 one of the illegitimate sons of John of Gaunt was created marquis of Dorset, but he was soon deprived of the title, and his son had only the earldom of Somerset. The title of marquis of Dorset was however revived in the same family in 1443, when also William de la Pole was made marquis of Suffolk.

In 1470 John Nevil, earl of Northumberland, brother to Richard Nevil, earl of Warwick, the king-maker, was made marquis Montacute, but he was soon after slain at the battle of Barnet, and the title became lost.

In 1475 Thomas Grey, earl of Huntingdon, son to the queen of King Edward IV. by her former husband, was made marquis of Dorset; and in 1489 Maurice Berkeley, earl of Nottingham, was made marquis of Berkeley. Henry VIII. made Henry Courtenay, earl of Devonshire, marquis of Exeter; and he made Anne Boleyn, a little before his marriage with her, marchioness of Pembroke. William

Parr, earl of Essex, brother of Queen Catherine Parr, was created marquis of Northampton by King Edward VI.; and William Powlett, earl of Wiltshire, marquis of Winchester.

All these titles had become extinct in 1571, except that of marquis of Winchester. This title still continues in the male representative of the original grantee, though for a century or more it was little heard of, being lost in the superior title of duke of Bolton.

Queen Elizabeth made no new marquis, nor did King James I. till the fifteenth year of his reign, when his great favourite George Villiers was created marquis of Buckingham. Charles I. advanced the earls of Hertford, Worcester, and Newcastle to be marquises of those places; and Henry Pierrepoint, earl of Kingston, was made marquis of Dorchester.

Charles II. advanced the earl of Halifax to be marquis of Halifax in 1682, and James II. made the earl of Powis marquis of Powis in 1687.

A new practice in relation to this title was introduced at the Revolution. This was the granting of the title of marquis as a second title when a dukedom was conferred. Thus when Schomberg was made duke of Schomberg he was made also marquis of Harwich; when the earl of Shrewsbury was made duke of Shrewsbury he was also made marquis of Alton: and when the earl of Bedford was made duke of Bedford he was also made marquis of Tavistock. There were many other creations of this kind in the reign of William III., and several of marquisates only. It is not intended to name all the instances, either in this or the subsequent reigns. Of the existing dukes eleven have marquisates in the second title, which is borne by the eldest son during the life of the father.

The only marquis who sits in the House of Peers as a marquis, and whose title dates before the reign of George III., is the marquis of Winchester. The other marquises are all of recent creation, though most of them are old peers under inferior titles.

The title seems not to have been known in Scotland till 1599, when marquises of Huntley and Hamilton were created.

MARRIAGE is a contract by which a man and a woman enter into a mutual engagement, in the form prescribed by the laws of the country in which they reside, to live together as husband and wife during the remainder of their lives.

Marriage is treated as a civil contract even by those Christians who regard it as a sacrament, and as typical of the union between Christ and the church. The religious character of the transaction does not attach until there has been a complete civil contract, binding according to the laws of the country in which the marriage is contracted. The authority of the sovereign power in regulating and prohibiting marriages is therefore not affected by the superinduced religious character.

Among Protestants marriage has ceased to be regarded as a sacrament, yet in most Protestant countries the entrance into the marriage state has continued to be accompanied with religious observances. These are not however essential to the constitution of a valid marriage, any further than the sovereign power may have chosen to annex them to, and incorporate them with, the civil contract.

After the establishment of Christianity, in order to avoid the scandal of persons living together who were not known to be married, and also to secure and perpetuate the evidence of marriage, where really contracted, it became usual to make the marriage promise in the presence of the assembled people, and to obtain at the same time the blessing of the priest upon their union, except when one of the parties had been married before, in which case no nuptial benediction was antiently pronounced, the benediction once received by one party being considered sufficient to hallow the union as to both, unless by the distinction it was intended to intimate that second marriages, though tolerated, were not sanctioned by the church. So late however as the twelfth century, in a decretal epistle of Alexander III. to the bishop of Norwich, the pope says, 'We understand from your letter that a man and woman mutually accepted one another without the presence of any priest, and without the observance of those solemnities which the Anglican church is wont to observe, and that before consummation of this marriage he had contracted marriage with another woman, and consummated that marriage. We think right to answer, that if the man and the first woman accepted one another de præsenti, saying one to another, "I accept thee as mine, and I accept thee as mine," although the wonted solemnities were not observed, and although the first marriage was not consummated, yet the woman ought to be restored to her husband; since after such consent he neither should nor could marry another.'

Private marriages, designated *clandestine* marriages by the clergy, continued to be valid till the Council of Trent, which, after anathematizing those who should say that private marriages theretofore contracted by the sole consent of the parties were void, decreed, contrary to the opinion of 56 prelates, that thenceforward all marriages not contracted in the presence of a priest and two or three witnesses should be void. This decree, being considered as a usurpation upon the rights of the sovereign power, which alone can prescribe whether any and what formalities shall be required to be added to the consent of the parties in order to constitute a valid marriage, has never been received in France and some other Catholic countries.

A marriage was clandestine if contracted otherwise than in public, that is, in facie ecclesiæ; and it was called an *irregular* marriage if it was clandestine, or if, though not clandestine, it was contracted without the benediction of a priest in the form prescribed by the rubric, the intervention of a priest having latterly been required in all cases, even though one of the parties were a widower or a widow. Clandestinity and irregularity subjected the parties to ecclesiastical censures, but did not affect the validity of the marriage.

The decrees of the council of Trent had no force in England. A marriage by mere consent of parties, until the passing of the Marriage Act in 1753, constituted a binding engagement; though if application were made to the ecclesiastical courts for letters of administration, &c., under a title derived through such irregular marriage, those courts sometimes showed their resentment of the irregularity by refusing their assistance, more especially where the non-compliance with the usual formalities could be traced to disaffection to the Established Church. What the formalities required by the Church before the Marriage Acts were, it is now immaterial to consider. Such of them as are not incorporated into any of the Marriage Acts, are now of no force for any purpose.

To constitute a valid marriage, as well before as since the Marriage Acts, it is necessary, 1st, that there should be two persons capable of standing in the relation of husband and wife to each other; 2ndly, that they should be willing to stand in that relation; and 3rdly, that they should have contracted with one another to stand in that relation.

1. The capacity of standing in the relation of husband and wife implies that at the time of the contract there should be no natural or legal disability. Total and permanent disability on either side to consummate marriage will render the contract void. Temporary disability from disease does not affect the validity of a marriage. Temporary disability from defect of age does not invalidate the marriage, but it leaves the party or parties at liberty to avoid or to confirm such premature union on attaining the age of consent, which for males is 14, and for females 12. Before the abolition of feudal tenures, when the lords were entitled to sell the marriages of their male and female wards, infantine marriages were very common, fathers being anxious to prevent wives and husbands from being forced upon their children after their death, and lords being eager, either to secure the prize for their own family, or to realise the profit resulting from a sale. A person who is already married is under a legal disability to contract a second marriage whilst the first wife or husband is alive; and although there may have been the strongest grounds for believing that the first wife or husband was dead, the children of the second marriage would not in England derive any benefit from the absence of moral guilt in their parents, though in France and some other countries the issue of marriages so contracted, bonâ fide, are treated with greater indulgence.

Near consanguinity or relationship in blood is a legal impediment to marriage. The degree of nearness which shall disable parties from uniting in marriage varies in different countries, and has varied at different periods in our own.

This impediment is founded not only upon the moral but upon the physical constitution of man. The purity of domestic intercourse, the sanctity of affection with which the family circle is now united, would be at an end if matrimonial connexions could be formed among its members;

and even with the present restrictions intermarriages in families are frequently productive of the most injurious consequences in respect of mental and bodily health.

Affinity or relationship by marriage is an impediment arising out of moral considerations alone. The extent to which this impediment has been carried has also varied.

The impediment to marriage arising out of consanguinity applies in the same degree to illegitimate as to legitimate relations, and the impediment resulting from affinity is created by illicit connexion as well as by marriage. The Council of Trent restricted the impediment of affinity arising out of illicit connexion to the second degree.

2. Each party must have the will to contract marriage with the other. An idiot therefore, who cannot understand the nature of the conjugal relation, is incapable of contracting marriage. So is a lunatic, except during a lucid interval. But however absurd it may appear, children are presumed to have sufficient intelligence to understand the nature of the marriage engagement at seven; and though the contract is not absolutely binding upon them until they reach the age of consent, still the marriage of a child above the age of seven would prevent its forming a second marriage until the age of consent, as until that age it cannot dissent from the first marriage.

3. There must be an actual contract of marriage. This, at common law, might be by words of present contract, which would, without more, constitute a perfect marriage,—or by words of future contract, followed by cohabitation.

The unlimited freedom of marriage was first broken in upon in England by the Marriage Act of 1753 (26 Geo. II., c. 33), the principal provisions of which form the basis of the law as it now stands. Many of these provisions are taken from the canon law, an observance of which was, before this statute, necessary to constitute a *regular* marriage, though a marriage contracted without them was *valid*.

The restrictions upon the common-law freedom of marriage are now embodied in two statutes.

The 4 Geo. IV., c. 76, contains the following provisions: Banns of matrimony are to be published in the church, or a public chapel in which banns are allowed to be published, of the parish or chapelry wherein each of the parties dwells, immediately after the second lesson of morning service, or of evening service if there be no morning service, upon three Sundays preceding the solemnization (s. 2). Notice of the names of the parties, their place of abode, and the time during which they have dwelt there, is to be delivered to the minister seven days before the first publication (s. 7). Banns are to be republished on three Sundays, if marriage do not take place within three months after publication completed (s. 9). No licence of marriage (that is, dispensation from the obligation to publish banns) is to be granted to solemnize marriage in any church or chapel not belonging to the parish or chapelry within which the usual place of abode of one of the parties has been for fifteen days immediately before the granting of the licence (s. 10). Extra-parochial places are to be taken to belong to the parish or chapelry next adjoining (s. 12). Upon obtaining a licence, one of the parties must swear that he or she believes that there is no impediment of kindred or alliance (consanguinity or affinity), or of any other lawful cause, nor any suit commenced in any ecclesiastical court, to hinder the marriage, and that one of the parties has, for fifteen days immediately preceding, had his or her usual place of abode within the parish or chapelry; and where either of the parties, not being a widower or widow, is under the age of twenty-one, that the consent of the person or persons whose consent is required by that act has been obtained, or that there is no person having authority to give such consent (s. 14). The father, if living, of any party under twenty-one, not being a widower or widow, or, if the father be dead, the guardian or guardians of the person of such party, or one of them, and in case there be no guardian, then the mother of such party if unmarried, and if there be no mother unmarried, then the guardian or one of the guardians of the person appointed by the Court of Chancery, has authority to give consent to the marriage of such party; and such consent is required, unless there be no person authorised to give it (s. 16). In case of the father, guardian, or mother being *non compos mentis*, or beyond sea, or unreasonably or from undue motives refusing or withholding consent, any person desirous of marrying may petition the lord-chancellor, master of the rolls, or vice-chancellor; and in case the marriage proposed shall, on examination, appear to be proper, the lord-chancellor, &c., may judicially declare the same to be so; and such declaration shall be equivalent to consent of the father, &c. (s. 17). If a marriage be not had within three months after licence, marriage cannot be solemnized without a new licence or banns (s. 19). The archbishop of Canterbury is authorised to grant special licences to marry at any convenient time or place (s. 20). If any persons, knowingly and wilfully, intermarry in any other place than a church or such public chapel, unless by special licence, or, knowingly and wilfully, intermarry without the publication of banns and licence, or, knowingly and wilfully, consent to the solemnization of such marriage by a person not being in holy orders, the marriage is null and void (s. 22). (It has been held, that in order to invalidate a marriage under this section, both parties must know the irregularity of the proceeding.) When a marriage is solemnized between parties, both or one of them being under age, by false oath or fraud, the marriage is valid, but the guilty party is to forfeit all property accruing from the marriage (s. 23). After the solemnization of any marriage by banns or licence, no proof can be required of actual dwelling or usual place of abode, nor can any evidence be received to prove the contrary (s. 26). Marriages are to be solemnized in the presence of two witnesses besides the minister, and registered.

The principal provisions of 6 & 7 Wm. IV., c. 85, which was passed chiefly in ease of those who scrupled at joining in the services of the Established Church, are these:—Marriages may be solemnized on production of the registrar's certificate, under the provisions of that act, in like manner as after publication of banns (s. 1). In every case of marriage intended to be solemnized according to the rites of the Church of England, unless by licence or special licence, or after publication of banns, and in every case of marriage intended to be solemnized according to the usages of the Quakers or Jews, or according to any form authorised by that act, one of the parties is to give notice, according to the form set out in the act, to the superintendent registrar of the district or each of the districts within which the parties have dwelt for seven days then next preceding, stating the name and surname, and the profession or condition, and the dwelling-place of each, and the time (not less than seven days) during which each has dwelt therein, and the church or building in which the marriage is to be solemnized (s 4).

After the expiration of seven days, if the marriage is to be solemnized by licence (that is, from the surrogate, or officer of the ecclesiastical court), or of twenty-one days, if without licence, the superintendent registrar, upon request, is to issue a certificate, provided no lawful impediment be shown, stating the particulars set forth in the notice, the day on which it was entered, that the full period of seven days or of twenty-one days has elapsed since the entry of such notice, and that the issue of such certificate has not been forbidden by any authorised person (s. 7). (This provision does not apply to marriages by licence celebrated according to the rites of the Church of England.) The like consent is required to a marriage solemnized by licence, as would have been required to marriages by licence before the passing of the act (that is, by 4 Geo. IV., c. 76, s. 16 & 17); and every person whose consent to a marriage by licence is required by law is authorised to forbid the issue of the superintendent registrar's certificate (s. 10). Every superintendent registrar may grant licences for marriage in any building registered within any district under his superintendence, or in his office (s. 11). Before any licence for marriage can be granted by a superintendent registrar, one of the parties must appear personally before him, and must, in case the notice of the intended marriage has not been given to the same superintendent registrar, deliver to him the certificate of the superintendent registrar or registrars to whom such notice has been given; and such parties must make oath, affirmation, or declaration, that he or she believes that there is not any impediment of kindred or alliance, or other lawful hindrance, to the marriage, and that one of the parties has for fifteen days immediately before the day of the grant of the licence (or rather the day of the making of the oath, &c.), had his or her usual place of abode within the district in which such marriage is to be solemnized; and where either party, not being a widower or widow, is under twenty-one, that the consent of the person or persons whose consent to such marriage is required by law has been obtained thereto, or that there is no person having authority to give such consent (s. 12). No marriage after notice, unless by virtue of a licence by the superintendent registrar, is to be solemnized or registered until after the expiration of twenty-one days after entry of notice, and no marriage is to be solemnized by the licence of any superintendent registrar, or registered, until after the expiration of seven days after the day of the entry of notice (s. 14). Whenever a marriage is not had within three calendar months after notice entered by the superintendent registrar, the notice and certificate, and any licence granted thereupon,and all other proceedings, become utterly void; and no person can proceed to solemnize the marriage, nor can any registrar register the same, until new notice, entry, and certificate (s. 15). The certificate of the superintendent or (superintendents) is to be delivered to the officiating minister, if the marriage is to be solemnized according to the rites of the Church of England; and such certificate or licence is to be delivered to the registering officer of Quakers for the place where the marriage is solemnized, if the same shall be solemnized according to their usages; or to the officer of a synagogue by whom the marriage is registered, if to be solemnized according to the usages of persons professing the Jewish religion; and in all other cases it is to be delivered to the registrar present at the marriage (s. 16).

Any proprietor, or trustee, of a separate building, certified, according to law, as a place of religious worship, may apply to the superintendent registrar, in order that such building may be registered for solemnizing marriages therein; and in such cases he is to deliver to the superintendent registrar a certificate signed in duplicate by twenty householders, that such building has been used by them during one year as their usual place of public religious worship, and that they are desirous that the place shall be registered; each of which certificates is to be countersigned by the proprietor or trustee by whom the same is to be delivered, and the superintendent registrar is to send both certificates to the registrar-general, who is to register such building accordingly, and indorse on both certificates the date of the registry, and to keep one certificate with the other records of the general register office, and to return the other certificate to the superintendent registrar, who is to keep the same with the other records of his office; and the superintendent registrar is to enter the date of the registry of such building, and is to give a certificate of such registry under his hand, on parchment or vellum, to the proprietor or trustee by whom the certificates are countersigned, and is to give public notice of the registry thereof, by advertisement in some newspaper circulating within the county and in the 'London Gazette' (s. 18).

After the expiration of the twenty-one days, or of seven days, if the marriage is by licence (that is, from the surrogate), it may be solemnized in the registered building stated in the notice, between and by the parties described in the notice and certificate according to such form and ceremony as they may see fit to adopt: every such marriage to be solemnized with open doors between eight and twelve in the forenoon, in the presence of some registrar of the district in which the building is situate, and of two witnesses.

In some part of the ceremony, and in the presence of registrar and witnesses, each of the parties is to declare—

> 'I do solemnly declare, that I know not of any lawful impediment why I, A. B., may not be joined in matrimony to C. D.'

And each of the parties is to say to the other—

> 'I call upon these persons here present, to witness that I, A. B., do take thee, C. D., to be my lawful wedded wife (or husband).'

Provided also, that there be no lawful impediment to the marriage of such parties (s. 20). Persons who object to marry in any such registered building may, after due notice and certificate issued, contract and solemnize marriage at the office of the superintendent registrar, and in his presence and in that of some registrar of the district, and of two witnesses, with open doors, and between the hours aforesaid, making the declaration and using the form of words as above (s. 21). After any marriage solemnized, it is not necessary, in support of such marriage, to give proof of the actual dwelling of either of the parties previous to the marriage within the district for the time required by the act, or of the consent of any person whose consent is required; nor is evidence admissible to prove the contrary in any suit touching the validity of such marriage (s. 25). The registrar before whom any marriage is solemnized according to the provisions of this act may ask of the parties to be married the several particulars required to be registered touching such marriage (s. 36). Every person knowingly and wilfully making any false declaration, or signing any false notice or certificate required by this act, for the purpose of procuring any marriage, and every person forbidding the issue of any superintendent registrar's certificate by falsely representing himself or herself to be a person whose consent to such marriage is required by law, knowing such representation to be false, is to suffer the penalties of perjury (s. 38). If any person knowingly and wilfully intermarry under the provisions of this act,—in any place other than the church, chapel, registered building, or office, or place specified in the notice and certificate,—or without due notice to the superintendent registrar,—or without certificate of notice duly issued,—or without licence, in case a licence is necessary,—or in the absence of a registrar, where the presence of a registrar or superintendent registrar is necessary, the marriage of such persons, except in certain excepted cases, is null and void (s. 42); as under 4 Geo. IV., c. 76, s. 22, a marriage would not be void unless *both* parties knowingly and wilfully concurred in marrying contrary to the provisions of the 42nd section. If any valid marriage be had under the provisions of this act by means of any wilfully false notice, certificate, or declaration made by either party to such marriage, as to any matters to which a notice, certificate, or declaration is required, the attorney-general or solicitor-general may sue for a forfeiture of all estate and interest in any property accruing to the offending party by such marriage (s. 43). Consent to marriage may be withdrawn upon good reason; but it would rather appear that this cannot be done merely because the parent or guardian has changed his mind. The question of consent is not however of such vital importance as under the first Marriage Act (26 Geo. II., c. 33, s. 11), which made marriages without consent of parents, &c. *absolutely* void. Under 4 Geo. IV., c. 76, s. 23, and 6 & *7 Wm. IV.*, c. 85, s. 43, a false statement as to consent subjects the fraudulent party to the penalties of perjury, and to a forfeiture of all estate and interest in any properties accruing by the marriage, but leaves the marriage itself in full force.

These statutes do not extend to marriages contracted *out* of England, or to marriages of the royal family, which are regulated by a particular statute, 12 George III., c. 11.

Before 1835 marriages within the prohibited degrees of consanguinity and affinity were valid until annulled by a declaratory sentence of the ecclesiastical court, after which they became void ab initio, and the issue of such marriages were, by such sentence, rendered illegitimate; and the law is still so with respect to personal incapacity existing at the time of the contract. But as the ecclesiastical court could, professedly, only proceed *pro salute animæ*, and its authority to annul an incestuous marriage was founded upon the duty of putting a stop to the incestuous intercourse, the power of annulling the marriage ceased upon the death of either of the parties. The validity of such marriage, and the legitimacy of the issue, depended therefore upon the contingency of a suit being instituted and a sentence pronounced, during the joint lives of the husband and wife. But now, by 5 and 6 Will. IV., c. 54, all marriages thereafter celebrated between persons within the prohibited degrees of consanguinity or affinity are absolutely void to all intents and purposes. And, even at common law, a marriage contracted while there is a former wife or husband alive is ipso facto void, without any declaratory sentence.

Generally speaking, a marriage, valid according to the law of the country in which it was contracted, is valid in every other country. This rule is however subject to some exceptions, as where marriages, contracted according to the law of the country (*lex loci*), are considered, in the courts in which their validity happens to be contested, as contracted in violation of some principle of natural religion or morality, or as where, in Persia or Turkey, a man marries a second wife in the lifetime of the first.

A constitution of the emperor Constantine, restored in 476 by the emperor Zeno (*Cod.*, lib. 5, tit. 27, l. 5), enabled the husband of a concubina who had children by her, without having had any child ex justis nuptiis, to raise the concubina to the dignity of justa uxor, and to confer on those children the privilege of children born ex justis nuptiis, though actually born ex concubinatu. 'Divi Constantini, qui venerandâ Christianorum fide Romanum munivit imperium, super *ingenuis* concubinis ducendis uxoribus,

filiis quinetiam ex iisdem, vel ante matrimonium, vel postea progenitis, suis ac legitimis habendis, sacratissimam constitutionem renovantes, jubemus eos, qui ante hanc legem, ingenuarum mulierum nuptiis minimè intercedentibus, electo contubernio, cujuslibet sexus filios procreaverint: quibus nulla videlicet uxor est, nulla ex justo matrimonio legitima proles suscepta: si voluerint eas uxores ducere, quæ antea fuerant concubinæ tum conjugium legitimum cum hujusmodi mulieribus ingenuis (ut dictum est) posse contrahere, quam filios utriusque sexus ex earundem mulierum priore contubernio procreatos, mox postquam nuptiæ cum matribus eorum fuerint celebratæ, suos patri, et in potestate fieri: et cum his, qui postea ex eodem matrimonio suscepti fuerint, vel solos (si nullus alius deinde nascatur) tam ex testamento volentibus patribus etiam ex integro succedere, quam ab intestato petere hereditatem paternam, &c.'

This was carried still further when marriage was invested with a religious character. Its efficacy as a sacrament was regarded as so powerful, as to have a retrospective operation upon children born at a time when there was no semblance or intention of marriage of any kind, provided that at the time of the birth there existed no impediment to the marriage of the parents. Alexander III., who filled the papal chair from 1159 to 1181, pronounces that 'Tanta est vis matrimonii, ut qui antea sunt geniti, post contractum matrimonium, legitimi habeantur.' *Extravag.*, cap. 6, 'Qui filii sunt legit.' (Pothier, *Traité du Contrat de Mariage.*) This modification of the law of legitimacy, though frequently recommended by the clergy, was never adopted in England by the laity. It is however the law of Scotland and of France, and of most other Catholic countries.

MARRIAGE, ROMAN. The right conception of the Roman institution of marriage and of its legal consequences is essential to enable us to approximate to a right understanding of the old Roman polity.

Children were in the power of their father [EMANCIPATIO] only when they were the offspring of a legal marriage (justæ nuptiæ, or justum matrimonium). The cases of legitimation and adoption need not be considered here. To constitute such a legal marriage there must be between the parties *connubium*, the nature of which condition is best explained by an example:—Between a Roman citizen and the daughter of a Roman citizen there was *connubium*, and as a consequence the children of such marriage were Roman citizens, and in the power of their father. Between a Roman citizen and a female slave (ancilla) there was no *connubium*, and consequently the children which sprung from such a union were not Roman citizens. Whenever there was no *connubium*, the children followed the condition of the mother: when there was *connubium*, they followed the condition of the father. Various degrees of consanguinity, as the relation of parent and child, prevented *connubium* between parties in such a relation. After the emperor Claudius had married Agrippina, his brother's daughter, such relationship was no longer an impediment to a legal marriage; but the licence was carried no further than the terms of the decretum of the senate warranted, and the marriage of an uncle with his sister's daughter remained, as before, an illegal union. (Tacit., *Annal.*, xii. 7; Gaius, i. s. 62.) Further, to constitute a legal marriage, the two parties must be of sufficient bodily maturity; both parties also must consent, if they are capable of giving a legal consent (sui juris); or if not, their parents must consent.

The ceremonial parts of the marriage were of three kinds, by any one of which the wife was said to come into the hand of the husband (in manum), and to occupy the legal relation of a daughter. A woman who lived for one year with a man without interruption became his wife by virtue of this cohabitation (usus). As in the case of all moveables, by the laws of the Twelve Tables, one year's enjoyment of a thing transferred the ownership of it, so by one year's uninterrupted cohabitation the husband acquired that interest in the wife which was the result of complete marriage. The Twelve Tables provided that if the wife wished to avoid the legal effect of this cohabitation, it was only necessary to absent herself from her husband for three nights during the year, which would be a sufficient legal interruption to the usus. In the time of Gaius this part of the old law had been partly abolished by enactments, and had partly fallen into disuse.

The Confarreatio, so called from the use of a loaf of bread on the occasion, appears to have been of the nature of a religious ceremony, and it existed in the time of Gaius. It appears that certain offices, such as that of Flamen Dialis, could be held only by those who were born of parents who had been married by the ceremony of Confarreatio. (Gaius, i. 112; Tacit., *Ann.*, iv. 16.)

The Coemptio was, in form, a sale (mancipatio) before five witnesses. [MANCIPIUM.] The Coemptio might be made either between a woman and her intended husband, in which case she became, in contemplation of law, his daughter, or between a woman and a stranger (fiduciæ causa), which was a necessary legal process in case a woman wished to change one guardian for another, or to acquire the privilege of making a will. For until the senatusconsultum passed in the time of Hadrian no woman could make a testamentary disposition (with the exception of certain privileged persons), unless she had contracted the Coemptio, that is, had been sold, and then resold and manumitted. The Coemptio, being effected by mancipatio, worked a legal change of status (*Dig.*, iv., tit. 5, s. 1), or *diminutio capitis;* and it was the least of the three kinds of *diminutio capitis*, or that by which a person underwent no change in his civil capacity, except the being transferred into another family. (Paulus, *Dig.*, iv., tit. 5, s. 11.) This explanation will render intelligible the passage of Cicero on the testamentary power of women (*Topic.*, 4), taken in connection with Gaius (i., s. 115, &c.). The essays of Hoffmann and Savigny in the 'Zeitschrift für Geschichtliche Rechtswissenschaft,' vol. iii., p. 309, &c., may also be read with advantage.

A gift from husband to wife, or from wife to husband, was void (with some few exceptions). The transaction was the same as if nothing had been done. The Donatio mortis caussâ, or divortii caussâ, in contemplation of death, or in consideration of divorce, was a valid gift.

There could be no *dos* (marriage portion), unless there was justum matrimonium. The term *dos* comprehended both what the wife brought to the husband on her own account, and what was given or contracted to be given by any other person, in consideration and for the purposes of the marriage. (*Dig.*, xxiii., tit. 3, s. 76.) When the *dos* came from the wife's father, it was called *profecticia*, but when from any other person, *adventicia*. It was a general rule that the *dos adventicia* remained with the husband, unless there was some agreement to the contrary, in which case it was called *dos recepticia*. What came into the husband's possession, not as *dos*, was included in the term Parapherna (παράφερνα), or Paraphernalia, and did not become the property of the husband. All kinds of property could be the subject of *dos*. If they were things that could be estimated by number, weight, and measure (res fungibiles), the husband took them, subject to the liability, in case of a dissolution of the marriage, of restoring things to the same number, weight, and measure. Things given as *dos* might be valued or not valued: in case they were valued, the complete ownership of them passed to the husband, inasmuch as the valuation was in the nature of a sale, and the husband could dispose of the things as he pleased, subject only to the liability of restoring their value, in case of a dissolution of the marriage. If the things were not valued, and any loss ensued, without the fault or culpable neglect of the husband, the loss fell on the wife. In the case of things which were not fungibiles or not valued, the ownership during the marriage might be considered as in the husband, and as returning to the wife on the dissolution of the marriage. In such a case the husband could manage the wife's property as his own; he enjoyed the profits of it during the marriage, and could sell it. With some exceptions however he could not sell or dispose of the wife's immoveable property which was included in the *dos* (dotale praedium). (Gaius, ii., s. 63; *Instit.*, ii., tit. 8.) The portion became the husband's on the solemnization of the marriage, and he had the profits of it during the marriage. In the case of divorce the portion, or a part of it, according to circumstances, was restored. In case the wife died during the subsistence of a marriage, part returned to her father, and part remained to the children of the marriage, if any; but it might, by the terms of the marriage contract, become the husband's, even if there were no children of the marriage. As to the portion of the wife, whatever might have been originally the rights of the husband over it by virtue of the marriage, it was in later times the subject of the express stipulations of the marriage settlement. The questions of law which arose on the subject of the *dos* were numerous and sometimes difficult.

In enumerating the modes by which a man may acquire property *per universitatem*, Gaius mentions marriage, by which a woman comes *in manum viri*, and he observes that all things pass to the husband. The meaning of this passage is perhaps not quite certain; but it is partly explained by what has been already said.

(*Dig.* 23, tit. 3, 'De Jure Dotium;' tit. 5, 'De Fundo dotali;' Ulpian, *Frag.* vi., 'De Dotibus;' Thibaut, *System des Pandekten-Rechts.*)

MARROW, or MEDULLA, is the fat contained in the osseous tubes and cells of the bones. [BONE.] It consists of an oily fluid, contained in minute vesicles, which are usually collected into bunches and enclosed in spaces surrounded by bony walls. It is most abundant in the cavities of the long bones, and in the spongy tissue of their articular extremities, and of the short rounded bones.

Spinal marrow and medulla spinalis are names sometimes applied to the spinal chord. [NERVES.]

MARRU'BIUM VULGA'RE (White Horehound), a biennial or perennial herbaceous plant, common by roadsides, the officinal part of which is the leaves; these are to be collected without the stalks. They are of a whitish-grey woolly appearance, possessed of a faint odour, which becomes less by drying, and a bitter sharp taste. Ten pounds of leaves yield four pounds of extract. Their chief constituents are a bitter extractive, with a volatile oil, and probably some astringent matter.

White horehound, when young, is apt to be confounded with many other labiate plants, particularly the Ballota nigra, or black horehound, which possesses a disagreeable odour. The medicinal properties of horehound are very insignificant, being demulcent, slightly tonic, and astringent. As a popular remedy, it enjoys great favour in many pulmonary complaints; but the preparations vended under the name of horehound often contain more efficient ingredients, to which they owe their success.

MARS, the planet which comes next to the earth, in order of distance from the sun, is a brilliant star of a slightly red tint. On examination in a telescope, this colour is found to belong to parts of the surface of the planet which have been conjectured to be land; the rest, which appears somewhat green, being supposed to be sea. Certain white spots, which appear at each pole after the winter of its hemisphere, and disappear during its summer, have been conjectured to be snow. The apparent diameter of Mars varies from 3″·6 to 18″·28, being 6″·29 when the planet is at its mean distance from the earth. The real diameter is ·517 of that of the earth, or about 4100 miles. Its bulk is ·1386 of that of the earth, and its mass is ·0000003927 of that of the sun, or about the 2546000th part.

The planet revolves on its axis in 24^{h} 39^{m} 21^{s}·3, and the axis is inclined to the ecliptic 30° 18′ 10″·8. Its light and heat are 43 per cent. of those of the earth.

Elements of the Orbit of Mars.

Epoch 1799, December 31, 12^{h} mean astronomical time at Seeberg.

Semiaxis major 1·5236923, that of the earth being assumed as the unit.

Excentricity ·0933070; its secular increase (or increase in 100 years) ·000090176.

Inclination of the orbit to the ecliptic 1° 51′ 6″·2; its secular alteration insensible.

Longitudes from the mean equinox of the epoch (1.) of the ascending node 47° 59′ 38″·4; its secular increase (combined with the precession) 2500″; (2.) of the perihelion 332° 22′ 51″; its secular increase (combined with the precession) 6582″; (3.) of the planet (mean) 232° 33′ 23″·2.

Mean sidereal motion in one mean solar day, 31′ 26″·655; in 365¼ days 689100″·739; sidereal revolution 686·9796458 mean solar days.

MARS, or MAVORS (called *Mamers* in the Oscan language), the god of war among the Romans, generally considered as corresponding to the Greek *Ares*. He was also called Marspater or Marspiter (Gell., v. 12), and was worshipped in peace under the name of Quirinus, and in war under that of Gradivus. There was a temple in Rome sacred to Quirinus, and another outside the city, in which he was worshipped under the name of Gradivus, on the Appian Way, near the gate Capena (Servius on *Æneid*, i. 296). According to tradition, Romulus was the son of Mars, by Rea Silvia; and it was perhaps owing to his being the tutelar god of the Romans that the husbandmen were accustomed, according to Cato (*De Re Rust.*, c. 141), to present their prayers to this deity, when they purified their fields by performing the sacrifice called *suovetaurilia*, which consisted of a pig, a sheep, and a bull. He is also called by Cato, Mars Silvanus (c. 83). According to a principle in Roman mythology, by which a male and a female deity are always supposed to preside over the same object of fear or desire, the Romans had a goddess of war called BELLONA.

A round shield (*ancile*), which was supposed to have been the shield of Mars, is said to have fallen from heaven during the reign of Numa, and was entrusted to the care of the Salii, the priests of Mars. Eleven other shields were made like it, in order that it might not be stolen.

The first month (Martius) of the old Roman year, which consisted of ten months only, derived its name from this god.

Mars is generally represented with a beard, but in other respects like the Greek Ares, and is frequently placed in the same group with Rea Silvia. (Müller, *Archæologie der Kunst*, p. 492.) For the Greek god of war, see ARES.

MARSA'LA, a town at the western extremity of Sicily, built near the site of the antient Lilybœum, the port of which is filled up. There is however good anchorage, sheltered by a small island which lies off the coast, and which is mentioned in the history of the siege of Lilybœum by the Romans.

The present town of Marsala, which was built by the Saracens, contains about 10,000 inhabitants, and belongs to the intendenza or province of Trapani. [TRAPANI.] The country around produces very good white wine, which is prepared for exportation by an English mercantile house established there, and is known by the name of Marsala. It is exported in great quantities to Malta, and also to England. There are very few remains of antiquity, except some traces of former aqueducts and tombs scattered about the country.

MARSAN, a subdivision of Gascogne, in France, now included in the department of Landes. Mont de Marsan was its capital. [FRANCE; GUIENNE ET GASCOGNE; LANDES.]

MARSDEN, WILLIAM, a distinguished Oriental scholar, was born in Dublin, on the 16th of November, 1754. He was of a Derbyshire family which had settled in Ireland at the end of the reign of Queen Anne. John Marsden, his father, was the son of one of the original settlers, and was established in Dublin as a merchant on a large scale. The subject of this article was his tenth child. After going through the usual course of classical education in the schools of Dublin, he was about to be entered at Trinity College with a view to the church, when his destinies led him to take a very different course. His eldest brother had before proceeded to Bencoolen as a civil servant of the East India Company; and sending home a very favourable account of his prospects, the father was induced to apply for another appointment in the same quarter for William, which proved successful. He was accordingly removed from school, and in the beginning of the year 1771, when he was but 16 years of age, he embarked for India, and arrived at Bencoolen in May of the same year. Here his assiduity, intelligence, and integrity quickly secured to him such distinction as a small establishment and community afforded. He became first sub-secretary, and soon after principal secretary to the government. The duties of these stations were not very laborious, and afforded ample leisure for study and inquiry. Mr. Marsden mastered the vernacular language of the country, the Malay, and at the same time laid in that stock of local knowledge which, being embodied afterwards in his publications, was the foundation of his fame as a writer.

Mr. Marsden's whole stay in Sumatra did not exceed eight years, but how well and diligently he employed this brief period can only be sufficiently appreciated by those who, like the writer of this article, have been engaged in the same pursuits. But he felt that his powers were wasted in the narrow field in which they were exercised, and he determined upon an experiment, usual in such a case as his, that of returning to England to push his fortune. He felt that, at all events, literary leisure, independence, and a congenial climate would be assured to him by this step.

Having this object in view, he quitted Sumatra in the summer of 1779, and in the last days of the same year arrived in England, with good health, but with a very trifling income of a few hundred pounds a year. His first attempt was to procure a small post under the government; but, failing in this, he resolved on a literary retirement, and on supplying the want of wealth by a prudent economy; and if he afterwards abandoned this course, his departure from it cannot be said to have been of his own seeking. Shortly after his return to England he made the acquaintance of the late Sir Joseph Banks, and at his philosophical breakfasts met and acquired the friendship of some of the most eminent men of the day, Solander, Maskelyne, Dalrymple, Rennell, and Herschel. He soon became a Fellow of the Royal Society, and eventually of almost every learned or scientific society of eminence in the kingdom. His literary reputation was insured by the publication, in 1782, of the well-known 'History of Sumatra.' This work, which has come to a third edition, and has been translated into French and German, has maintained its reputation with the public for the long period of 56 years. It has the peculiar impress of Mr. Marsden's mind, strong sense, truthfulness, and caution. In so far as our language at least is concerned, it may be considered as the first book of Oriental travels which, with a thorough and intimate personal knowledge of local details, combines philosophy, science, and a liberal acquaintance with letters. For 14 years after his return to England Mr. Marsden's time was devoted wholly to literature and science; and in this manner it was his fixed intention to have passed the rest of his life. In 1782 he had resisted the temptation of going to India with Admiral Sir Hyde Parker, with the lucrative office of secretary; and, in 1787, the certainty, under the auspices of the leading parties at the India House, of becoming an East India Director. In 1795 however, invited by Earl Spencer, on the recommendation of his intimate friend, the celebrated geographer, Major Rennell, he accepted the situation of second secretary; and in due course of time the secretary of the little Bencoolen government, and the author of the 'History of Sumatra' became chief secretary to the British board of Admiralty, with the war salary of 4000*l.* per annum. In this matter however it is evident that Mr. Marsden rather yielded to the advice of his friends than consulted his own inclination. No man at the same time could be better fitted, by diligence, official training, integrity, and general intelligence, to discharge the various functions which he was called upon to perform, and he did so discharge them for a period of 12 years, greatly to his own honour and the public advantage. This period too comprehended the most eventful and glorious in the history of the British navy, for it embraced the victories of Cape St. Vincent, Camperdown, the Nile, and Trafalgar. In 1807 Mr. Marsden, whose health began to suffer severely by the laborious discharge of the very onerous duties of his office, tendered his resignation of the secretaryship to the Admiralty, and retired on a pension of 1500*l.* per annum. The first solid fruits of Mr. Marsden's leisure were the publication, in 1812, of his Grammar and Dictionary of the Malay language, the most difficult, elaborate, and, we may perhaps add, the most likely to endure of his literary labours. A portion of the materials he had of course brought with him from Sumatra, and we find him engaged in the compilation of the Dictionary as far back as 1786. The eventual publication of these works however did not take place until 33 years after he had quitted Sumatra, and, consequently, after he had ceased to receive any assistance from native instructors. When we consider therefore the accuracy and erudition by which they are so eminently characterized, we must look upon them as affording the highest proofs of happy industry and acuteness.

After the lapse of twenty-six years, they still continue, as they are likely long to continue, the only standard works on Malayan philology. Translations of them have been made, under the auspices of the Netherland government, both into the French and Dutch languages. In 1817 he published his 'Translation of the celebrated Travels of Marco Polo.' The translation has been made with Mr. Marsden's accustomed accuracy, and is accompanied by a commentary far more valuable than the translation itself. In 1823 he published the first part, and in 1825 the second, of his 'Numismata Orientalia, or Description of Eastern Coins,' a valuable collection of which had fallen into his hands by purchase. This is a work of great care and learning, in which, as well as in some respects in the compilation of the Malayan Dictionary, he had the invaluable assistance of his learned relative Sir Charles Wilkins. In 1832, in his seventy-eighth year, Mr. Marsden published his last work, comprising three Essays, the longest, most elaborate, and important of which is on the Polynesian or East Insular Languages, a subject which had long engaged his attention and was a great favourite with him. He was indeed the first that pointed out the existence of a considerable body of Sanscrit words in all the cultivated Polynesian languages, and also the singular connexion which exists among these languages themselves, extending from Madagascar to Easter Island. In 1831 Mr. Marsden voluntarily relinquished his pension to the public, an act of liberality and generosity which, at the time, had no example, and has had very few since. It met, as it well deserved, the warmest applause of the House of Commons. In 1834, feeling, as he himself says, the increasing infirmities of age, he determined in his life-time to bestow his rich collection of coins and medals and his extensive library of books and Oriental manuscripts in such a manner as would make them most serviceable to the public. The coins and medals he gave to the British Museum, and his library to the newly-founded King's College. In 1833 he had a slight apoplectic attack, and in 1834 and 1835 a second and third. These greatly enfeebled his body, leaving him however in the entire possession of his memory. The final and fatal attack did not take place until the 6th of October, 1836, when, at seven o'clock in the morning, after passing a tranquil night, he gently expired, hardly uttering a groan, in the eighty-second year of a happy, prosperous, and well-spent life. Agreeably to his own directions, he was interred in the cemetery at Kensal Green. In 1807, shortly after quitting the Admiralty, Mr. Marsden married the eldest daughter of his old and intimate friend the late Sir Charles Wilkins; and notwithstanding the great disparity in the ages of the parties, the connexion, which lasted near thirty years, was one of much satisfaction and happiness, the result, on both sides, of exemplary prudence, good sense, and high principle. His widow is the judicious and accomplished editor of the 'Autobiographical Memoir' from which we have extracted this brief account, and which has been printed for private circulation only, and not published.

MARSEILLE, a seaport and city in France, capital of an arrondissement in the department of Bouches du Rhône. It is on the coast of the Mediterranean, 408 to 410 miles in a direct line south-south-east of Paris, or 497 miles by the road through Auxerre, Châlons-sur-Saône, Lyon, Valence, Avignon, and Aix, in 43° 18′ N. lat. and 5° 23′ E. long.

Marseille was founded by the inhabitants of Phocæa (*Φωκαία*), a Greek town which was a member of the Ionian confederation. [IONIA.] The Phocæans founded several colonies in the western part of the Mediterranean, of which Massilia, as the Latins generally wrote it, or Massalia (*Μασσαλία*) according to the usual Greek orthography, was perhaps the earliest, as it certainly was the most important. Two colonies of Phocæans successively established themselves in the place, the first about B.C. 600, while Phocæa was yet flourishing. The leader of this original colony, called by Aristotle (Ἡ *Μασσαλιωτῶν Πολιτεία*, quoted in Athenæus *Δειπνοσοφισταί*, lib. x.) Euxenus (*Εὔξενος*), having found favour in the eyes of Petta (*Πέττα*), daughter of Nanos (*Νάνος*), king of the Segobrigians, a tribe probably of Ligurians (Justin., *Hist.*, c. xliii.), received her in marriage, and also permission to found a city. The circumstances are related, with some variation, by Justin.

The new colony was early involved in hostilities with the native tribes, Ligurian and Celtic, over whom the Massilians obtained several victories, and established new settlements along the coasts, in order to retain them in subjection. The surrounding barbarians acquired from the new settlers some of the arts of civilised life: they learned to prune and train the vine, and to plant the olive. The Massilians had also to contend with the power of the Carthaginians (the commercial rivals of the Greeks in western Europe), whom they defeated in a sea-fight of early but uncertain date. (Thucyd., lib. i., c. 13.)

The second colonization of Massilia took place about B.C. 544, on occasion of the Phocæans quitting their native city to avoid the subjection with which they were threatened by the Persians. Herodotus does not notice the fact of any of these Phocæans settling at Marseille: he says that they sailed to Alalia in Corsica, which was a Phocæan colony, and commenced piracy. The Tyrrheni and Carthaginians uniting against them, a great sea-fight took place, in which the pirates obtained a dear-bought victory. After this battle they left Corsica for Rhegium. (Herod., i. 165-167.)

The Massilian constitution was aristocratic; their laws and their religious rites were similar to those of the Ionians of Asia. The worship of the Ephesian Artemis, or Diana, was cherished with peculiar reverence, both in Massilia itself and in its colonies. The governing body was a senate (*συνέδριον*) of 600 persons, called Timuchi (*τιμοῦχοι*), who were appointed for life. This senate had fifteen presidents (*προεστῶτες*), who formed a sort of committee, by which the ordinary business of the government was managed. Of this committee three persons possessed the chief power. The Timuchi were chosen from among those who had children, and in whose families the right of citizenship had been possessed by three generations. (Strabo, lib. iv.)

The Massilians, like the Phocæans, were a naval people; they had several colonies or posts on the coasts both of Gaul, Spain, and Italy: as Emporium (Ἐμπόρειον), now Ampurias, in Spain; Rhöe Agatha (Ῥόη Ἀγαθή), now Agde; Tauroeis (Ταυρόεις), or Tauroentium (Ταυροέντιον), now Tarente, near La Ciotat; Antipolis (Ἀντίπολις), now Antibes; Olbia (Ολβία), perhaps the port and castle of Leoube, between Hieres and St. Tropez; and Nicæa (Νίκαια), now Nice. They early and steadily cultivated an alliance with the Romans, which alliance was gradually converted into subjection. In the civil war of Pompey and Cæsar they embraced the party of the former; and receiving L. Domitius, one of his most zealous partisans, within their walls, and appointing him governor of the city, they closed their gates against Cæsar, under pretence of preserving neutrality (B.C. 49). Cæsar, hastening into Spain against Afranius and Petreius, after building and equipping a squadron with marvellous celerity, left his lieutenant C. Trebonius with three legions to carry on the siege, and appointed D. Brutus to command his fleet. In the first naval encounter the townsmen were defeated, with the loss of nine vessels. But the place was well stored with warlike machines; and the townsmen being encouraged by the arrival of L. Nasidienus, who was sent by Pompey to their aid, with a squadron of seventeen ships, they refitted their fleet, and put to sea to join him; but the confederate fleet being defeated by D. Brutus, and an attempt to destroy the machines which Trebonius had prepared for the attack of the city having failed, they were induced to apply for an armistice: this, when obtained, they violated by an attack in which they seriously damaged the works of Trebonius; but these being repaired, they again implored an armistice; and on Cæsar's return from his victory over the Pompeians in Spain, they surrendered to him. Cæsar did not reduce them into entire subjection, but left two legions in garrison while he marched forward into Italy. (Cæs., *De Bell. Civ.*, lib. i. 34-36, 56, 57; ii. 1-16, 22.)

The municipal government of Massilia remained unaltered, but its political independence was virtually overthrown. The attention of the Massilians was now more directed to literature and philosophy, of which indeed they were already diligent cultivators. They had spread through the south of Gaul the knowledge of the Greek written character, which Cæsar found in use among the Helvetii (*De Bell. Gall.*, lib. i., c. 29); and now their city became to the west of Europe what Athens was to the east. The moderate charges and frugal habits of the citizens added to the advantages of the place as a place of study, and the most illustrious of the Roman youth resorted thither. Cicero has recorded in the strongest language the praises of the Massilians (*Orat. pro L. Flacco*, c. 26). Livy has put a high encomium upon them into the mouth of a Rhodian ambassador (lib. xxxvii., 54); and Tacitus (*Agricolæ Vita*, c. 4) has spoken in the same strain. [AGRICOLA.]

For more than three centuries the history of Massilia presents no event of interest. In the troubles which followed the abdication of Diocletian and Maximian, the latter (A.D. 310) attempted to resume the purple at Arles, to the prejudice of the emperor Constantine, his son-in-law; but being baffled in his attempt, fled to Massilia, which he vainly attempted to defend. The city surrendered, or was taken by Constantine, and Maximian became his own executioner.

In the reign of Honorius, Massilia repelled the attempt of the Visigothic king Ataulphus, to take possession (Photii, *Biblioth.*); but it afterwards became the prey of Burgundians, Visigoths, and Franks. It was taken from the Franks by Theodoric the Ostrogoth king of Italy.

Toward the middle of the sixth century Marseille (to which we may now give its modern name), was ceded with the rest of Provence by Vitiges the Ostrogoth to the Franks, in order to secure their alliance against the Eastern emperor Justinian, who had sent Belisarius to conquer Italy. While under the Frankish sceptre the town suffered from the Lombards, who sacked it (A.D. 576), and from the Saracens, who seized it, but were quickly driven from it by the Franks, about the middle of the eighth century. In the division of the empire of Charlemagne among his descendants (A.D. 856), Marseille was included in the kingdom of Provence, under Charles, younger son of the emperor Lothaire; and afterwards it made part of the kingdom of Provence, or Bourgogne Cis-jurane, under Boson (A.D. 879). The union of this kingdom with that of Bourgogne Transjurane under Rodolph II. (A.D. 930), and the subsequent acquisition of the united kingdoms by the emperor Conrad le Salic (A.D. 1032), brought Marseille into the condition of a remote dependency of the German empire. During these changes, from the tenth century Marseille was under the immediate dominion of its own viscounts.

The Marseillois appear to have been actively engaged in the Crusades; and in the third Crusade, several armaments sailed from their port. The commerce of the town at this time was great, and the townsmen were in league with some of the great trading cities of Italy for the purposes of trade or of defence. In the beginning of the thirteenth century they freed themselves from feudal subjection to their viscounts and to the counts of Provence, and organised themselves into a municipal republic, under a chief magistrate called the podestat; but in a few years they were deprived of many of their privileges by Charles of Anjou, count of Provence, brother of Louis IX. It was from Marseille that Charles set sail for the conquest of Naples. The troubles which agitated Provence during the reigns of his successors materially diminished the population of Marseille; and as the authority of the emperor in Provence had ceased to exist even in name, the country was exposed to the inroads of the Brigands, who had risen up during the wars of the English in France and the desolation of that kingdom.

In the contest for the sovereignty of Naples and Provence, between the houses of Anjou and those of Durazzo, and subsequently of Aragon, the Marseillois faithfully adhered to the house of Anjou, and rendered signal services to their cause; but in the year 1421 the town was taken by the king of Aragon, and a considerable part of it sacked and burned. It was, upon the retreat of the Aragonese (A.D. 1423), further plundered by marauders from the surrounding country. The town recovered however from this severe blow, and became the ordinary residence of Réné, duke of Anjou and Lorraine, who died here, A.D. 1480. Upon the death of Charles, count of Maine, successor of Réné, Marseille came directly under the government of the French crown, to which it has ever since remained subject.

In the war of the emperor Charles V. with François I. of France, the Constable Duke of Bourbon [BOURBON, CHARLES DE] at the head of an army of Imperialists besieged Marseille (A.D. 1524), but was bravely repelled by the townsmen. In the year 1536 the town was again unsuccessfully attacked by the Imperialists under Charles V. in person and the Duke of Alba. In the religious troubles of the sixteenth century a plot was formed (A.D. 1585) to betray Marseille into the power of the League, but it failed. Subsequently however the partisans of the League gained a complete ascendancy in the city, which became the prey of intestine commotions, until the Duke of Guise, governor of Provence, for Henri IV., was admitted (A.D. 1596) by the partisans of that monarch. In the reign of Louis XIV. the municipal privileges of the city were diminished, and forts were built, as much probably to control the townsmen as to defend the place. In A.D. 1720, 40,000 or 50,000 of the inhabitants were swept away by pestilence. Belzunce, bishop of Marseille, the echevins or municipal officers of the town, and three physicians of Montpellier, distinguished themselves by their courageous performance of their duties at this trying season. In the Revolution the Marseillois acted a conspicuous part. A band of political fanatics went to Paris, and were among the leaders in the attack on the Tuileries, in August, 1792. The townsmen attempted, but in vain, to support by an insurrection the Girondists against the party of the Mountain.

The city of Marseille is built on the coast of the Mediterranean, which here runs north and south. The harbour is formed by a small inlet of the sea, running eastward into the very heart of the city, which is built round it. Its immediate site is a rich valley or hollow enclosed on the land-side by hills, of which the highest is that of Notre Dame de la Garde, on the south, surmounted by a fort. From the summit of the hill of Viste, on the north side of the town, over which the road from Paris leads, three miles distant, a fine view is obtained of the town and of the numerous country-houses (said to be five or six thousand in number) which occupy the surrounding part of the valley. The town was once fortified, and there are some remains of its walls and bastions. The entrance from Paris is by a fine broad planted road or wide street, which extends into the heart of the town, and is prolonged in a direct line, by a street of less width, quite through the town. To the east of this street is the old town, occupying a triangular point north of the harbour. The other parts constitute the new town, which consists of broad straight streets, provided with paved foot-paths and lined with well-built houses. The port, an oval of more than half a mile long and about a quarter of a mile broad, and capable of containing 1200 vessels, is surrounded by fine quays used as a promenade by the townsmen in the winter. There are several other promenades, the finest of which is that of Tourette, or the Esplanade, on the shore in the old town. The places or squares are more numerous in the old town than in the new, but neither so large, so regular, nor so ornamental. The town-hall built by the architect Puget, faces the harbour; the ground-floor is used as the Exchange; the great council-chamber has some fine paintings. There are a new market-house supported by thirty-two columns of the Tuscan order, a fish-market, and other markets; a lazaretto on the shore, north of the city, one of the finest and best managed in the world. There are also a mint; two theatres, the chief of them one of the finest in France; a triumphal arch, a column, and several public fountains. Water is brought from the little rivers Huveaune and Jarret by an aqueduct almost entirely subterranean; and many houses have wells, the water of which is drinkable.

The population of Marseille in 1789 was 76,222; in 1801, 111,130; in 1811, 102,217; in 1821, 109,483; in 1831, 121,272 for the town, or 145,115 for the whole commune; and in 1836, 146,239 for the commune. It is the third city in France for population, being exceeded only by Paris and Lyon. The city has always depended for its prosperity on commerce. The harbour is very safe. Opposite the mouth of it, which is narrow, not permitting the entry of more than one ship at a time, are the three small islands of If (having a castle, once used as a state prison, and numerous batteries), Ratonneau, and Pomègue, which are both fortified. The entrance to the port is defended by two forts; that of St. Jéan on the north, and that of St. Nicholas on the south. Fort St. Nicholas, which was converted by Louis XIV. into a citadel, has been in great part demolished by the townsmen.

The port is not deep, and is liable to be filled by the mud brought down by the rain from the neighbouring hills: machines are continually at work to keep it clear. Frigates cannot enter without difficulty; ships of the line cannot enter at all, but are obliged to anchor in the road between the islands of Ratonneau and Pomègue, where also vessels perform quarantine. This anchorage is secure. The number of vessels which enter the port is estimated at 5000 or 6000 in the year; and the customs and other dues collected are estimated at nearly 1,000,000*l.* annually. The French trade with the Levant is entirely carried on from this port; and there is active communication with Italy, Spain, and Barbary. The imports are of raw cotton, sugar, dye-woods, and of divers articles from the Levant. The exports are of wines, brandy, corn, dried fruits, oil, soap, hosiery, damask and other linens, woollens, silks, leather, hides, and colonial produce. The chief manufactures are those of soap, morocco and other leather, glass, porcelain, hats, caps, starch, gunpowder, snuff, alum, sulphur, vitriol, nitre and other chemicals, glue, wax-candles, straw-hats, and cutlery. The refining of sugar and salt, calico-printing, the distillation of brandy, essences, and liqueurs, cork-cutting, and the preparation of anchovies and other salt provisions, dried fruits, olives, and wine for exportation, are carried on. The city is from its commercial character the resort of foreigners of all nations; and the variety of costume, continual bustle, and medley of languages which this occasions are among the most striking features of the place. The character of the people is by no means favourably drawn by our authorities.

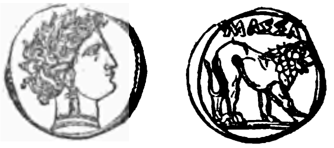
Marseille has communications by daily public conveyances with Lyon, Aix, Avignon, Nîmes, Toulon, Geneva, and other places; and by steam-boats at brief intervals with Nice, Genoa, Leghorn, Bastia, Civita Vecchia, and Naples; and at longer intervals with Port Vendre, Barcelona, and Valencia. It abounds with hotels and has some public baths and handsome cafés. The mistral, a keen, parching, and often tempestuous wind, blights all verdure, and its blasts are interchanged with the scorching rays of an unclouded sun; swarms of gnats infest every corner night and day; and the scorpion is often found in the houses and occasionally even in the beds.

Marseille has a custom-house, a stamp-office, an exchange, and a board of trade; a commercial court, a subordinate justice court, and a tribunal for the regulation of the fisheries and the settlement of disputes respecting them, the members of which, called Prud'hommes, are annually chosen by the fishermen from among themselves; and several other government or other public offices. There is also an arsenal.

The parish and other Catholic churches and chapels are twenty in number; there are a Protestant church and a Jews' synagogue; with several hospitals and other charitable institutions. There are, an academy of sciences, belles-lettres, and art; an agricultural and a medical society; a high-school, schools of medicine, drawing, music, and navigation; a deaf and dumb school; a public library of 60,000 volumes, a picture gallery, a museum, two botanic gardens, and an observatory. Literature is not much cultivated at present: astronomy and navigation are the studies chiefly pursued. Marseille has produced several learned and eminent men. The navigator Pytheas and the poet Petronius Arbiter, in antient times, and the architect Puget, in modern times, are the chief.

Few antiquities have been discovered at Marseille, and there are no remains of antient buildings; some statues, urns, and medals have been dug up.

The diocese of Marseille comprehends the town and its arrondissement. The bishop is a suffragan of the archbishop of Aix. The town is the head-quarters of the 8th military division, which includes the departments of Basses Alpes, Vaucluse, and Bouches du Rhône. The arrondissement comprehends an area of 252 square miles, and comprehends nine cantons, or districts, each under a justice of the peace, and sixteen communes. The population was 178,866 in 1831, and 180,127 in 1836.



Coin of Marseille.

British Museum. Actual size. Silver.

MARSHAL, a term which, in its origin, meant simply a groom or manager of horses; but from the importance of such an employment in a rude warlike nation, the office of marshal became invested with great military authority, which, according to the usage of the times, drew to itself a considerable civil jurisdiction. One of the principal officers of state is the king's marshal, which office is now held hereditarily by the duke of Norfolk, who is said to have the office of marshal of England, and also an honour in respect of which he is earl marshal. This office was executed in time of war in the king's host or army; in time of peace, in the aula regis, or king's great court. Upon the division of the aula regis the marshal appointed deputies in the new courts. In the King's Bench, the marshal's deputy was called the marshal of the marshalsea of the king's court, or marshal of the King's Bench. In the Exchequer, the deputy was marshal of the Exchequer, or clerk of the marshalsea of the Exchequer. The duty of the acting marshal is regularly to attend the court, and to take into his custody all persons committed to his custody by the court.

The lord high constable, when there was one, and the earl marshal, were the judges before whom the court of chivalry or court martial was held. This court had cognizance of contracts touching deeds of arms and of war arising out of the realm, and of all appeals [APPEAL] of offences committed out of the realm, and of matters within the realm relating to war, in cases which the courts of common law were incompetent to decide. Its proceedings were according to the course of the Roman or civil law. The earl marshal cannot hold this court alone, and there has been no hereditary or permanent high constable since the forfeiture of the duke of Buckingham, 'poor Edward Bohun,' in the time of Henry VIII. In the few cases in which the court of chivalry has been since held, a high constable has been appointed for the occasion. In the case of an appeal of death brought in 1583 against Sir Francis Drake by the heir of one Dowtie whose head Drake had struck off in parts beyond sea, Queen Elizabeth refused to appoint a high constable; and thus, says Lord Coke, the appeal slept. The minor duties of the earl marshal are set out with great minuteness of details in a document preserved in Spelman's 'Glossary.'

Besides the earl marshal, there is a knight marshal, or marshal of the king's household. The office of earl marshal, and that of marshal of the King's Bench, as well as that of the knight marshal, is called a marshalsea; but the term is ordinarily applied to the last only.

MARSHALSEA. In the Marshalsea of the king's household there are two courts of record. 1. The original court of the marshalsea is a court of record, to hear and determine causes between the servants of the king's household and others within the verge, that is, within a circle of twelve miles round the king's palace, with a jurisdiction of pleas of trespass where either party is one of the king's servants. 2. The palace court was erected by letters patent, 6 Charles I., confirmed by Charles II., and has authority to try all personal actions between party and party, though neither of them be of the king's household, provided they arise within twelve miles round Whitehall. The judges of this court are, the steward of the king's household and knight-marshal; but the court is, in fact, held before a barrister deputed by the knight-marshal. The palace court is held once a week in Scotland Yard, and causes are here brought to trial in four or five court-days, unless they are of sufficient magnitude or importance to induce either party to remove it into one of the superior courts. A writ of error lies from both courts into the court of king's bench.

MARSHAM, SIR JOHN, born 1602, died 1685. The noble family of Marsham have the honour of tracing themselves to a man whose chief distinction it was, that he was one of the most eminent scholars of his age, as the founder of their hereditary honours. He was one of six sons and four daughters of an alderman of London, and was born in the parish of St. Bartholomew. He had his education in Westminster school, and St. John's College, Oxford. He afterwards travelled much abroad in France, Italy, and Germany, both as a private gentleman and in the suite of Sir Thomas Edmunds the ambassador. When he returned home he betook himself to the study of the law, but it does not appear that he attained to more than to be appointed one of the six clerks in Chancery, and even this office he lost when the contentions arose between the king and the parliament. Nor was this all; for, following the king to Oxford, and remaining attached to the royal cause, he suffered greatly in his estate. On the change of the times he was returned to parliament for the city of Rochester, was restored to his six clerks' office, was knighted, and soon after was created a baronet. He died at Bushy Hall near Watford.

Such is the outline of his life. The predominance of a political power to whom he was obnoxious, in the period of his life when his mind was at maturity, gave him leisure to pursue those studies for which he had acquired a taste in the earlier period of his life. The subject on which his mind was particularly directed is one of peculiar intricacy and difficulty, the disentangling the perplexed statements to be found in early writers concerning antient dynasties and events in the earliest periods of history. The results of these studies he gave to the world in a folio volume, printed at London in 1672, which he entitled 'Canon Chronicus, Ægyptiacus, Ebraicus, Græcus,' being an enlargement of a work on the same subject published in 1649, entitled by him 'Diatribe Chronologica.' Sir John Marsham has treated the subject in a manner befitting a scholar intent on nothing but the discovery of truth, if truth be attainable. His work was published at Leipzig in 1676, and at Franeker in 1696, with a preface by the editor Menckenins, in which some of his conclusions are questioned. It is probable that the modern discoveries in Egypt may affect in some points the argument of this learned scholar.

In the same spirit he attacked the difficulties which rest on the 'Chronology of the Early History of Persia:' but this work has not, we believe, been given to the public; nor the 'Dissertations on the Money of the Antients,' and on the 'Roman Provinces and Legions,' which it is understood he left in manuscript.

There is another work of his, less celebrated, the Preface, or Προπυλαιον, as he called it, to the great work on English monasteries, entitled 'Monasticon Anglicanum,' which was begun by Roger Dodsworth, and finished by Sir William Dugdale. This appeared in 1655.

Sir John Marsham was not only himself learned, but his two sons, Sir John Marsham of Cuxton, and Sir Robert Marsham of Bushy, were also studious and learned men The son of Sir Robert was created Lord Romney by King George I.

MARSHES are those places of greater or less extent on the earth's surface, where the soil is almost constantly soaked with water. The swamp, the bog, the fen, and the morass, are so many different names for the same thing, or modifications which have not yet been defined. Whether marshes be considered with regard to their advantages or disadvantages, they are equally interesting, and are objects that call for the attention of individuals and sometimes of states. The advantages which they offer are of limited extent, and may be divided into spontaneous and artificial. The former consist in the natural productions which are furnished by some of them, of which peat is unquestionably the most important. (Ireland, Holland.) Some furnish iron-ore in considerable quantity, and, though generally of a bad kind, it is sometimes very good, and worked with advantage (Siberia); others supply aquatic game in abundance, which is a great resource to the neighbouring inhabitants, either for consumption or as an article of commerce (the marshes of Tuscany); *others again* abound in eels and other fish; and some, as *those of the* Saône in France, and those of Poland, are valuable for the myriads of leeches which they furnish, and which are sent to distant parts. The soil itself, dug up from the marshes, which is called bog-earth, and the upper surface of the peat bogs, burnt or unburnt, are in many cases considered an excellent manure, and employed as such. (Poland, France.) The reeds, rushes, willows, &c., which grow so abundantly in certain marshy lands, are in many places objects of considerable importance. (Italy, Holland.) The artificial advantages to which marshes may be turned are confined chiefly to the cultivation of rice, where climate and other circumstances are favourable to the growth of this grain. (North America, Hungary.) The disadvantages of marshes are great: they are in general fatal to health, and agriculture suffers by the loss of all the marshy land. That health is materially injured by the pestilential air of marshes is evident from the fact that the ordinary mean length of life in their neighbourhood is very low. Cattle are also great sufferers from the influence of marshy grounds. The engineer Rauch says, 'Marshes are the ulcers of the earth, which blur the fair face of nature, where all should be beauty; and from these infectious sores the languor of death extends far and wide over all that should live and flourish:' but the details of their baleful influence are nowhere more strikingly set forth than in the prize essay on this subject, by M. Ramel of Paris. Nevertheless all marshes are not equally prejudicial to health; but independent of their different degrees of insalubrity, marshes present other distinguishing features. The climate, the nature of the soil, and the vegetation, are all so many circumstances which vary the appearance and character of marshes. The quantity of water is also very different; in some cases it is hardly visible, while in others, at least in certain seasons, the marsh presents the aspect of a multitude of stagnant pools covered with aquatic birds. This is the case with many of the Tuscan marshes, which are moreover remarkable for their floating islands, which sometimes unite and cover a large surface: these islands have little solidity, and, eventually sinking, become in time converted into peat: some of these marshes gain in extent, while the soil of others gradually rises, and the marsh disappears. Reeds are particularly abundant in the Tuscan marshes, and they are applied to a great number of useful purposes. The quality of the marsh-water also differs: thus, in some of the marshes of South Carolina, in the United States, it is salt, as likewise at Rochelle, Rochfort, &c., in France. In other places it is sulphurous, as is the case with the marshes of Mesopotamia; in many it is ferruginous, as in Siberia, where the marshes are strongly impregnated with sulphate of iron from the vitriolic springs which flow into them. The trees which are found imbedded in these marshes are so thoroughly impregnated with oxide of iron, that they supply an ore of excellent quality, furnishing a metal free from the defect of brittleness so common to the iron of most other bog-ores. In some cases the water of the marsh exhales an intolerable smell of sulphuretted hydrogen, arising from the decomposition of the sulphate of magnesia or Epsom salt, which is continually forming on their banks. (Siberia, and the banks of the Euphrates.)

In cold countries marshes freeze, but seldom become dry; in warm countries, on the contrary, the marshes are often dry, and such can never form peat. As to the vegetation of marshes, it is either composed of reeds, rushes, algæ, gramineæ, or mosses, of which the *sphagnum palustre* is the most common in peat-bogs. Brushwood of various kinds, and willows and alders, are also common in marshy grounds.

Marshes are found in all kinds of situations, in continents and in islands (Iceland, Anau, &c.), on the margin of the sea, as well as in the interior of the land, on the slopes and even on the summits of mountains, as well as in the plains. Most countries have them in greater or less abundance, but it has been remarked that they are less common in Asia and in Africa (as far as the latter is known) than in Europe, and that they are more abundant in America than elsewhere. In this latter part of the world almost all the plains are wet and abound in marshes; they are exceedingly common in the northern countries of the globe, particularly in the flat parts bordering on the sea, where the land is low and the subsoil clay. Here the rain and snow-water accumulate, and remain for want of sufficient evaporation to carry them off.

It would be impossible to enumerate all the existing marshes: we may however observe that in Italy there are the Tuscan and the celebrated Pontine marshes, which are of great extent; in France there are about 1,500,000 arpens, or French acres, of marshes, some of great surface, as that of Montoire near the mouth of the Loire, which has been worked for its peat for upwards of five hundred years, and gives constant employment to 8000 persons. Ireland contains about 3,000,000 acres of marsh; the marsh or bog of Allen alone contains 300,000 acres, and there are others very extensive. England has many marshes, particularly in Lincolnshire, Somersetshire, Kent, and Cambridgeshire; Chester, Huntingdonshire, Lancashire, and Stafford have extensive marshes, some of which contain embedded trees. Scotland is much diversified with marshy ground, as in Peeblesshire, Ayrshire, Sterlingshire, Kinross, &c. As for Holland, the whole country is properly a drained marsh, and it still contains some extensive bogs which furnish peat. All the space along the coast from Holland to Denmark is little better than a succession of marsh and sand. Russia in Europe has marshes of vast extent, as those at the source of the Don, along the river Pripitz, and round the sea of Azoff, as also in Finland and the Baltic Provinces, in Lithuania and Poland. The eastern part of Prussia abounds in swamps. Norway and Sweden have some bogs, but little in proportion to their territory. In Bessarabia in Turkey, and all along the lower Danube, there are extensive marshes covered with reeds. In Hungary the marshes are estimated at 2,000,000 arpens. Switzerland has some considerable swampy patches, many of which are on the slopes of the mountains and in the higher valleys. In Spain and Portugal there are some extensive marshes; indeed they are more or less scattered all over Europe.

Asia has its marshes and swamps, but they are less common than in Europe, if we except the northern portion, where they are in great number and very extensive, as between the lower Ob and the Yeniseï, and between this last river and the Lena. There is between the little Tanguska and the Yeniseï the marsh called Lis, equal in extent to the great lake Ladoga, suspended as it were in the midst of rocky hills. The province of Okhotsk has many swampy forests. A large part of China is naturally swampy, but it is to a great extent drained by the numerous canals which intersect the country. Tonquin has many marshes, and the peninsula of Malacca contains many of great extent. In India the province of Oude has some extensive marshes covered with reeds, the retreat of great herds of wild buffaloes. The mouths of the greater part of the rivers of India are marshy, and large swamps are sometimes found along their course, as is the case with the Padder. In the northern provinces there are many savannahs, or wet meadows. There are swamps along the Euphrates, and those of Mesopotamia are bitter, sulphurous, and salt. In Persia the province of Ghilan, in other respects fertile and beautiful, is very unwholesome on account of its marshes and marshy forests. Mazenderan has also many swamps. The eastern side of the lake Aral is marshy. The steppes of the Kirghis abound in salt marshes and pools. The Asiatic islands, that is, all those that are of any extent, contain marshes: thus part of the coast of Sumatra is covered with extensive marshes, which have caused it to receive the name of 'the pestiferous coast;' the reeds are gigantic bamboos, and a continual fog hangs over the aquatic soil. Batavia, Samarang, and other places in the island of Java are reputed to be so unwholesome, in consequence of the stagnant waters and pestilential marshes, that the island has been named the grave of Europeans. The Philippine Islands have a great many peat bogs. New Holland has much marshy ground along the coast, and immense swamps have been seen inland.

As for Africa, its interior is too little known to enable us to speak with any certainty of its marshes; but the southern part, according to Barrow, has many and extensive swamps covered with reeds and saline plants. Some of the rivers on the east are marshy at their embouchures, which is also the case with the Quorra. Madagascar contains marshes, in which the singular Ravenala (*urania speciosa*), a kind of palm, grows, remarkable for the size and disposition of its leaves, which are similar to those of the banana, and are employed by the natives as table-cloths, napkins, plates, dishes, and spoons.

America contains immense marshes. In the frigid zone of the New World, as far as known, fog-enveloped marshes have been found. To the westward, in Russian America, the land lying between the coast and the mountains is a slip of black swampy soil; some of the marshy grounds are on the slopes of the mountains, and retain the water like a sponge; their verdure (being covered with moss of various kinds) gives them the appearance of firm land, but in endeavouring to pass them the traveller sinks up to the waist. On the opposite or east coast of America we find Newfoundland intersected by marshes and morasses. Lower Canada has neither marshes nor stagnant water, but the rivers are muddy. To the south of the great lakes of North America, and as far south as Mexico, the United States contain a great number of marshes, and some of them of great extent. The low lands of Mexico also contain many swamps The former intendencia of Vera Cruz is principally occupied with marshes and sands. South America contains a great abundance of extensive marshes, as on the upper Apure, an affluent of the Orinoco; and the delta of the latter river is one vast swamp. The region which extends between the Andes and the Pacific has little marshy ground, if we except Chaco, where there are many swampy valleys; but on the other hand the immense plains which occupy the whole interior of the continent, from the mountains of Caracas on the north to the Straits of Magalhaens on the south, contain a great number of extensive marshes. All the immense basin of the Amazon is covered with swamps and wet land and marshy forests. To the south of the Campos Parexis, the provinces of Moxos and Chiquitos contain extensive marshes; in the latter particularly there is the great lake or marsh of Xarayes. [BRAZIL, p. 356.] This marsh is temporary however, being dry a great part of the year, and then covered with the cornflag (*gladiolus*) and other *irideæ*. The province of Chaco is also full of marshes, as well as that of Cordova, in which are the swamp of Los Porongos, the Mar-chiquito, &c. In La Plata there is the great marsh of Ybera, formed by the infiltrations of the Parana. At the north-west extremity of the Pampa of Buenos Ayres is the great reedy marsh called Los Canaverales, and along the whole course of the Rio Mendoza, and between that river and the foot of the Cordilleras, there are extensive marshes. They also exist on the upper part of Rio Negro. In short, we may say that all the immense region of the Pampas, or plains of South America, contains marshes. Brazil has many swampy woods; and in ascending the coast we find the great island of Marajo at the embouchure of the Amazons, a considerable tract of which is a marsh, formed in part by the deposit from the water of the river, and in part by the sands of the sea. Farther north again the whole coast of French Guyana is a swamp.

This enumeration of the known marshes and swamps, though comprehensive, is however far from being complete. Very large portions of the earth's surface remain still unexplored, and physical geography is yet too modern a science to have attracted the attention of travellers to the correction and completion of its details. Nevertheless it is certain that the extent of marshy ground is very great; and probably it was formerly much greater, for a multitude of natural circumstances have greatly diminished them, and are still effacing them by degrees. On the other hand colonization, and the consequent increase of population in the newly settled places, cause the clearing of forests and the draining of marshes to go on rapidly. There is no doubt but that in proportion as the swamps are dried up the source of many diseases will be got rid of; but again, it may be doubtful whether the increased drought occasioned by so vast a reduction of evaporating surface may not engender other diseases equally fatal with those which now spring from the superabundance of swampy ground; and it is possible that even absolute sterility may result, in some cases, from imprudent drainage.

MARSIAN WAR. [SOCIAL WAR.]

MARSIGLI, LUIGI FERDINANDO, COUNT, born at Bologna, of a noble family, in 1658, studied mathematics under Borelli, and natural history under Malpighi and other able professors. At the age of twenty he went to Constantinople. On his return he published 'Osservazioni sul Bosforo Tracio' (Rome, 1681), which he dedicated to Christina of Sweden; and he also wrote a memoir on the rise and decline of the Ottoman empire, which was not published until after his death. He afterwards served in Hungary as a volunteer in the Imperial army against the Turks, was raised to the rank of captain, and was wounded and taken prisoner at the battle of Raab, in 1683. He was sold as a slave, and, after suffering considerable hardships, was ransomed by his family. He was then employed by the emperor Leopold I. as an engineer, to settle the boundary-line of the Austrian dominions on the side of Turkey, agreeably to the treaty of peace between the two empires. When the war of the Spanish succession broke out, Marsigli, who was already a general, was actively employed, and he found himself in command of the garrison of Brisach, of which town the Count d'Arco was political governor. Brisach surrendered to the French thirteen days after they had opened the trenches. The aulic council of Vienna highly disapproved of the surrender, and Marsigli was publicly sentenced to be cashiered. He tried every means to have the sentence revoked, but in vain. He wrote and published a memoir in his defence, which is said to have appeared perfectly satisfactory to competent judges, and among others to Marshal Vauban. From that time he devoted himself to study; he travelled in France, was numbered among the members of the Academy of Sciences of Paris, and at last returned to his native town Bologna, to which in 1712 he made a donation of his scientific collections, which were placed by the senate of Bologna in a building allotted for the purpose, and called the Institute of Sciences and Arts. In 1726 Marsigli published his great work on the Danube, 'Danubius Pannonico-Mysicus, Observationibus Geographicis, Astronomicis, Hydrographicis, Historicis, Physicis, perlustratus ab Aloysio Ferdinando Comite Marsili, socio R. Societatum Parisiensis, Londinensis,' etc. (Amsterdam, 7 vols. folio, with handsome plates). The first volume treats of the geography of Hungary, Servia, and other countries bordering on the central Danube; the second, of the antient monuments in the same; the third, of the geology; the fourth, fifth, and sixth, of the ichthyology, zoology, and ornithology; and the last contains a catalogue of the plants, and treats of the nature and properties of the waters of the Danube and its great affluent the Theiss.

MARSTON, JOHN, a dramatist in the reigns of Elizabeth and James I., the particulars of whose life, and even the exact times of whose birth and death, are, like those of many of his contemporary poets, very uncertain. On the testimony of Wood, he seems to have been a student at Corpus Christi College, Oxford. At one time he appears to have been intimate with Ben Jonson, if we may judge from his dedication to that poet of the 'Malecontent;' but from the epistle to the reader prefixed to his 'Sophonisba,' it seems that his friendship subsequently ceased, as that epistle contains severe strictures on Jonson for his use of passages from classical authors in his tragedies of 'Sejanus' and 'Catiline.'

Marston left several plays, of which the following have been printed separately:—'Antonio and Mellido,' 'Antonio's Revenge,' 'Dutch Courtezan,' 'Insatiate Countess,' 'Malecontent,' 'Parasitaster,' 'Sophonisba,' 'Tamerlane the Great,' and 'What you will.' Of these the 'Malecontent,' an excellent play, abounding in causticity, and embellished with the most forcible poetic expressions, is printed in Dodsley's Collection. It appears however from the title-page of the first edition (1604) that this piece was written by Webster, and only altered by Marston. He also left some miscellaneous poetical works, collected and edited by Mr. Bowle in 1764; and he assisted Ben Jonson and Chapman in the composition of 'Eastward Hoe,' a play which is in Dodsley's Collection.

MARSTRAND. [SWEDEN.]

MARSUPIA'LIA, or MARSUPIA'TA (*Marsupium*, a purse or bag), an extensive group of Mammalia, differing essentially from all the others in their organization, and comprehending genera fed by every variety of nourishment. Their structure is, as a necessary consequence, modified accordingly; and we find among them an adaptation of the organs of progression, prehension, and digestion to their several wants and habits, so that we may trace in them analogies to the carnivorous, insectivorous, herbivorous, and rodent forms of the other mammiferous quadrupeds.

The first species belonging to this anormal or aberrant group brought under the notice of zoologists were those of America, and they received from Scaliger the appropriate name of *Animalia crumenata*, or *Purse-bearing animals;* for the leading peculiarity in these Marsupials is, so to speak, the premature birth of their young, which are born in a state of development not much beyond that of the fœtus in the other groups, at a very early stage of pregnancy, and attach themselves by the mouth to the teats, which are situated in the marsupium, or pouch, of the mother; and in this nidus, or, as it may be termed, second uterus, the almost embryotic young one is nourished till the little knobs that marked the place of the extremities shoot out into limbs, and till the whole frame-work of the animal is completed, and it is able to go alone. Long after this period it flies to the pouch upon the approach of danger, or enters it when fatigued, and may often be seen peeping out to ascertain whether it is safe to venture abroad again.

Linnæus, who appears only to have known the American species, or Opossums, arranges them under the generic appellation of *Didelphis*,* in his order *Feræ*, placing them between the Bears, Badgers, and Racoons, &c. (*Ursus*), and the Moles (*Talpa*).

Cuvier, who had the advantage of knowing the great quantity of species and variety of forms discovered in New Holland, arranged the copious materials which that extraordinary country afforded in addition to the few American forms, as the fourth order of his *Mammifères*, dividing the now numerous group into several subdivisions, and placing the order between his *Carnassiers* and his *Rodentia*.

Illiger makes the *Marsupialia* the sixth family of his second order, *Pollicata;* and his third order, *Salientia*, consists of the Kangaroos and Potoroos.

M. de Blainville divides the *Mammifères* into two subclasses; the first being the *Monadelphes*, and the second the *Didelphes*, which last consists of the *Marsupialia* and *Monotremes*, properly so called: we say properly so called, because, strictly speaking, every Marsupial female is a *Monotreme*.

Mr. Gray collects all the forms under the family *Didelphidæ*. The subfamilies into which the group is separated by him will be found in the article MAMMALOGY, where the views of zoologists in general, as to the classification of these animals, will be found.

Storr congregates all mammalia with opposable thumbs into one great group, which he divides into three sections: the first consisting of the genus *Homo;* the second of the genera *Sima*, *Prosimia*, *Procebus*, *Tarsius*, and *Lemur;* and the third of the genera *Didelphis* and *Phalanger*.

Mr. Ogilby separates his *Cheiropeds* (Mammals with opposable thumbs) into the three groups, *Bimana*, *Quadrumana*, and *Pedimana*, which last are characterised as having opposable thumbs on the hind hands only. The *Pedimana* consist of the families *Simiadæ* (with anthropoid teeth) and the *Didelphidæ* (with abnormal teeth). These last consist of the genera *Phascolarctos, Phalangista, Petaurus, Didelphys, Cheironectes, Dasyurus,* and *Phascogale.* ('Nat. Hist. of Monkeys, Opossums, and Lemurs,' *Menageries*, vol. iii., 1838.)

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* Or more properly 'Didelphys,' signifying 'double uterus.'

Before we proceed to notice the classification proposed by Professor Owen, it will be advisable to draw the attention of our readers to the Marsupial

ORGANIZATION.

Skeleton.—The Marsupialia differ considerably from each other in the osseous part of their structure, as might be expected in a group whose food and habits vary so much. Our limits do not permit of a detailed inquiry into these differences; but the examples given in the skeletons, skulls, and teeth represented in this article will convey a general notion of the formation of the bony parts, and the modifications to which they are subject. There is however one peculiarity common to all, which is even found in the true *Monotremes*, and presents a marked discrepancy from the osseous systems of the other Mammalia;—we allude to the *Marsupial bones.* These are attached to the pubis, and embedded in the muscles of the abdomen, where they afford support to the marsupium, or pouch, in the females. They exist also in the males, to whom their presence seems to be necessary for the purposes of reproduction. These bones and their situation are shown in the skeletons of the Kangaroo and Opossum. The principal modifications in the general form of the skull and in the other parts of the skeleton are well pointed out by Professor Owen, in his paper 'On the Osteology of the Marsupialia.' (*Zool. Proc.*, Oct., 1838.)

Organs of Digestion.—These, as might also be expected, vary greatly. The teeth are appropriated to the food or prey to be taken, whether it be flesh, insects, fruits, herbs, or roots; and in conformity with the same law, we have a simple or a complex stomach, and a corresponding structure in the viscera; the flesh-eating tribes being entirely without a cæcum, and the others possessing that appendage in a greater or less degree according to circumstances.

Organs of Reproduction.—But it is in the organs of generation and mode of reproduction that the great and striking difference exists between the Marsupials and all other known Mammals. Tyson first distinguished the true *vaginæ* from the *urethro-sexual canal,* as it has been termed by later physiologists, though he denominated it the *common passage* or *canalis;* nor was his conjecture as to the parts of the complicated uterine apparatus wherein gestation is carried on other than true. John Hunter, Sir Everard Home, M. Geoffroy St. Hilaire, M. de Blainville, and Mr. Morgan have all thrown more or less light upon this obscure subject; and the paper of Mr. Morgan, in the 'Transactions of the Linnean Society,' vol. xvi., is especially worthy of attention, as far as it goes. But it was reserved for Professor Owen to supply the many and great deficiencies which existed, and to attain a precise knowledge of the mode in which the embryo is developed, by determining from the examination of the impregnated uterus the nature of the relations subsisting between the fœtus and the mother.

Professor Owen, in his paper 'On the Generation of the Marsupial Animals, with a Description of the Impregnated Uterus of the Kangaroo' (*Phil. Trans.*, 1834), observes that in all the genera of this group the uterus is double, and the true vagina is separated either wholly or for a considerable extent into two lateral canals. Both the digestive and generative tubes terminate within a common cloacal outlet, and the term *Monotremata* therefore, he remarks, though confined to the edentate *Marsupiata*, is so far applicable to the whole of this aberrant division. As the females approach the *Oviparous Vertebrata* in their separate genital tubes, so also the males resemble them in the peculiar structure and connexions of the intromittent organ; and he points out that in the *Macropi*, the *Dasyuri*, and the *Phalangistæ* the corpora cavernosa penis have the same position below the pubis, with the same want of ligamentous attachment to the bony pelvis; and the glans has the same bifurcated form and double groove for the transmission of the semen as in the Opossum, in which these peculiarities in the male organs were first described by Cowper (*Phil. Trans.*, 1704). 'In those genera,' continues Mr. Owen, 'in which the females have an inward fold of integument, or abdominal pouch, the males have an outward duplicature in the corresponding situation for the lodgment of the testes, which are thus placed anterior to the penis; and it is a remarkable fact that the muscle which surrounds the mammary gland in the one sex is analogous to the suspensory cremaster of the testes in the other. Both sexes in the Marsupial genera manifest also their affinity to the oviparous classes in possessing two superior venæ cavæ, and in the want of the inferior mesenteric artery; and the marsupial bones, so common in the skeletons of reptiles, are limited in the mammiferous class to this division, in which alone, from the peculiarly brief period of uterine gestation, and the consequent non-enlargement of the abdomen, their presence might be expected. But these bones serve important purposes in relation to the generative economy of the *Marsupiata.* In the female they assist in producing a compression of the mammary gland necessary for the alimentation of a peculiarly feeble offspring, and they defend the abdominal viscera from the pressure of the young as these increase in size during their mammary or marsupial existence, and still more when they return to the pouch for temporary shelter. In the males, with the exception of the edentate genera, the marsupial bones, from their relation to the cremaster muscles, which wind round them like pulleys, assist in the compression and retraction of the testes during coition; a process which, from the peculiar position of the scrotum, has been supposed to differ from that of other quadrupeds. A recent opportunity however of observing the coitus of the Kangaroo, at the Zoological Gardens, proves that there is no difference as to position, which is the same as in the Dog, but that it is chiefly remarkable for the repetition of the act during a long-continued embrace. The peculiar length and tortuosity of the double vagina, for which the bifurcated glans of the male organ is adapted, may render necessary so efficient a process; and as the testes are then retracted entirely out of sight, it would seem that the marsupial bones have the same relation in the male to their secretion as they have in the female to the mammary glands. The minute size of the young of the American Opossum when found in the marsupium, their pendulous attachment to the nipples, and perhaps the mode in which the latter are developed, gave rise among the earlier observers to a supposition that they were originally formed from those parts; and the gemmiparous theory, which has subsequently often been revived, appears to have been prevalent at the time when Tyson first devoted his attention to the subject.'

Professor Owen, after concluding, from data stated in his paper, that it may be concluded that the ovulum in the Kangaroo quits the ovisac in a condition corresponding to that in the ordinary *Mammalia*, and increases in a similar manner as it descends in the uterus, goes on to describe in minute and most interesting detail the fœtus and membranes of a Kangaroo (*Macropus major*) at apparently the middle period of gestation, which in that animal continues for thirty-eight days. The membranes consisted of an amnios, a very large vitelline sac, rendered highly vascular by ramifications of omphalo-mesenteric vessels, and a thin unvascular chorion. There was no placenta, nor any adhesion between the exterior membrane of the fœtus and the internal surface of the mother by the opposition and interlacement of villi, or vessels, as in those *Mammalia* in which the placenta is replaced by a uniform villous and vascular chorion; the condition of the fœtus was such as occurs in the viper and other ovoviviparous reptiles, except that there was no trace of the existence of an allantois in that stage of the fœtal development. The dissection of very young mammary fœtuses of the Kangaroo, Phalangista, and Petaurus exhibited the remains of a urachus and umbilical vessels, whence Professor Owen concluded that at a more advanced stage of the fœtus an allantois was developed. Mr. Owen remarked that as the growth of the fœtus advanced, the circulating fluids became necessarily more charged with decomposed particles of the organised substance; and that although the extended surface of minutely subdivided blood-vessels afforded by the vitelline sac might serve both for respiration and nutrition at the earliest stages, yet that at a late period, and as the embryo acquired additional bulk and strength and parts, an accessory apparatus for that end appeared to be necessary. In all the *Reptilia*, he observed, in which the respiratory function of the fœtus is not performed by the extension of vascular filaments from the sides of the neck, an allantois or cæcal process, organised by umbilical or hypogastric vessels, is produced from the terminal portion of the intestinal tube. In the placental *Mammalia*, where the vitelline sac and vitellus are relatively smaller, the allantois makes its appearance much earlier, but is developed in different proportions in the different orders. It is subservient in all the placental *Mammalia* to the important function of the transference of the hypogastric or umbilical arteries to the exterior enveloping membrane or chorion; and in these *Mammalia*, Mr. Owen further remarked, the umbilical vessels coextended with the allantoic cæcum seek a more intimate contact with the vascular surface of the womb, and proceed to organise the chorion shooting out into villi, either extended over the whole surface, as in the mare, or disposed in circumscribed tufts, as in the *Ruminants*, or limited to one place and forming a single placenta, as in the human subject, and in all unguiculate mammals.

As connected with this subject Mr. Owen subsequently exhibited a preparation (of which a cut is given in Loudon's 'Magazine of Natural History,'* with the summary of the professor's paper in the *Phil. Trans.*) to the Zoological Society of London, and took occasion to observe that in the bird and reptile the umbilical vessels are limited to the allantois, and do not extend beyond that membrane to the chorion; the allantois therefore plays a primary part in the respiration of the fœtus. In the placental mammalia, on the other hand, its office as a temporary respiratory organ is secondary, but it is essential as a means of transference of the umbilical vessels to the chorion; it has therefore a pre-existence to the placenta, and without it the placenta could not be formed; for if it be considered that the embryo is formed within the bag of the chorion, and is originally free from any connexion with that membrane, there must of necessity be some support for the umbilical vessels during their passage to the chorion; but no other is known except the allantois, or urinary bladder, and urachus, as its remains are termed. The existence of a placenta, in Mr. Owen's mind, therefore infers the pre-existence of an allantois, but the reverse of the proposition does not therefore hold good. In birds and scaled reptiles the allantois itself performs the functions of the placenta or vascular chorion; and the question to be resolved relatively to the Kangaroo and other Marsupials was whether, the allantois being developed, it would serve as a medium for the organization of the chorion, or remain, as in the oviparous vertebrata, an independent vascular bag or cæcum. The examination of the preparation alluded to, a uterine fœtus of a Kangaroo placed at Mr. Owen's disposal by Dr. Sweatman, contributed to the solution of that question. This fœtus was further advanced than that described by Mr. Owen in *Phil. Trans.* The digits of the hinder extremities were, in this, completely formed. The umbilical chord extended nearly three lines from the abdominal surface of the fœtus; the amnios was reflected from this point to form the usual immediately investing tunic of the fœtus; and beyond the point of reflection, the chord divided into a very large superior vascular sac, organised by the omphalo-mesenteric vessels, corresponding in all respects with the vitelline sac described and figured in Mr. Owen's paper in *Phil. Trans.*; but below the neck of this sac there extended a second pyriform sac, about one-sixth the size of the vitelline sac, having numerous ramifications of the umbilical vessels, and constituting a true allantois. This sac was suspended freely from the end of the umbilical chord; it had no connexion at any part of its circumference with the chorion, and was equally free from attachment to the parietes of the uterus, in which the fœtus was developed.

The period of gestation (thirty-nine days) was determined in 1833, in the vivarium of the Zoological Society of London, by Mr. Owen, whose account of this hitherto obscure and most interesting portion of the natural history of the animal we here give from his paper in the *Phil. Trans.*

'In order to inure the female to the examinations of the pouch when they should become indispensable, they were commenced six days after the copulation, which took place on the 27th of August, and were repeated every morning and evening until the 5th of October, when, at 7 A.M., the fœtus was discovered in the pouch attached to the left superior nipple. On the preceding day at the same hour a great quantity of the moist brown secretion peculiar to the pouch was noticed, indicating a commencing determination of blood to that part, and at different periods during the day the female was observed to put her head into the pouch and lick off the secretion. When she was again examined, at six o'clock in the evening, a slight increase of the secretion was the only perceptible change in the state of the pouch; but there was no appearance in the nipples indicative of the event so soon about to take place. The nipple in use by the young one of the previous year was the right superior or anterior one; it was nearly two inches in length, and one-third of an inch in diameter, while the other three were about half an inch in length, and about a line in diameter. I took notes of the appearance of the marsupium on the 6th, the 10th, 15th, 21st, 30th, and 38th days of uterine gestation; no material alteration was however observable till after the death of the young Kangaroo of the previous year, which took place on the twenty-fifth day, when the brown secretion first began to appear, and the nipple that had been in use to diminish. As parturition took place in the night, the mode of transmission to the pouch was not observed. No blood or albuminous discharge could be detected on the litter, nor any trace of it on the fur between the vagina and orifice of the pouch; but these might have been removed by the mother. The appearances presented by the little one thus detected within twelve hours after being deposited in the pouch were as follow:—It resembled an earth-worm in the colour and semitransparency of its integument, adhered firmly to the point of the nipple, breathed strongly but slowly, and moved its fore-legs when disturbed. Its body was bent upon the abdomen, its short tail tucked in between the hind-legs, which were one-third shorter than the fore-legs, but with the three divisions of the toes now distinct. The whole length from the nose to the end of the tail, when stretched out, did not exceed one inch and two lines. On the 9th of October I again examined the pouch; the young one was evidently grown and respired vigorously. I determined to detach it from the nipple for the following reasons:—1st, to decide the nature of the connection between the fœtus and the nipple; 2nd, to ascertain, if possible the nature of the mammary secretion at this period; 3rd, to try whether so small a fœtus would manifest the powers of a voluntary agent in regaining the nipple; and lastly, to observe the actions of the mother to effect the same purpose, which one might presume would be instinctively analogous to those by means of which the fœtus was originally applied to the nipple. With respect to the first point, I was aware that the Hunterian dissections, as exhibited in the preparations in the museum of the college, and the observations of Mr. Morgan and Mr. Collie, concurred in disproving the theory of a vascular mode of connection between the mammary fœtus and the nipple; nevertheless as a discharge of blood had been stated by Geoffroy St. Hilaire to accompany marsupial birth, or the spontaneous detachment of the fœtus from the nipple, and even the anastomoses and distribution of the continuous vessels in the neck of the fœtus had been speculated on by him, it became desirable to have ocular demonstration of the facts.

The fœtus retained a firm hold of the nipple; when it was detached, a minute drop of whitish fluid, a serous milk, appeared on the point of the nipple. About half a line of the extremity of the nipple had entered the mouth, which extremity was of smaller diameter than the rest of the nipple, not being as yet so compressed by the contracted orifice of the mouth as to form a clavate extremity, such as it afterwards presents. The young one moved its extremities vigorously after being detached, but did not make any apparent effort to apply its legs to the integument of the mother, so as to creep along, but seemed, in regard to progressive motion, to be perfectly helpless. It was deposited at the bottom of the pouch, and the mother was liberated and carefully watched for an hour. She immediately showed symptoms of uneasiness, stooping down to lick the orifice of the vagina, and scratching the exterior of the pouch. At length she grasped the sides of the orifice of the pouch with her fore-paws, and drawing them apart, as in the act of opening a bag, she thrust her head into the cavity as far as the eyes, and could be seen moving it about in different directions. During this act she rested on the tripod formed by the tarsi and tail. She never meddled with the pouch while in the recumbent posture; but when stimulated by uneasy sensations, she immediately rose and repeated the process of drawing open the bag and inserting her muzzle, sometimes keeping it there for half a minute at a time. I never observed that she put her fore-legs into the pouch;

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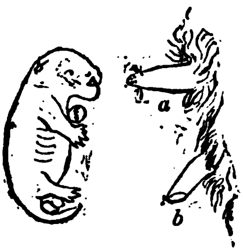
* Vol. i., New Series.

they were invariably employed to widen the orifice. When she withdrew her head, she generally concluded by licking the orifice of the pouch, and swallowing the secretion. After repeating the above act about a dozen times, she lay down, and seemed to be at ease.



Outline of the Kangaroo about twelve hours after uterine birth, showing its natural size and external development at this period. The elongation of the jaws has reduced the mouth to a simple round anterior orifice, which subsequently becomes even more contracted before the lateral fissures begin to extend backwards. The eye is concealed by the completely formed eyelids. Three divisions are now seen at the posterior extremity. A longitudinal line indicates the separation of the umbilical pedicle. *a*, the upper nipple of the left side, to which the above fœtus was attached; *b*, the lower nipple of the same side.

The freedom with which the mother reached with her mouth the orifices both of the genital passage and pouch suggested at once a means adequate to the removal of the young from the one to the other; while at the same time her employment of the fore-paws indicated that their assistance in the transmission of the fœtus need not extend beyond the keeping open the entrance of the pouch while the fœtus was being introduced by the mouth, when it is thus probably conducted to, and held over, a nipple, until the mother feels that it has grasped the sensitive extremity of the part from which it is to derive its sustenance. This mode of transmission is consistent with analogy, the mouth being always employed by the ordinary quadrupeds, as dogs, cats, and mice, for the purpose of removing their helpless offspring. It accords also with the phenomena better than those which have been previously proposed; for it is now ascertained, by repeated dissections both of the Kangaroo and Opossum, that there is no internal passage from the uterus to the marsupium; and if the genital outlet can be brought into contact with the orifice of the pouch in the dead Kangaroo by means of great stretching of the relaxed parts, yet such an action has never been witnessed in the living animal;[*] the tender embryo would be more liable to receive injury from the fore-paws; and these, from the absence of a thumb, could not so effectually ensure its passage as the lips, which can be opposed to each other. Lastly, the young one did not by any of its actions encourage the idea of its possessing the power of instinctively creeping up to the nipple. When the female had rested quiet for about half an hour, we again examined her, and found the young one not at the bottom of the pouch, but within two inches of the nipple; it was breathing strongly, and moving its extremities irregularly as before. I made an attempt to replace it on the nipple, but without success, and the mother was then released. On an examination two days afterwards the marsupium was found empty. Every portion of the litter was carefully searched, in the hopes of finding the fœtus, but without success. The mother therefore, owing to the disturbance of the young one, had probably destroyed it. This was a result I had not expected, for the head keeper at the Zoological Farm had twice taken a mammary fœtus from the nipple and pouch of the mother, soon after it had been deposited there, and when it did not exceed an inch in length, and it had each time again become attached to the nipple. I afterwards saw this fœtus attached to the nipple, and it continued to grow, without having sustained any apparent injury from the separation, until the death of the mother, when it was nearly ready to leave the pouch. A similar result occurred to Mr. Collie.'

The young one observed by Mr. Collie (see *Zoological Journal*, vol. v., p. 238) was of nearly the size of the last and half the middle joint of one's little finger; and the flesh-coloured integuments were so transparent as to permit the higher coloured vessels and viscera to be seen through them. The extremities seemed completely formed, and its muscular power was testified by its efforts in sucking, during which it put every part of its body in motion. 'According to the testimony of the person,' continues Mr. Collie, 'who preserved the mother with this little one for me, the latter by no means passes the whole of its time with the lacteal papilla in its mouth, but has been remarked, more than once, without having hold of it. It has even been wholly removed from the sac to the person's hand, and has always attached itself anew to the teat. Yesterday,[*] on again looking at it, I gently pressed, with the tip of my finger, the head of the little one away from the teat of which it had hold, and continued pressing a little more strongly for the space of a minute altogether, when the teat, that had been stretched to more than an inch, came out of the young one's mouth, and showed a small circular enlargement at its tip, well adapting it for being retained by the mouth of the sucker. The opening of the mouth seemed closed in on both sides, and only sufficiently open in front to admit the slender papilla. After this I placed the extremity of the teat close to the mouth of the young, and held it there for a short time, without perceiving any decided effort to get hold of it anew; when I allowed the sac to close, and put the mother into her place of security. An hour afterwards the young one was observed still unattached, but in about two hours it had hold of the teat and was actively employed in sucking.'

Professor Owen then refers to a similar experiment tried with a mammary fœtus about the size of a Norway rat by Mr. Morgan. This fœtus, after two hours' separation from the nipple, regained its hold, and sustained no injury from the interruption of the supply of nourishment. Mr. Owen concludes, therefore, that the evidence adduced establishes the fact that the mammary fœtus at a very early period is at least capable of sustaining a separation from the nipple; and although it may not at this stage of growth possess the power of regaining its hold by its own unaided efforts, it is far from being the inert and formless embryo that it has been described to be, resembling on the contrary, in its vital powers, the new-born young of the smaller *Mammalia* rather than the uterine fœtus of a larger species at a period of development when such a fœtus corresponds in size to a new-born Kangaroo; and although the latter possesses greater powers of action than the same-sized embryo of a sheep, and approximates more nearly in this respect to the new-born young of the rat, yet, Mr. Owen observes, it is evidently inferior to the latter. For, though enabled by the muscular power of its lips to grasp and adhere firmly to the nipple, its own unaided efforts seem incapable of drawing sustenance therefrom. The peculiar adaptation of a muscle, analogous to the cremaster, to the mammary gland, for the purpose of injecting the milk from the nipple into the mouth of the adherent fœtus, has been demonstrated by Professor Geoffroy and Mr. Morgan; and Mr. Owen remarks that it can scarcely be supposed that the fœtal efforts of suction should always be coincident with the maternal act of injection. If at any time this should not be the case, the consequences might be fatal from the forcible injection of milk into the larynx. To guard against this there is a special contrivance, first described by M. Geoffroy, the necessity for which appears to have been foreseen by John Hunter in his dissection of two small mammary fœtuses of the Kangaroo for the especial purpose of showing the relation of the larynx to the posterior nares (Nos. 3731, 3734, 3735, Mus. Coll. Reg. Chir., Physiological series), in which, as Mr. Owen states, there are evidences that Hunter had anticipated most of the anatomical discoveries which have subsequently been made upon the embryo of the Kangaroo. The epiglottis and arytenoid cartilages are elongated and approximated, and the rima glottidis is thus situated at the apex of a cone-shaped larynx which projects, as in the *Cetacea*, into the posterior nares, where it is closely embraced by the muscles of the soft palate. The air-passage is thus completely separated from the fauces, and the injected milk passes in a divided stream on either side the larynx to the œsophagus.

'Thus aided and protected by modifications of structure,' continues Professor Owen, 'both in the system of the mother and in its own, designed with especial reference to each other's peculiar condition, and affording therefore the most irrefragable evidence of creative foresight, the feeble offspring continues to increase from sustenance exclusively derived from the mother for a period of about eight months. The young Kangaroo may then be seen frequently to protrude its head from the mouth of the pouch, and to crop the grass at the same time that the mother is browsing. Having thus acquired additional strength, it quits the pouch, and hops at first with a feeble and vacillating gait, but continues to return to the pouch for occasional shelter and supplies of food till it has attained the weight of ten pounds. After this it will occasionally insert its head for the purpose of sucking, notwithstanding another fœtus may have been deposited in the pouch, for the latter, as we have seen, attaches itself to a different nipple from the one which had been previously in use.'

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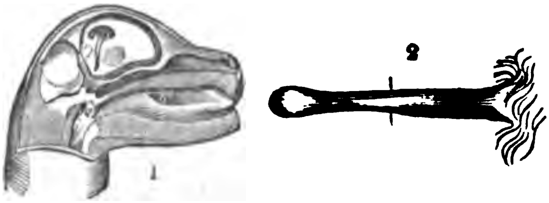
[*] N.B.—Mr. Owen observes that this argument is not applicable to those *Marsupiata* which, like *Perameles* and the smaller South American opossums, have the duplicatures of integument forming the pouch extended close to the cloaca.

[*] Mr. Collie's letter, which is addressed to Mr. Vigors, is dated '26th January, 1830.'



1. The head of a mammary fœtus of a Kangaroo, about eight weeks old, dissected to show the relation of the larynx to the tongue and posterior nares. *a*, the epiglottis, drawn down out of the aperture in the soft palate; *b*, the cavity in the tongue for the reception of the nipple. 2. The elongated nipple, withdrawn from the mouth: the dotted line shows the extent to which it is grasped; it never extends into the œsophagus or stomach, as has been conjectured. (Owen.)

For the observations made by Professor Owen on the structure of the female generative organs in the other Marsupials, as compared with those of Oviparous, Ovoviviparous, and Viviparous animals, we must refer to his paper above quoted, our space not permitting us to do more than call the reader's attention to the fact that his inductions rest principally on the examination of those organs in *Didelphys dorsigera*, *Petaurus pygmæus*, *Petaurus Taguanoides*, *Dasypus viverrinus*, *Didelphys Virginiana*, *Hypsiprymnus Whitei*, and *Macropus major*. His remarks on the inferiority of the cerebral development of the Marsupials will be read with great interest as bearing on the structure and analogies of those organs, and other points of resemblance to the lower vertebrate classes, especially to the reptiles. 'Those marsupial quadrupeds which I have had an opportunity of observing alive in the Zoological Gardens,' says the professor ('and there are at present (1834) species of *Dasyurus*, *Didelphys*, *Phalangista*, *Petaurus*, *Hypsiprymnus*, *Macropus*, and *Phascolomys*), are all characterised by a low degree of intelligence; nor can I learn that they ever manifest any sign of recognition of their keepers or feeders. Another character, no less uniformly belonging to them, is the want of a power of uttering vocalised sounds. When irritated they emit a wheezing or snarling guttural sound; that of the *Dasyurus ursinus* is the clearest, and is the nearest approach to a growl. Mr. Harris however states that in addition to this noise, the Ursine Opossum utters a kind of hollow barking. The *Thylacinus cynocephalus*, or large Dog-faced Opossum, he observes, utters 'a short guttural cry, and appears exceedingly inactive and stupid, having, like the owl, an almost constant motion with the nictitating membrane of the eye.' The Wombat, when irritated, emits a loud hiss, which forcibly reminds one of that of the serpent. The noise emitted by the Kangaroo under similar circumstances is equally remote from a vocalised sound; the necessary apparatus for producing which, Cuvier long ago observed to be wanting in the larynx of this animal. It is interesting to find these analogies to the *Reptilia*, and more might be pointed out if it were not a comparison which merits a separate consideration.' The reader who would pursue his inquiries as to the generative system of the Marsupialia may also consult the previous writings of Daubenton, Rengger, and Leuckart. The museum of the Royal College of Surgeons will afford ample materials for following out the organization of this extraordinary group in the skeletons and preparations preserved in the Physiological Series of that noble institution The following is the arrangement, based on the organization of the animals, proposed by Professor Owen in a paper read to the Zoological Society of London on the 8th and 22nd of January, 1839.

Classification of the Marsupialia.

Tribes.	Families.	Genera.	Subgenera.
SARCOPHAGA. Three kinds of teeth; canines long in both jaws; a simple stomach; no intestinum cæcum.	*Dasyuridæ*	Thylacinus. Dasyurus. Phascogale.	
. . . .	Extinct transitional forms.	Phascalotherium Thylacotherium } fossil.	
ENTOMOPHAGA. Three kinds of teeth in both jaws; simple stomach; a moderately long *intestinum cæcum.*	*Ambulatoria*	Myrmecobius.	
	Saltatoria	Chœropus. Perameles.	
	Scansoria	Didelphys	Cheironectes.
CARPOPHAGA. Anterior incisors large and long in both jaws; canines inconstant; a simple stomach; a very long *intestinum cæcum.*	*Phalangistidæ*	Phalangista	Cuscus. Pseudocheirus. Tapoa (Gray).
		Petaurus	Ascobates.
	Phascolarctidæ	Phascolarctos.	
POEPHAGA. Anterior incisors large and long in both jaws, canines present in the upper jaw only or wanting; a complex stomach; a long *intestinum cæcum.*	*Macropodidæ*	Hypsiprymnus.	
		Macropus	Halmaturus. Macropus.
RHIZOPHAGA.* Two scalpriform incisors in both jaws; no canines; stomach with a special gland; cæcum short, wide, with a vermiform appendage.	*Phascolomyidæ*	Phascolomys. Diprotodon (fossil)	

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* The terms given to the tribes or primary groups of Marsupialia in the classification are not to be understood as strictly indicating the food of the species severally included therein, but only their general tendency to select for their support the substances implied by those designations.

We now proceed to give a succinct illustration of the genera and some of the subgenera above mentioned.

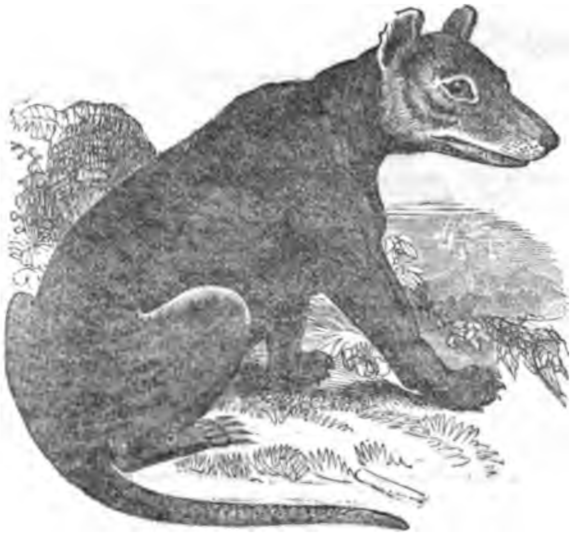
Thylacinus. (*Temminck.*)

Generic Character.—Dental Formula:—Incisors $\frac{8}{6}$, Canines $\frac{1-1}{1-1}$, Molars $\frac{7-7}{7-7}$ = 46. The incisors are ranged in a semicircle, equal, and separated in the middle in each jaw by a vacant space; the external incisor on each side is the stoutest; the canines are of considerable size, curved and pointed like those of the Cats and Dogs; the last molars are armed with three obtuse tubercles, resembling those of the two groups of *Carnivora* last mentioned. *Toes* five on each fore-foot, and four on each hind-foot.

Example, *Thylacinus cynocephalus* (*Dasyurus cynocephalus* of Geoffroy, *Thylacinus Harrisii* of Temminck).

Description.—Size of a young wolf; the short smooth hair of a dusky yellowish-brown above, barred or zebraed on the lower part of the back and rump with about sixteen jet-black transverse stripes, broadest on the back and gradually tapering downwards, two of which extend a considerable way down the thighs. The ground-colour on the back inclines to blackish gray. *Tail* much compressed and tapering to a point.

Habits and *Locality.*—Mr. Harris, from whose paper in 'Linn. Trans.' our description and figure are taken, states that this species, the largest of the Australian *Carnivora*, inhabits amongst caverns and rocks in the deep and almost impenetrable glens in the neighbourhood of the highest mountainous parts of Van Diemen's Land, where it probably preys upon the brush (bush?) Kangaroo and various small animals that abound in those places. The individual from which the description and drawing were taken was caught in a trap baited with Kangaroo-flesh. It remained alive but a few hours, and during that period uttered the cry and presented the appearances quoted by Mr. Owen. In its stomach were found the partly-digested remains of a Porcupine Ant-Eater (*Echidna aculeata*). The vulgar names for this species are, the *Zebra Opossum, Zebra Wolf,* &c.



Thylacinus cynocephalus.

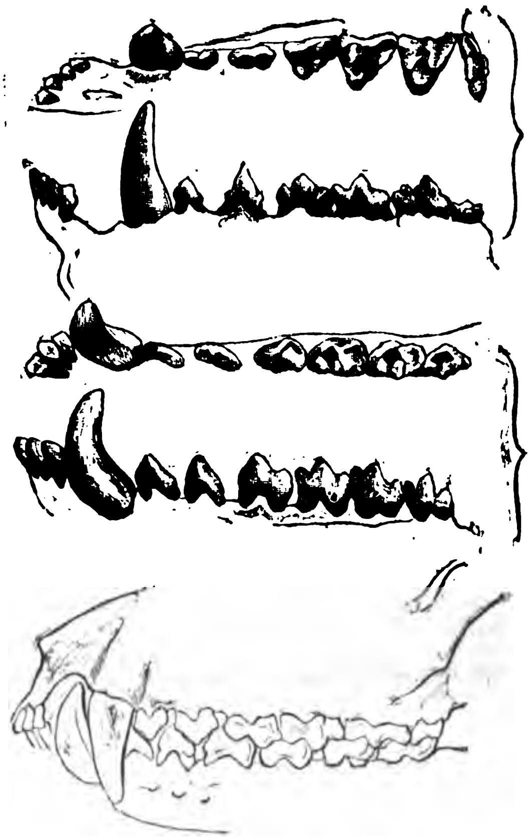
Dasyurus. (*Geoffroy.*)

Generic Character.—*Head* conical, very much pointed; gape very wide; ears moderate. *Toes* five on the fore-feet; on the hind-feet the great toe is reduced to a tubercle or is entirely absent.

Dental Formula:—Incisors $\frac{8}{6}$, Canines $\frac{1-1}{1-1}$, Molars $\frac{6-6}{6-6}$ = 42.

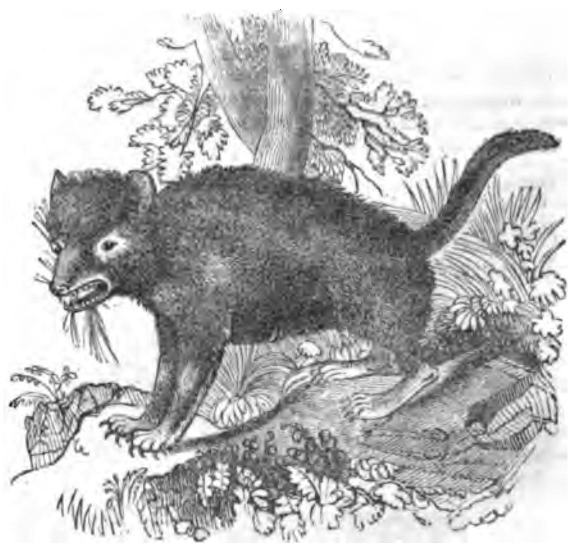
Example, *Dasyurus ursinus* (*Didelphis ursina* of Harris).

Description.—Head, body, legs, and upper part of the tail covered with long, coarse, black hair, irregularly marked with one or two blotches of white; in some specimens on the shoulders, in others on the throat or rump. Tail slightly prehensile, its under part bare. (Harris.)



Teeth of Dasyurus (Dasyurus macrurus)

Habits and Locality.—This species, which is very voracious, and burrows in the ground in Van Diemen's Land, is of the size of a badger. 'These animals,' says Mr. Harris, 'were very common on our first settling at Hobart Town, and were particularly destructive to poultry, &c. They however furnish the convicts with a fresh meal, and the taste was said to be not unlike veal. As the settlement increased, and the ground became cleared, they were driven from their haunts near the town to the deeper recesses of forests yet unexplored. They are however easily procured by setting a trap in the most unfrequented parts of the woods, baited with raw flesh, all kinds of which they eat indiscriminately and voraciously; they also, it is probable, prey on dead fish, blubber, &c., as their tracks are frequently found on the sands of the sea-shore. In a state of confinement they appear to be untameably savage; biting severely, and uttering at the same time a low yelling growl.



Dasyurus ursinus (Ursine opossum). (Harris.)

A male and female, which I kept for a couple of months chained together in an empty cask, were continually fighting; their quarrels began as soon as it was dark (as they slept all day), and continued throughout the night almost without intermission, accompanied with a kind of hollow barking, not unlike a dog, and sometimes a sudden kind of snorting, as if the breath was retained a considerable time, and then suddenly expelled. The female generally conquered. They frequently sat on their hind parts, and used their fore-paws to convey food to their mouths. The muscles of their jaws were very strong, as they cracked the largest bones with ease asunder; and many of their actions, as well as their gait, strikingly resembled those of the bear. Its vulgar name is the Native Devil.'

The specimen in the garden of the Zoological Society was a snarling surly animal.

Mr. Owen's account of the dissection of a *Dasyurus macrurus*, or *Long-tailed Dasyurus* (*Spotted Martin* of Phillip's Voyage), will be found in the 'Zoological Proceedings' for 1835.

Phascogale. (*Temminck.*)

Generic Character.—Differing from *Dasyurus*, especially in its Dental Formula:—

$$\text{Incisors } \frac{8}{6}\text{; Canines } \frac{1-1}{1-1}\text{; Molars } \frac{7-7}{7-7} = 46.$$

Example, *Phascogale penicillata* (*Didelphis penicillatus* of Shaw, *Dasyurus penicillatus* of Geoffroy). Size rather larger than that of the Brown Rat (*Mus decumanus*). Tail very bushy. Fur uniform, ash-colour, whitish beneath, short, woolly, and very thick.

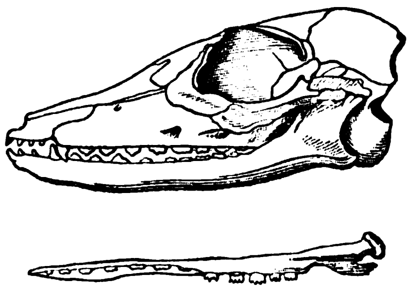
Habits and Locality.—This *Phascogale* lives on trees in New Holland.

Phascogale penicillata.

Myrmecobius. (Waterhouse.)

Generic Character.—*Fore-feet* with 5 toes; hind-feet with 4 toes, all free. *Head* elongated, snout produced; ears moderate, narrower, and subacute at the apex. *Body* slender. *Tail* moderate.

$$\text{Dental Formula:—Incisors } \frac{8}{6}\text{; Canines } \frac{1-1}{1-1}\text{; Pseudo-molars } \frac{3-3}{3-3}\text{; Molars } \frac{5-5}{6-6} = 52.$$

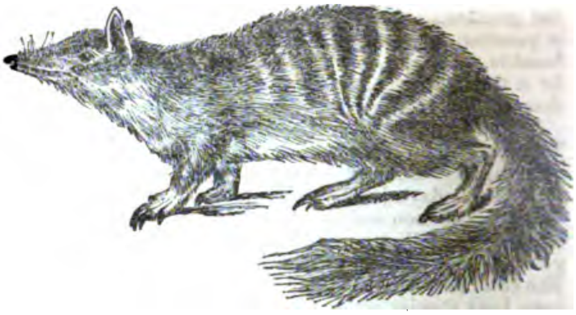


Skull and lower jaw of Myrmecobius.

Example, *Myrmecobius fasciatus.*

Description.—Fore part of the body reddish, gradually blended into the black, which is the prevailing colour of the posterior half, and which is adorned with nine white bands. Fur of two kinds. Under hair scanty and whitish grey; upper hair rather coarse, short, and adpressed on the anterior parts; long on the posterior and under parts; hairs on the anterior part of the back generally black at the base and fulvous at the apex; those on the head very short, brownish above, being composed of a mixture of black, fulvous, and a few white hairs; a few black hairs spring from the sides of the muzzle and under each eye; hair of the tail long and rather bushy; most of the hairs on the under part fulvous at the base and white at the tip; those on the under side of the tail generally black at the base and white at the apex. Length from nose to root of tail 10 inches; length of tail to the end of the hair 7 inches.

Habits and Locality.—Mr. Waterhouse, in his paper in the 'Transactions of the Zoological Society,' descriptive of this animal, gives the following account of the two specimens on which his description is founded. The first was procured by Lieutenant Dale of Liverpool, whilst on an exploring party in the interior of the country at the Swan River Settlement, and was discovered about ninety miles to the south-east of the mouth of that river. Two of these animals, according to Lieut. Dale, were seen within a few miles of each other; they were first observed on the ground, and on being pursued, both directed their flight to some hollow trees which were near. The party succeeded in capturing one of them; the other was unfortunately burnt to death in their endeavour to dislodge it by fumigating the hollow tree in which it had taken refuge. The country in which they were found abounded in decayed trees and ant-hills. Mr. Waterhouse was informed that the second individual was found in Van Diemen's Land (but he suspects some mistake here), and that others similar to it had been seen in the act of burrowing or digging at the roots of trees in search after insects. Their favourite haunts are stated to be in those situations in which the Port Jackson willow abounds.



Myrmecobius fasciatus. (Waterhouse.)

Mr. Waterhouse observes, that although in the structure of the skull *M. fasciatus* evinces an affinity to *Phascogale*, it differs from that genus in the want of a thumb to the hind-feet, and in the strength and larger size of the claws of the fore-feet, which are shaped somewhat like those in the genus *Herpestes*, and are evidently suited to burrowing. The fore-legs are also stouter in proportion, and the feet are stronger. In their narrow and pointed shape, the ears, he remarks, resemble those of *Perameles nasutus*, and differ from those of *Phascogale;* they also differ in being tolerably well clothed with hairs. Mr. Waterhouse imagines that in the present animal he can perceive a slight approach to the *Edentate Marsupialia*, or *Monotremes*, and he thinks that analogically it may be compared to the genus *Tupaia* among the true *Insectivora*, bearing a somewhat similar connection with *Echidna* and *Ornithorhynchus* to that which exists between the last-mentioned genus and the genera *Erinaceus* and *Mygale*. In conclusion he adds that it must be allowed that there is a greater dissimilarity in structure between the last-mentioned genus and the genera *Myrmecobius* and the *Monotremes*, than between *Tupaia* and *Mygale;* we are however prepared for this, by the comparatively sudden transitions from one form to another which we find in the *Marsupialia*, which group, it must be borne in mind, stands low in the grade of organization among the Mammalia. (*Zool. Trans.*, vol. ii.)

Chœropus. (*Ogilby.*)

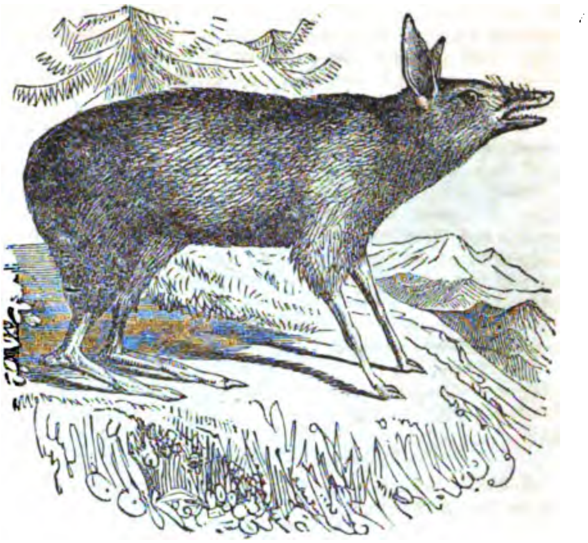
On the 13th March, 1838, Mr. Ogilby exhibited to a meeting of the Zoological Society of London a drawing, made by Sir Thomas Mitchell, of a Marsupial animal found by that officer on the banks of the river Murray, during his late journey in the interior of New South Wales. Mr. Ogilby stated his original belief that the animal in question belonged to the genus *Perameles*, under which impression he had proposed to name it *Per. ecaudatus*, from its entire want of tail, a character found in no other species of the same group; but a drawing of the fore-foot, afterwards found by Sir Thomas Mitchell, and likewise exhibited to the Society on the present occasion, had considerably shaken this first opinion, and induced Mr. Ogilby to suspect that the animal may eventually form the type of a new genus. According to Sir Thomas Mitchell's drawing, and the notes which he took at the time of examining the specimen, it would appear that there were only two toes on the fore-feet, which were described as having been so perfectly similar to those of a pig, as to have procured for the animal the name of the pig-footed bandicoot, among the persons of the expedition.

The drawing of the foot, in fact, very closely resembles that of the genus *Sus* in form and characters; two toes only are represented, short, and of equal length; but there is a swelling at the base of the first *phalanges*, which renders it probable that there may be two smaller ones behind. The *Perameles*, on the contrary, have three middle toes on the fore-feet, all of equal length, and armed with very long powerful claws, besides a small rudimentary toe very distinctly marked on each side. The form and character of the hind-feet were perfectly similar to those of the *Perameles*; as were also the teeth, as far as could be judged from the drawing, except that the canines did not appear to surpass the anterior molars in point of size. The ears were long, elliptical, and nearly naked; the head broad between the ears, and very much attenuated towards the muzzle; the body about the size of a small rabbit, and the fur very much of the same quality and colour as in that animal. Mr. Ogilby, after expressing his confidence in the fidelity of Sir Thomas Mitchell's drawings, and the care with which that gentleman assured him he had made the observation in question, expressed his belief that this animal would be found to constitute a new genus of Marsupials, and proposed for it the provisional name of *Chœropus*, in allusion to the described characters of the fore-feet.

The following is the notice of this animal inserted by Sir Thomas Mitchell in his journal, on the occasion of first discovering it. 'June 16, 1836. The most remarkable incident of this day's journey was the discovery of an animal of which I had seen only a head in a fossil state in the limestone caves of Wellington Valley, where, from its very singular form, I supposed it to belong to some extinct species. The chief peculiarity then observed was the broad head and very long slender snout, which resembled the narrow neck of a wide bottle; but in the living animal the absence of a tail was still more remarkable. The feet, and especially the fore-legs, were also singularly formed, the latter resembling those of a pig; and the marsupial opening was downwards, and not upwards, as in the Kangaroo and others of that class of animals. This quadruped was discovered by the natives on the ground; but on being chased, it took refuge in a hollow tree, from which they took it alive, all of them declaring that they had never before seen an animal of the kind. This was where the party had commenced the journey up the left bank of the Murray, immediately after crossing that river.' Such, Mr. Ogilby remarked, was all the information he possessed at present with regard to this singular animal; but Mr. Gould had promised to examine the original specimen on his arrival at Sydney, in the Museum of which town it had been deposited; and Mr. Ogilby therefore hoped that, through the kindness of that gentleman, he should shortly have it in his power to communicate a more detailed description of its form and characters to the Society. (*Zool. Proc.* 1838.)

Dental Formula:—

Jaw	Upper	4 incisors,	4 spurious molars,*	3 or 4 molars
		4 ,,	4 ,,	3 or 4 ,,
	Lower	3 incisors,	4 spurious molars,	3 or 4, perhaps 5
		3 ,,	4 ,,	3 or 4 ,, 5.

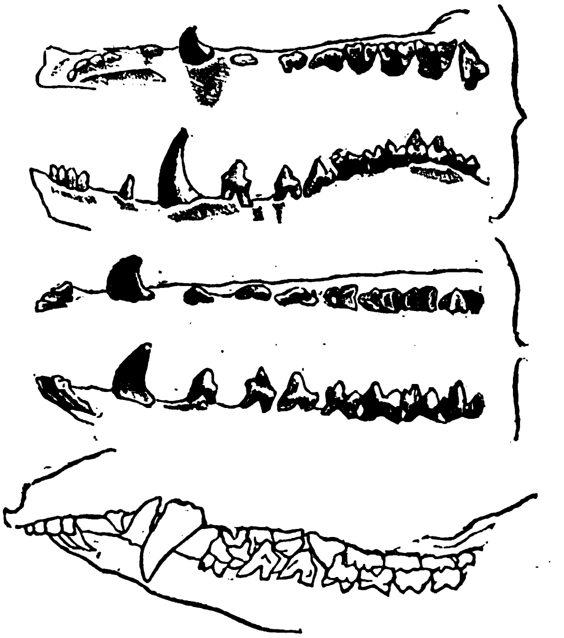


Chœropus ecaudatus.

Perameles. (*Geoffroy.*)

Generic Character.—*Head* elongated, pointed; ears moderate, hairy; posterior great-toes rudimentary, and the two succeeding toes united by the skin up to the nails, great toe and little toe of the fore-feet with the form of simple tubercles, so that they wear the appearance of having only three anterior toes.

Dental Formula:—Incisors $\frac{10}{6}$; canines $\frac{1-1}{1-1}$; molars $\frac{7-7}{7-7} = 48$.



Teeth of Perameles. (F. Cuvier.)

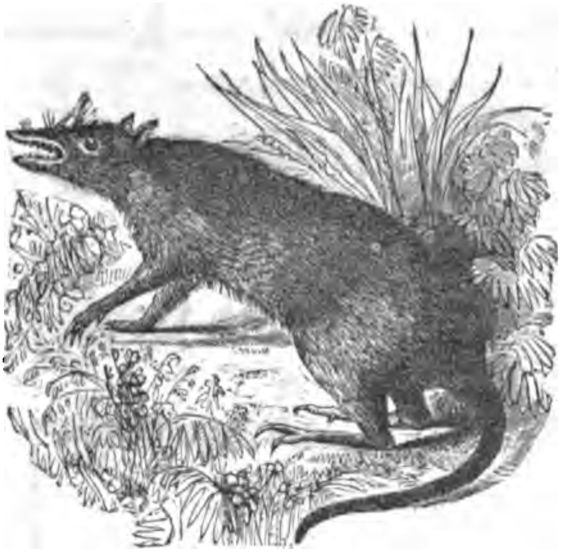
Example, *Perameles nasutus.*

Description.—*Head* very long; muzzle produced; nose prolonged above the jaw; fur grey-brown above and white beneath.

Locality.—Australia.

Mr. Gray, in characterizing a new species of Perameles (*Per. Gunnii*), very closely agreeing with *Per. nasutus*, but peculiar for its very short white tail, and in having several indistinct white bands over the haunches, stated that *Per Gunnii* inhabits Van Diemen's Land, where it frequents gardens, and commits great havoc amongst bulbous roots, which it is said to devour with avidity (*Zool. Proc.*, 1838). There is now (1839) a specimen of *Perameles Lagotis*, or *Rabbit Perameles*, from Swan River, in the garden of the Zoological Society in the Regent's Park.

* The anterior of these might be termed canines,

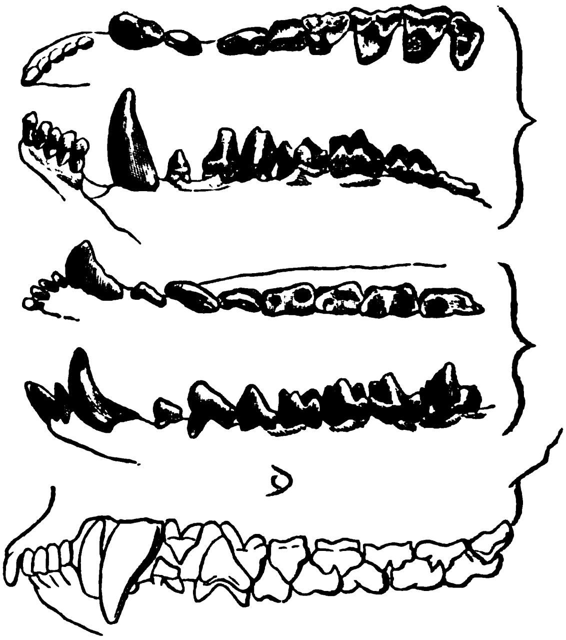


Perameles nasutus.'

Didelphys. (*Linnæus.*)

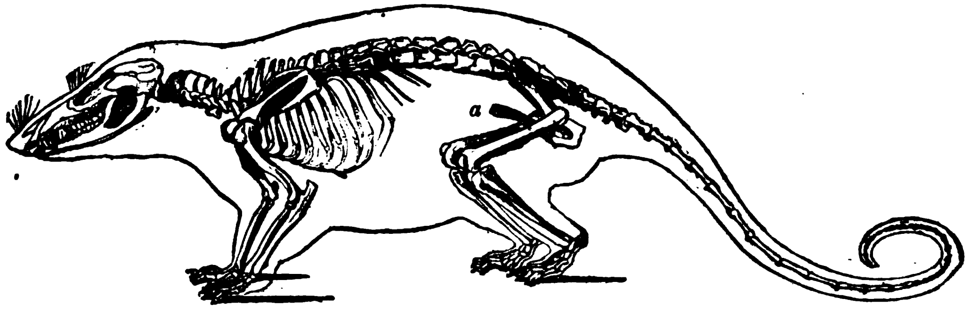
Generic Character.—Head very much pointed, gape wide, tongue rough with horny papillæ; ears large and naked; eyes small; tail long and tapering, flexible, and prehensile, with hair at the base only, the remaining part being covered with scales. Fore-feet with five toes, all armed with strong, sharp, curved claws; thumb of the hind-foot opposable and destitute of nail or claw, the other toes or fingers armed with claws like those of the fore-feet.

Dental Formula:—Incisors $\frac{10}{8}$; canines $\frac{1-1}{1-1}$; molars $\frac{7-7}{7-7}$ = 50.



Teeth of Didelphys Virginiana. (F. Cuvier.)

Geographical Distribution of the Genus.—America exclusively.



Skeleton of Didelphys Virginiana. a, the marsupial bones

Example, *Didelphys Virginiana.*

Description.—Size that of a domestic cat. *Colour* dull white. *Hair* of two kinds; that which is lowest, a long fine woolly down, white at the base, brownish at the tip, through this pass the long hairs of a pure white on the head, neck, and upper parts of the body; the hair is short and close. Round each eye a brownish circle. Ears generally black at the base and yellowish at the tip. Whiskers long, partly white, partly reddish. Extremity of the nose flesh-coloured, with a tinge of yellow. Legs deep chestnut brown. Tail not so long as the body, covered at the base by long hairs, but only scantily furnished with bristles, which come out from between the whitish scales that protect it, for the greater part of its length.

Habits and Locality.—The Virginian Opossum is an arboreal animal, as might be expected from the structure of its posterior feet or hands especially. It appears to be to a certain degree carnivorous, for it preys upon insects and birds, and feeds also on fruits; but there is reason for believing that animal food forms its principal support, for it sometimes invades the farm-yards in its neighbourhood. According to Barton, the period of uterine gestation in this species is twenty-six days. It inhabits North America, and was, perhaps is, very abundant in the North of Mexico, and nearly throughout the United States, where it is called the opossum. In the *Perfect Description of Virginia* (1649), we find, in the catalogue of animals, '*Passonnes*—This beast hath a bagge under her belly, into which she takes her young ones, if at any time affrighted, and carries them away.' Lawson says, 'The *Possum* is found nowhere but in America. She is the wonder of all the land animals, being the size of a badger and near that colour. The female doubtless breeds her young at her teats, for I have seen them stick fast thereto, when they have been no bigger than a small rasberry, and seemingly inanimate. She has a paunch or false belly, wherein she carries her young, after they are from those teats, till they can shift for themselves. Their food is roots, poultry, or wild fruits. They have no hair on their tails, but a sort of a scale, or hard crust, as the beavers have. If a cat has nine lives, this creature surely has nineteen; for if you break every bone in their skin, and mash their skull, leaving them for dead, you may come an hour after, and they will be gone quite away, or perhaps you may meet them creeping away. They are a very stupid creature, utterly neglecting their safety. They are most like rats of anything. I have, for necessity in the wilderness, eaten of them. Their flesh is very white, and well tasted; but their ugly tails put me out of conceit with that fare. They climb trees as the racoons do. Their fur is not esteemed nor used, save that the Indians spin it into girdles and garters.' The tail appears to be not alone of use as an organ of prehension to the adult animal; for it is stated that the little ones when advanced in growth leap upon their mother's back if they are frightened, and, twisting their tails round hers, escape with her assistance the threatened danger.* In captivity the animal is sullen, snarling, and stupid.

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* In the British Museum there is a stuffed specimen of Didelphys dorsigera beautifully prepared, with the young in this position.

Didelphys Virginiana (Virginian Opossum).

The French name *Sarigue* for the species of this genus is evidently a form of *Carigueya*, the Brazilian name for the genus. They are known in Paraguay under the name of *Micouré*, in the American Islands under that of *Manicou*, and in Mexico by the appellation of *Tlaquatzin*.

Cheironectes. (Illiger.)

Generic Character.—The complete dental formula of this subgenus does not appear to be known. The number of incisors is stated at ten above and eight below. *Head* rather pointed; ears naked, rounded; tail scaly, prehensile; an opposable thumb on the hind feet or hands, and the toes webbed.

Example, *Cheironectes palmatus* (*Cheironectes Yapock* of Desmarest; *Didelphis palmata* of authors).

Description.—Fur brown above, with three transverse bright grey bands, interrupted in the middle; white below. Size larger than that of the brown rat.

Habits and Locality.—The river Yapock, or Oyapock (the boundary that separates the French Settlements from Brazil), in Guyana, is the place where this species has been found. It swims with facility; indeed Buffon describes it under the name of *Petite loutre de la Guyane.*

Cheironectes palmatus.

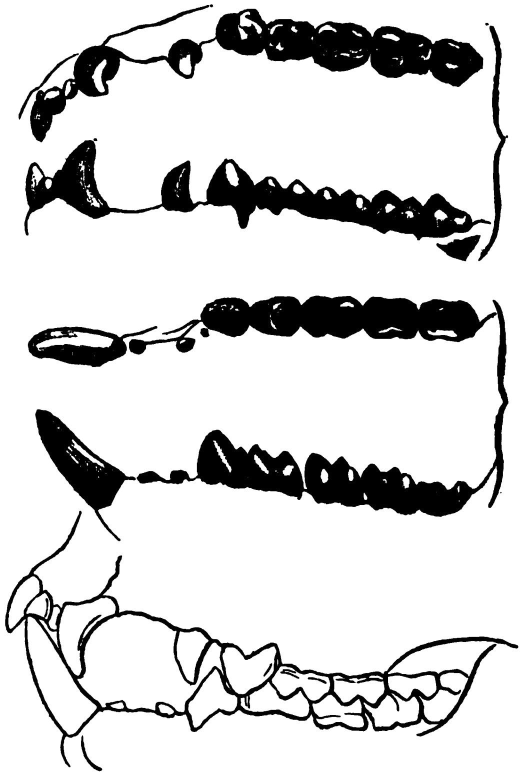
Phalangista. (Cuvier.)

Generic Character.—*Head* rather short; ears hairy; fur woolly and short; no extensible membrane between the anterior and posterior limbs; *tail* long, prehensile, sometimes without hair on its extremity.

Subgenus Phalangista, properly so called—Balantia (Illiger).

Tail prehensile, but covered with hair; ears long and erect.

Dental Formula:—**Incisors** $\frac{6}{2}$; **canines** $\frac{4}{0}$; **pseudo-molars** $\frac{4}{8}$; **molars** $\frac{8}{8}=40.$*



Teeth of Phalangista. (F. Cuvier.)

Example, *Phalangista vulpina.*

Description.—The following description of this species is given in Phillip's *Voyage:*—'Vulpine Opossum. This is not unlike the common fox in shape, but considerably inferior to it in respect to size, being from the point of the nose to the setting on of the tail only 26 inches; the tail itself 15 inches: the upper parts of the body are of a grisly colour, arising from a mixture of dusky and white hairs, with rufous yellow tinge; the head and shoulders partaking most of this last colour: round the eyes blackish: above the nostrils ten or twelve black whiskers, four inches or more in length: all the under parts of the body are of a

Phalangista vulpina (Vulpine Opossum).

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* Lesson gives the dentition of Phalangista as, Incisors $\frac{6}{2}$, canines 0, molars $\frac{8-8}{7-7}=38.$

tawny buff colour, deepest on the throat, where the bottom of the hairs are rust colour: the tail is of the colour of the back for about one quarter of its length, from thence to the end black: the toes on the fore-feet are five in number, the inner one placed high up: on the hind-feet four toes only; with a thumb, consisting of two joints, without a claw, placed high up at the base of the inner toe: the whole foot serving the purpose of a hand, as observable in many of the Opossum genus. The legs are much shorter in proportion than those of the common fox: the ears about one inch and a half in length.' It is the *Phalanger Renard* of the French, *Bruno* of Vicq-d'Azyr, and *Whatapooroo* of the natives.

Locality.—New Holland; neighbourhood of Port Jackson.

Subgenus Cuscus. (*Lacépède.*)

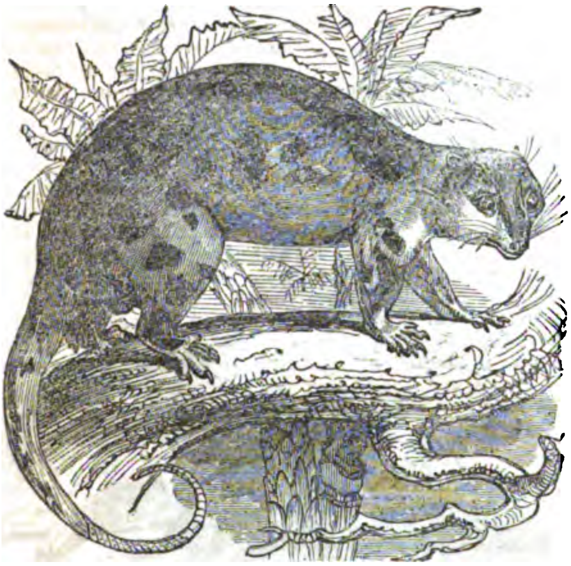
Tail prehensile, but in great part naked and covered with rugosities; ears very short.

Dental Formula:—Incisors $\frac{6}{6}$; canines 0; molars $\frac{6-6}{8-8}$ = 40. (Lesson.)

Geographical Distribution of the Genus.—Peculiar to the Western Polynesia or Malaisia (Lesson).

Example, *Cuscus maculatus* (*Didelphis Orientalis* of Gmelin; *Cuscus Amboinensis* of Lacépède; *Phalangista maculata* of Geoffroy).

Description, Habits, and Locality.—This species, which is named Coescoes at the Moluccas, according to Valentyn, varies much in its colouring, with reference to sex and age. M. Lesson, who found it at Wagiou, where the natives call it *Scham-scham*, says that its fur, which is thick and woolly, is generally whitish, covered with isolated brown spots, sometimes running together. The same author states that its habits are slow and nocturnal, and that it lives on fruits in the equatorial forests of the great Molucca and Papuan Islands.



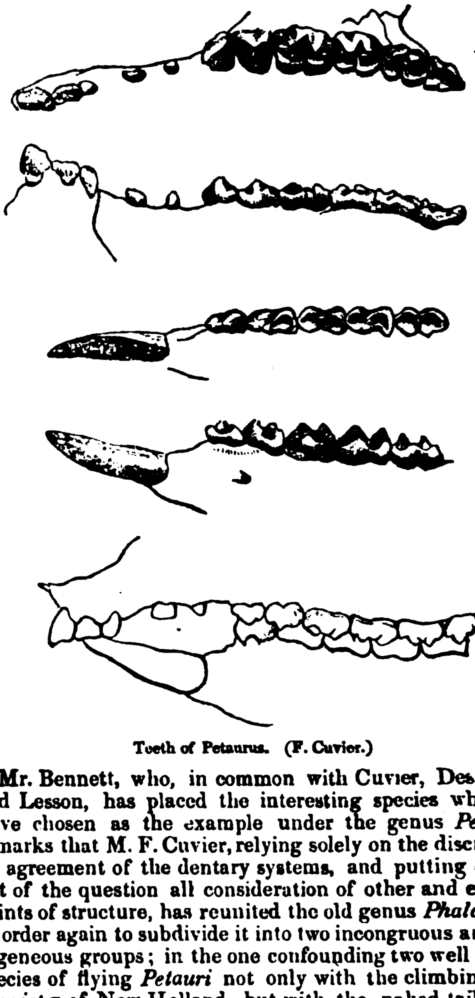
Cuscus maculatus.

Petaurus. (Shaw.)

Generic Character.—*Head* rather short; ears small and hairy; skin of the flanks extended between the anterior and posterior limbs, and covered with hair; tail not strictly prehensile.

Dental Formula:—Incisors $\frac{6}{2}$; canines $\frac{0-0}{0-0}$; molars $\frac{8-8}{7-7}$ = 38.

It will be observed that the number of lower molar teeth given in the cut amounts only to five, and consequently does not correspond with the formula above given, or with that stated by M. F. Cuvier himself, who makes the total number of teeth 22 in the upper jaw, and 16 in the lower, and the number of upper false molars 8, and of molars 8 also; the number of lower molars being 6 false and 8 true, = 38 in all. He tells us that this form of dentition is taken from *Phalangista Cookii*, *Petaurus Taguanoides*, '*Le Phalanger didelphoide* or *Le Macraure* of M. Geoffroy, and a species which has no name.'



Teeth of Petaurus. (F. Cuvier.)

Mr. Bennett, who, in common with Cuvier, Desmarest, and Lesson, has placed the interesting species which we have chosen as the example under the genus *Petaurus*, remarks that M. F. Cuvier, relying solely on the discrepancy or agreement of the dentary systems, and putting entirely out of the question all consideration of other and essential points of structure, has reunited the old genus *Phalangista*, in order again to subdivide it into two incongruous and heterogeneous groups; in the one confounding two well marked species of flying *Petauri* not only with the climbing *Phalangistæ* of New Holland, but with the naked-tailed and strictly prehensile Couscous of the Moluccas; repaying the other group, which he had so unnecessarily dismembered, by the addition of a true *Phalangista*, whose only pretensions to such an association are made to depend on a somewhat similar arrangement of the teeth. 'By thus confining himself to a single character,' continues Mr. Bennett, 'he has broken up the regular series of affinities which connected together three marked but still closely allied gradations of form, to substitute an arrangement which has no other recommendation than the theoretic views of its author. In such a case we cannot hesitate in giving to the organs of locomotion, combined with the general habit, that precedence before those of mastication, which, under other circumstances, we are generally in the habit of conceding to the latter; and we feel the less repugnance to adopting this course, because it is admitted that the dentary formula is in these animals subject to some variation, and because zoologists are by no means agreed with respect to its exact definition. The teeth of the *Squirrel Petaurus* agree generally, according to M. F. Cuvier, with those of the Phalangistas. They are consequently 38 in number, 20 occupying the upper jaw, and 18 the lower. The former are divided by the same eminent naturalist into six incisors, four canines, two false molars, and eight true ones; the latter consisting of two incisors, and no canines, with eight false and as many true molars. The dentary character of the original species of *Petaurus*, which he takes as the type of his other group, differs chiefly in the total want of canine teeth; but we may here be permitted to observe that it appears to us somewhat doubtful how far those which are above enumerated as such truly deserve the name which has been applied to them. In every other respect the little creature in question perfectly agrees with the group of animals to which we have restored it; and which are at once characterised by the broad expansion of their skin on each side of the body, extending between the anterior and posterior limbs, as in the Flying Squirrels, to which indeed they bear a close resemblance. In common with nearly the whole of the mammiferous quadrupeds of the country which they inhabit, they possess the abdominal pouch which fixes their place in the system among the marsupial animals; and, as in many of these, the thumbs of the hind-feet are long and distinctly opposable to the sole. The other toes are four in number, and furnished with tolerably strong claws, of which the thumbs are destitute. The fore-feet have long radiating toes, the middle one of which is the longest, all armed with similar claws to those of the hind-feet. The tail is round, covered with loose hair, somewhat tapering towards the point, and not strictly prehensile, having no naked surface at its extremity beneath. In size the present species is about equal to the common Squirrel, and its tail is rather longer than its body. Its colour is delicately gray above, somewhat darker on the head, and white beneath. A black line passes from the point of the nose along the back towards the tail; and the lateral folds of the skin are bounded in front and on the sides by a similar band, which confounds itself gradually in the inside with the gray of the body, and is bordered at the outer margin by a fringe of white. The eyes are each placed in a spot of black, and a faint blackish line extends along the upper surface of the hinder limbs. The tail is also of a darker hue, especially towards its extremity.

Example, *Petaurus sciureus* (*Norfolk Island Flying Squirrel*, figured and described in Phillip's Voyage).

Description.—See above.

Petaurus Sciureus (Squirrel Petaurus).

Habits and Locality.—'During the day,' says Mr. Bennett, 'the animal generally remains quietly nestled in the hollows of trees, but becomes animated as night advances, and skims through the air, supported by its lateral expansions, half leaping, half flying from branch to branch, feeding upon leaves and insects. This peculiar mode of locomotion can scarcely be considered as a true flight, inasmuch as the cutaneous folds which serve the purposes of wings seem rather destined for the mere support of the animal in its long and apparently desperate leaps, than for raising it in the air and directing its course towards any given object. For this latter purpose they are indeed but little fitted by their structure, the want of proper muscles in a great measure incapacitating them from performing such offices as are dependent on volition. It may be doubted however whether these animals are entirely destitute of the power of exercising their will in their flight-like leaps. For the following anecdote bearing upon this subject we are indebted to our friend Mr. Broderip, who related it to us on unquestionable authority. On board a vessel sailing off the coast of New Holland was a Squirrel Petaurus, which was permitted to roam about the ship. On one occasion it reached the mast-head, and as the sailor who was despatched to bring it down approached, made a spring from aloft to avoid him. At this moment the ship gave a heavy lurch, which, if the original direction of the little creature's course had been continued, must have plunged it into the sea. All who witnessed the scene were in pain for its safety; but it suddenly appeared to check itself, and so to modify its career that it alighted safely on the deck.' Those that we have seen in captivity are in a state of somnolency all day; one kept at the Garden in the Regent's Park was formerly in the possession of the then marchioness of Cleveland. At night it was lively and active, and was perfectly tame, but rather shy. The species inhabits New South Wales, and is said to be abundant at the foot of the Blue Mountains. There seems to be no authority for the locality of Norfolk Island as a habitat of this very pretty little animal, excepting the figure and description in Phillip's Voyage above alluded to. The fur would be highly ornamental from its colour, softness, and beauty, as an article of dress.

Phascolarctos (*De Blainville; Lipurus, Goldfuss;* Amblotis, *Illiger*).

Generic Character.—*Body* stout. *Head* short, ears shaggy. *Limbs* rather short, robust, and nearly equal in length. *Toes* five on each fore-foot; the anterior toes divided into two groups for prehension, the thumb and the fore-finger being in one group, and the remaining three fingers in the other, the thumb of the posterior foot very large, but without a nail, and the two inner fingers united. *Tail* very short, almost null. Mr. Martin says that it differs from the *Wombat* in its dental formula, in which respect it closely resembles the Kangaroos.

Dental Formula:—Incisors $\frac{6}{2}$; canines $\frac{1-1}{0-0}$; spurious molars $\frac{1-1}{1-1}$; true molars $\frac{4-4}{4-4} = 30$.

The canines are small, and in the intermaxillary suture. The false molars are compressed and trenchant, but thicker than in *Hypsiprymnus*, the dentition of which, otherwise, that of the *Koala* resembles closely. The lower true grinders are narrower than the upper ones, and both quadricuspid.

Only one species is known, namely *Phascolarctos cinereus* (*Lipurus cinereus* of Goldfuss; *Phascolarctos fuscus* of Desmarest; *Phascolarctos Flindersii* of Lesson. The *Ashy Koala*).

Phascolarctos cinereus (Ashy Koala).

Description, Habits, and Locality.—As large as a dog of moderate size. Fur long, thick, rather coarse, and ashy brown, tufted ears rather lighter. It is said to have the gait and carriage of a young bear, to be arboreal in its habits, and to pass its life upon trees and in dens or holes which it hollows at their feet. Of its powers of climbing there can be no doubt; the structure of its extremities would lead to this inference, and actual observation has confirmed it. Its locality is New Holland, and we are enabled to give figures of the parent and young, taken by the kind permission of a friend, from a very accurate and beautiful drawing executed from the living animals, the first that were known in the colonies. They were brought in by natives to Colonel Paterson, then lieutenant-governor of the colony, from the Hat Hill district, to the southward of Port Jackson, in 1803. The native name 'Koala' is said to signify 'Biter.'

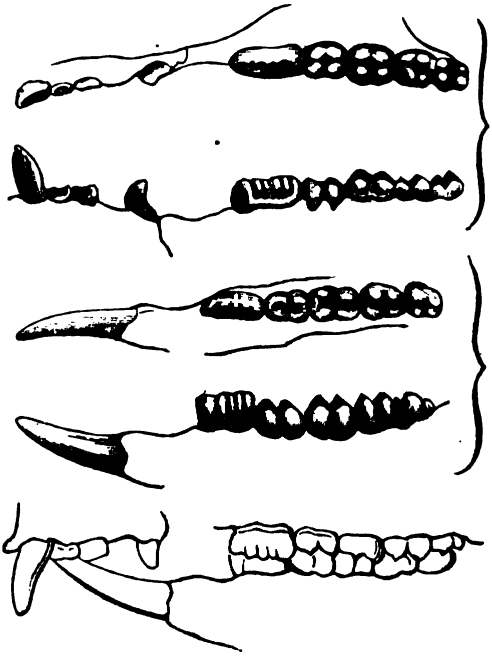
There are old and young stuffed specimens in the British Museum, and a stuffed specimen (Mr. Caley's) in the Museum of the Linnean Society.

The visceral anatomy will be found in Mr. Martin's paper 'On the anatomy of the *Koala*,' read to the Zoological Society in November, 1836 (*Zool Proc.*, 1836). It is chiefly remarkable for the enormous size and length of the cæcum.

Hypsiprymnus. (Illiger.)

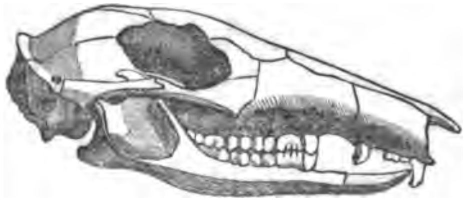
Generic Character.—*Head* elongated; ears large; upper lip cleft. *Tail* moderate, scaly, covered scantily with hairs. Two teats only in the ventral pouch of the females. Anterior feet five-toed, armed with obtuse nails; third toe of the hind-feet very robust, and armed with a very strong nail.

Dental Formula:—Incisors, $\frac{6}{2}$; canines, $\frac{1-1}{0}$; molars, $\frac{5-5}{5-5} = 30$.



Teeth of Hypsiprymnus. (F. Cuvier.)

Example, *Hypsiprymnus Potoroo* (*Macropus minor* of Shaw; *Potorous minimus* and *Kangurus Gaimardi* of Desmarest; *Hypsiprymnus Whitei* of Quoy and Gaimard; *Potoroo* of White, and *Kanguroo Rat* of Phillip's Voyage).



Skull of Hypsiprymnus.

Description.—Size of a rabbit; general colour grayish, reddish-brown above, whitish below; head triangular, ears large, tarsi very long; tail elongated, flexible, terminated by a pencil of hairs.

Habits and Locality.—The manners of the *Kangaroo Rat* are stated to be mild and timid; its food consists of vegetables, and it is said to burrow in the ground. New Holland is its locality, and Lesson says that it is not rare in the neighbourhood of Port Jackson, especially near the river Weragambia in the Blue Mountains.

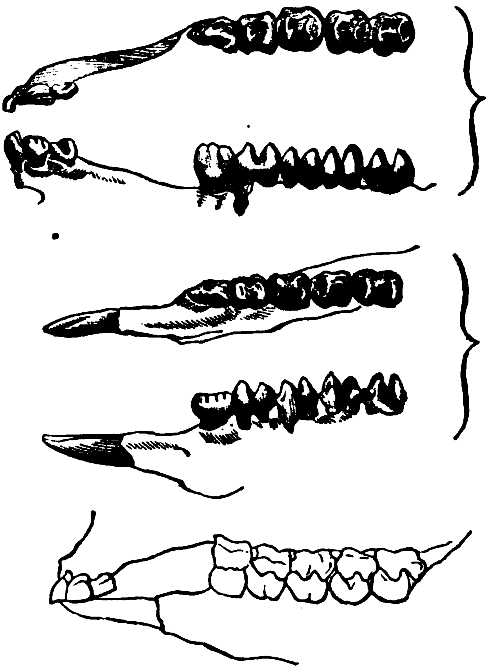
M. Lesson records two other species, and Mr. Ogilby describes (*Zool. Proc.*, 1831) a fourth, *Hypsiprymnus setosus*, known in the colony of New South Wales by the native name of *Bettong Kangaroo*. The specimen described by Mr. Ogilby was believed to have been brought from Swan River. The last-named zoologist has also characterised six other new species. (*Zool. Proc.*, 1838.)

Hypsiprymnus Potoroo (Kangaroo Rat).

Subgenus Halmaturus. (*Illiger* in part.)

Generic Character.—Differing from the true Kangaroos in having shorter ears, a tail nearly naked, or only with a few hairs.

Dental Formula:—Incisors, $\frac{6}{2}$; canines, $\frac{0-0}{0-0}$; molars $\frac{5-5}{5-5} = 28$.



Teeth of Halmaturus. (F. Cuvier.)

Example, *Halmaturus elegans* (*Kangurus fasciatus* of Péron and Lesueur).

Description.—Colour mouse-gray, bounded transversely with reddish-brown on the back and loins. Size of a large hare.

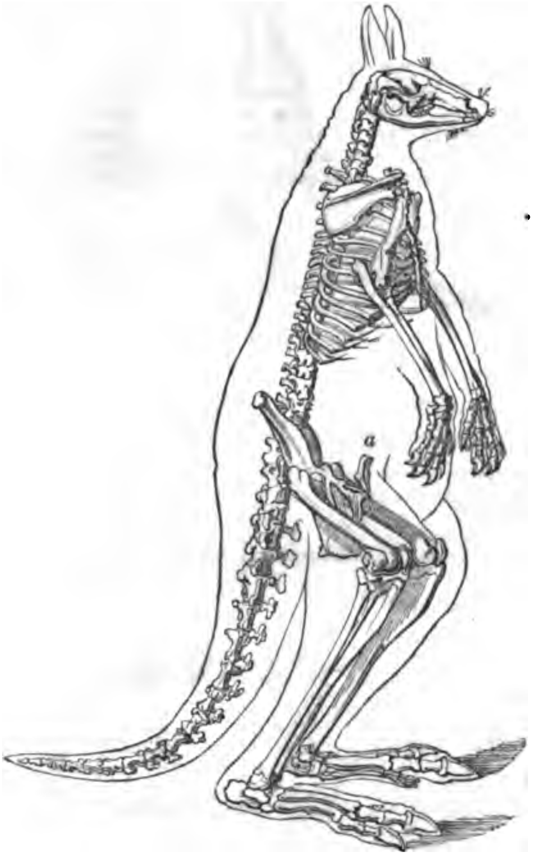
Habits and Locality.—Haunts under thick bushes, and is said to form subterranean galleries in the island of St. Pierre.

Subgenus Macropus (*Shaw;* Halmaturus of *Illiger* in part).

Generic Character.—*Head* elongated; ears very large; upper lip cleft; whiskers very short and few. Posterior limbs like those of *Hypsiprymnus*, but much longer and more robust. *Tail* long, triangular, very muscular.

Dental Formula:—Incisors $\frac{6}{2}$; canines $\frac{0-0}{0-0}$; molars $\frac{4-4}{4-4} = 24$.

Example, *Macropus Major* of Shaw (*Kangurus labiatus* of Geoffroy; *Didelphis gigantea* of Gmelin; *The Kangaroo* of Cook).



Skeleton of Macropus major (the Great Kangaroo).
a, the marsupial bones.

Macropus major (the Great Kangaroo).

This extraordinary animal, discovered by Captain Cook, is now so well known, that a description, in addition to our illustrations and account of its animal economy at the beginning of this article, would be superfluous. Our countrymen pursued it in New Holland with greyhounds, and the leaps which it took surprised those who beheld it clear obstacles seven or eight feet high. In size it equals a sheep, some of the largest weighing 140 lbs., and the flesh is represented by those who have tasted it as being a little like venison. The species breeds pretty freely in this country, and has been kept with success in our parks.

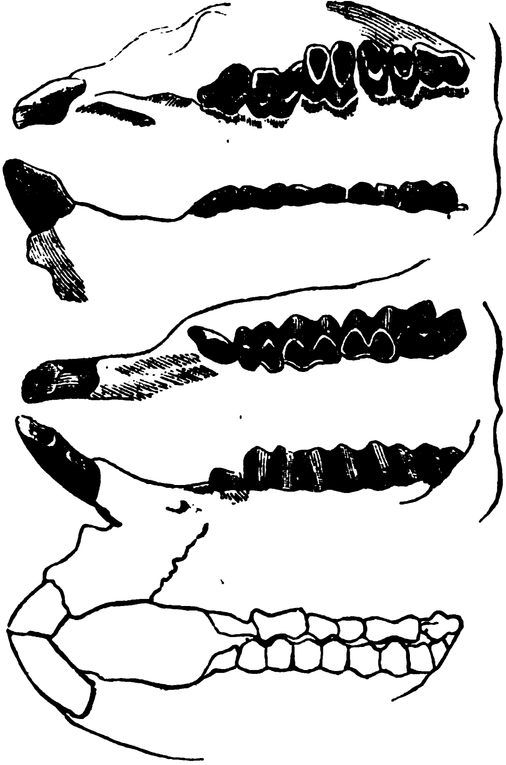
Locality.—New Holland.

There are several other species.

Phascolomys. (Geoffroy.)

Generic Character.—*Body* clumsy. *Head* large and bluff. Fore-*feet* with five toes, armed with crooked nails; hind-feet with four, and a little tubercle without a nail, in place of the great toe; indeed it may be said to have but four toes on the hind-feet. *Tail* nearly null.

Dental Formula:—Incisors $\frac{2}{2}$; canines $\frac{0-0}{0-0}$; molars $\frac{5-5}{5-5} = 24$.



Teeth of Phascolomys, or Wombat (F. Cuvier), nearly of the natural size.

Example.—The only species known is *Phascolomys Wombat* (*Didelphis ursina* of Shaw; *The Wombat* of the natives, navigators, and naturalists).

Description.—From Lieut.-Col. Collins's 'Account of the English Colony of New South Wales' (1802), we select the following part of a description of a *Wombat* found on Cape Barren Island, abstracted from Bass's 'Journal:'—'The *Wombat*, or, as it is called by the natives of Port Jackson, the *Womback*, is a squat, short, thick, short-legged, rather inactive quadruped, with great appearance of stumpy strength, and somewhat bigger than a large turnspit dog. Its figure and movements, if they do not exactly resemble those of the bear, at least strongly remind one of that animal. Its length, from the tip of the tail to the tip of the nose, is thirty-one inches, of which its body takes up twenty-three and five-tenths. The head is seven inches and the tail five-tenths. Its circumference behind the fore-legs twenty-seven inches; across the thickest part of the belly thirty-one inches. Its weight by hand is somewhat between twenty-five and thirty pounds. The hair is coarse, and about one inch or one inch and five-tenths in length, thinly set upon the belly, thicker on the back and head, and thickest upon the loins and rump; the colour of it a light sandy brown of varying shades, but darkest along the back.' The head is large, flattish, and nearly triangular when viewed in front; the ears are sharp and erect; the eyes small and rather sunken than prominent, but quick and lively.

Habits and Locality.—From the same work we take the following account of the habits, &c. of this species:—'This animal has not any claim to swiftness of foot, as most men could run it down. Its pace is hobbling or shuffling, something like the awkward gait of a bear. In disposition it is mild and gentle, as becomes a grass-eater; but it bites hard, and is furious when provoked. Mr. Bass never heard its voice but at that time; it was a low cry between a hissing and a whizzing, which could not be heard at a distance of more than thirty or forty yards. He chased one, and with his hands under his belly suddenly lifted him off the ground without hurting him, and laid him upon his back along his arm like a child. It made no noise, nor any effort to escape, not even a struggle. Its countenance was placid and undisturbed, and it seemed as contented as if it had been nursed by Mr. Bass from its infancy. He carried the beast upwards of a mile, and often shifted him from arm to arm, sometimes laying him upon his shoulder, all of which he took in good part; until, being obliged to secure his legs while he went into the brush to cut a specimen of a new wood, the creature's anger arose with the pinching of the twine; he whizzed with all his might, kicked and scratched most furiously, and snapped off a piece from the elbow of Mr. Bass's jacket with his grass-cutting teeth. Their friendship was here at an end, and the creature remained implacable all the way to the boat, ceasing to kick only when he was exhausted. This circumstance seems to indicate that, with kind treatment, the Wombat might soon be rendered extremely docile; but let his tutor beware of giving him provocation, at least if he should be full grown. Besides Furneaux's Islands, the Wombat inhabits, as has been seen, the mountains to the westward of Port Jackson. In both these places its habitation is under ground, being admirably formed for burrowing; but to what depth it descends does not seem to be ascertained. According to the account given of it by the natives, the Wombat of the mountains is never seen during the day, but lives retired in his hole, feeding only in the night; but that of the islands is seen to feed in all parts of the day. His food is not yet well known; but it seems probable that he varies it, according to the situation in which he may be placed. The stomachs of such as Mr. Bass examined were distended with the coarse wiry grass, and he, as well as others, had seen the animal scratching among the dry ricks of sea-weed thrown up upon the shores, but could never discover what it was in search of. Now the inhabitant of the mountains can have no recourse to the sea-shore for his food, nor can he find there any wiry grass of the islands, but must live upon the food that circumstances present to him.'

A letter from James Hunter, Esq., Governor of the settlement, dated Sydney, New South Wales, August 5, 1798, and published in Bewick's 'Quadrupeds,' states, that this animal, there called *The Wombach*, was found upon an island on the coast of New South Wales, in lat. 40′ 36″ S., where considerable numbers were caught by the company of a ship which had been wrecked there on her voyage from Bengal to Port Jackson. The same communication relates that it had 'lately been discovered to be an inhabitant of the interior of this country also. The mountain natives call it the *Wombach*.'

The specimen dissected by Sir Everard Home in 1808 was brought from one of the islands in Bass's Straits, and lived as a domestic pet in the house of Mr. Clift for two years.

The individual dissected by Mr. Owen in May, 1836, had lived at the Gardens of the Zoological Society upwards of five years.

M. Lesson says that it lives in King Island and the Furneaux Islands, but that it does not exist in the neighbourhood of Port Jackson.

The anatomy of the Wombat will be found in Cuvier's 'Leçons d'Anatomie Comparée,' in Sir Everard Home's paper, 'Phil. Trans.,' 1808, and in Mr. Owen's memoir, 'Zool. Proc.,' 1836. The latter observes that the digestive organs in the abdominal cavity presented a development corresponding generally to that which characterises the same parts in the *phytiphagous Rodents*. It has a very short cæcum.

The flesh of the Wombat is said to be excellent. Mr. Hunter, the writer of the letter above quoted, terms it delicate meat, and some have remarked that the animal might be easily naturalised in this country.

The impression made upon us by Mr. Bass's account of the behaviour of the Wombat which he caught, and by one that we have seen in captivity, is, that the animal is of a low grade in point of intellect. In both cases, as long as there was no positive pain or disagreeable sensation, the animal was content, however new its situation might be. There was none of that anxiety and uneasiness which all animals of lively sense show when suddenly placed in new positions or in strange places; and indeed the following note is appended to Mr. Bass's account of the capture of his Wombat:—'The Kangooroo and some other animals in New South Wales were remarkable for being domesticated as soon as taken.' This may be one of the consequences of the low cerebral development generally to be observed in this group.

Phascolomys Wombat.

Fossil Marsupialia.

Besides the Fossil Opossum (*Didelphys Cuvieri*) of the Montmartre Gypsum, figured and described by Cuvier in the 'Annales du Museum,' and in his 'Ossemens Fossiles,' and the fossil *Dasyurus*, *Hypsiprymnus*, *Halmaturus*, *Phascolomys*, and *Kangaroo*, described by Mr. Clift and Cuvier and Mr. Pentland, from the Australian bone-caverns and bone breccia, there are some fossil forms now generally considered as belonging to the Marsupialia, which it will be necessary, on account of the great interest which attaches to them both geologically and zoologically, to mention more at length. We commence with those fossil jaws originally described as belonging to the Marsupialia, which were found at Stonesfield.

Thylacotherium. (Owen.)

In consequence of strong doubts* having been recently expressed by M. de Blainville, *from inspection of casts*, respecting the mammiferous nature of the fossil jaws found at Stonesfield, and assigned to the *Marsupialia* by Baron Cuvier, a paper 'On the Jaws of the *Thylacotherium Prevostii* from Stonesfield' was read before the Geological Society by Richard Owen, Esq., F.R.S., G.S., &c., Hunterian professor in the Royal College of Surgeons, on the 21st of November, 1838, being the first of two memoirs meeting the objections, and giving a detailed account of the fossils from a careful inspection of the originals. In this communication Mr. Owen confined his description to the jaws discovered at Stonesfield, characterised by having eleven molars in each ramus of the lower jaw. He commenced by observing that the scientific world possesses ample experience of the truth and tact with which the illustrious Cuvier formed his judgments of the affinities of an extinct animal from the inspection of a fossil fragment; and that it was only when so distinguished a comparative anatomist as M. de Blainville questioned the determinations, that it became the duty of those who possessed the means to investigate the nature of the doubts, and re-assure the confidence of geologists in their great guide.

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* See 'Comptes Rendus,' 1838.

When Cuvier first hastily examined at Oxford, in 1818, one of the jaws described in Mr. Owen's paper, and in the possession of Dr. Buckland, he decided that it was allied to the Didelphys ('me semblèrent de quelque Didelphe'[*]); and when doubts were raised by M. Constant Prevost, in 1824,[†] relative to the age of the Stonesfield slate, Cuvier, from an examination of a drawing made for the express purpose, was confirmed in his former determination; but he added that the jaw differs from that of all known carnivorous Mammalia, in having ten molars in a series in the lower jaw: ('il [the drawing] me confirme dans l'idée que la première inspection m'en avoit donnée. C'est celle d'un petit carnassier dont les mâchelières ressemblent beaucoup à celles des sarigues; mais il y a dix de ces dents en série, nombre que ne montre aucun carnassier connu.' *Oss. Foss.*, v., 349, note.) It is to be regretted that the particular data, with the exception of the number of the teeth, on which Cuvier based his opinion, were not detailed; but he must have been well aware that the grounds of his belief would be obvious, on an inspection of the fossil, to every competent anatomist: it is also to be regretted that he did not assign to the fossil a generic name, and thereby prevent much of the reasoning founded on the supposition that he considered it as belonging to a true Didelphys.

Mr. Owen then proceeded to describe the structure of the jaw; and he stated that having had in his possession two specimens of the *Thylacotherium Prevostii* belonging to Dr. Buckland, he had no hesitation in declaring that their condition is such as to enable any anatomist conversant with the established generalizations in comparative osteology, to pronounce therefrom not only the class but the more restricted group of animals to which they have belonged. The specimens plainly reveal, first, a convex articular condyle; secondly, a well-defined impression of what was once a broad, thin, high, and slightly recurved, triangular, coronoid process, rising immediately anterior to the condyle, having its basis extended over the whole of the interspace between the condyle and the commencement of the molar series, and having a vertical diameter equal to that of the horizontal ramus of the jaw itself: this impression also exhibits traces of the ridge leading forwards from the condyle and the depression above it, which characterises the coronoid process of the zoophagous marsupials; thirdly, the angle of the jaw is continued to the same extent below the condyle as the coronoid process reaches above it, and its apex is continued backwards in the form of a process; fourthly, the parts above described form one continuous portion with the horizontal ramus of the jaw, neither the articular condyle nor the coronoid being distinct pieces, as in reptiles. These are the characters, Mr. Owen believes, on which Cuvier formed his opinion of the nature of the fossil; and they have arrested the attention of M. Valenciennes in his endeavours to dissipate the doubts of M. de Blainville.[‡]

From the examination of a cast, M. de Blainville however has been induced to infer that there is no trace of a convex condyle, but in place thereof an articular fissure, somewhat as in the jaws of fishes; that the teeth, instead of being embedded in sockets, have their fangs confluent with or anchylosed to the substance of the jaws, and that the jaw itself presents evident traces of the composite structure.

In answer to the first of these positions, Mr. Owen stated that the portion of the true condyle which remains in both the specimens of Thylacotherium examined by Cuvier and M. Valenciennes, clearly shows that the condyle was convex, and not concave. It is situated a little above the level of the grinding surface of the teeth, and projects beyond the vertical line dropped from the extremity of the coronoid process, but not to the same extent as in the true Didelphys. In the specimen examined by M. Valenciennes the condyle corresponds in position with that of the jaw of the Dasyurus rather than the Didelphys: it is convex, as in mammiferous animals, and not concave, as in oviparous. The entire convex condyle exists in the specimen belonging to the other genus, Phascolotherium, now in the British Museum, but formerly in the cabinet of Mr. Broderip. Mr. Owen is of opinion that the entering angle or notch, either above or below the true articular condyle, has been mistaken for 'une sorte d'échancrure articulaire, un peu comme dans les poissons.'

The specimen of the half-jaw of the Thylacothere examined by M. Valenciennes, like that which was transmitted to Cuvier, presents the inner surface to the observer, and exhibits both the orifice of the dental canal and the symphysis in a perfect state. The foramen in the fossil is situated relatively more forward than in the recent Opossum and Dasyure, or in the Placental Insectivora, but has the same place as in the marsupial genus *Hypsiprymnus*. The symphysis is long and narrow, and is continued forward in the same line with the gently convex inferior margin of the jaw, which thus tapers gradually to a pointed anterior extremity, precisely as in the jaws of the Marsupial Insectivora. In the relative length of the symphysis, its form and position, the jaw of the Thylacotherium precisely corresponds with that of the Didelphys.

In addition however to these proofs of the mammiferous nature of the Stonesfield remains, and in part of their having belonged to Marsupialia, Mr. Owen stated that the jaws exhibit a character hitherto unnoticed by the able anatomists who have written respecting them, but which, if co-existent with a convex condyle, would serve to prove the marsupial nature of a fossil, though all the teeth were wanting.

In recent marsupials the angle of the jaw is elongated and bent inwards in the form of a process, varying in shape and development in different genera. In looking therefore directly upon the inferior margin of the marsupial jaw, we see, in place of the edge of a vertical plate of bone, a more or less flattened triangular surface or plate of bone extended between the external ridge and the internal process or inflected angle. In the Opossum this process is triangular and trihedral, and directed inwards with the point slightly curved upwards and extended backwards, in which direction it is more produced in the small than in the large species of Didelphys.

Now, observed Mr. Owen, if the process from the angle of the jaw in the Stonesfield fossil had been simply continued backwards, it would have resembled the jaw of an ordinary placental carnivorous or insectivorous mammal; but in both specimens of Thylacotherium, the half-jaws of which exhibit their inner or mesial surfaces, this process presents a fractured outline, evidently proving that when entire it must have been produced inwards or mesially, as in the Opossum.

Mr. Owen then described in great detail the structure of the teeth, and showed, in reply to M. de Blainville's second objection, that they are not confluent with the jaw, but are separated from it at their base by a layer of matter of a distinct colour from the teeth or the jaw, but evidently of the same nature as the matrix; and secondly, that the teeth cannot be considered as presenting an uniform compressed tricuspid structure, and being all of one kind, as M. de Blainville states, but must be divided into two series as regards their composition. Five if not six of the posterior teeth are quinque-cuspidate, and are *molares veri;* some of the *molares spurii* are tricuspid, and some bicuspid, as in the Opossums. An interesting result of this examination is the observation that the five cusps of the tuberculate molares are not arranged, as had been supposed, in the same line, but in two pairs placed transversely to the axis of the jaw, with the fifth cusp anterior, exactly as in the Didelphys, and totally different from the structure of the molares in any of the Phocæ, to which these very small Mammalia have been compared: and in reference to this comparison Mr. Owen again called attention to the value of the character of the process continued from the angle of the jaw, in the fossils, as strongly contradistinguishing them from the Phocidæ, in none of the species of which is the angle of the jaw so produced. The Thylacotherium differs from the genus Didelphys in the greater number of its molars, and from every ferine quadruped known at the time when Cuvier formed his opinion respecting the nature of the fossil. This difference in the number of the molar teeth, which Cuvier urged as evidence of the generic distinction of the Stonesfield mammiferous fossils, has since been regarded as one of the proofs of their Saurian nature; but the exceptions by excess to the number seven, assigned by M. de Blainville to the molar teeth in each ramus of the lower jaw of the insectivorous Mammalia, are well established, and have been long known. The insectivorous Chrysochlore, in the order Feræ, has eight molars in each ramus of the lower jaw; the insectivorous Armadillos have not fewer; and in one subgenus (Priodon) there are more than twenty molar teeth on each side of the lower jaw. The dental formulæ of the carnivorous Cetacea, again, demonstrate the fallacy of the argument against the mammiferous character of the Thylacotherium founded upon the number of its molar teeth. From the occurrence of the above exceptions in recent placental Mammalia, the example of a like excess in the number of molar teeth in the marsupial fossil ought rather to have led to the expectation of the discovery of a similar case among existing Marsupials, and such an addition to our zoological catalogues has, in fact, been recently made. In the Australian quadruped described by Mr. Waterhouse under the name of Myrmecobius an approximation towards the dentition of the Thylacotherium is exemplified, not only in the number of the molar teeth, which is nine on each side of the lower jaw in the Myrmecobius, but also in their relative size, structure, and disposition. Lastly, with respect to the dentition, Mr. Owen says it must be obvious to all who inspect the fossil and compare it with the jaw of a small Didelphys, that, contrary to the assertion of M. de Blainville, the teeth and their fangs are arranged with as much regularity in the one as in the other, and that no argument of the Saurian nature of the fossil can be founded on this part of its structure.

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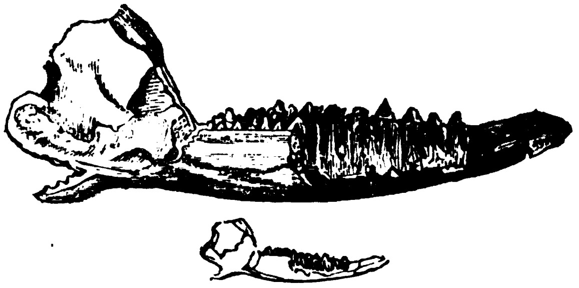
[*] 'Ossemens Foss.,' tom. v., p. 349.

[†] 'Annales des Sciences Nat.,' Avril, 1825; also the papers of Mr. Broderip and Dr. Fitton, in the 'Zoological Journal,' 1828, vol. iii., p. 408.

[‡] 'Comptes Rendus,' 1838, Second Semestre, No. 11, Sept. 10, p. 527, et seq.

With respect to M. de Blainville's assertion that the jaw is compound, Mr. Owen stated that the indication of this structure near the lower margin of the jaw of the Thylacotherium is not a true suture, but a vascular groove similar to that which characterises the lower jaw of Didelphys, Opossum, and some of the large species of Sorex. (*Geol. Proc.*)



Jaw of Thycalotherium Prevostii. Upper figure magnified.

Some discussion having ensued, in which Dr. Grant and Mr. Ogilby expressed opinions in support of M. de Blainville's views, Mr. Owen, on the occasion of reading, on the 9th of December following, his paper on *Phascalotherium*, being the second part of the 'Description of the Remains of Marsupial Mammalia from the Stonesfield slate,' gave a brief summary of the characters of the Thylacotherium, described in the first part of the memoir, and which he conceived fully proved the mammiferous nature of that fossil. He stated that the remains of the split condyles in the specimen demonstrate their original convex form, which is diametrically opposite to that which characterises the same part in all reptiles and all ovipara;—that the size, figure, and position of the coronoid process are such as were never yet witnessed in any except a zoophagous mammal endowed with a temporal muscle sufficiently developed to demand so extensive an attachment for working a powerful carnivorous jaw;—that the teeth, composed of dense ivory with crowns covered with a thick coat of enamel, are everywhere distinct from the substance of the jaw, but have two fangs deeply embedded in it;—that these teeth, which belong to the molar series, are of two kinds; the hinder being bristled with five cusps, four of which are placed in pairs transversely across the crown of the teeth, and the anterior or false molars, having a different form, and only two or three cusps—characters never yet found united in the teeth of any other than a zoophagous mammiferous quadruped;—that the general form of the jaw corresponds with the preceding more essential indications of its mammiferous nature. Fully impressed with the value of these characters, as determining the class to which the fossils belonged, Mr. Owen stated that he had sought in the next place for secondary characters which might reveal the group of Mammalia to which the remains could be assigned, and that he had found in the modification of the angle of the jaw, combined with the form, structure, and proportions of the teeth, sufficient evidence to induce him to believe that the *Thylacotherium* was a marsupial quadruped.

Mr. Owen then recapitulated the objections against the mammiferous nature of the *Thylacotherian* jaws from their supposed imperfect state, and repeated his former assertion that they are in a condition to enable these characters to be fully ascertained: he next reviewed, first the differences of opinion with respect to the actual structure of the jaw; and, secondly, with respect to the interpretation of admitted appearances.

1. As respects the structure.—It has been asserted that the jaws must belong to cold-blooded vertebrata, because the articular surface is in the form of an entering angle: to which Mr. Owen replied, that the articular surface is supported on a convex condyle, which is met with in no other class of vertebrata except in the Mammalia. Again, it is asserted that the teeth are all of an uniform structure, as in certain reptiles; but, on reference to the fossils, Mr. Owen stated that it will be found that such is not the case, and that the actual difference in the structure of the teeth strongly supports the mammiferous theory of the fossils.

2. With respect to the argument founded on an interpretation of structure, which really exists, the author showed that the *Thylacotherium* having eleven molars on each side of the lower jaw is no objection to its mammiferous nature, because among the placental Carnivora the *Canis Megalotis* has constantly one more grinder on each side of the lower jaw than the usual number; because the *Chrysochlore*, among the *Insectivora*, has also eight instead of seven molars in each ramus of the lower jaw; and the *Myrmecobius*, among the Marsupialia, has nine molars on each side of the lower jaw; and because some of the insectivorous *Armadillos* and zoophagous *Cetacea* offer still more numerous and reptile-like teeth, with all the true and essential characters of the mammiferous class. The objection to the false molars, having two fangs, Mr. Owen showed was futile, as the greater number of the spurious molars in every genus of the placental *Feræ* have two fangs, and the whole of them in the Marsupialia. If the ascending ramus in the Stonesfield jaws had been absent, and with it the evidence of their mammiferous nature afforded by the condyloid, coronoid, and angular processes, Mr. Owen stated that he conceived the teeth alone would have given sufficient proof, especially in their double fangs, that the fossils do belong to the highest class of animals.

In reply to the objections founded on the double fangs of the *Basilosaurus*, Mr. Owen said, that the characters of that fossil not having been fully given, it is doubtful to what class the animal belonged; and in answer to the opinion that certain sharks have double fangs, he explained that the widely bifurcate basis supporting the tooth of the shark is no part of the actual tooth, but true bone, and ossified parts of the jaw itself, to which the tooth is anchylosed at one part, and the ligaments of connection attached at the other. The form, depth, and position of the sockets of the teeth in the *Thylacothere* are precisely similar to those in the small Opossums. The colour of the fossils, Mr. Owen said, could be no objection to those acquainted with the diversity in this respect, which obtains in the fossil remains of Mammalia. Lastly, with respect to the *Thylacothere*, the author stated that the only trace of compound structure is a mere vascular groove running along its lower margin, and that a similar structure is present in the corresponding part of the lower jaw of some species of Opossum, of the *Wombat*, of the *Balæna antarctica*, and of the *Myrmecobius*, though the groove does not reach so far forwards in this animal; and that a similar groove is present near the lower margin, but on the outer side of the jaw, in the *Sorex Indicus*.

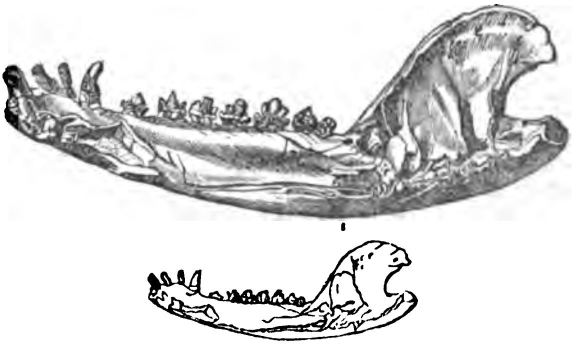
Phascolotherium. (Owen.)

Description of the Half-Jaw of the Phascolotherium.—This fossil is a right ramus of the lower jaw, having its internal or mesial surface exposed. It once formed the chief ornament of the private collection of Mr. Broderip, by whom it has since been liberally presented to the British Museum. It was described and figured by Mr. Broderip (1828, with the provisional name of *Didelphis Bucklandi*) in the 'Zoological Journal,' and its distinction from the *Thylacotherium* clearly pointed out. The condyle of the jaw is entire, standing in bold relief, and presents the same form and degree of convexity as in the genera *Didelphys* and *Dasyurus*. In its being on a level with the molar teeth, it corresponds with the marsupial genera *Dasyurus* and *Thylacynus*, as well as with the placental zoophaga. The general form and proportions of the coronoid process closely resemble those in zoophagous Marsupials; but in the depth and form of the entering notch, between the process and the condyle, it corresponds most closely with the *Thylacynus*. Judging from the fractured surface of the inwardly reflected angle, that part had an extended oblique base, similar to the inflected angle of the *Thylacynus*. In the *Phascolotherium* the flattened inferior surface of the jaw, external to the fractured inflected angle, inclines outwards at an obtuse angle with the plane of the ascending ramus, and not at an acute angle, as in the *Thylacyne* and *Dasyurus;* but this difference is not one which approximates the fossil in question to any of the placental zoophaga; on the contrary, it is in the marsupial genus *Phascolomys*, where a precisely similar relation of the inferior flattened base to the elevated plate of the ascending ramus of the jaw is manifested. In the position of the dental foramen the *Phascolothere*, like the *Thylacothere*, differs from all zoophagous Marsupials and the placental *Feræ;* but in the *Hypsiprymnus* and *Phascolomys*, marsupial herbivora, the orifice of the dental canal is situated, as in the Stonesfield fossils, very near the vertical line dropped from the last molar teeth. The form of the symphysis, in the *Phascolothere*, cannot be truly determined; but Mr. Owen stated his opinion that it resembles the symphysis of the *Didelphys* more than that of the *Dasyurus* or *Thylacynus*.

Mr. Owen agrees with Mr. Broderip in assigning four incisors to each ramus of the lower jaw of the *Phascolothere*, as in the *Didelphys;* but in their scattered arrangement they resemble the incisors of the *Myrmecobius*. In the relative extent of the alveolar ridge occupied by the grinders, and in the proportions of the grinders to each other, especially the small size of the hindermost molar, the *Phascolothere* resembles the *Myrmecobius* more than it does the *Opossum*, *Dasyurus*, or *Thylacynus;* but in the form of the crown the molars of the fossil resemble the *Thylacynus* more closely than any other genus of Marsupials. In the number of the grinders the *Phascolothere* resembles the *Opossum* and *Thylacine*, having four true and three false in each maxillary ramus; but the *molares veri* of the fossil differ from those of the *Opossum* and *Thylacothere* in wanting a pointed tubercle on the inner side of the middle large tubercle, and in the same transverse line with it, the place being occupied by a ridge which extends along the inner side of the base of the crown of the true molars, and projects a little beyond the anterior and posterior smaller cusps, giving the quinquecuspid appearance to the crown of the tooth. This ridge, which in *Phascolotherium* represents the inner cusps of the true molars in *Didelphys* and *Thylacotherium*, is wanting in *Thylacynus*, in which the true molars are more simple than in the *Phascolothere*, though hardly less distinguishable from the false molars. In the second true molar of the *Phascolothere* the internal ridge is also obsolete at the base of the middle cusp, and this tooth presents a close resemblance to the corresponding tooth in the *Thylacine;* but in the *Thylacine* the two posterior molars increase in size, while in the *Phascolothere* they progressively diminish, as in the *Myrmecobius*. As the outer sides of the grinders in the jaw of the *Phascolothere* are imbedded in the matrix, we cannot be sure that there is not a smaller cuspidated ridge sloping down towards that side, as in the crowns of the teeth of the *Myrmecobius*. But assuming that all the cusps of the teeth of the *Phascolothere* are exhibited in the fossil, still the crowns of these teeth resemble those of the *Thylacine* more than they do those of any placental *Insectivore* or *Phoca*, if even the form of the jaw permitted a comparison of it with that of any of the Seal tribe. Connecting then the close resemblance which the molar teeth of the *Phascolotherium* bear to those of the *Thylacynus* with the similarities of the ascending ramus of the jaw, Mr. Owen is of opinion that the Stonesfield fossil was nearly allied to *Thylacynus*, and that its position in the marsupial series is between *Thylacynus* and *Didelphys*. With respect to the supposed compound structure of the jaw of the *Phascolotherium*, Mr. Owen is of opinion that, of the two linear impressions which have been mistaken for *harmoniæ*, or toothless sutures, one, a faint shallow linear impression continued from between the antepenultimate and penultimate molars obliquely downwards and backwards to the foramen of the dental artery, is due to the pressure of a small artery, and he stated that he possessed the jaw of a *Didelphys Virginiana* which exhibits a similar groove in the same place. Moreover this groove in the *Phascolothere* does not occupy the same relative position as any of the contiguous margins of the opercular and dentary pieces of a reptile's jaw. The other impression in the jaw of the *Phascolotherium* is a deep groove continued from the anterior extremity of the fractured base of the inflected angle obliquely downwards to the broken surface of the anterior part of the jaw. Whether this line be due to a vascular impression or an accidental fracture is doubtful; but as the lower jaw of the *Wombat* presents an impression in the precisely corresponding situation, and which is undoubtedly due to the presence of an artery, Mr. Owen conceives that this impression is also natural in the *Phascolothere*, but equally unconnected with a compound structure of the jaw; for there is not any suture in the compound jaw of a reptile which occupies a corresponding situation.

The most numerous, the most characteristic, and the best-marked sutures in the compound jaws of a reptile are those which define the limits of the coronoid, articular, angular, and surangular pieces, and which are chiefly conspicuous on the inner side of the posterior part of the jaw. Now the corresponding surface of the jaw of the *Phascolothere* is entire; yet the smallest trace of sutures, or of any indication that the coronoid or articular processes were distinct pieces, cannot be detected; these processes are clearly and indisputably continuous, and confluent with the rest of the ramus of the jaw. So that where sutures ought to be visible, if the jaw of the *Phascolothere* were composite, there are none; and the hypothetical sutures that are apparent do not agree in position with any of the real sutures of an oviparous compound jaw.

Lastly, with reference to the philosophy of pronouncing judgment on the Saurian nature of the Stonesfield fossils from the appearance of sutures, Mr. Owen offered one remark, the justness of which, he said, would be obvious alike to those who were and to those who were not conversant with comparative anatomy. The accumulative evidence of the true nature of the Stonesfield fossils, afforded by the shape of the condyle, coronoid process, angle of the jaw, different kinds of teeth, shape of their crowns, double fangs, implantation in sockets,—the appearance, he repeated, presented by these important particulars cannot be due to accident; while those which favour the evidence of the compound structure of the jaw may arise from accidental circumstances. (*Geol. Proc.*, 1838-39, vol. iii.)



Jaw of Phascolotherium Bucklandii. Upper figure magnified.

A paper was afterwards read, entitled 'Observations on the Structure and Relations of the presumed Marsupial Remains from the Stonesfield oolite,' by William Ogilby, Esq., F.G.S.

These observations were intended by the author to embody only the most prominent characters of the fossils, and those essential points of structure in which they are necessarily related to the class of mammifers or of reptiles respectively. For the sake of putting the several points clearly and impartially, he arranged his observations under the two following heads:—

1. The relations of agreement which subsist between the fossils in question and the corresponding bones of recent Marsupials and Insectivora.

2. The characters in which the fossils differ from those families. Mr. Ogilby confined his remarks to Marsupialia and Insectivora, because it is to those families only of Mammifers that the fossils have been considered by anatomists to belong; and to the interior surface of the jaw, as the exterior is not exhibited in any of the fossil specimens.

1. In the general outline of the jaws, more especially in that of the *Didelphys* (*Phascolotherium*) *Bucklandii*, the author stated that there is a very close resemblance to the jaw in recent Insectivora and insectivorous Marsupials; but he observed that with respect to the uniform curvature along the inferior margin, Cuvier has adduced the same structure as distinctive of the Monitors, Iguanas, and other true Saurian reptiles; so that whatever support these modifications of structure may give to the question respecting the marsupial nature of the Stonesfield fossils, as compared with other groups of Mammals, they do not affect the previous question of their mammiferous nature, as compared with reptiles and fishes. The fossil jaws, Mr. Ogilby said, agree with those of Mammals, and differ from those of all recent reptiles, in not being prolonged backward behind the articulating condyle; a character, in conjunction with the former relation, which would be, in this author's opinion, well-nigh incontrovertible, if it were absolutely exclusive; but the extinct Saurians, the *Pterodactyles*, *Ichthyosauri*, and *Plesiosauri*, cotemporaries of the Stonesfield fossils, differ from their recent congeners in this respect, and agree with Mammals. Mr. Ogilby is of opinion that the condyle is round both in *D. Prevostii* and *D. Bucklandii*, and is therefore a very strong point in favour of the mammiferous nature of the jaws. The angular process, he said, is distinct in one specimen of *D. Prevostii*, and, though broken off in the other, has left a well-defined impression; but that it agrees in position with the Insectivora, and not the Marsupialia, being situated in the plane passing through the coronoid process and the ramus of the jaw. In the *D. Bucklandii*, he conceived, the process is entirely wanting; but that there is a slight longitudinal ridge partially broken, which might be mistaken for it, though placed at a considerable distance up the jaw, or nearly on a level with the condyle, and not at the inferior angular rim of the jaw. He is therefore of opinion that the *D. Bucklandii* cannot be properly associated either with the Marsupial or Insectivorous Mammals. The composition of the teeth, he conceives, cannot be advanced successfully against the mammiferous nature of the fossils, because animal matter preponderates over mineral in the teeth of the great majority of the Insectivorous *Cheiroptera*, as well as in those of the *Myrmecobius* and other small Marsupials. In the jaw of the *D. Prevostii* Mr. Ogilby cannot perceive any appearance of a dentary canal, the fangs of the teeth, in his opinion, almost reaching the inferior margin of the jaw, and being implanted completely in the bone; but in the *D. Bucklandii* he has observed, towards the anterior extremity of the jaw, a hollow space filled with foreign matter, and very like a dentary canal. The double fangs of the teeth of *D. Prevostii*, and probably of *D. Bucklandii*, he said, are strong points of agreement between the fossils and mammifers in general; but that double roots necessarily indicate, not the mammiferous nature of the animal, but the compound form of the crowns of the teeth.

2. With respect to the most prominent characters by which the Stonesfield fossils are distinguished from recent mammals of the insectivorous and marsupial families, Mr. Ogilby mentioned, first, the position of the condyle, which is placed in the fossil jaws in a line rather below the level of the crowns of the teeth; and he stated that the condyle not being elevated above the line in the *Dasyurus Ursinus* and *Thylacinus Harrisii*, is not a valid argument, because those Marsupials are carnivorous. The second point urged by the author against the opinion that the fossils belonged to insectivorous or marsupial mammifers, is in the nature and arrangement of the teeth. The number of the molars, he conceives, is a secondary consideration; but he is convinced that they cannot be separated in the fossil jaws into true and false, as in Mammalia; the great length of the fangs, equal to at least three times the depth of the crowns, he conceives, is a strong objection to the fossils being placed in that class, as it is a character altogether peculiar and unexampled among mammals; the form of the teeth also, he stated, cannot be justly compared to that of any known species of marsupial or insectivorous mammifer, being, in the author's opinion, simply tricuspid, and without any appearance of interior lobes. As to the canines and incisors, Mr. Ogilby said that the tooth in *D. Bucklandii*, which has been called a canine, is not larger than some of the presumed incisors, and that all of them are so widely separated as to occupy full five-twelfths of the entire dental line, whilst in the *Dasyurus viverrinus* and other species of insectivorous Marsupials they occupy one-fifth part of the same space. Their being arranged longitudinally in the same line with the molars, he conceives, is another objection, because, among all mammals, the incisors occupy the front of the jaw, and stand at right angles to the line of the molars. With respect to the supposed compound structure of the jaw, Mr. Ogilby offered no formal opinion, but contented himself with simply stating the appearances: he nevertheless objected to the grooves being considered the impression of blood-vessels, though he admitted that the form of the jaws is altogether different from that of any known reptile or fish.

From a due consideration of the whole of the evidence, Mr. Ogilby stated, in conclusion, that the fossils present so many important and distinctive characters in common with mammals on the one hand, and cold-blooded animals on the other, that he does not think naturalists are justified at present in pronouncing definitively to which class the fossils really belong. (*Geol. Proc.*, 1838-39, vol. iii.)

On the 9th of January, 1839, Mr. Owen proved, in a paper read to the Geological Society, that the so-called *Basilosaurus* of Dr. Harlan, upon which M. de Blainville and the other objectors, thinking it to be a fossil reptile with double-fanged teeth, had relied so strongly as an argument for the non-mammiferous nature of the Stonesfield jaws, is no Saurian at all, but a mammiferous animal forming a most interesting link between the carnivorous and herbivorous *Cetacea*; and in compliance with the suggestion of Dr. Harlan, who, having compared with Mr. Owen the microscopic structure of the teeth of the *Basilosaurus* with those of the *Dugong* and other animals, admitted the correctness of the inference of its mammiferous nature,—Mr. Owen proposed to substitute for the name of *Basilosaurus* that of *Zeuglodon*. [WHALES.]

Among the fossil remains collected by Sir Thomas Livingstone Mitchell, in the caves of Wellington Valley, Australia, and which are now deposited in the museum of the Geological Society of London, Professor Owen describes the following genera and species:—

Macropus.

Macropus Atlas, at least one-third larger than the *Macropus major*, the largest known existing species of Kanguroo, approaching in the great size of its permanent spurious molar to *Hypsiprymnus*.

Macropus Titan, as large as the preceding, but differing chiefly in the smaller size of the permanent spurious molar, which in this respect more nearly corresponds with the existing *Macropus major*.

Hypsiprymnus.

An undetermined species, rather larger than any of the three species with whose crania Mr. Owen has had the opportunity of comparing them. There is no evidence, according to him, that it agrees with any existing species.

Phalangista.

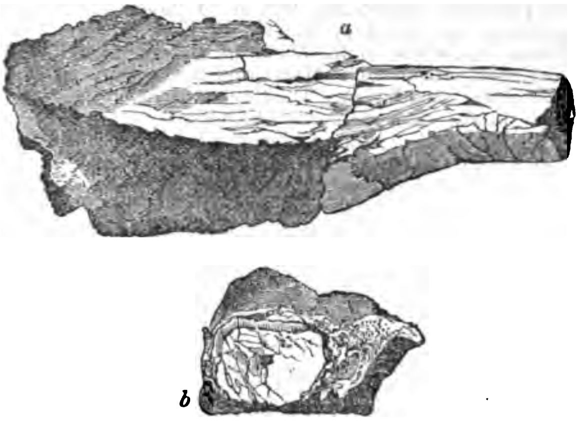
A species differing from *Phalangista Vulpina* in having the spurious molar of relatively smaller size, and the second molar narrower; the symphysis of the lower jaw is also one line deeper in the fossil. Mr. Owen states that there is no proof that it corresponds with any existing species; but, he adds, that a comparison of the fossils with the bones of these species (which are much wanted in our osteological collections) is obviously necessary to establish the important fact of the specific difference or otherwise of the extinct Phalanger.

Phascolomys.

Phascolomys Mitchellii, a little larger, probably, than the existing Wombat.

Diprotodon. (N. G. Owen.)

Mr. Owen applies this name to the genus of *Mammalia* represented by the anterior extremity of the right ramus of the lower jaw, with a single large procumbent incisor, of which we give a reduced figure below (*a*, *b*). It had been formerly conjectured to belong to the Dugong, but the incisor resembles the corresponding tooth of the Wombat in its enamelled structure and position (*b*), and the section of the Wombat's teeth. It differs however in the quadrilateral figure of its transverse section, in which it corresponds with the inferior incisors of the Hippopotamus.



Anterior extremity of the right ramus, lower 'aw, of Diprotodon. *a*, profile. (Owen.)

Dasyurus.

Dasyurus laniarius, closely resembling *Dasyurus Ursinus*, but differing from it in being one-third larger, and in having the canines or laniaries of proportionately larger size. Another specimen leads Mr. Owen to doubt whether it is the lower jaw of the *Dasyurus laniarius*, or of some extinct marsupial carnivore of an allied but distinct species.

The general result of the examination of the remains found in the Wellington Valley bone-caves are,—1st. That the fossils are not referrible to any known extra-Australian genus of mammals. 2nd. That the fossils are not referrible, from the present evidence, to any existing species of Australian mammal. 3rd. That the greater number certainly belong to species either extinct or not yet discovered living in Australia. 4th. That the extinct species of *Macropus*, *Dasyurus*, and *Phascolomys*, especially *Macropi Atlas* and *Titan*, are larger than the largest known existing species. 5th. That the remains of the saltatory animals, as the *Macropi* and *Hypsiprymni*, are all of young individuals; while those of the burrowing Wombat, the climbing Phalanger, and the ambulatory Dasyure, are the remains of adults. (Owen, in Mitchell's *Three Expeditions into the Interior of Eastern Australia*, &c.)

Dr. Buckland observes, that the discovery of the *Marsupialia*, both in the secondary and tertiary formations, shows that this order, so far from being of more recent introduction than other orders of Mammalia, is in reality the first and most antient condition under which animals of this class appeared upon our planet;—that, as far as we know, it was their only form during the secondary period;—that it was co-existent with many other orders in the early parts of the tertiary period; and that its geographical distribution in the present creation is limited to North and South America, and to New Holland, with the adjacent islands. (*Bridgewater Treatise.*)

MARSUPIOCRINITES, a genus of Crinoidea, recently proposed by Professor Phillips for some remarkable fossils noticed by Mr. Murchison in the strata of the Silurian system. (*The Silurian System*, pl. 18, f. 3.) The arms are formed of two rows of calcareous plates.

MARSUPIOCRINITES. [ENCRINITIES, vol. ix., p. 393.]

MARSUPITES, a fossil genus of *Echinodermata*, established by Miller in his work on the Crinoidea. In many respects it resembles the Crinoidea, but has no stem. [ENCRINITES, vol. ix., p. 393.] It belongs to the chalk.

MARTABAN. [TENASSERIM.]

MARTEL, CHARLES. [CHARLES MARTEL.]

MARTELLO TOWER, a circular building of masonry, generally two stories high; the lower story is divided into chambers for the reception of stores, and the upper serves as a casemate for troops: the roofs are vaulted, and that of the upper story is shell-proof. The wall of the building terminates above in a parapet; and, on the terreplein of the roof, are placed pieces of artillery which rest on platforms of timber traversing on pivots, so that the guns are capable of being fired in any direction. The entrances are at a considerable height above the ground, and over these are machicolations. The whole work is generally surrounded by a ditch and glacis.

It is probable that the name of such works should be Mortella Towers, since it is supposed to have been derived from that of a fort in Mortella (Myrtle) Bay, Corsica, which after a gallant resistance was taken in 1794 by a British naval force. Several such towers were, during the late war, built on the coasts of this country, in Jersey, and elsewhere; but most of them have, since the peace, been taken down, from an opinion that the defence which could be made from them, in the event of an invasion, would not be adequate to the expense of keeping them in repair.

MARTEN, or MARTIN (Mammalogy), the name of a carnivorous quadruped (*Mustela Martes*, Linn.), of the Weasel family. [WEASEL.]

MARTHA'S VINEYARD. [MASSACHUSETTS.]

MARTIAL LAW is a series of regulations made to preserve order and discipline in the army, and enforced by the prompt decisions of courts-martial; this is generally however called military law. During the existence of a rebellion, when, in consequence of the ordinary processes of general law becoming ineffectual for the security of life and property in any province or state, the legislature has appointed that a military force shall be employed to suppress the disorders and secure the offenders—and when the trial of the latter takes place according to the practice of military courts, that province or state is said to be subject to martial law.

On the occurrence of such a calamity in any part of the British dominions, the two houses of parliament, jointly with the crown, determine that a temporary suspension of the Habeas Corpus Act shall take place. This measure is, of course, adopted only in cases of great emergency, on account of the abuses to which it may give rise; and the necessity of it and the time of its duration are always stated in the provisions of the decree. The act by which martial law was declared in Ireland during the Rebellion in 1798 may be seen in Tytler's *Essay on Military Law*, Appendix, No. 6.

In merely local tumults the military commander is called upon to act with his troops only when the civil authorities have failed in preserving peace; and the responsibility of employing soldiers on such occasions falls entirely upon the magistrate. The military officer must then effect by force what by other means could not be effected; and, for the consequences, the officer can be answerable only to a military court or to the parliament of the nation.

The constitution of this country permits a military law for the government of the army, even in times of internal tranquillity, to co-exist with the general law of the land. But the former applies to military persons only; among these its jurisdiction comprehends all matters relating to the discipline of the army, to the cognizance of which the civil courts are not competent—as disobedience of orders, cowardice, &c.; and extends to such crimes as desertion, mutiny, and holding correspondence with the enemy. On the other hand, every citizen who is not engaged in the military profession is subject to the general laws of the land alone, and is free from all the restraints which, by the necessity of preserving discipline, are imposed on the soldier: he is his own master, he can dispose of his time at pleasure, and the peculiar regulations of the military service are, to him, as though they did not exist.

This distinction between the two classes of persons with respect to military law is clearly expressed in the 'Mutiny Act,' as it is called, which was first passed in the reign of William III. It is there stated that the subjects of this realm cannot be punished in any other manner than conformably to the common laws of the country. But an exception is immediately made in the case of military persons; and there follow several enactments for the purpose of bringing soldiers who shall mutiny, excite sedition, or desert from the service, to a more exemplary and speedy punishment than the usual forms of law will allow.

Immediately after the Norman conquest of this country the military law consisted in the obligation imposed on the vassals of the crown to follow the king to the field, under penalty of a pecuniary fine or the forfeiture of their land. But the first known record concerning the regulation of the army is believed to be that which was made in the reign of King John; and this relates chiefly to the purchase of provisions at the sales held for supplying the army with necessaries. The ordonnances of Richard II. and of

Henry V., and the statutes of Henry VIII., contain many useful rules for the government and discipline of the army. They prescribe obedience to the king and the commanders; they award punishments for gaming, theft, and other crimes; for raising false alarms in the camp, and for the seizure of religious persons. They also contain regulations concerning the disposal of prisoners taken in battle, and concerning the stakes, fascines, ladders, and other materials for military operations, with which the soldiers were to provide themselves. (*Grose*, vol. ii.)

The early kings of this country do not appear to have exercised, generally, a discretionary power over the army; for a statute of Edward I. states that the king had power to punish soldiers only according to the laws of the realm. The court of high constable and high marshal of England had for many years an exclusive jurisdiction in all military affairs, and this was sometimes extended over the civil courts. But the power of that court was restrained by a statute in the reign of Richard II. (1386), and it subsequently expired. From the time of Henry VII. till the reign of Charles I. the enactment of laws for the government of the army depended on the king alone.

The excesses which, during the last-mentioned reign, were committed by the undisciplined army which that ill-advised prince quartered on such of the people as had refused to lend money to the crown for raising them, led to the promulgation of a martial law, by which power was given to the magistrates to arrest and execute the persons guilty of murders, robberies, and other crimes, as in time of war. The *petition of right* abolished martial law for a time in this country, but it was subsequently restored by the parliament, and several ordinances of great severity were during the interregnum enacted respecting the maintenance of discipline. In the beginning of the reign of James II., after the rebellion of the Duke of Monmouth, several executions took place by martial law; and this may be said to have been the last occasion on which the law was exercised in Great Britain. At the time of the Revolution the present regular code was established for the government of the army; and this, under the name of the 'Mutiny Act,' has ever since been annually renewed by parliament.

(Grose, *Military Antiquities;* Tytler's *Essay on Military Law*, by Charles James; Samuel, *Historical Account of the British Army;* Major Adye, *Treatise on Military Law;* Major-General C. J. Napier, *Remarks on Military Law.* See also Courts-Martial.)

MARTIA'LIS, MARCUS VALE'RIUS, was a native of Bilbilis [Bilbilis], in Spain, where he was born on the Calends of March, about the year 40 A.D. Very few particulars of his life are ascertained, and even these are principally collected from his own writings. He came to Rome at an early age, and passed about thirty-five years of his life in that city. He left Rome probably about the commencement of Trajan's reign, and retired to his native town. The emperor Titus appears to have been his first imperial patron. Domitian, the successor of Titus, gave him the 'jus trium liberorum,' and conferred on him the dignity of tribune (*Epig.* ii. 91; iii. 95), for which and other favours the grateful poet made a most abundant return of flattery. Some critics have supposed that the author was married, and had a wife Marcella (xii., 21, 31); but the conclusion to be drawn from his writings is on the whole the other way. Martial was acquainted with most of his literary contemporaries, Juvenal, Quintilian, Pliny the younger, and others, as appears from his own writings (ii., 90; xii., 18, &c.).

There are extant of Martial fourteen books, entitled 'Epigrammata,' of which the thirteenth also bears the particular name of Xenia, and the fourteenth that of Apophoreta. A book called 'Spectaculorum Liber,' which is prefixed to the 'Epigrams,' contains a number of small poems on the shows of Titus and Domitian, and, as some critics suppose, may not be altogether the work of Martial. The whole collection contains above 1500 epigrams.

Many of the epigrams of Martial belong to that class of compositions which are now known by the name of epigrams, and may be considered as the prototype of that species of composition: they are short pieces, varying in length from two lines to four, six, or more, the point of which is generally contained in the last line. Like modern compositions of this kind, the thought is often forced and laboured, and the whole meaning sometimes obscure. Other of his compositions belong to that class more properly called epigrams [Epigram], according to the original signification of the word, and are often characterized by great felicity of expression: they are on a great variety of subjects, and contain much matter that needs and requires comment. There is perhaps no Roman writer extant whose works, if well studied, would be so useful as Martial in illustrating the period in which he lived. Martial's description of his native Bilbilis and the river Salo (Xalon) which flows by it, and several other pieces, show a taste for a country life, and a poetic vein hardly inferior to that of Horace (i. 50, &c.). The twelfth book of his 'Epigrams' was published after his return to Bilbilis (xii. 3).

Many of the epigrams of Martial are as gross and obscene as thought and expression can make them; as to which it may be sufficient to remark that the manners of his age did not forbid the publication of obscene poetry, and that in this respect Martial was no worse than many of his contemporaries. In the Delphin edition the most obscene epigrams have been carefully selected and placed together at the end of the work, for reasons which, as there given, do not appear very satisfactory.

The editions and translations of Martial are very numerous. There are several English translations, the latest of which, so far as we know, is that by James Elphinstone, London, 1782.

MARTIGUES, LES, a town in France in the department of Bouches du Rhône, on the channel which forms the communication between the étang or lake of Martigues, or Berre, and the sea. It consists of three parts communicating with each other by bridges: the most antient part, called the Isle, is on an island in the mid channel; the other two, called Jonquières and Ferrières, are on the south-east and north-west banks respectively. The streets are generally well laid out and the houses neatly built. The banks of the channel are lined with quays. There are a spacious and regularly built town-hall and a handsome church. The population in 1831 was 5335 for the town, or 7379 for the whole commune; the inhabitants are engaged as seamen, or in the manufacture of hats, in ship-building, and in the fishery on the lake. They export oil, wine, salt, and a great quantity of fish. The fish of the Mediterranean resort periodically to the lake, where the greater part are taken by the fishermen.

MARTIN (Ornithology), the name for some of the Swallow tribe, as the *House Martin* (*Hirundo urbica*, Linn.), the *Bank* or *Sand Martin* (*Hirundo riparia*), and the *Black Martin* or *Swift*. [Swallows.]

MARTIN I., a Tuscan by birth, succeeded Theodore I. in the see of Rome, A.D. 649. He held a council of Italian bishops in the Lateran church, in which the Monothelites were condemned. The emperor Constans II., who favoured the Monothelites, gave orders to the exarch of Ravenna to seize the person of the pope. Martin was taken to Constantinople, where a judicial inquiry was instituted against him for disobedience to the emperor, and he was banished to the Thracian Chersonesus, where he died in 655. He was succeeded by Eugenius I.

MARTIN II., called by some Marinus I., succeeded John VIII. in 882, and died in 884. He was succeeded by Adrian III.

MARTIN III., called by some Marinus II., a Roman by birth, succeeded Stephen VIII. in 942. He died in 946, and was succeeded by Agapitus II.

MARTIN IV., cardinal Simon de Brie, a native of France, succeeded Nicholas III. in the papal chair in 1281, through the influence of Charles of Anjou, king of Sicily and Naples. The Sicilian Vespers in 1282 having deprived Charles of Sicily, Martin excommunicated Peter of Aragon, whom the Sicilians had elected king, but his excommunication was of no more avail than the arms of the Angevins, for the Sicilians stood firm against both. Martin excommunicated the Byzantine emperor Michael, by which he widened the breach between the Greek and Latin churches. He died in 1285, and was succeeded by Honorius IV.

MARTIN V., Cardinal Otho Colonna, of an illustrious Roman family, was chosen by the council of Constance, after the deposition of John XXIII. and of the two antipopes Gregory and Benedict. Martin closed the council of Constance, in April, 1417, without its having effected the reforms in the church which were expected from it by Europe in general. Martin however promised to call together a new council for the purpose, which after much delay met first at Siena and afterwards at Basle in Switzerland, whither the pope sent his legate, cardinal Julian Cesarini, in 1431. But Martin died soon after, and was succeeded by Eugenius IV.

MARTIN-DE-RE′, ST. [Charente Inferieure.]

MARTIN, SAINT, one of the Lesser Antilles, lies to the south of Anguilla, from which island it is separated by a deep channel, about four miles wide in the narrowest part. Saint Martin is about 12 miles long and of a very irregular shape; its area is about 90 square miles. It contains no mountains, but a great number of rocky hills. The soil of the valleys and plains is sandy, and not very productive; there are no rivers or running streams on the island. The little rain which falls is collected into cisterns. The produce consists of sugar, cotton, and tobacco. The island also contains some valuable salt-ponds.

Saint Martin was originally settled by Spaniards, soon after the discovery of the West Indies by Columbus, but they abandoned the island in the middle of the seventeenth century. After this it was held jointly by the French and the Dutch, the former taking the northern and the latter the southern half, which is the most valuable, from its containing the salt-ponds. In March, 1801, the island was taken by the English, but at the peace of Paris was given up wholly to the Dutch, who have since retained possession of it. Philisburg, the town, is on the south-west side, in 18° 1′ N. lat. and 63° 7′ W. long.; it has a commodious harbour with from 8 to 10 fathoms water.

MARTI′NI, GIAMBATTISTA, well known throughout Europe under the title of the Padre Martini, was born at Bologna in 1706. Early in youth he entered the order of St. Francis, and, prompted by a spirit of inquiry and love of antiquity, soon set out on travels which he extended to Asia, on his return from which he seriously recommenced the study of music, under the celebrated Ant. Perti. In 1723 he became Maestro di Capella of the convent of his order, which office he retained till his death. 'He was,' says Dr. Burney, who knew him well, 'regarded during the last fifty years of his life as the most profound harmonist, and the best acquainted with the art and science of music, in Italy. All the great masters of his time were ambitious of becoming his disciples, and proud of his approbation.' He was also a composer, and produced much music for the church, which was formerly held in esteem. His sixty Canons in the unison, for 2, 3, and 4 voices, are still known, and admired for their smoothness and grace. But the reputation of the excellent and learned Father is built, and durably, on his Essay on Counterpoint, published, in two folio volumes, at Bologna, in 1774; and on his History of Music, in three volumes, quarto, the last of which appeared in 1781.

Martini's Essay (*Saggio fondamentale practico di Contrappunto sopra il Canto-Fermo*) is divided into two parts. In the first is a compendium of the rules of counterpoint, explaining clearly, and well illustrating, the laws of harmony. This is followed by the application of the foregoing to *Canto-Fermo* [Plain-Chant], and succeeded by upwards of sixty compositions by the great masters of the antient Italian school. The second part is wholly devoted to fugue and canon, and is extremely recondite, containing, however, too many musical enigmas and other matters which, happily, have no value in the present day: but compensation is made, for what now can only be considered as laborious trifling, by nearly fifty specimens of composition, in from two to eight parts, by several of the most distinguished of the old Italian masters.

The History (*Storia della Musica*) by Martini was intended to be most voluminous, it is to be presumed, for the third volume only reaches the time of Alexander the Great. What is completed exhibits vast erudition and astonishing research, but is grievously defective in plan; and though valuable as a work of reference, will now be read chiefly by the studious professor and the patient antiquary, who may derive from it much curious and useful information. The materials collected by the author for his purpose were of surprising extent; the number of volumes in his library amounted, we are told, to seventeen thousand, of which three hundred were manuscripts of great rarity; and a large part of all this he was enabled to purchase and obtain through the generosity and interest of Farinelli, the famous singer, whose numerous acts of liberality and benevolence proved that he was able to repress his resentment against mankind for having sanctioned the cruel practices under which he had suffered. Martini died in 1784.

MARTINI, GIUSEPPE SAN, a composer of distinguished merit, and a most celebrated performer on the oboe—an instrument which he may be said to have civilised—was a native of Milan, and arrived in England in 1723. He was soon engaged at all the public and private concerts, and in 1740 was taken into the service of the Prince of Wales, and received the appointment of music-master to the princesses. His Twelve Sonatas for two violins and violoncello were long in the highest favour with the public; but his best work is his Concertos for a full band, which display great invention, very elegant taste, and a thorough knowledge of his art. He died in 1750.

MARTINI, VINCENZO, commonly known as Martini of Madrid, was born at Valencia in Spain, about the year 1750. He was Maestro di Capella to the prince of Asturias, in 1785, and has always been thought one of the most agreeable composers of Italian operas. Among his works are *L'Arbore di Diana*, brought out at Vienna in 1787, and *La Cosa Rara*, produced about the same time, both of which have been everywhere popular, particularly the latter, which is well known on our English as well as on the Italian stages, Stephen Storace having introduced most of it in Cobb's opera, the *Siege of Belgrade*.

MARTINIQUE, or MARTINICO, one of the largest of the Caribee Islands, is 10 leagues south-south-east of Dominica. The greatest length is 50 miles from north-west to south-east, and the mean breadth is about 16 miles; in form it is very irregular, and its surface is very uneven, being generally occupied by conical shaped hills. Three mountains of considerable height are visible on approaching the island in any direction; one of these, Mont Pelée, on the north-west side, is an exhausted volcano; the summits of the three are mostly covered with clouds. The island contains a great number of streams, and the coast, being indented by numerous bays and inlets, affords many good harbours. There are two principal towns, Saint Pierre and Port Royal, both on the west side of the island; the former is in 14° 44′ N. lat. and 61° 14′ W. long., and the latter in 14° 35′ N. lat. and 61° 7′ W. long. Port Royal, the residence of the governor, stands on the north side of a deep and well sheltered bay, protected by a fort which covers the whole surface of a peninsula and commands the town and harbour. During the war and while Martinique was in possession of the English, Port Royal was the general rendezvous and head-quarters of the fleet stationed in the West Indies. The Diamond Rock, which is about three leagues south-south-east from Port Royal bay, was taken possession of by the English between the breaking out of the war in 1802 and the capture of the island in 1810, and was commissioned and rated as a sloop of war in the British navy. Saint Pierre is an open roadstead, affording very indifferent shelter to shipping, but it is the principal place of trade in the island, and is said to be the handsomest town in the West Indies. It consists of three spacious streets parallel to the beach, and several transverse streets. Streams of water are conveyed through the principal streets, and impart a degree of freshness to the air most desirable in so warm a climate.

The population of the island in 1834 consisted of 36,766 whites and free coloured persons, and 78,233 slaves: together 114,999.

The staple production of the island is sugar, of which it yielded in 1834, 28,692 tons, besides 8748 tons of molasses and 365,600 gallons of rum. There were also grown about 600 tons of coffee, and small quantities of cotton, cocoa, and cloves. The total value of the imports in that year was 588,000*l.*, and of the exports 647,500*l.* The number and tonnage of ships that arrived and sailed were—

	Vessels.	Tons.
Arrived—French ships . .	375	50,121
„ Foreign ships .	442	tonnage not stated.
Sailed—French ships . .	371	48,063
„ Foreign ships .	444	tonnage not stated.

The foreign vessels were chiefly craft from the neighbouring English colonies; the rest were Americans.

Martinique was first settled by a party of about 100 men headed by a French planter, M. Desnambre, from St. Christopher, in 1635. The island was at that time peopled by Caribs, but in the course of a very few years they were exterminated. It was taken in 1762 by the English, but was restored at the peace in the following year. In 1794 it was again taken by the English, and again restored to France at the peace of Amiens. It was once more cap tured by the English in 1810, and finally restored by the treaty of Paris in 1814, since which time it has remained under the dominion of France. At the beginning of the present year (1839) the island suffered the shock of an earthquake, which did considerable damage to the town of St. Pierre, and almost wholly destroyed Port Royal, in which town upwards of 500 persons were killed by the falling of the buildings, including nearly all the inmates of the principal hospital. The works and the negro villages of many of the sugar plantations were destroyed by the same shock.

MARTLET. [HERALDRY.]

MARTOS, IVAN PETROVITCH, director of the Academy of Fine Arts, St. Petersburg, was not only the most eminent sculptor Russia has yet produced (and she has given birth to a Prokophiev and a Kozlovsky), but one who would have ranked high in almost any age or country. The number of his works is very considerable, and among the more important are the following public monuments:—the bronze colossal group of the patriot Minin and Pozharsky, at Moscow; the monument to the emperor Alexander, at Taganrog; the statue of the duke of Richelieu, at Odessa; Potemkin's monument, at Cherson; and that erected in honour of Lomonosov, at Arkhangel. Martos has been styled the Canova of Russia; and while some have admitted that his works are inferior to those of the great Italian artist in point of refined elegance and high finish, they assert them to be free from that mannerism and over-studied gracefulness which were Canova's defects. It has been further admitted that they do not evince equal power of imagination with those of his countryman Kozlovsky, although on the other hand they stand the test of a critical scrutiny much better. Their characteristics are nobleness of conception, truth of expression, and freedom, without negligence, of execution. In the draping of his figures he was, if anything, superior to Canova, besides which he had a particular talent for bas-relief subjects. One of the most admired of these is that which adorns the monument of the grand-duchess Helena Paulovna, and which represents Hymen extinguishing a torch. Martos died April 17th, 1835, being upwards of eighty years of age.

MARTYN, HENRY, known as *The Missionary*, born 1781, died 1812. The short life of this amiable and zealous man may thus in brief be delineated. His birth was obscure. He was the son of a person who had been a labourer in the mines at Gwennap in Cornwall, but who was probably a person of talent and virtue, as he raised himself to the situation of clerk to a merchant at Truro, in which town Henry Martyn was born. He had his education in the grammar-school of Truro, and having acquired a considerable share of grammar learning, he tried for a scholarship in Corpus Christi College, Oxford; but failing in this, in 1797 he entered Saint John's College, Cambridge. Here he pursued his studies with such energy, that in 1801 he came out senior wrangler. During this period also his mind became directed with more than common earnestness to the truths of revelation. The death of his father is thought to have affected him at this period of his life so deeply as to have had no small share in turning his thoughts into the channel in which from this time they continued to flow; and not less the intimacy which at this time began with the Rev. Charles Simeon, the celebrated evangelical preacher in the university of Cambridge. He was chosen fellow of St. John's in March, 1802; but out of zeal in the cause of religion, he finally determined to devote himself to the work in which many of his countrymen had by that time begun to engage themselves, of propagating Christianity in nations which had not received it. There had been, it is true, a Society in England associated for the purpose of propagating the gospel in foreign parts, but a new impulse and a new energy were given to such operations by the establishment of Missionary Societies, supported by the Methodists, the Independent Dissenters, and by the Evangelical party in the church. Mr. Martyn was not content with supporting this object by his influence at home, but he proposed himself to the African and Eastern Missionary Society as a person willing to undertake the duties of a missionary in the East, and finally embarked for India in 1805.

It now became necessary that he should make himself master of the languages of the countries which he was about to visit; and with what success he studied them is evidenced by the fact that he had the superintendence of the translations of the New Testament made under the instructions of the Missionary Society, both into Persian and Hindustanee. He made also some progress in an Arabic translation. In his capacity of missionary he traversed large tracts both of India and Persia. After above five years' labour in these countries, his health began to decline, and it soon became manifest that he would see his native shores no more. He did however make the attempt to return; but his strength wholly failing him, he was obliged to halt at Tokat, in Asia Minor, about 250 miles from Constantinople, where in a few days he died. The regrets in England which this event occasioned were great. Much was expected from him, and much would probably have been done by him in the cause to which he had devoted himself. As it was, he brought not a few both Hindus and Mohammedans to make profession of the Christian faith, and he caused the Scriptures to be extensively dispersed among a people who had not previously known them.

An interesting account of his life, compiled from various Journals left by him, was published by the Rev. John Sargent, 1819.

MARTYR, JUSTIN. [JUSTIN MARTYR.]

MARTYRS, MARTYROLOGY, from the Greek *Martur* or *Martus* (μάρτυρ or μάρτυς), *a witness*.

By the term *martyr* we now generally understand a person who suffers death rather than renounce his religious opinions; and those who have made a profession of their faith and thereby endured sufferings short of death are called *confessors*. These terms appear to have been used in the same sense by some of the early Christian writers; but others give the title of *martyr* to all who suffered tortures on account of their faith, and that of *confessor* to those who were only imprisoned for its avowal. Tertullian calls the latter 'martyres designati,' *martyrs elect* The duty of enduring suffering, and even death, for the sake of religion was plainly taught by Christ and the apostles. (*Matt.*, x. 17-39; xvi. 25; *Rev.*, ii. 10, 11.) In the *Acts of the Apostles* we have several instances of the patience and even exultation of the first Christians under persecution; and in some passages martyrs are spoken of with peculiar honour. (*Acts*, xxii. 20; 2 *Tim.*, i. 8; *Rev.*, ii. 13; vi. 9-11; xvii. 6; xx. 4.) The annals of the early Christian church contain the histories of many martyrs, whose astonishing fortitude under the most cruel tortures was doubtless one great cause of the rapid diffusion of Christianity. Among the earliest and most valuable documents relating to this subject are the letter of the church at Smyrna, giving an account of the martyrdom of Polycarp (A.D. 167), and that of the churches at Lyon and Vienne (A.D. 177), concerning the martyrs who suffered in the same reign, namely, that of Marcus Aurelius Antoninus. (Eusebius, *Ecc. Hist.*, iv. 5; v. i.; and Lardner's *Works*, vol. vii., p. 150, edition of 1831.) We learn from these accounts that martyrs were highly honoured by the church, but we read nothing of that intercessory power nor of those extraordinary privileges which were ascribed to them in later ages. The degree of honour paid to them is expressed by the writers of the letter from Smyrna, where they state that the governor was induced to refuse their request to have the body of Polycarp delivered to them, 'lest they should leave him that was crucified, to worship this man; .... little considering that we can never forsake Christ, who has suffered for the salvation of all men. Him we worship as the Son of God. The martyrs we love as the disciples and imitators of the Lord.' But in less than a century the reverence felt towards martyrs became quite extravagant and superstitious. We learn from the writings of Cyprian, bishop of Carthage (A.D. 248), that the sufferings of martyrdom were held to purge away the stain of sin, so that the martyr was admitted at once into paradise without needing the fires of purgatory: martyrs were thought to expiate by their blood not only their own sins, but those of other men, and even of the church; and the fiery baptism of martyrdom was accounted of equal efficacy with the sacraments of Christ. The sense of pain was believed to be blunted or even removed by miraculous power. If they expired under their tortures, temples (called *martyrum confessiones* or *memoriæ*) were built over their graves, yearly festivals were instituted in their honour, their relics were held sacred and believed to have the power of working miracles, and their intercession with God was invoked as being peculiarly prevalent. If their sufferings fell short of death, they had ever after the highest authority in the church. But these honours appear sometimes to have had a bad effect on those to whom they were paid, for Cyprian complains strongly of the disgraceful conduct of some who had been confessors.

In proportion to the honour paid to martyrdom was the disgrace attached to those who feared it. But here we observe a remarkable difference. In the earliest ages the Christians, acting upon Christ's command in *Matt.*, x. 23, did not think it disgraceful to avoid persecution by flight; but in later times the glory ascribed to martyrdom induced men to throw themselves in its way. Tertullian wrote a book against all flight in persecution; and Cyprian himself, when he retired from Carthage during a persecution, did not attempt to defend his conduct by general arguments, but pleaded an express revelation from God as his excuse. In a word, the martyrs of this age seem to have had more ambition and less steadfastness than those of earlier times.

The earliest accounts of Christian martyrdoms, for instance, that of Stephen in the *Acts* (vii.), are related with the utmost simplicity; but it was not long before the narratives of the deaths of martyrs were adorned with accounts of miracles, which, to say the least, are difficult to believe. This fashion had commenced even in the second century, for we find examples of it in the letter already mentioned, which relates the death of Polycarp. On these miracles Middleton remarks, 'These deaths of the primitive martyrs seldom failed of being accompanied by miracles, which, as we find them related in the old Martyrologies, were generally copied from each other: concerning sweet smells issuing from their bodies, and their wonderful resistance to all kinds of torture; and the miraculous cures of their wounds and bruises, so as to tire their tormentors by the difficulty of destroying them, which yet, after a vain profusion of miracles, was always effected at the last.' (*Free Enquiry*, p. 126, note.)

It is very difficult to ascertain the number of martyrs who suffered in the early persecutions. Some writers have made it enormous, others quite insignificant. Among the latter is Dodwell, who has written an elaborate dissertation on the subject. (*Dissertationes Cyprianicæ*, Diss. xi.) The expressions of Eusebius and other ecclesiastical writers would lead us to infer that the number of martyrs was considerable, but probably it has been much overrated.

Middleton has shown that many of the accounts in the Martyrologies are fabulous. He mentions, in his 'Letter from Rome,' some curious instances in which persons who never existed, heathen deities with their names slightly or not at all changed, and even inanimate objects, have been canonized as saints and martyrs.

That department of ecclesiastical history which relates to the acts and deaths of martyrs is termed *martyrology;* and a work embracing one or more such narratives is called *a martyrology*. As examples of this description of works we may mention the 'Martyrology' of Eusebius, which was translated into Latin by Jerome, and was celebrated in the early church, but is lost; that ascribed to the venerable Bede, but the genuineness of which is very doubtful; and the 'Acts and Monuments' of Fox, which is an elaborate and valuable record of the sufferings of the English reformers.

Much interesting information on this subject may be found in Ruinart's *Acta Martyrum*, Dodwell's *Dissertationes Cyprianicæ*, v., xi., xii., xiii., and Dr. Conyers Middleton's *Free Enquiry into the Miraculous Powers supposed to have subsisted in the Christian Church*.

MARVEJOLS. [LOZERE.]

MARVELL, ANDREW, was born on the 15th of November, 1620, at Kingston-upon-Hull, where his father was master of the grammar-school and lecturer of Trinity church. At the age of fifteen he was sent to Trinity College, Cambridge. All that is known of Marvell's career through the university is what may be gathered, and that is not much certainly, from the following entry in the Conclusion Book of his college, under date September 24th, 1641. 'It is agreed by the master and eight seniors that Mr. Carter, Dominus Wakefield, Dominus Marvell, Dominus Waterhouse, and Dominus Maye, in regard that some of them are reported to be married, and the others looke not after their dayes nor acts, shall receave no more benefitt of the college, and shall be out of their places, unless they show just cause to the college for the contrary in three months.'

For the ten following years there is little information respecting Marvell, though some notion of his occupations during that time may be gathered from the following passage of a letter from Milton to Bradshawe, dated February 21, 1652:—'He (Marvell) hath spent four years abroad in Holland, France, Italy, and Spain, to very good purpose, as I believe, and the gaining of those four languages; besides he is a scholar, and well read in the Latin and Greek authors, and no doubt of an approved conversation, for he comes now lately out of the house of the Lord Fairfax, who was general, where he was intrusted to give some instructions in the languages to the lady his daughter.'

In 1660 Andrew Marvell commenced his parliamentary career. We may judge of the manner in which he acted in that course from an anecdote which has been often related, varying somewhat as to details, though the same in the main circumstances.

The following version of it is extracted from a pamphlet printed in Ireland about 1754; but we think it has too melodramatic an air to be strictly accurate. 'The borough of Hull, in the reign of Charles II., chose Andrew Marvell, a young gentleman of little or no fortune, and maintained him in London for the service of the public. His understanding, integrity, and spirit were dreadful to the then infamous administration. Persuaded that he would be theirs for properly asking, they sent his old schoolfellow the lord-treasurer Danby, to renew acquaintance with him in his garret. At parting the lord-treasurer, out of pure affection, slipped into his hand an order upon the treasury for 1000*l*., and then went to his chariot. Marvell, looking at the paper, calls after the treasurer, 'My lord, I request another moment.' They went up again to the garret, and Jack, the servant boy, was called. 'Jack, child, what had I for dinner yesterday?' 'Don't you remember, sir? You had the little shoulder of mutton that you ordered me to bring from a woman in the market.' 'Very right, child. What have I for dinner to-day?' 'Don't you know, sir, that you bid me lay by the bladebone to broil?' ''Tis so; very right, child; go away.' 'My lord, do you hear that? Andrew Marvell's dinner is provided; there's your piece of paper. I want it not. I know the sort of kindness you intended. I live here to serve my constituents: the ministry may seek men for their purpose; I am not one.'

Marvell was twice elected member for Hull in 1660. In April, 1661, he thus writes to his constituents:—'I perceive you have again (as if it were grown a thing of course) made choice of me, now the third time, to serve you in parliament: which as I cannot attribute to any thing but your constancy, so God willing, as in gratitude obliged, with no less constancy and vigour I shall continue to execute your commands and study your service.' Marvell really had cause to be grateful for their constancy. They were undeviating in their support of a man who had neither wealth, nor power, nor rank, nor even brilliant reputation to strike the vulgar eye and dazzle the vulgar imagination; and who had in fact nothing to recommend him but his unostentatious adherence to what he considered to be the line of his duty.

Throughout the whole of Marvell's parliamentary career the electors are no less deserving of praise than the elected. In the first parliament in which Marvell served, he and his colleague, Mr. Ramsden, used to write jointly. But afterwards Colonel Gilley was elected in the room of Mr. Ramsden, and then, in consequence of some misunderstanding between him and Marvell, the latter wrote singly to his constituents. He thus alludes to the difference between them:—'Though perhaps we may differ in our advice concerning the way of proceeding, yet we have the same good ends in general; and by this unlucky falling out we shall be provoked to a greater emulation of serving you. I must beg you to pardon me for writing singly to you, for if I wanted my right hand yet I would scribble to you with my left rather than neglect your business.'

A gap occurs in Marvell's correspondence after June, 1661. He appears to have been in Holland for a considerable time. Lord Bellasis, then high-steward of Hull, having requested the corporation to proceed to the election of a new member, they wrote to Marvell, who immediately returned to England and resumed his seat in the house.

About three months after his return Marvell again left England as secretary to Lord Carlisle, who was appointed ambassador extraordinary to Russia, Sweden, and Denmark. Marvell's acceptance of this appointment seems a little at variance with his alleged invariable refusal to accept any mark of royal favour.

Marvell was absent on this embassy nearly two years.

On his return he began to correspond with his constituents almost every post.

The following passages are characteristic both of the man and the times:—

'*Nov.* 14, 1667.—Really the business of the House hath been of late so earnest daily and so busy, that I have not had the time and scarce vigour left me by night to write to you; and to-day, because I would not omit any longer, I lose my dinner to make sure of this letter.' *Letter to Mayor and Aldermen of Hull.*

'*April* 14, 1670.—The king about ten o'clock took boat with Lauderdale only, and two ordinary attendants, and rowed awhile as towards the bridge; but soon turned back to the Parlt. Stairs, and so went up into the House of Lords and took his seat. Almost all of them were amazed, but all seemed so, and the duke of York especially was very much surprised. He told them it was a privilege he claimed from his ancestors, to be present at their deliberations. After three or four days' continuance, the lords were very well used to the king's presence, and sent the lord-steward and lord-chamberlain to him to enquire when they might wait as an House on him, to render their humble thanks for the honour he did them. The hour was appointed them, and they thanked him, and he took it well. The king has ever since continued his session among them, and says, "it is better than going to a play."' *Letter to William Ramsden, Esq.*

The following presents a curious picture of the government of Charles II.:—

'The king having, upon pretence of the great preparations of his neighbours, demanded 300,000*l.* for his navy (though, in conclusion, he hath not sent out any), that the parliament should pay his debts, which the ministers would never particularize to the House of Commons, our house gave several bills. You see how far things were stretched beyond reason, there being no satisfaction how those debts were contracted; and all men foreseeing that what was given would not be applied to discharge the debts, which I hear are at this day risen to four millions, but diverted as formerly. Nevertheless, such was the number of the constant courtiers, increased by the apostate patriots, who were bought off for that term, some at six, others at ten, one at fifteen thousand pounds, in money; besides what offices, lands, and reversions to others, that it is a mercy they gave not away the whole land and liberty of England. The duke of Buckingham is again 140,000*l.* in debt, and, by this prorogation, his creditors have time to tear all his lands in pieces. The House of Commons has run almost to the end of their line, and are grown extremely chargeable to the king and odious to the people. They have signed and sealed 10,000*l.* a year more to the duchess of Cleveland, who has likewise near 10,000*l.* a year out of the new farm of the country excise of beer and ale; 5000*l.* a year out of the post-office; and, they say, the reversion of all the king's leases; the reversion of all places in the custom-house, the green wax, and, indeed, what not. All promotions, spiritual and temporal, pass under her cognizance.'

In 1672 Marvell engaged in a controversy with Dr. Samuel Parker (afterwards nominated bishop of Oxford by James II.). The following are a few of Parker's opinions, published in 1670, in a book entitled 'Ecclesiastical Polity.' 'It is better to submit to the unreasonable impositions of Nero and Caligula than to hazard the dissolution of the state.' 'Princes may with less hazard give liberty to men's vices than to their consciences.' Of the different sects then subsisting he held 'that tenderness and indulgence to such men were to nourish vipers in our bowels, and the most sottish neglect of our own quiet and security.'

Marvell's various publications were mostly of a temporary interest. Mr. Dove gives the following account of the close of his career. 'Marvell had now rendered himself so obnoxious to the usual friends of a corrupt court, and to the heir presumptive, James, duke of York, that he was beset on all sides by powerful enemies, who even proceeded so far as to menace his life. Hence he was obliged to use great caution, to appear seldom in public, and frequently to conceal the place of his abode; but all his care proved ineffectual to preserve him from their vengeance, for he died on the 16th of August, 1678, aged fifty-eight years, not without strong suspicions (as his constitution was entire and vigorous) of having suffered under the effect of poison.' (*Life of Andrew Marvell*, p. 65, London, 1832.)

Marvell's powers as a poet were not sufficient to ensure him lasting fame. Few or none of his poetical compositions, any more than his prose, obtained a lasting popularity. Many of his verses, particularly the satirical, are defaced by the coarseness of his time, from which his contemporary, Milton, is so remarkably free. Others display a degree of feeling and a perception of the beauties of nature, expressed with a harmony of versification and felicity of language which not unfrequently recall the 'L'Allegro' and 'Il Penseroso' of Milton. But Marvell's verse did not possess sufficient vitality to secure its continued existence. He says of it himself, with a sort of prophetic truth, in his lines to 'His Coy Mistress,'—

> 'But at my back I always hear
> Time's winged chariot hurrying near;
> And yonder all before us lie
> Deserts of vast eternity.
> Thy beauty shall no more be found,
> Nor in thy marble vault shall sound
> My echoing song.'

Upon the whole Andrew Marvell's claim to be honourably remembered is founded rather on his moral than his intellectual qualities. His intellectual merits are those of a wit and satirist; and though in these departments considerably above mediocrity, and even famous in his day, he could scarcely have hoped for a different fate from that of other wits and satirists who are now forgotten. But the degree in which Andrew Marvell possessed that very rare quality, political integrity, gives him a claim to the remembrance and even the reverence of after-ages, still greater than is due to him as the friend and associate of Milton.

(Marvell's Works, by Captain Edward Thompson, with his *Life*, London, 1776.)

MARWAR, a district or division of the province of Ajmeer, lying between 24° 35′ and 27° 45′ N. lat., and between 70° 25′ and 75° 15′ E. long. Its greatest length from north-east to south-west is 310 miles, and its mean breadth is about 120 miles. The surface of the district is irregular and mountainous, rising towards the south; some of the mountains in that quarter indicate by the barometer an elevation of 5000 feet above the level of the sea: European fruits and shrubs are produced on their summits. The country contains many hill forts, and is for the most part subject to the rajah of Joudpore. The population is partly Mohammedan and partly Hindu; but there are, besides these sects, many tribes of uncivilized people, who, by their predatory habits, are frequently troublesome to their more quiet neighbours. The failure of the annual fall of rain in 1811, together with the desolation occasioned by clouds of locusts, produced a dreadful famine throughout the district, and drove great numbers of the inhabitants into the province of Gujerat, which, in the following year, also experienced a failure of rain, and the people died by thousands in a state of the greatest misery, so that it is said scarcely one in a hundred ever returned to his native province. Marwar contains few towns of any size. Nagore, in 27° 8′ N. lat. and 73° 33′ E. long., stands upon barren sandhills, with scarcely any vegetation within a mile of its walls, and it is badly supplied with water. The only other town requiring notice is Joudpore, the capital and the residence of the rajah, in 26° 18′ N. lat. and 73° 5′ E. long. This country has been so little visited by Europeans, that our knowledge concerning it is very scanty. The castle or palace of Joudpore is said to be a large and very magnificent building. In 1818, when part of his territory was in the occupation of the sovereign of Jeypore, the rajah of Joudpore made an arrangement with the English government, under which, in return for our protection, he bound himself to the payment of an annual tribute of 10,800*l.*, and engaged to furnish a contingent of 1500 cavalry. The entire revenue of the district is estimated at 50 lacs of rupees (500,000*l.*), but usually falls far short of that sum.

MARY I., Queen of England, was the daughter of Henry VIII., by his first wife Catherine of Aragon, and was born at Greenwich, on the 18th (Burnet says 19th) of February, 1516. She was the only one of several children borne by her mother that lived; and on this account, according to Burnet, and because her father was then 'out of hopes of more children,' he in 1518 'declared his daughter princess of Wales, and sent her to Ludlow to hold her court there, and projected divers matches for her.' It was first settled that she should be married to the dauphin by a treaty with the king of France, dated 9th November, 1518, which however was soon after broken. Then it was arranged, 22nd June, 1522, that her hand should be given to the emperor

Charles V. On Charles declining to fulfil this bargain, some overtures of a Scottish marriage followed in September, 1524. Finally, in April, 1527, it was agreed that the princess should be given in marriage either to the French king Francis, or to his second son, the duke of Orleans; but before it was determined whether she should be married to the father or the son, the affair of her mother's divorce, implying her own illegitimacy, came to be agitated, and stopped all match-making for some years.

Mary was brought up from her infancy in a strong attachment to the antient religion, under the care of her mother, and Margaret, countess of Salisbury, the effect of whose instructions was not impaired by the subsequent lessons of the learned Ludovicus Vives, who, though somewhat inclined to the reformed opinions, was appointed by Henry to be her Latin tutor. After her mother's divorce, Mary was deprived of her title of princess of Wales, which was transferred to the Princess Elizabeth soon after she came into the world; and during all the time that Anne Boleyn lived, Mary, who clung to her mother's cause and her own, remained in a state of estrangement from her father. In the mean time, according to Lord Herbert, negotiations for disposing of her in marriage were twice entered into by her near relation the emperor, without her father's consent having been asked; in 1533 he offered her to James V. of Scotland, and in 1535 to her old suitor the dauphin. But immediately after the execution of Queen Anne in 1536, a reconcilement took place between Henry and his eldest daughter, who, with great reluctance, was now prevailed upon to make a formal acknowledgement both of Henry's ecclesiastical supremacy—utterly refusing 'the bishop of Rome's pretended authority, power, and jurisdiction within this realm heretofore usurped'—and of the nullity of the marriage of her father and mother, which she declared was 'by God's law and man's law incestuous and unlawful.' (See the 'Confession of me, the Lady Mary,' as printed by Burnet, 'Hist. Ref.,' from the original, 'all written with her own hand.') By the new act of succession however, passed this year, she was again, as well as her sister Elizabeth, declared illegitimate, and for ever excluded from claiming the inheritance of the crown as the king's lawful heir by lineal descent. While she was thus circumstanced, 'excluded,' as Lord Herbert expresses it, 'by act of parliament from all claim to the succession except such as the king shall give her' by the powers reserved to him of nominating his own successor after failure of the issue of Queen Jane, or of any other queen whom he might afterwards marry, she was in 1538 offered to Don Louis, prince of Portugal, and the next year to William, son of the duke of Cleves. Meanwhile continuing to yield an outward conformity to all her father's capricious movements in the matter of religion, she so far succeeded in regaining his favour, that in the new act of succession, passed in 1544, the inheritance to the crown was expressly secured to her next after her brother Edward and his heirs, and any issue the king might have by his then wife Catherine Parr.

Mary's compliance with the innovations in religion in her father's time had been dictated merely by fear or self-interest; and when, after the accession of her brother, his ministers proceeded to place the whole doctrine, as well as discipline, of the national church upon a new foundation, she openly refused to go along with them; nor could all their persuasions and threats, aided by those of her brother himself, move her from her ground. Full details of the various attempts that were made to prevail upon her may be found in Burnet's 'History,' and in King Edward's 'Journal.' Mention is made in the latter, under date of April, 1549, of a demand for the hand of the Lady Mary by the duke of Brunswick, who was informed by the council that 'there was talk for her marriage with the infant of Portugal, which being determined, he should have answer.' About the same time it is noted that 'whereas the emperor's ambassador desired leave, by letters patents, that my Lady Mary might have mass, it was denied him.' On the 18th of March of the following year, the king writes: 'The Lady Mary, my sister, came to me at Westminster, where, after salutations, she was called, with my council, into a chamber; where was declared how long I had suffered her mass, in hope of her reconciliation, and how now being no hope, which I perceived by her letters, except I saw some short amendment, I could not bear it. She answered, that her soul was God's, and her faith she would not change, nor dissemble her opinion with contrary doings. It was said, I constrained not her faith, but wished her not as a king to rule, but as a subject to obey; and that her example might breed too much inconvenience.' In fact throughout this reign the princess Mary was the centre of the intrigues of the Catholic party, and the hope of her succession their main strength and support. In the summer of this same year a project was entered into by her friends at home and abroad for removing her from England, where her faith at least, if not her person, was probably supposed to be in some danger. On the 29th of August, her brother writes: 'Certain pinnaces were prepared to see that there should be no conveyance over sea of the Lady Mary secretly done. Also appointed that the lord chancellor, lord chamberlain, the vice-chamberlain, and the secretary Petre should see by all means they could whether she used the mass; and if she did, that the laws should be executed on her chaplains.'

Mary's firm adherence to the Roman faith finally induced Edward, under the interested advice of his minister Northumberland, to attempt at the close of his life to exclude her from the succession, and to make over the crown by will to the Lady Jane Grey, an act which was certainly without any shadow of legal force. [Edward VI.] Although Lady Jane however was actually proclaimed, scarcely any resistance was made to the accession of Mary, the commencement of whose reign accordingly is dated from the 6th of July, 1553, the day of her brother's death. [Grey, Lady Jane.]

Mary was scarcely seated on the throne when she proceeded to re-establish the antient religion. In the course of the month of August, Bonner, Gardiner, and three other bishops, who had been deposed for nonconformity in the late reign, were restored to their sees, and the mass began again to be celebrated in many churches. In the following month archbishop Cranmer and bishop Latimer were committed to the Tower; and in November the parliament passed an act repealing all the acts, nine in number, relating to religion, that had been passed in the late reign, and replacing the church in the same position in which it had stood at the death of Henry VIII. These measures, and the other indications given by the court of a determination to be completely reconciled with Rome, were followed by the insurrection, commonly known as that of Sir Thomas Wyatt, its principal leader, which broke out in the end of January, 1554, but was in a few days effectually put down; its suppression being signalised by the executions of the unfortunate Lady Jane Grey and her husband the Lord Guildford Dudley, of her father the duke of Suffolk, and finally, of Wyatt himself.

On the 25th of July, Mary was married in the cathedral church of Winchester to the prince of Spain, afterwards Philip II., the son of the emperor Charles V.; and the reunion with Rome was speedily completed by a parliament which assembled in the beginning of November, and which passed acts repealing the attainder of cardinal Pole, who immediately after arrived in England with the dignity of papal legate, restoring the authority of the pope, repealing all laws made against the see of Rome since the 20th of Henry VIII., reviving the antient statutes against heresy, and in short re-establishing the whole national system of religious policy as it had existed previous to the first innovations made by Henry VIII. By one of the acts of this session of parliament also Philip was authorised to take the title of king of England during the queen's life. All these acts appear to have been passed with scarcely any debate or opposition in either house, except occasionally upon mere points of detail and form.

The remainder of the history of the reign of Mary is occupied chiefly with the sanguinary persecutions of the adherents to the reformed doctrines. The Protestant writers reckon that about two hundred and eighty victims perished at the stake, from the 4th of February, 1555, on which day John Rogers was burnt at Smithfield, to the 10th of November, 1558, when the last *auto-du-fé* of the reign took place by the execution in the same manner of three men and two women at Colchester. Dr. Lingard admits that after expunging from the Protestant lists 'the names of all who were condemned as felons or traitors, or who died peaceably in their beds, or who survived the publication of their martyrdom, or who would for their heterodoxy have been sent to the stake by the reformed prelates themselves, had they been in possession of the power,' and making every other reasonable allowance, it will still be found 'that in the space of four years almost two hundred persons perished in the flames for religious opinion.' Among the most distinguished sufferers were Hooper bishop of Gloucester, Ferrar of St. David's, Latimer of Worcester, Ridley of London, and Cranmer archbishop of Canterbury. Gardiner, bishop of Winchester and lord chancellor, was Mary's chief minister till his death in November, 1555, after which the direction of affairs fell mostly into the hands of cardinal Pole, who after Cranmer's deposition was made archbishop of Canterbury; but the notorious Bonner, Ridley's successor in the see of London, has the credit of having been the principal instigator of these atrocities, which, it may be remarked, so far from contributing to put down the reformed doctrines, appear to have had a greater effect in disgusting the nation with the restored church than all other causes together.

At the same time that the new opinions in religion were thus attempted to be extinguished by committing the bodies of those who believed in them to the flames, the queen gave a further proof of the sincerity of her own faith by restoring to the church the tenths and first-fruits, with all the rectories, glebe-lands, and tithes that had been annexed to the crown in the times of her father and brother. She also re established several of the old religious houses, and endowed them as liberally as her means enabled her.

Tired both of the country and of his wife, Philip left England, in the beginning of September, 1555, and continued absent for about a year and a half. The bond however by which this marriage attached the English court to Spain and the Empire remained the same as ever; and when, after a short cessation of hostilities, war recommenced in the spring of 1557 between Spain and France, Mary was prevailed upon to join the former against the latter power. The principal consequence of this step, in so far as this country was concerned, was the loss of the only remaining English continental possession, the town and territory of Calais, which surrendered to the duke of Guise, in January, 1558, after a siege of a few days. This event, which was regarded as a national disgrace worse than any mere loss, excited the bitterest feelings of dissatisfaction with the policy of the court; and Mary herself is said never to have recovered from the blow. Some ineffectual efforts were made to retaliate upon France by force of arms; but at last negotiations for a peace between the three belligerent powers were opened at Cambray, in the midst of which queen Mary died, worn out with bodily and mental suffering, on the 17th of November, 1558, in the forty-third year of her age and the sixth of her reign. She is affirmed to have said on her deathbed, that if her breast should be opened after her decease, Calais would be found to be written on her heart. Mary left no issue, and was succeeded on the throne by her half-sister Elizabeth. [ELIZABETH.]

MARY STUART, queen of Scotland, was born on the 7th of December, 1542. She was the third child of king James V. of Scotland, by his wife Mary of Lorraine, daughter of the duke of Guise, who had previously borne her husband two sons, both of whom died in infancy. A report prevailed that Mary too was not likely to live; but being unswaddled by her nurse at the desire of her anxious mother, in presence of the English ambassador, the latter wrote to his court that she was as goodly a child as he had seen of her age. At the time of her birth her father lay sick in the palace of Falkland; and in the course of a few days after he expired, at the early age of thirty, his death being hastened by distress of mind occasioned by the defeats which his nobles had sustained at Fala and Solway Moss. James was naturally a person of considerable energy and vigour both of mind and body, but previous to his death he fell into a state of listlessness and despondency, and after his decease it was found that he had made no provision for the care of the infant princess, or for the administration of the government. The ambitious Beatoun seized this opportunity, and producing a testament which he pretended was that of the late king, immediately assumed the office and title of regent. The fraud was soon discovered; but by the haste and imprudence of the regent Arran and Henry VIII. of England, who wished a marriage agreed to between his son and the young queen, Beatoun regained his influence in the country; and on the 9th of September, 1543, Mary was crowned by the archbishop, who was also immediately afterwards appointed lord high chancellor of the kingdom. He had even the address to win over the regent Arran to his views, both political and religious; and thus the French or Roman Catholic party obtained the ascendancy. The first two years of Mary's life were spent at Linlithgow, in the royal palace of which she was born; she was then removed to Stirling castle; and when the disputes of parties in the country rendered this a somewhat dangerous residence, she was carried to Inchmahome, a sequestered island in the lake of Monteith, where she remained about two years. In the meantime a treaty of marriage had been concluded between her and the dauphin Francis; and in terms of the treaty it was resolved she should be sent into France to be educated at the French court, until the nuptials could be solemnized. Accordingly in the fifth year of her age she was taken to Dumbarton, where she was put on board the French fleet; and setting sail towards the end of July, 1548, she was, after a tempestuous voyage, landed on the 14th of August at Brest, whence she proceeded by easy stages to the palace at St. Germaine-en-Laye. At every town in her progress she was received with all the honours due to her royal rank, and as a mark of respect and joy the prisons were thrown open and the prisoners set free.

Soon after her arrival at her destination Mary was placed with the French king's own daughters in one of the first convents of the kingdom, where she made such rapid progress in the acquisition of the literature and accomplishments of the age, that when visiting her in the end of the year 1550, her mother, Mary of Guise, with her Scottish attendants, burst into tears of joy. She did not however remain long in this situation. Perceiving the bent of her mind to the society and occupations of a nunnery, which did not accord with the ambitious projects entertained by her uncles of Lorraine, they soon brought her to the court, which, as Robertson observes, was one of the politest but most corrupt in Europe. Here Mary became the envy of her sex, surpassing the most accomplished in the elegance and fluency of her language, the grace and liveliness of her movements, and the charm of her whole manner and behaviour. The youthful Francis, to whom she was betrothed, and was soon to be united in wedlock, was about her own age, and they had been playmates from early years: there appears also to have grown up a mutual affection between them; but the dauphin had little of her vivacity, and was altogether considerably her inferior both in mental endowments and personal appearance. The marriage, which took place on the 24th of April, 1558, was celebrated with great pomp; and when the dauphin, taking a ring from his finger, presented it to the cardinal Bourbon, archbishop of Rouen, who, pronouncing the benediction, placed it on the finger of the lovely and youthful bride, the vaulted roof of the cathedral rung with the shouts and congratulations of the assembled multitude.

The solemnities being over, the married pair retired to one of their princely retreats for the summer; but that season was hardly gone when, a vacancy having occurred on the throne of England by the death of Queen Mary, claims were put forth on behalf of the queen of Scots through her grandmother, who was eldest daughter of King Henry VII. of England; and notwithstanding Elizabeth had ascended the throne, and was, like her sister Mary (both daughters of King Henry VIII.), queen both *de facto* and by the declaration of the parliament of England, yet this claim for the Scottish princess was made and continued to be urged with great pertinacity by her ambitious uncles the princes of Lorraine. On every occasion on which the dauphin and dauphiness appeared in public, they were ostentatiously greeted as the king and queen of England; the English arms were engraved upon their plate, embroidered on their banners, and painted on their furniture; and Mary's own favourite device at the time was, the two crowns of France and Scotland, with the motto *Aliamque moratur*, meaning that of England. Henri II. died in July, 1559, and in September of the same year Francis was solemnly crowned at Rheims. Mary was now at the height of her splendour; it was doomed however to be only of short continuance. In June, 1560, her mother died; and in December of the same year, her husband, who had been wasting away for some months, expired. By this latter event, Catherine de' Medici rose again into power in the French court, and Mary, who did not relish being second where she had been the first, immediately determined on quitting France and returning to her native country. The queen of England however interposed; and because Mary would not abandon all claim to the English throne, refused to grant her a free passage, being moved to this piece of discourtesy not less perhaps by envy than by jealousy. Mary notwithstanding resolved to go, and at length, after repeated delays, still lingering on the soil where fortune had smiled upon her, she reached Calais. Here she bade adieu to her attendants, and sailed for Scotland; but as long as the French coast remained in view, she continued involuntarily to exclaim, 'Farewell, France! Farewell, beloved country!' She landed at Leith on the 19th August, 1561, in the 19th year of her age, and after an absence from Scotland of nearly 13 years. She was now, in the language of Robertson, 'a stranger to her subjects, without experience, without allies, and almost without a friend.'

A great change had taken place in Scotland since Mary was last in the country. The Roman Catholic religion was then supreme; and under the direction of cardinal Beatoun the Romish clergy displayed a fierceness of intolerance which seemed to aim at nothing short of the utter extirpation of every seed of dissent and reform. The same causes however which gave strength to the ecclesiastics gave strength also, though more slowly, to the great body of the people; and at length, after the repeated losses of Floddon and Fala, and Solway Moss and Pinkey,—which, by the fall of nearly the whole lay nobility and leading men of the kingdom, brought all classes within the influence of public events,—the energies, physical and mental, of the entire nation were drawn out, and under the guidance of the reformer Knox expended themselves with the fury of awakened indignation upon the whole fabric of the antient religion. The work of destruction was just completed, and the Presbyterian government established on the ruins of the Roman Catholic, when Mary returned to her native land. She knew little of all this, and had been taught in France to shrink at the avowal of Protestant opinions: her habits and sentiments were therefore utterly at variance with those of her subjects; and, nurtured in the lap of ease, she was wholly unprepared for the shock which was inevitably to result from her being thrown among them.

Accordingly the very first Sunday after her arrival she commanded a solemn mass to be celebrated in the chapel of the palace; and, as might have been expected, an uproar ensued, the servants of the chapel were insulted and abused, and had not some of the lay nobility of the Protestant party interposed, the riot might have become general. The next Sunday Knox had a thundering sermon against idolatry, and in his discourse he took occasion to say that a single mass was, in his estimation, more to be feared than ten thousand armed men. Upon this, Mary sent for the reformer, desiring to have an interview with him. The interview took place, as well as one or two subsequent ones from a like cause; but the only result was to exhibit the parties more plainly at variance with each other. In one of these fruitless conferences the young queen was bathed in tears before his stern rebukes. Her youth however, her beauty and accomplishments, and her affability, interested many in her favour; and as she had from the first continued the government in the hands of the Protestants, the general peace of the country remained unbroken.

A remarkable proof of the popular favour which she had won, appeared in the circumstances attending her marriage with Darnley. Various proposals had been made to her from different quarters; but at length she gave up all thoughts of a foreign alliance, and her affections became fixed on her cousin Henry Stuart, lord Darnley, the youthful heir of the noble house of Lennox, to whom she was united on Sunday, 29th July, 1565, the ceremony of marriage being performed in the chapel of Holyrood-house, according to the rites of the Romish church. Whether the queen had any right to choose a husband without consent of parliament, was in that age, as Robertson observes, a matter of some dispute; but that she had no right to confer upon him, by her private authority, the title and dignity of king, or by a simple proclamation invest him with the character of a sovereign, was beyond all doubt: yet so entirely did she possess the favourable regard of the nation, that notwithstanding the clamours of the malecontents, her conduct in this respect produced no symptom of general dissatisfaction. The queen's marriage was particularly obnoxious to Queen Elizabeth, whose jealous eye had never been withdrawn from her rival. Knox also did not look favourably on it. Nevertheless the current of popular opinion ran decidedly in Mary's favour, and it was even remarked that the prosperous situation of her affairs began to work some change in favour of her religion.

This popularity however was the result of adventitious circumstances only. There existed no real sympathy of opinion between Mary and the great body of her people; and whatever led to the manifestation of her religious sentiments dissolved in the same degree the fascination which her other qualities had created. It is in this way we may account for the assistance given to Darnley in the assassination of Rizzio—an attendant on Mary, who seems to have come in place of Chatelard. The latter was a French poet who sailed in Mary's retinue when she came over from the Continent; and having gained the queen's attention by his poetical effusions, he proceeded, in the indulgence of a foolish attachment for her, to a boldness and audacity of behaviour which demanded at last the interposition of the law, and he was condemned and executed. Rizzio, a Piedmontese by birth, came to Edinburgh in the train of the ambassador from Savoy, a year or so before Chatelard's execution. He was skilled in music, had a polished and ready wit, and, like Chatelard, wrote with ease in French and Italian. His first employment at court was in his character of a musician; but Mary soon advanced him to be her French secretary; and in this situation he was conceived to possess an influence over the queen which was equally hateful to Darnley and the Reformers, though on very different grounds. Both therefore concurred in his destruction, and he was assassinated accordingly. Darnley afterwards disclaimed all concern in the conspiracy; but it was plain the queen did not believe and could not forgive him; and having but few qualities to secure her regard, her growing contempt of him terminated in disgust. In the mean time the well-known earl of Bothwell was rapidly advancing in the queen's favour, and at length no business was concluded, no grace bestowed, without his assent and participation. Meanwhile also Mary bore a son to Darnley; and after great preparations for the event, the baptism of the young prince was performed according to the rites of the Romish church. Darnley himself was soon after seized with the smallpox, or some dangerous distemper, the nature and cause of which are not very clear. He was at Glasgow when he was taken ill, having retired thither to his father somewhat hastily and unexpectedly. Mary was not with him, nor did she visit him for a fortnight. After a short stay they returned to Edinburgh together, when Darnley was lodged, not in the palace of Holyrood, as heretofore, but in the house of the Kirk of Field, a mansion standing by itself in an open and solitary part of the town. Ten days after, the house was blown up by gunpowder, and Darnley and his servants buried in the ruins. Whether Mary knew of the intended murder is not certain, and different views of the circumstances have been taken by different historians. The author of the horrid deed was Bothwell, and the public voice was unanimous in his reprobation. Bothwell was brought before the privy-council for the crime; but in consequence of the shortness of the notice, Lennox, his accuser, did not appear. The trial nevertheless proceeded, or rather the verdict and sentence; for, without a single witness being examined, Bothwell was acquitted. He was upon this not only continued in all his influence and employments, but he actually attained the great end which he had in view by the perpetration of the foul act. This was no other than to marry the queen herself, which he did in three months after; having in the interval met the queen, and carried her off a prisoner to his castle of Dunbar, and also raised a process of divorce against the lady Bothwell, his wife, on the ground of consanguinity, and got a decree in the cause just nine days before the marriage. Before the marriage, also, Mary created Bothwell duke of Orkney; and the marriage itself was solemnized at Holyrood-house by Adam Bothwell, bishop of Orkney, according to the forms both of the Romish and Protestant religions. [BOTHWELL.]

Public indignation could no longer be restrained. The nobles rose against Bothwell and Mary, who fled before an armed and indignant people from fortress to fortress. At length, after they had collected some followers, a pitched battle near Carbery Hill was about to ensue, when Mary abandoned Bothwell, and threw herself on the mercy of her subjects. They conducted her first to Edinburgh, and thence to the castle of Lochleven, where, as she still persisted to regard Bothwell as her husband, it was determined she should at once abdicate in favour of the prince her son James. Instruments of abdication to that effect were accordingly prepared, and she was at last constrained to affix her signature to them; upon which the prince was solemnly crowned at Stirling, 29th July, 1567, when little more than a year old. Mary continued a prisoner at Lochleven; but by the aid of friends, in less than twelve months she effected her escape, and collected a considerable army. The battle of Langside ensued, where she was completely routed; upon which she fled towards Galloway, and thence passed into England, hoping to secure the favour of Elizabeth. In this however she was mistaken. Elizabeth refused her an audience, but declared her readiness to act as umpire between her and her subjects. Mary would not yield to this, or consent to be regarded in any other light than as queen of Scotland. The consequence was, that being now in the hands of her great rival, Elizabeth contrived to detain her a captive in her dominions till the end of the year 1586,—a period of about nineteen years,—when she was accused of being accessary to Babington's conspiracy against the queen of England. To try this accusation a commission was appointed by Elizabeth, but Mary refused to acknowledge its jurisdiction. 'I came into the kingdom,' she said, 'an independent sovereign, to implore the queen's assistance, not to subject myself to her authority. Nor is my spirit so broken by past misfortunes, or so intimidated by present dangers, as to stoop to anything unbecoming a crowned head, or that will disgrace the ancestors from whom I am descended, or the son to whom I leave my throne. If I must be tried, princes alone can try me: they are my peers; and the queen of England's subjects, however noble, are of a rank inferior to mine. Ever since my arrival in this kingdom I have been confined as a prisoner. Its laws never afforded me protection: let them not be perverted now, to take away my life.' Deluded however by the pretext that she would thus vindicate her character, Mary consented to be tried. The commission accordingly proceeded: Mary was condemned, and, on Wednesday the 8th of February, 1587, beheaded at Fotheringay castle, in the 45th year of her age. When about to enter the great hall which was prepared for her execution, she was allowed to stop and take farewell of the master of her household, Sir Andrew Melville, whom her keepers had not suffered to come into her presence for some weeks before. Melville kissed her hand, and kneeling down before her with tears in his eyes, declared this was the heaviest hour of his life. 'Not so to me,' said Mary: 'I now feel, my good Melville, that all this world is vanity. When you speak of me hereafter, say that I died firm in my faith, willing to forgive my enemies, conscious that I never disgraced my native country, and rejoicing in the thought that I had always been true to France, the land of my happiest years. Tell my son—,' and here she burst into a flood of tears, overcome by her feelings when she thought of her only child, the son of whom she had been so proud in his infancy, and whom she still loved notwithstanding his coldness and ingratitude,—'Tell my son, I thought of him in my last moments, and that I said I never yielded, by word or deed, to aught that might lead to his prejudice: tell him to remember his unfortunate parent; and may he be a thousand times more happy and prosperous than she ever was.' [ELIZABETH; JAMES I. of England.] She died professing the religion in which she had been brought up, and to her adherence to which many of her miseries may be traced.

For further particulars concerning Mary, and the love-letters, &c. which she is said to have written to Bothwell, we must refer to the writers who have minutely discussed the events of Mary's life. These writers are not few in number, from the time of Buchanan and Knox on the one hand, and Lesley, bishop of Ross, on the other, down to the present day, when Mr. Tytler's 'History of Scotland' is in course of issuing from the press. We may notice however Jebb's works on the subject, Anderson's 'Collections,' Goodall's 'Examination,' Tytler's 'Enquiry,' Whittaker, Laing, and Chalmers, and the 'Life of Mary,' by Henry Glassford Bell, which forms vol. 24 of Constable's 'Miscellany.'

MARY, wife of William III. [WILLIAM III.]

MARYBOROUGH. [QUEEN'S COUNTY.]

MARYLAND, one of the United States of North America, lies between 38° 3′ and 39° 42′ N. lat. and 75° 10′ and 79° 25′ W. long. It is divided into two portions by Chesapeake Bay and the Susquehanna river. That portion which is east of the bay is bounded on the south by Virginia for 15 miles; on the east by the Atlantic Ocean, which washes its shores for 35 miles; and by the state of Delaware, which extends 36 miles along its northern and 91 miles along its eastern boundary. Pennsylvania forms the whole northern boundary of this state, for 200 miles, along the parallel of 39° 42′. The western portion of Maryland is divided from Virginia by a straight line running north and south for about 36 miles, which constitutes the western boundary-line of Maryland. On the south, where it also borders on Virginia, the Potomac river, with its numerous windings and large æstuary, forms the boundary-line for 320 miles. The surface is calculated to be 10,000 square miles, or somewhat less than double the area of Yorkshire.

Surface and Soil.—The country east of Chesapeake Bay has a level surface as far north as Chester Bay, where it begins to be undulating, and towards the boundary of Pennsylvania isolated hills make their appearance. The soil is generally thin and sandy, but tolerably well cultivated. Along the shores both of the Atlantic and Chesapeake Bay marsh tracts of some extent occur. The largest is the Cypress Swamp, near the northern extremity of Sinepuxent Bay, a shallow arm of the sea, separated from the ocean by a ridge of low sand-hills, which however are intersected by some channels which form a communication between the bay and the ocean. Cypress Swamp partly belongs to Delaware, and is wooded. Along the eastern side of Chesapeake Bay several indentations occur, forming harbours for vessels of moderate size, as Pocomoke Bay, Fishing Bay, Choptank Bay, and Chester Bay. There are also several islands belonging to Maryland in Chesapeake Bay, of which the largest is Kent Island.

The country on the opposite shore of Chesapeake Bay is of the same description, but rather less fertile, its surface being mostly composed of a quartzose sand, without a sufficient quantity of clay to render it productive. But there are some productive tracts of considerable extent, as in the neighbourhood of Annapolis. North of the river Patapsco the country along the Chesapeake Bay is undulating, and possessed of a greater degree of natural fertility. About twenty miles from the shore the country rises into hills, which extend westward to the foot of the Blue Ridge, a part of the Appalachian range, a distance of about forty miles. In this hilly tract the fertility of the soil varies greatly; the extremes of fertility and sterility are frequently found in a very limited space. The country west of 77° 30′ W. long. is mountainous, being traversed from south to north by six or seven of the ranges which compose the Appalachian system. The valleys which are enclosed by these ridges are generally wide and fertile; they are from 500 to 800 feet above the level of the sea. The ranges themselves are rather narrow, but they rise to an elevation of from 2000 to 2500 feet.

Rivers.—The Potomac rises within the Appalachian Mountains, with two branches: the northern branch rises in 39° 12′ N. lat., on the eastern declivity of the Backbone Range, and runs in a valley in a north-eastern direction thirty miles, when it suddenly turns south-east, and breaks through two chains of mountains in about ten miles of its course; it then runs again north-east to Cumberland, and has a course of twenty miles in a valley; deflecting again to the south-east, it traverses a mountain range, and twenty miles below Cumberland it is joined by the South Branch, which rises in the centre of Virginia, about 38° 25′ N. lat., and runs north-east for about 100 miles in a valley enclosed between the Alleghany and Kittatinny chains, before it unites with the northern branch. After this junction the Potomac continues to flow in an eastern direction through mountain ranges with great rapidity, until it turns south-east, and before it breaks through the Blue Ridge, the most eastern chain of the Appalachian system, is joined from the south by the Shenandoah, the largest of its affluents, which rises in Virginia, near 38° N. lat. and flows over limestone rocks, in a wide and fertile valley between the Kittatinny and Blue Ridge, for about 130 miles. The united stream passes through the Blue Ridge at Harper's Ferry, by a gap which has all the appearance of being the effect of a violent disruption in the continuity of the mountain-chain. The river now enters the plain country, through which it flows in a south-east direction, with rather a rapid course: the last falls occur a few miles above Georgetown, to which place the tide ascends. Below the head of tide-water the Potomac becomes a deep and wide river, and, passing Washington and Alexandria, it has a general east-south-east course to the Chesapeake

Bay, which it enters in 30° N. lat. At the falls above Georgetown it is ten feet deep, and at Alexandria three fathoms; so that vessels of any burden can ascend to the latter place, and large vessels as far as Washington navy-yard. The whole course of the river exceeds 320 miles: large boats ascend it 50 or 60 miles above Harper's Ferry, and smaller ones much higher.

The Patuxent, the second largest river, rises on the eastern border of the hilly country, in 39° 20′ N. lat. Its general course varies between south-east and south, and it flows about 100 miles; towards its mouth it becomes a bay, from two to three miles wide. It is navigable for vessels of 250 tons to Nottingham, forty-six miles from its outlet, and boats ascend fourteen miles higher, to Queen Anne's Town.

The Patapsco forms the harbour of Baltimore. This river likewise rises in the eastern portion of the hilly region, north-west of the source of the Patuxent; after a course of about thirty miles in an east-south-east direction, it falls over a ledge of rocks, and before it enters Chesapeake Bay it widens into an æstuary ten or twelve miles in length. Vessels of 600 tons can sail to Fell's Point, the lower harbour of Baltimore, and boats may ascend to Elkridge Landing, eight miles above Baltimore.

The Susquehanna river traverses the northern part of Maryland for fifteen miles, before it falls into Chesapeake Bay.

Climate.—The climate is rather mild in the level part of the country, but the winter is severe enough to block up the harbour of Baltimore with ice for some weeks. In this town the range of the thermometer is from 9° to 92°; the mean annual temperature exceeds 53°, being about three degrees higher than that of London. In the level and hilly districts the summer-heat is modified by sea-breezes; but in the valleys between the mountains it is frequently insupportable. These valleys experience very severe winters, being from 500 to 800 feet above the sea-level. The prevailing winds blow from north-west and south-east. Rain is rather abundant, the mean annual fall amounting to about forty inches, and it occurs nearly in equal proportions throughout the year. Drought is rare.

Productions.—Wheat, Indian corn, and tobacco are chiefly cultivated; and rye, oats, and barley less extensively. Vegetables of various kinds are abundant. The common fruits of England, as apples, pears, plums, and peaches, succeed in most places, and are of good quality. Hemp and flax are raised to a considerable extent in the upper valleys. The whole country was originally covered with a dense forest, of which a considerable part still remains, composed of a great variety of trees, especially oak, hickory, ash, walnut, pine, and the tulip-tree. Along the coasts of the Atlantic and the adjacent swamps a wild grape grows, the fruit of which yields a pleasant wine.

The common domestic animals succeed well in Maryland. The wild animals have nearly disappeared from the plains, but in the forests on the mountains wolves, bears, and deer are still found. The wild turkey is still seen in the western districts. The land-tortoise is also common. Fish is abundant, especially in the Potomac.

The principal minerals are coal and limestone. Coal does not occur to the eastward of Cumberland, but west of that town it is abundant. It is found in beds which vary in thickness from one inch to several inches, and sometimes ten feet. Limestone occurs in the whole range of the mountains, and is used for different purposes; sometimes it supplies a good building-marble. Iron-ore is met with in several places, and there are also indications of copper and lead.

Inhabitants.—The native tribes have long since disappeared in Maryland. The present population consists of whites and negroes. In 1820 it was composed of 260,222 whites, 39,730 free people of colour, and 107,398 slaves: in all, of 407,350 individuals. In 1830 it consisted of 343,320 free people, whites and coloured, and of 102,880 slaves; or of 446,200 souls. Since the importation of slaves into the United States has ceased, Maryland supplies slaves for the market of the southern states.

Roads and Canals.—A turnpike-road has been made across the country from Baltimore to Hagerstown, and thence to Cumberland and Wheeling in Virginia. The Chesapeake and Ohio canal is to connect Georgetown in the district of Columbia with Pittsburg on the Ohio, in Pennsylvania. It chiefly follows the course of the Potomac, and in 1834 one hundred and ninety miles were completed, but it had not yet reached the coal region west of Cumberland. The difficulties in carrying the canal over the mountain-ridges suggested the construction of a railroad, which begins at Baltimore, and in 1834 was finished as far as Harper's Ferry; it is still in progress, but we are not informed how far it has advanced westward. Chesapeake Bay is united by a canal to Delaware River. This canal begins in Maryland, on the Elk river, which flows into the most north-eastern corner of Chesapeake Bay, at some distance south of Elkton, and runs about sixteen miles to the Delaware river, where it terminates some miles south of Newcastle. It is calculated for sloop navigation, and has been more expensive than other canals, in consequence of a deep cut of about seventy feet for a considerable distance. A railroad connecting Baltimore with York in Pennsylvania is in progress; when terminated it will be 76 miles long. A branch of the Chesapeake and Ohio railroad runs to Washington; it is 33 miles long.

Political Division and Towns.—Maryland is divided into nineteen counties, of which eight are situated on the peninsula between Chesapeake and Delaware bays. The capital and seat of government is Annapolis [ANNAPOLIS], but the most commercial town is Baltimore. [BALTIMORE.] Other places of some importance are, Fredericktown, near the foot of the Blue Ridge, with 5000 inhabitants and a considerable trade in the produce of the country, it being situated on the turnpike-road to Wheeling; Cumberland on the Potomac, in the centre of the mountain-region, has 3000 inhabitants, who carry on trade in iron, lead, and coal. In the eastern districts the largest town is Easton, with 1500 inhabitants and some commerce. Chester and Snowhill are still less important.

Education.—The institutions for the education of the higher classes are rather numerous. As to those in Baltimore, see BALTIMORE, vol. iii., p. 340. There are also St. John's College at Annapolis, and Mount St. Mary's College in Frederick county. The schools for the lower classes are also numerous, and the State has granted considerable sums for their support.

Manufactures are rather numerous, but chiefly concentrated in the neighbourhood of Baltimore. The principal articles made are iron utensils, woollen and cotton goods, hats, paper, ropes, leather, sugar, and tobacco. Vessels are built at Baltimore and Annapolis.

Commerce.—The maritime commerce is almost entirely in the hands of the inhabitants of Baltimore, Annapolis and Easton having only a small portion of it. The exports consist of flour, wheat, rye, and Indian corn, flax-seed and flax-seed oil, salt beef and pork, butter, hog's lard, whiskey, lumber, and a considerable quantity of tobacco, which is greatly esteemed in the European market. The imports are colonial merchandise from the West Indies, wines and spirituous liquors, tea and spices, hardware and some other manufactured goods. The value of the imports from 1st of October, 1832, to the 30th of September, 1833, amounted to 5,437,057 dollars, and the exports to 4,062,467. This commerce employed 156,323 tons of shipping, of which 83,643 entered the ports, and 72,680 cleared out. Two-thirds of this amount of shipping belonged to the United States, and the remainder were foreign vessels. The shipping of Maryland is more than 80,000 tons, of which nearly 50,000 belong to Baltimore.

History.—Maryland was first settled as a place of refuge for the persecuted Roman Catholics of England by Lord Baltimore [BALTIMORE, LORD] in 1634, when 200 Roman Catholics established themselves at St. Mary's, and the country received the name of Maryland from Henrietta Maria, the wife of Charles I. The numbers of settlers soon increased, not only by emigration from England, but also by the addition of non-conformists from New England and Virginia. During the commonwealth the oppression of the Catholics retarded the growth of Maryland, though it enjoyed a more liberal constitution than the other colonies. In 1699 the seat of government was fixed at Annapolis, where it has ever since remained. The constitution of the state was adopted in 1776, and has since been often amended. The legislative body consists of two assemblies, a senate and house of delegates. The members of the senate, fifteen in number, are chosen by forty electors. These electors, who are two for each county, and one for each of the cities of Annapolis and Baltimore, are chosen by the citizens, and elect the senators by ballot out of their own body, or from the mass of citizens. The senators serve for five years. The members of the house of delegates are annually chosen by all the citizens, four for each county, and two for each of the cities of Annapolis and Baltimore. The executive power is vested in a governor and council, consisting of five members, who are elected annually by the joint ballot of the two legislative bodies. Maryland sends two senators and eight representatives to congress.

(Darby's *View of the United States*; Warden's *Account of the United States of North America*; Keating's *Expedition to the Source of St. Peter's River*; Pitkin's *Statistical View of the Commerce of the United States of America*.)

MARYLEBONE. [LONDON.]

MARYPORT. [CUMBERLAND.]

MASA'CCIO, called **MASO DA SAN GIOVANNI**, one of the earliest painters of the Florentine school, was born at San Giovanni in Val d'Arno, in the year 1401, and died in 1443. He was a disciple of Masolino da Panicali, to whom he proved as much superior as his master was to all his contemporaries. He had great readiness of invention, with unusual truth and elegance of design. He made nature his constant study; and he gave in his works examples of that beauty which arises from a judicious and pleasing choice of attitudes, accompanied with spirit, boldness, and relief. He was the first who studied to give more dignity to his draperies, by designing them with greater breadth and fulness, and omitting the multitude of small folds. He was also the first who endeavoured to adapt the colour of his draperies to the tints of his carnations, so that they might harmonise with each other.

He was remarkably well skilled in perspective, which he was taught by P. Brunelleschi. His works procured him great reputation, but excited the envy of his competitors. He died, to the regret of all lovers of the art, not without strong suspicions of having been poisoned. Fuseli says of him—'Masaccio was a genius, and the head of an epoch in the art. He may be considered as the precursor of Raphael, who imitated his principles, and sometimes transcribed his figures. He had seen what could be seen of the antique in his time at Rome, but his most perfect works are the frescos of S. Pietro del Carmine at Florence, where vigour of conception, truth and vivacity of expression, correctness of design, and breadth of manner, are supported by truth and surprising harmony of colour.'

MASANIELLO. [ANIELLO.

MASCAGNI, PAUL, was born in 1752. He studied medicine in the university of Siena, and in 1774 succeeded his master, Tabarani, in the professorship of anatomy in that institution. He is chiefly celebrated for his admirable work on the absorbent system, and the beauty of his anatomical preparations, of which the greater part are preserved in the Anatomical Museum of Florence. An outline of his great work was published in 1784 in French, under the title, 'Prodrome d'un Ouvrage sur le Système des Vaisseaux Lymphatiques,' and was sent to the Académie des Sciences in competition for a prize offered for the best essay on the subject. In 1787 the more complete work, 'Vasorum Lymphaticorum Corporis Humani Historia et Ichnographia,' was published in folio at Siena. It contains twenty-seven large plates, finished and in outline, of the lymphatics in different parts of the body, engraved with extreme delicacy by Cyro Sancti. It was dedicated to the reigning duke of Tuscany, under whose patronage Mascagni afterwards rapidly advanced in reputation. In 1800 he left the university of Siena for that of Pisa, and the year after went to that of Florence. He died in 1815.

After his death two large works were published from his papers, 'Anatomia per uso degli Studiosi di Saultura e Pittura,' Florence, 1816, and 'Prodromo della Grande Anatomia,' Florence, 1819, by Antommarchi. Mascagni also published works of some celebrity on the lagunes and hot-springs of Tuscany, and on the cultivation of the potato and other branches of agriculture, to which he devoted all his leisure time.

MASCAGNIN, volcanic sulphate of ammonia, occurs stalactitic and pulverulent. Colour yellowish or greyish; taste acrid and bitter; translucent or opaque. Volatilized entirely at a high temperature. Occurs among the lavas of Etna and Vesuvius, &c.

By the analysis of Gmelin it contains—

Sulphuric acid . . .	53·29
Ammonia . . .	22·80
Water	23·91
	——— 100·

MASCLEF, FRANCIS, was born at Amiens, in the year 1662. He very early devoted himself to the study of Oriental languages, in which he attained an extraordinary degree of proficiency. Having been brought up to the church, he became first a curate in the diocese of Amiens, and afterwards obtained the confidence of De Brou, bishop of Amiens, who placed him at the head of the theological seminary of the district and made him a canon. De Brou died in 1706, and Masclef, whose opinions on the Jansenist controversy were not in accordance with those of the new prelate Sabbatier, was compelled to resign his place in the theological seminary and to retire from public life. From this time he devoted himself to study with such close application as to bring on a disease, of which he died, on the 24th of November, 1728, at the age of sixty-six. Though austere in his habits, he was amiable and pious.

Masclef's chief work is the 'Grammatica Hebraica, à punctis aliisque inventis Massorethicis libera,' in which he embodied an elaborate argument against the use of the vowel points. The first edition was published in 1716, and speedily called forth a defence of the points from the Abbé Guarin, a learned Benedictine monk. In the year 1731 a second edition of Masclef's work was published at Paris, containing an answer to Guarin's objections, with the addition of grammars of the Syriac, Chaldee, and Samaritan languages. This work still ranks as the best Hebrew grammar without points. The other works of Masclef were, 'Ecclesiastical Conferences of the Diocese of Amiens;' 'Catechism of Amiens;' and, in MS., 'Courses of Philosophy and Divinity.' The last-mentioned work was not printed, on account of its being thought to contain Jansenist opinions.

MASCULINE and NEUTER. [GENDER.]

MASERES, FRANCIS. The dates and facts in the following account are taken from 'The Gentleman's Magazine' for June, 1824.

He was born in London, December 15, 1731. His father was a physician, descended of a family which was driven out of France by the revocation of the Edict of Nantes. He was educated at Clare Hall, Cambridge, and took the degree of B.A. in 1752, obtaining the highest place, both in classics and mathematics. He then (having first obtained a fellowship in his college) removed to the Temple, was in due time called to the bar, and went the Western circuit for some years with little success. He was then appointed (the date is not mentioned) attorney-general for Canada, in which province he remained till 1773, distinguished 'by his loyalty during the American contest, and his zeal for the interests of the province.' On his return in 1773 he was appointed cursitor baron of the Exchequer, which office he held till his death. He was also at different times deputy recorder of London and senior judge of the sheriff's court. He died May 19, 1824, at Reigate, in the 93rd year of his age.

Baron Maseres (as he was commonly called) has left behind him a celebrity arising partly from his own writings and partly from the munificence with which he devoted a part of his income to reprinting such works as he thought useful, either in illustration of mathematical history or of that of his own country. These were the objects of his private studies, and a peculiarity of his mathematical views which tinctured the whole of his writings, as well as his selection of works to be reprinted, requires some explanation.

It is well known that the art of algebra grew faster than the science, and that, at the time when Maseres began his studies, a branch of knowledge which is essentially distinct from arithmetic, or rather of which arithmetic is one particular case, had been pushed beyond the simple science of numbers in its methods, reasonings, and results, while its fundamental definitions were allowed to be expressed in arithmetical language, and restricted by arithmetical conceptions. [NEGATIVE AND IMPOSSIBLE QUANTITIES.] The consequence was, that the algebraical books were anything but logical; and while those who could make for themselves the requisite generalization at the proper time were more likely to employ themselves in extending the boundary of the science than in writing elementary works, all other students had to take a large part of algebra on trust, their faith being built partly on authority, partly on continually seeing verifiable truths produced by its operations. Maseres, when a young man, rejected all of algebra which is not arithmetic, as being what he could not comprehend himself, though he admitted that others might do so. In his earliest publication but one ('Dissertation on the Use of the Negative Sign in Algebra,' London, 1758), which is in fact a treatise on the elements of algebra, after rejecting an equation in which negative quantities occur, he adds: 'I speak according to the foregoing definition, by which the affirmativeness or negativeness of any quantity implies a relation to another quantity of the same kind, to which it is added, or from which it is subtracted; for it may perhaps be very clear and intelligible to those who have formed to themselves some other idea of affirmative and negative quantities different from that above defined.'

The other works of Masères are, 'Elements of Plane Trigonometry,' London, 1750; 'Principles of the Doctrine of Life Annuities,' London, 1783; Appendix to Frend's 'Principles of Algebra,' 1799; tracts on the Resolution of Equations, 1800; various remarks on the tracts published in the 'Scriptores Logarithmici,' presently to be noticed; papers in the 'Philosophical Transactions;' and political writings, a list of which will be found in the 'Genleman's Magazine' above cited. The characteristic of all these writings is an extreme prolixity, occasioned by his rejection of algebra, and the consequent multiplication of particular cases. In his 'Dissertation,' &c. above noticed, the four rules, and the solution of equations of the second and third degree, occupy three hundred quarto pages.

Of the reprints which Baron Masères made at his own expense, the most important is the 'Scriptores Logarithmici,' a collection, in six volumes quarto, published in various years from 1791 to 1807, of writings on the subject of logarithms. Here we find the works of Kepler, Napier, Snell, &c., interspersed with original tracts on kindred subjects. The republication of these old writings has put them in the way of many students to whom they would otherwise have been inaccessible, and has thus tended to promote historical knowledge and to excite inquiry. The 'Scriptores Optici,' 1823, a reprint of the optical writings of James Gregory, Descartes, Schooten, Huyghens, Halley, and Barrow, has a merit of the same kind: it was begun at an earlier period, but having been delayed by circumstances, was completed under the superintendence of Mr. Babbage. Besides these, he also reprinted the tract of James Bernoulli on Permutations and Combinations, and discovered and printed Colson's translation of Agnesi's 'Analytical Institutions.' He also reprinted a large number of tracts on English history. The expense of Hales's Latin treatise on Fluxions, 1800, was defrayed by him, and we understand that more than one other author was indebted to him for assistance of the same kind.

MASHAM, ABIGAIL, the favourite of Queen Anne, noted in the history of the time for her political intrigues, was the daughter of Francis Hill, a Levant merchant of London, who married the sister of Mr. Jennings, the father of the Duchess of Marlborough. Upon the bankruptcy of her father she became the attendant of a baronet's lady, whence she removed into the service of her relative, then Lady Churchill, who procured her the place of waiting-maid to the Princess Anne. She retained her situation after the princess ascended the throne, and by her assiduity and complaisance acquired a great degree of influence over her. The high church principles in which she had been educated contributed to increase her credit with the queen, who was secretly attached to the tory party, though obliged, in the beginning of her reign, to favour the whigs. The marriage of Miss Hill with Mr. Masham (son of Sir Francis Masham, of Otes in Essex) in 1707, occasioned an open quarrel with the Duchess of Marlborough, who was, in consequence of it, deprived of her majesty's confidence. Harley, afterwards earl of Oxford, connected himself with the new favourite; a change of ministry took place, and in 1711 Mr. Masham was raised to the peerage. He and his wife appear to have been actively engaged in the intrigues of the tories in favour of the exiled House of Stuart. Lady Masham lived a long time in retirement after the death of the queen, and died herself at an advanced age, December 6, 1734.

(*Life of Sarah, Duchess of Marlborough*, 8vo., London, 1745, p. 48; *Polit. State of Brit.*, vol. xlviii., p. 656; see also a character of Mr. Masham in Manley's *Secret Memoirs from the New Atalantis*, 12mo., London, 1709, vol. ii., p. 147.)

MASKELYNE, NEVIL, was born in London, October 6, 1732, was educated at Westminster, and afterwards at Catherine Hall and Trinity College, Cambridge, in which university he took the degree of B.A., with distinction, in 1754. In 1755 he took orders, but he had previously been led to turn his attention to astronomy by the solar eclipse of 1748, and by becoming acquainted with Bradley, whom he assisted in the formation of his tables of refraction. In 1761 he went to St. Helena, to observe the transit of Venus, and to detect, if possible, the parallax of the fixed stars. In this voyage, and in one undertaken to Barbadoes in 1764, to try the merits of Harrison's new chronometers, he acquired that knowledge of the wants of nautical astronomy, which afterwards led to the formation of the Nautical Almanac. In 1765 he was appointed to succeed Mr. Bliss as astronomer royal, and from this time, with the exception of his voyage to Scotland in 1772, to determine the mean density of the earth by observing the effect of the mountain Schehallien upon the plumb-line, his life was one unvaried application to the practical improvement of astronomical observation. He died February 9, 1811.

Delambre dates the commencement of modern astronomical observation, in its most perfect form, from Maskelyne, who was the first who gave what is now called a standard catalogue (A.D. 1790) of stars; that is, a number of stars observed with such frequency and accuracy, that their places serve as standard points of the heavens. His suggestion of the Nautical Almanac, and his superintendence of it to the end of his life, from its first publication in 1767, are mentioned in ALMANAC (vol. i., p. 364); his Schehallien experiment, in ATTRACTION (vol. iii., p. 69); and the character of his Greenwich observations, in GREENWICH OBSERVATORY (vol. xi., p. 442).

Dr. Maskelyne, as arbitrator on the part of the government of the merits of the chronometers which were submitted by their makers as competitors for the prize, had more than one public accusation of partiality to bear. The now celebrated Harrison was one of his oppugners, and Mr. Mudge, junior, on the part of his father, another. The only publication (as far as we know) which he ever made out of his official capacity (with the exception of papers in the 'Philosophical Transactions'), was a reply to a pamphlet by the latter, London, 1792. He edited Mayer's lunar tables, and was the means of five thousand pounds being awarded to the widow of the author.

MASON, WILLIAM, born in 1725, was the son of a clergyman at Hull. He took his B.A. degree at Cambridge in 1745, after which he removed from St. John's College to Pembroke, of which college he was elected fellow in 1747. Having taken orders, he was presented to the rectory of Aston in Yorkshire, and became chaplain to the king. His political principles strongly opposed him to the American war, and he was a member of the Yorkshire association for obtaining reform of parliament. The horrors of the French Revolution however are said to have caused a change in his opinions, but as he was growing an old man when it broke out, the timidity of age probably worked as strongly as the reign of terror. He died in 1797, aged 72; having been for years precentor and canon-residentiary of York. There is a tablet to his memory in Poets' Corner, Westminster Abbey.

Mason's Poems are now almost forgotten. Two tragedies, 'Elfrida' and 'Caractacus,' a descriptive poem called 'The English Garden,' and some odes, are his principal productions, but he is now perhaps best remembered as Gray's biographer and friend. His style is that of an imitator of Gray, and not being so perfect an artist in language as his master, he has been proportionally less successful. In addition to his poetical reputation he possessed considerable skill in painting and music, and in the latter subject entertained opinions not at all consonant to those of musicians in general. He wished to reduce church music to the most dry and mechanical style possible, excluding all such expression as should depend on the powers and taste of the organist. (Mason's *Compendium of the History of Church Music.*)

MASONRY (from the French *maison* and *maçon*) signifies both the operation of constructing with stone and the parts of a building consisting of such material. It is a most important branch of architectural practice, because much, both of the durability and beauty of an edifice so constructed, depends upon the excellence of the workmanship and the quality and colour of the stone. Owing to its expense, masonry is comparatively rarely employed in this country, except for public buildings or others of the highest class, the mason's work being in other cases restricted to such parts as steps to doors, string-courses, facias, and plain cornices externally, and to pavements and stairs in the interior. Yet that degree of stone-work does not constitute what is termed a brick and stone building, because such term implies a considerable mixture of stone and brick, namely, that the doorways, window dressings, columns, parapets, angle-quoins, and all the ornamental parts are of stone, the *nude* or plain face of the wall only being of brick. But such mode is now fallen into disuse, except for buildings in some of the later Gothic styles, the brick-work being now covered with stucco, cement, or mortar, to resemble as far as possible the stone, when the latter is used for columns, pilasters, and ornamental parts; or, as is now more frequently the case, the whole, even the columns themselves are formed of brick, and afterwards stuccoed. In other instances, while the building itself is entirely faced with stone, all the richer and more elaborate decorations, such as capitals, carved mouldings, and other sculptured ornament, are composed of terra-cotta, or burnt artificial composition, which is said to be not only more economical, but far more durable than stone itself, owing to its being to a certain extent vitrified. This mode has been resorted to with great success for the Ionic capitals of St. Pancras Church, London.

Of all our freestones, Portland stone is perhaps the very best yet discovered, both for durability and colour; but its high price and the expense of working it prevent its being so often employed as could be wished. Of late years therefore Bath stone is the kind more generally made use of for building purposes, it being soft when first taken out of the quarry, and very easily worked. Neither its texture nor tint however is so good; and when discoloured by time, as is quickly the case, it has a certain shabbiness of appearance. In fact a living architect (Mr. A. Bartholomew) describes it, in his 'Hints on Fire-proof Buildings,' as 'the vilest of material, which, when new, is mean and swarthy, and which decays before I myself am old;' and he further mentions St. Bartholomew's Hospital as the earliest instance of the extensive use in London of Bath stone. Ketton stone, which has been used for the tower of St. Dunstan's in the West, Fleet Street, is, though not equal to Portland, greatly superior to Bath stone. Cornwall granites and Dundee stone are now in great requisition for constructions demanding strength and solidity, and have been used in several of the docks and new bridges.

Walls which are not of solid masonry throughout, but built either of brick or inferior stone and rubble, with only an external facing of squared stone laid in courses, are termed *ashler*, or *ashlering*. [ASHLER.]

Rusticated ashler or stone work is that where the separate stones are divided at their seams or joints, which is done either by bevelling off or chamfering their *arrises* or edges to a certain depth, or sinking them by cutting each stone so that it has a general projecting surface, by which means, when united together, those surfaces are flush with the plane of the wall, and the sunk margin round each forms rectangular grooves or channels between them. This latter mode is always adopted when horizontal rustics alone are used, as is now too frequently the practice, for it is not only poor and monotonous, in comparison with rusticating with both vertical and horizontal joints, but unmeaning in itself, and therefore justly condemned by Sir W. Chambers. Though generally made quite smooth, the faces of the rustics are sometimes tooled, or else, though very rarely, *hatched*, *vermiculated*, or *frosted;* all which varieties may likewise be combined, with exceedingly good effect and great diversity, with smooth-faced rustics. Such rough rustics are sometimes distinguished by the name of *bossages*.

Stones inserted quite through a wall, in order to bind it firmly together (in the absence of which the ashlering would be a mere external coating, adhering to the brick-work only by mortar), are called *bond stones;* and those at the base of the wall, projecting beyond its general plane, for the purpose of giving greater solidity just above the foundation, are termed *footings*.

Walls built with unhewn stones, either with or without mortar, are called *rubble walls*, and the stone itself rubble.

MASONS, FREE. According to the extravagant and whimsical hypotheses entertained by some of those who have written upon the subject of freemasonry, it is an institution of almost incredible antiquity. We are told by some that it originated with the builders of the tower of Babel, though others are content with tracing it no farther back than the temple of Solomon. If we are to believe them, the institution has been continued down in uninterrupted succession from that very remote time to the present day, through all the changes of governments, religion, civilization, and knowledge. Against this there exists one very simple, yet fatal, argument, namely, that were this really the case, such an uninterrupted series of tradition must have kept alive and handed down to us much information that has, on the contrary, been utterly lost. Instead of accumulated knowledge, we find that even a technical knowledge of architecture itself has not been so preserved; else how are we to account for the ignorance which everywhere prevailed with respect to Gothic architecture and its principles almost as soon as the style itself fell into disuse? That there may have been many points of resemblance between the fraternities of masons in the middle ages, and such institutions as those of the Eleusinian mysteries, and the corporation of Ionian architects, is not only possible, but highly probable, because similarity of circumstances would almost necessarily lead to it. Before the invention of printing, when the means of communicating knowledge were few and imperfect, no readier mode presented itself of extending and keeping up the speculative and practical information spread among any profession, than by establishing the profession itself into a community or order, all the members of which would have one object and one interest in common. This would be more particularly the case with regard to architecture, which calls for the co-operation of various branches of science and the mechanical arts, and was moreover for several ages the paramount art, all the other arts of decoration being, as far as they then existed, subservient to it.

The importance of architecture to the church, on account of the impressive dignity it conferred upon religious rites and the ministers of religion, naturally induced the clergy to take it under their especial protection. For a long time not only were ecclesiastics the chief patrons but almost the chief professors of the art; yet as they had occasion for the assistance of practical artificers in various branches, they admitted them into fellowship with themselves, establishing a kind of order of a mixed character, just as the orders of chivalry combined at their origin the principles of military and religious discipline. Hence some have supposed freemasonry to have been a branch of chivalry, and to have been established at the time of the Crusades. The more probable hypothesis perhaps is that they were related to each other only in emanating from the same source—from the influence of ecclesiastical power; and their being so derived would alone account for the mystery and secrecy which the guilds of masons affected; and, together with their zeal in accumulating knowledge for themselves, their desire to confine it to their own body.

By means of these associations the inventions and improvements made in architecture were communicated from one country to another, a circumstance which at once accounts for the sudden spread of pointed or Gothic architecture throughout the whole of the west of Europe; and at the same time renders it so exceedingly difficult to determine at all satisfactorily where that style actually originated, or what nation contributed most towards its advancement. Owing also to the jealousy with which the masons kept their knowledge to themselves, it is not at all surprising that the history of the art during the middle ages should be involved in so much obscurity that it can now be traced only by its monuments, all documents relative to the study of it having been concealed as much as possible, even when something of the kind must have been in existence. Among the causes which led afterwards to the decline of these institutions was, on the one hand, the suspicion with which the church itself began to regard them as societies that might in time acquire an influence not easily watched, and which might be turned against itself; and on the other, the spread of information, together with the revival of the arts, which deprived such bodies of their utility and importance, and rendered it impossible for them to confine their knowledge exclusively within their own pale.

In this country an act was passed against Masonry in the third year of Henry VI., at the instigation of the bishop of Winchester. It was however never enforced, and Henry himself afterwards countenanced the brethren by his presence at lodges of masons. It was also patronised by James I. of Scotland: but it was no longer indispensable to the church, which accordingly withdrew its protection—an event that would otherwise have been occasioned by the Reformation.

Freemasonry revived again in this country about the time of the civil war, yet merely in semblance, being altogether different in object and character from what it had been, and becoming merely 'speculative' or modern Masonry, an institution in nowise connected with architectural practice. From this country it was first introduced into France about the year 1725; into Spain in 1728, and into Italy in 1733, when the first masonic lodge was established at Florence. It was afterwards however the object of persecution not only in France and Italy, but also in Holland and Germany. Some writers, more especially Abbé Baruel and Professor Robison, have made it a charge against freemasonry that it has been converted into an organised secret conspiracy against religion and existing governments. If the charge has been unjustly made, it must be owned that the profound mystery in which it has cloaked itself gave some colouring to such charges, it being but natural to infer that if there was anything to call for such extraordinary degree of secrecy, it could hardly be aught for good, or in accordance with the interests of society at large. The greater probability is that there is nothing either good or bad to conceal; that the mystery of freemasonry is nothing more than an innocent mystification; and that its symbols and instructions, whatever meaning or purpose they may originally have had, are now become mere forms and signs retained by the brethren or 'free and accepted masons,' as they style themselves, for the purpose of conferring peculiar importance on their harmless social meetings.

MASORITES. [Hebrew Language.]

MASOVIA. [Poland.]

MASQUE. [English Drama.]

MASQUERADE (from the Italian *mascherata* and French *mascarade*), an amusement introduced into England in the sixteenth century from Italy. Hall, in his 'Chronicle,' says, 'On the daie of the epiphaine, at night (A.D. 1512-13), the king (Henry VIII.) with eleven others were disguised after the manner of Italie, called a maske, a thing *not seen afore in England:* thei were appareled in garmentes long and brode, wrought all with golde, with visers and cappes of golde; and after the banket doen, these maskers came in with the six gentlemen disguised in silke, beryng staffe torches, and desired the ladies to daunce: some were content; and some that knew the fashion of it refused, because it was not a thing commonly seen: and after thei daunced and commoned together, as the fashion of the maskes is, thei toke their leave and departed, and so did the quene and all the ladies.'

The distinction between this species of amusement and the disguisings and mummings of the middle ages appears to have been the general mingling of the company in dance and conversation, in lieu of the execution of a particular dance or preconcerted action by certain individuals for the entertainment of the guests, the latter being as old at least as the time of Edward III. in England, and the precursors of the dramatic masque of the sixteenth century. In 'the garmentes long and brode,' and 'disguisings of silke,' we may perceive the present *domino*, so called, according to some authorities, from an ecclesiastical vestment (a black hood worn by canons of cathedrals), *dominus* being a title applied to dignified clergymen in the middle ages. Others derive it from the ordinary robe or gown worn by Venetian noblemen at that period. Granacci, who died in 1543, is said to have been the inventor of masquerades: at what particular date does not appear; but from the above evidence of Hall, they had become fashionable in Italy as early as 1512.

MASS. By the mass of a body is meant the quantity of matter which it contains, upon the supposition that differences of weight are always the consequence of different quantities of matter. This involves an hypothesis; for instance, if gold be, bulk for bulk, nineteen times as heavy as water, it is presumed that a given bulk of gold contains nineteen times as much matter as the same bulk of water. But it is possible that if we were better acquainted with the constitution of these bodies, it might appear that we are wrong in supposing difference of quantity to be the cause of difference of density.

The fact is, that mass means weight, so that of two bodies, the heavier is that which has the more mass; why then is this word introduced at all? If we had only to consider bodies at the surface of the earth, we might in all cases substitute weights for masses, but when we have occasion to speak of bodies at very different distances from the centre of the earth, their weight towards the earth, which is then called the attraction of the earth, depends upon their distance from the earth, as well as their absolute constitution. If we imagine two planets at the same distance from the earth, the attractions of the earth upon the two will then be in a proportion which depends, not on that distance, but on the amount of matter in the two planets.

When we say that Jupiter has only the 1047th part of the mass of the sun, we express—1, a fact of which observation and deduction make us certain, namely, that at the same distances the attraction of the sun upon the earth is 1047 times as great as that of Jupiter upon the earth; 2, an hypothesis of the following kind, that the sun contains 1047 times as much matter as Jupiter. The hypothesis is a convenience, not affecting the truth or falsehood of results; the fact represented remains, that at the same distances the sun does 1047 times as much towards deflecting the earth as is done by Jupiter.

In the application of mechanics, the following equations frequently occur:—

Weight = mass × force of gravity.
Mass = volume × density.

These equations, like others of the same kind, are to be understood with tacit reference to the units employed; they spring from the following proportions. Any two masses are to one another in the ratio compounded of that of the volumes and that of the densities; thus the two bodies being eight cubic feet three times as dense as water, and seven cubic feet four times as dense, the masses are in the proportion of 8 × 3 to 7 × 4, or of 24 to 28. Again, if two different masses be acted upon by pressures which would, in a unit of time, create different amounts of velocity, the pressures are to one another in the ratio compounded of that of the masses and that of the velocities which would be generated in the unit of time. Thus if the preceding masses, which are as 24 to 28, were subjected to attractions which would produce in single particles velocities of 10 and 11 feet, if allowed to act uniformly for one second, the pressures requisite to prevent motion at the outset would be as 24 × 10 to 28 × 11, or as 240 to 308.

To convert these proportions into equations, let the unit of time be one second, that of volume one cubic foot, and let water be the substance which has the unit of density; also let the unit of length be one foot. Then if the unit of mass be one cubic foot of water, and the unit of weight the pressure necessary to restrain a unit of mass acted on by an attraction which would, in one second, give a velocity of one foot per second—the preceding equations are true. [Weight; Specific Gravity; Acceleration.]

MASS (*Missa*, in Latin). The derivation of the word 'missa' has been variously accounted for; some derive it from missio or dimissio, 'dismissal,' because in the early ages of the church the catechumeni, or new converts who were not yet admitted to partake of the sacrament, were sent out of the church after the liturgy was read, and before the consecration of the Host. Others derive it from the Hebrew word 'Missah,' *i. e.* oblation or sacrifice in commemoration of the sacrifice of our Redeemer for the sins of man kind. Ducange, in his 'Glossarium,' art. 'Missa,' gives the various opinions on the etymology of the word. The word missa, signifying the ceremony or rite of consecrating the Host, is found in the epistles of St. Ambrose, St. Augustine, and Cesarius, bishop of Arles. See also Baronius, in his 'Annals.'

The mass is a church service which forms an essential part of the ritual of both the Roman Catholic and Greek or Eastern churches, and in which the consecration of the sacramental bread and wine takes place. It is performed entirely by the officiating priest standing before the altar, and attended by a clerk who says the responses. The prayers of the mass are all in Latin in the Roman Catholic church, in antient Greek in the Eastern church, and in Syriac among the Maronites and Jacobites, but never in the vulgar or vernacular tongue of the country. The congregation take no ostensible part in the service, but they follow it mentally or in their prayer-books, in which the text of the prayers is occasionally accompanied by a translation in the vulgar tongue. The priest does not address the congregation, but has his back turned to them, except at the end of certain prayers, when he turns round, and says, 'Dominus vobiscum' ('The Lord be with you'), and at the 'Orate Fratres,' &c. ('Brethren, pray,' &c.), which are responded to, on the part of the congregation, by the clerk.

The mass consists of various parts—1, the Introitus, or preparation, consisting of several prayers, psalms, the 'Gloria in excelsis,' the epistle and gospel for the day, the Creed, &c., which the priest recites with a loud voice. 2, The consecration, in which the priest consecrates the bread and wine, repeating the words, 'Hoc est corpus meum, et hic est calix sanguinis mei,' and then shows to the people both the bread and the chalice containing the wine, upon which all the congregation kneel down. 3, The Communion. The priest, after reciting more prayers, accompanied by an invocation of the apostles and other saints, the Lord's Prayer, &c., takes the sacrament under both forms; if any of the congregation are disposed to take the sacrament, the priest then descends from the altar and administers it to them in the shape of the consecrated wafers or bread only. 4, The post communio, which consists of a few more prayers, and of the blessing which the priest gives turning towards the congregation, after which he reads the first chapter of the gospel of St. John down to the fourteenth verse, and the mass is over.

The low or ordinary mass, *Missa brevis*, lasts in general about half an hour, and every Roman Catholic is bound, by what are styled the 'Commandments of the Church,' to attend it once at least on Sundays and other holidays, unless prevented by illness. The transgression of this precept is reckoned a sin. Pious persons hear several masses in succession, and many attend mass every day in the week, for it is celebrated every day in each parish church. A priest must not break his fast either by food or drink from the previous midnight until he has said mass, out of respect for the real presence of Jesus Christ in the sacrament. The service of the mass is indeed essentially connected with and depends on the doctrine of transubstantiation. [TRANSUBSTANTIATION.]

On great festivals and other solemn occasions the mass is performed by a priest or prelate, attended by a deacon and subdeacon, who says the responses and chants the epistle and gospel of the day. On those occasions the mass, or at least parts of it are sung by a choir, accompanied by the organ and other musical instruments. This is called 'high mass,' and is a long and pompous service. Both for the low and the high masses the officiating priest is dressed in peculiar various-coloured garments appropriated to the occasion, which he afterwards takes off in the vestry-room.

The 'Missale' is the name of the book which contains the ritual of the mass, and which the priest holds open before him on the altar. Some of the old Missals, whether MSS. or printed, are beautifully ornamented with paintings, and are valued as bibliographic curiosities.

The Protestant and reformed churches have no mass, as they do not believe in the doctrine of transubstantiation; but several of the detached 'Oremus,' or prayers of that service, which are very fine, have been retained in the Liturgy of the Church of England translated in the vulgar tongue.

MASSA, DUCHY OF, a small territory on the west coast of Italy, which, with the annexed territory of Carrara, constituted for a long time a sovereign principality under the family of Cibo. It now belongs to the duke of Modena. [CARRARA.] The territory of Massa extends about eight miles from the sea-coast to the Alpe Apuana or mountain-group which divides it from the province of Garfagnana, part of which also belongs to Modena. [GARFAGNANA.] To the south-east Massa borders upon the territory of Pietrasanta, belonging to Tuscany; and on the north-west it adjoins Carrara: its breadth between these two limits hardly exceeds six miles. The small river Frigido flows through the territory of Massa from the mountains of Carrara to the sea. The town of Massa is in the lower part of the country, not far from the sea, on the high road from Genoa to Lucca and Pisa. It is surrounded by fine gardens and plantations of fruit-trees. Massa is a neat town: it is also a bishop's see, has a cathedral with some good paintings, a town-house, a fine public garden with orange-trees, and a handsome marble bridge over the Frigido. It is the residence of the governor sent from Modena, and has a court of appeal for the duchy of Massa and Carrara. Massa and its territory contain from 9000 to 10,000 inhabitants.

MASSACHUSETTS, one of the United States of North America, lies between 41° 31′ and 42° 52′ N. lat. and 69° 50′ and 73° 50′ W. long.; but the two islands of Martha's Vineyard and Nantucket, which belong to it, extend as far south as 41° 12′. The Atlantic Ocean washes its eastern and southern shores to the extent of 270 miles, if the numerous inflexions and inlets are taken into account. On the south, Massachusetts is bounded by Rhode Island, with which it has a common boundary-line of 69 miles, and by Connecticut, which forms its boundary for 85 miles. On the west the boundary-line formed by New York rather exceeds 50 miles. North of Massachusetts are Vermont and New Hampshire, which respectively form its boundary for 38 and 85 miles. Its length from Plymouth harbour on Cape Cod Bay, along the southern border to New York, is about 145 miles, and its mean width about 50 miles. Its surface is 7335 miles, or nearly the area of Wales.

Shores and Islands.—Narraganset Bay, which lies chiefly within the state of Rhode Island [RHODE ISLAND], enters by its most north-eastern inlet into Massachusetts, where it receives the Taunton river, the most considerable of all the streams which fall into that bay; the tide ascends this river to Dighton, eight miles above its mouth. Farther east is Buzzards Bay, a deep indentation stretching in a north-eastern direction into the mainland. From its entrance between Seaconet Point and the south-western of the Elizabeth Islands, to its innermost corner, it is 35 miles long, but it lessens in width from ten miles to one mile. The innermost corner is divided from Cape Cod Bay by an isthmus five miles in width. This bay is very much indented by small bays on both shores, but it is shallow, especially towards its inner part; yet vessels of considerable draught may ascend to New Bedford, 16 or 17 miles from its entrance. The shores are low and sandy. On the east of Buzzards Bay begins Barnstable Peninsula, which first stretches from the mainland, a little north of east, 35 miles, varying in width from 3 to 20 miles: it then changes its direction to north and north-west, for about 30 miles, with a mean width of 2½ miles, and terminates in Cape Cod. The difference in the rise of the tide, south and north of the peninsula, is remarkable. In Buzzards *Bay and in* Nantucket Bay it rises from 3½ to 4 feet, and in Cape Cod Bay to 16 feet. Barnstable Peninsula encloses the southern portion of a large bay, which is generally called Massachusetts Bay, though at present that name is limited to the northern portion of it, and the southern, which is enclosed by the peninsula, is called Barnstable Bay or Cape Cod Bay. This large bay extends northwards to Cape Anne in the form of a parallelogram, 55 miles long from south-south-east to north-north-west, and 25 miles in width. From Cape Cod to Cape Anne it is open 44 miles to the Atlantic. It contains the important harbours of Plymouth, Boston, and Salem. North of Cape Anne the shores are somewhat high and rocky.

South of Barnstable Peninsula are the islands of Nantucket and Martha's Vineyard. Nantucket is about 15 miles in length and 4 in breadth, rises to a very moderate height, and is level. Its sandy soil is almost entirely sterile, and the inhabitants live by fishing. It constitutes a separate county, inhabited by 7286 souls in 1820. Martha's Vineyard is about 16 miles in length and 8 in its greatest breadth; the surface is level and the soil sandy, but productive in some places. Together with some smaller islands lying near it, Martha's Vineyard constitutes Dukes County, which in 1820 contained 3295 inhabitants. The wide bay which is enclosed by these islands on the south, and by Barnstable Peninsula on the north, is called Nantucket Bay.

Surface and Soil.—The surface of the Barnstable Peninsula is level, or rather consists of two inclined plains, which attain some elevation where they meet. Between Hyannas harbour and Barnstable, the highest level is about 80 feet above low-water in Nantucket Bay; but on the isthmus which unites the peninsula to the continent, it is only 40 feet. The soil of this tract is sandy and light, and of an inferior quality, but cultivated with great industry. The country along the western side of Buzzards Bay and the shores of Massachusetts Bay is similar in soil. But this flat country rises rapidly inland, so that the tide, though it amounts to 16 or 18 feet, is only perceptible from 5 to 10 miles from the sea in the rivers. At the back of this level tract is a hilly region, which in the north-eastern districts extends nearly to the shores of the sea, and westward to the valley of the Connecticut river. Its surface is agreeably diversified by hills and depressions; the soil of the latter is deep and strong, and cultivated with considerable care. In this part some hills rise to a considerable elevation, the highest, Mount Wachuset, attaining nearly 4000 feet. Hills of smaller elevation extend towards the Connecticut river, but they approach the banks of the river only near Northampton and Hadley. North and south of these places the Connecticut runs through a valley, from two to three miles wide, which is covered by an alluvium of great fertility. West of it the country immediately rises into high hills, which gradually attain the elevation of mountains; Berkshire, the most western district of the state, being traversed from north to south by two continuous ridges, whose more elevated parts are from 3000 to 4000 feet high. The valleys of this district have a very fertile soil.

Rivers.—The western and mountainous region is traversed by the Houssatonick, which rises near the north-western corner of the state, and traverses it by a southern course of nearly 50 miles, when it enters Connecticut; it is a very rapid river and not navigable in Massachusetts. The Connecticut enters Massachusetts from New Hampshire, and traverses it by a course of about 70 miles, including its numerous bends. It is navigable for boats in the whole of its course in Massachusetts. [CONNECTICUT.] No considerable river falls into Massachusetts Bay. Charles river, which falls into Boston harbour, though its whole course does not exceed 30 miles, is navigable for about eight miles for large boats, the tide flowing up to Dedham. The Merrimac rises in New Hampshire on the western declivities of the White Mountains, north of 44° N. lat., and runs nearly due south, 50 miles, when it receives a branch from Winnepisseogee lake, and then runs for 52 miles south-south-east, till it is met by the Nashua river from the south-south-west. Below the junction with the Nashua, the Merrimac curves gradually to the east for 12 miles, and afterwards runs to the north-east about 30 miles, when it falls into the Atlantic after a course of more than 150 miles. In its natural state the Merrimac opposed great impediments to navigation. The tide ascends to Haverhill, 18 miles from its mouth, but above it the course of the river is obstructed by several falls and rapids. The lowest is below Chelmsford, where the river falls over a ledge of rock, to avoid which a canal with three locks has been made. Between this ledge of rock and Haverhill the stream, though still rapid, is navigable. Numerous falls and rapids occur within New Hampshire, all which are now avoided by canals. The number of these canals is eleven, and an uninterrupted navigation has thus been effected as far up the river as Concord in New Hampshire. The importance of this river for internal navigation has been much increased by the Middlesex Canal.

Climate.—The climate of Massachusetts is much colder in winter, and warmer in summer, than the southern districts of Great Britain, though the difference of latitude amounts to about nine degrees. The mean temperature seems to be 48°, or about two degrees less than that of London. The winter commences about the middle of December and terminates about the middle of March. In this season the thermometer commonly ranges between 43° and 10°, and sometimes descends below zero of Fahr.; snow covers the ground and the rivers are frozen hard enough to bear loaded waggons. The spring terminates in the middle of May. The summer is hot, and at the solstice the thermometer frequently rises to 77° every day for a month and more; sometimes it attains 90° and even 100°. In the same season it sometimes descends in the night to 60°, whilst at noon it is 90°. The summer lasts to the beginning of October, when the weather grows rapidly colder. The prevalent winds are from the north-west and north. The north-west wind prevails during the whole year, except the summer, when the wind blows mostly from the south or south-west. In winter the coldest wind is from the north-west. Rains are more abundant in winter than in summer. The annual quantity amounts to more than 40 inches, which is nearly double the quantity that falls in many places on the continent of Europe. Yet it is stated that the number of rainy days is fewer in Massachusetts than in most countries of Europe. Slight shocks of earthquakes are not uncommon.

Productions.—As Massachusetts was early settled, a greater portion of its surface is cultivated than in most of the other states, and agriculture has been more improved. The farms generally average from 100 to 200 acres. The principal agricultural productions are, Indian corn, rye, oats, potatoes, hemp, flax, peas, hops, beans, and pumpkins, which last are used as food for swine and cattle. Wheat, buckwheat, and barley are raised only in small quantities. Forests still cover a considerable portion of the surface. In the plains there are only pines, the white pine on a soil consisting of light loam, and the yellow pine on sand and gravel. The hilly and mountainous country produces oak, walnut, birch, maple, ash, cedar, cherry, and chesnut. In the valleys and on the banks of the rivers there are elm, cherry, maple, and aspen. Some marshy places are covered mostly with white cedar. All the fruit-trees of England are cultivated.

The cattle and the hog are of a good size, especially the former, in the mountainous and hilly country west of Connecticut river. Wolves are still found in the hilly region. Fish abound in the rivers and in the sea. The whale fishery in the sea between Massachusetts and the Great Bank of Newfoundland is still important, though the larger kinds of whales have disappeared, and only the black fish (Delphinus globiceps, Cuv.) comes there in shoals, and is taken in considerable numbers by the inhabitants of Nantucket, and the vessels sent from New Bedford in Buzzards Bay. The fishery of cod in Massachusetts Bay and on the banks near Nantucket is still more important, and also that of mackerel. The other fish abounding in the same tract of sea are haddock, herring, halibut, and sturgeon. Lobsters, crabs, and some other shell-fish abound in Massachusetts Bay.

Iron occurs in several places, but is not much worked. There are some traces of copper and lead. Limestone abounds in Berkshire, where some good marble also occurs. Slate is found in one or two places.

Inhabitants.—The population, which during the last century increased very rapidly, at present increases more slowly. The emigration towards the west is considerable. In 1820 the population amounted to 521,725, and in 1830 to 610,408 individuals. According to the last census there were 81 individuals to each square mile. In 1837 it had increased to 691,222 individuals, or more than 94 to each square mile. Massachusetts has no slaves.

Canals and Railroads.—The Middlesex canal begins at Charlestown opposite Boston, and terminates at Chelmsford on the Merrimac; the length is 27 miles; the width at the surface thirty, and at the bottom twenty feet; the depth is three feet. The highest level is 104 feet above Boston harbour. By this canal the countries on both sides of the Merrimac are united with the town of Boston. The Blackstone canal extends from Worcester (which is about half way between Boston and the Connecticut river) to Providence in Rhode Island; the length is 44 miles, of which sixteen are in Rhode Island. The Hampshire and Hampden canal branches off from the Connecticut river at Northampton, and unites with the Farmington canal at the southern boundary-line of Massachusetts; the Farmington canal, which may be considered as its continuation, traverses the state of Connecticut in its whole breadth, terminating at New Haven. The whole line is about 80 miles long, of which about thirty are in Massachusetts.

The Quincy railroad, the first road of this description made in the United States, was constructed for the purpose of transporting the granite of that town to the tide-water; it is 3 miles long. A railroad intended to unite the town of Boston with Albany on the Hudson river in New York, has been completed to Worcester, about 40 miles Another railroad is constructing from Boston to Lowel, 30 miles; and another from Boston to Providence in Rhode Island, about 40 miles; probably both are completed.

Manufactures.—The manufactures of this state are more considerable than those of any other state of the Union, if its extent and population are considered. The most important branch is the construction of vessels; but the manufactures of cotton and woollen goods, of paper, leather, iron, and glass are also very extensive. Boston has some rope manufactures, sugar-houses, and train-oil distilleries, of which last there are also some in New Bedford and on the island of Nantucket. Straw bonnets are made by the country people in some districts. There are 250 incorporated manufacturing companies in the state.

Commerce; Navigation; Fishery.—The commercial relations of this state, both with foreign countries and the other states of the Union, are extensive and important. The most important articles of export are dried and salt fish, train and spermaceti oil, salted beef, flour, soap, candles, leather, and cotton goods. The imports consist mostly of colonial goods, brought from the West Indies, as coffee, sugar, molasses, indigo, iron, and hemp, together with the manufactured goods of England, especially silk, linen, and woollen. The countries of Europe which the vessels of this state principally visit are England, Russia, and Sweden; from the two latter countries they import great quantities of iron; they also visit China, Brasil, and the English, Spanish, and Danish islands in the West Indies. Massachusetts has more foreign trade than any state of the Union, except New York, and the tonnage of its shipping exceeds even that of New York. By an agreement entered into with England in 1818, the inhabitants of the United States are permitted to fish cod on the western coasts of Newfoundland, the Straits of Belleisle, and the coasts of Labrador; and in this branch of fishery, together with that of the mackerel, more than 1000 vessels and boats belonging to Massachusetts are engaged. New Bedford and the island of Nantucket also send about 250 vessels to the whale and sperm fishery, the tonnage of which amounts to more than 80,000 tons; and when the several vessels are added, which are supplied by Boston, Salem, and Plymouth, the shipping employed by this state, in this branch of industry, probably exceeds 100,000 tons.

The total of the imports from 1st of October, 1832, to 30th of September, 1833, amounted to 19,940,911 dollars, and that of the exports to 9,683,122 dollars, of which latter 5,150,584 dollars were of domestic produce, and 4,532,538 dollars of foreign produce, which clearly shows that many of the states lying farther west receive their imports by way of Massachusetts, but export their produce by another road. In carrying on this trade, more than 225,000 tons of American and somewhat more than 30,000 tons of foreign shipping were employed.

Political Division and Towns.—The state is divided into 28 counties; the capital is Boston. [Boston.] Round the Bay of Boston, whose entrance is formed by Point Alderton on the south, and Point Shirley on the North, are some important places, as Quincy, which has quarries of granite, and 4000 inhabitants; Cambridge, the seat of Harvard College, with 6071 inhabitants; and Charlestown, with 8783 inhabitants, and a dockyard belonging to the general government. Cambridge and Charlestown are united to Boston by bridges, and may almost be considered as suburbs. Farther north along the shore is Lynn, with 7000 inhabitants, and extensive manufactures of shoes; Salem, built on a peninsula in Marblehead Harbour, has an extensive commerce, especially with the East Indies, and 13,836 inhabitants; Gloucester, on the south-side of Cape Anne, has a spacious harbour, with 7518 inhabitants, and is engaged in the fisheries; and Newbury Port, a well-built place at the mouth of the Merrimac, with 6388 inhabitants, who are engaged in fishing and commerce. On the shores of Barnstable Bay is Plymouth, with a good harbour; it was the first settlement in the colony, and contains 4751 inhabitants. Barnstable has 4000 inhabitants, and is engaged in the fisheries. On Buzzards Bay is New Bedford, with 7592 inhabitants, who are extensively engaged in the whale fishery and in the manufacture of spermaceti candles and salt. In the interior is Lowell on the Merrimac, with extensive manufactures of cotton and wool; in 1833 more than 36,000,000 yards of cotton goods were made here. Worcester, near the centre of the state, where the railroad and the Blackstone canal meet, has 4172 inhabitants, and some internal commerce. Northampton, on the Connecticut river, has 3613 inhabitants and large tan-yards. Pittsfield, on the banks of the Houssatonic, near the boundary of New York, has 3570 inhabitants, with manufactures of iron and considerable trade.

History.—This part of the American continent was probably discovered by John Cabot at the end of the fifteenth century, but though visited several times during the following century, no settlement was made. A company was chartered by James I. in 1606, to which this country was granted under the name of North Virginia. The first settlement however was only formed in 1620 at Plymouth, by about 120 families of non-conformists, who had fled to Holland, and thence proceeded to Cape Cod. They framed a constitution, and took an oath to keep it. It afterwards became the groundwork of the constitution of the state. The first regular house of representatives was organised in 1639. The progress of the colony was very slow in the beginning, especially on account of the oppression to which the inhabitants were subjected during the reign of the Stuarts, before the time of the Commonwealth and after the Restoration. Though they were relieved by the Revolution of 1688, as the increase of the colony was thus promoted, its population in 1730 did not exceed 120,000 individuals. Since that time however it has improved rapidly. In the Revolutionary war Massachusetts took a leading part, by resisting the demands of the English government, and creating a military force. Hostilities were commenced by the battle of Lexington. It adopted a new constitution in 1780, and after Maine, which up to 1819 formed a part of the state, had been separated from it, the constitution was amended for the last time in 1820. According to this constitution the legislature consists of a senate and a house of representatives. The senate is chosen by the counties, each citizen possessed of landed property to the amount of 60 dollars having a vote; but the number of the senators to be chosen by each county depends on its quota of taxes. The other house is chosen by the towns, according to their population, each citizen possessed of 60 dollars having a vote. In 1830 there were 40 senators and 501 representatives. The executive power is vested in a governor, lieutenant-governor, and nine counsellors. The first two officers are chosen annually by the citizens, and the counsellors by the joint ballot of the two houses from among the persons returned as senators. Massachusetts sends two members to the senate and thirteen to the house of representatives at Washington.

Education.—As generally in the United States, the education of the lower classes is an object attended to by the state. For that purpose the State is divided into small townships, or separate corporations, of from five to seven miles square, and the number of these townships amounts to 305. But that the distance which children have to go to attend school may not be too great, each township is divided into smaller districts. In each a school is established, which in summer is attended by the younger children, and conducted by a woman; but in winter it is visited by children from ten to fifteen years old. The children are instructed in orthography, reading, writing, English grammar, geography, and arithmetic. The number of these schools amounts to about 3000; and in winter they are attended by more than 140,000, and in summer by upwards of 120,000 children. These common schools, as they are called, are wholly supported by a tax upon the people. The number of academies or private schools amounts to 854, but a great proportion of them are small establishments, kept in the interval between the winter and summer terms of the district schools. Some larger institutions of this description are attended by the children of wealthier parents, who wish to give them a greater amount of useful knowledge. Their number amounts to more than 60. Among the learned institutions is Harvard College at Cambridge, three miles from Boston, the best endowed institution in the United States; it has an anatomical museum, a botanical garden, a collection of minerals, and a library of 35,000 volumes. There are at present thirty instructors and about two hundred and thirty students. Other collegiate institutions are Williams' College at Williamstown, with seven instructors and about one hundred and twenty students; Amherst College, with twelve instructors and two hundred and sixty students; the Theological Seminary at Andover, which has a deservedly high reputation, and the Newton Theological Seminary.

(Darby's *View of the United States*; Warden's *Account of the United States of America*; Pitkin's *Statistical View of the Commerce of the United States of America*; *Journal of Education*, 'On the New England Free Schools,' vol. ii.; *American Almanac*; 'An account of the Common Schools in the States of Massachusetts,' &c., in the 3rd publication of the Central Society of Education.)

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